



ethertronics[®]

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**Control Tool Quick
Start Guide**

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OVERVIEW

The purpose of this document is to explain the quick steps communicate with module EtherLoRa ETH-LORA-M-AX-01 (V1.2) via UART interface. In order to that, Ethertronics has developed evaluation boards for this module.

Two types of evaluation boards have been designed to test the features of the ETH-LORA-M-AX-01 (V1.2), Evaluation Board Active and Passive.

This document is divided in four main parts:

- Hardware information
- Software information
- Installation
- Quick Start Guide

REQUIREMENT

To follow the procedures in this document the items below are needed.

Hardware Tools:

1. EtherLoRa module ETH-LORA-M-AX-01 (V1.2) Evaluation board (Passive and/or Active)
2. USB-UART Cable (FTDI USB-UART TTL Cable)
3. Computer with windows OS

Software Tools:

1. Driver for USB-UART cable
2. Ethertronics Control Tool
3. Tera Term (optional)

SCOPE

This document focuses on quick start guide on how to communicate with the module ETH-LORA-M-AX independently of the functionality of the module.

HARDWARE INFORMATION

EVALUATION BOARD

To facilitate the final product's developers, Ethertronics has built completed passive and active evaluation boards (EVBs) for ETH-LORA-M-AX-01 (V1.2). In order to test the functionalities of the IM algorithm, a passive evaluation board is used and to test the functionalities of the MCD algorithm, an active evaluation board is used. This evaluation boards come with test connectors to communicate with ETH-LORA-M-AX-01 using AT commands via UART interface.

PASSIVE EVALUATION BOARD

This passive evaluation is also provided with Ethertronics' Prestta™ 1002232 Multi-Band ISM antenna which covers all the ISM frequencies (868/915/2400 MHz).

PASSIVE EVB (TOP VIEW)

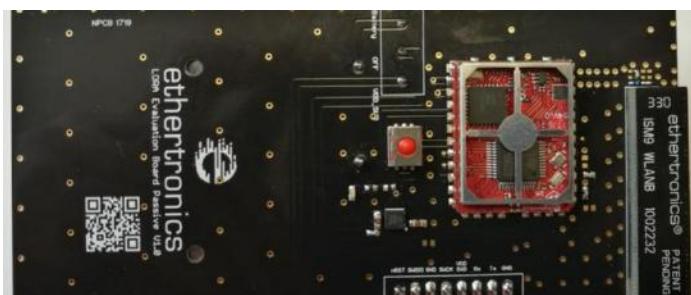


Figure 1

PASSIVE EVB (BOTTOM VIEW)

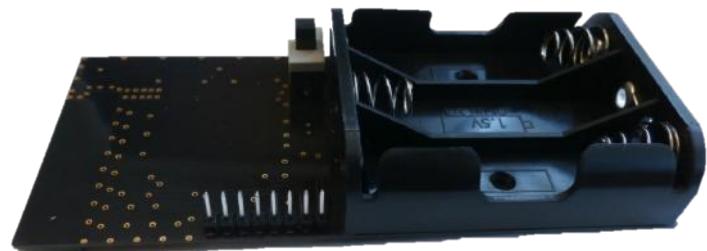


Figure 2



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EVB PASSIVE COMPONENTS

Component	Position	Function	Description
ETH-LORA-M-AX-01	Top	LoRa Module	Module to communicate LoRa communication
PresttaTM 1002232	Top	Passive Antenna	Emit/receive the signal
Push Button	Top	Reset button	Reset the ETH-LORA-M-AX-01
Test connectors	Bottom	UART/Power Supply	To communicate using AT Commands and to supply the voltage to the module
Toggle switch	Bottom	Power Supply selection	To select the power supply whether from Battery or Test connector
Battery holder	Bottom	Place for 3 AA batteries	To supply the voltage to the module

Table 1

For more information about the passive evaluation board, please refer to LoRa_Module_Application_Note_1-Passive Evaluation Board document from www.avx.com/products/modules/lora-module.

ACTIVE EVALUATION BOARD

This board is also provided with Ethertronics' Active Steering antenna for ISM Band which covers the LoRa frequencies (868/915 MHz).

ACTIVE EVB (TOP VIEW)

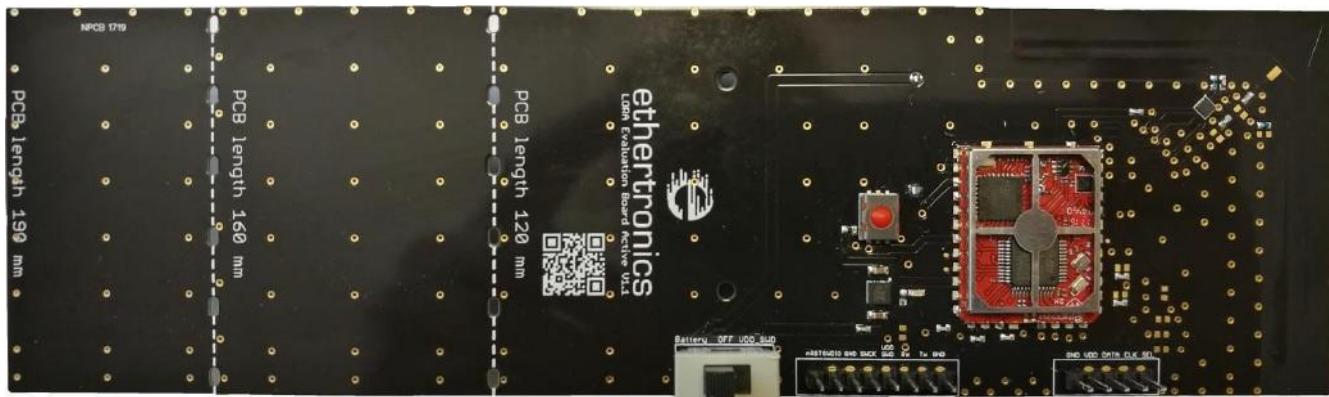


Figure 3

ACTIVE EVB (TOP VIEW)



Figure 4

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ACTIVE EVB COMPONENTS

Component	Position	Function	Description
ETH-LORA-M-AX-01	Top	LoRa Module	Module to communicate LoRa communication
Active Steering PCB Antenna	Top	Active Antenna with EC686	Emit/receive the signal
Push Button	Top	Reset button	Reset the ETH-LORA-M-AX-01
Test connectors 1	Top	UART/Power Supply	To communicate using AT Commands and to supply the voltage to the module
Test connectors 2	Top	EC686 MIPI interface	To communicate directly with the external EC686 via MIPI interface
Toggle switch	Top	Power Supply selection	To select the power supply whether from Battery or Test connector
Battery holder	Bottom	Place for 3 AA batteries	To supply the voltage to the module

Table 2

For more information about the active evaluation board, please refer to LoRa_Module_Application_Note_4-Active Steering Evaluation Board document from www.avx.com/products/modules/lora-module.

USB UART CABLE

The communication between the host and the module is done using UART interface and AT Commands. To send the data to ETH-LORA-M-AX-01 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



Figure 5

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

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 3



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COMPUTER WITH WINDOWS OS

The software tool is developed to be used on the computer that runs on windows operating system. To communicate with module using other operating system, user can use serial port terminal.

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

FTDI Cable Color	FTDI Description	Pin name on the evaluation board connector	Description
Red	Voltage Supply Output (VDD)	VDD SWD	Voltage Supply Input (VDD) If batteries are used, the pin is not needed.
Orange	Transmit UART Data output	Rx	USART1 RX Input
Yellow	Receive UART Data input	Tx	USART1 TX Output
Black	Device ground supply (GND)	GND	Ground Connection (GND)

Table 4

There are two options to supply the voltage to the module on the EVBs. If the user wishes to use the battery to power the device, the voltage supply wire on the FTDI UART cable does not have to be cabled. However user must set the toggle switch on the EVBs correctly.

TOGGLE SWITCH POSITION

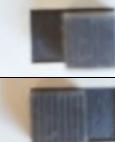
Voltage Supply option	Toggle Switch Position	
FTDI UART Voltage supply wire		On VDD_SWD position
Using 3 AA batteries		On Battery position

Table 5

PASSIVE EVALUATION BOARD CONNECTION

CONNECTION BETWEEN THE FTDI UART CABLE AND THE PASSIVE EVB (SIDE VIEW)

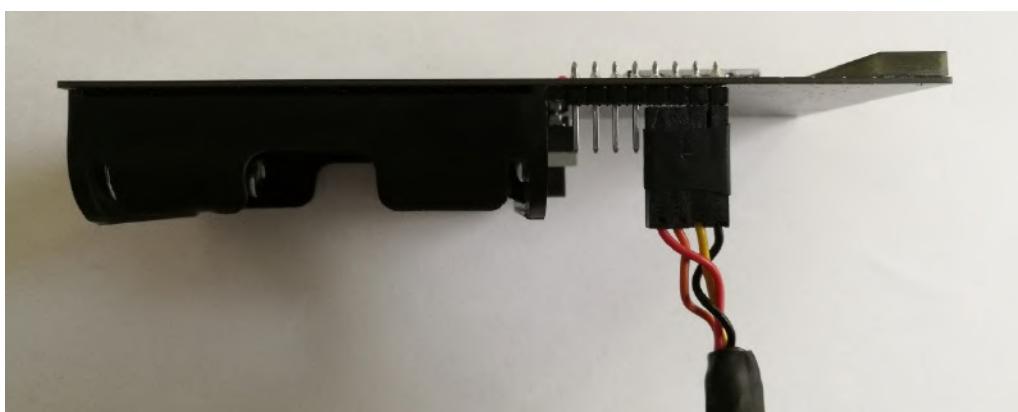


Figure 6



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ACTIVE EVALUATION BOARD CONNECTION

CONNECTION BETWEEN THE FTDI UART CABLE AND THE ACTIVE EVB (SIDE VIEW)

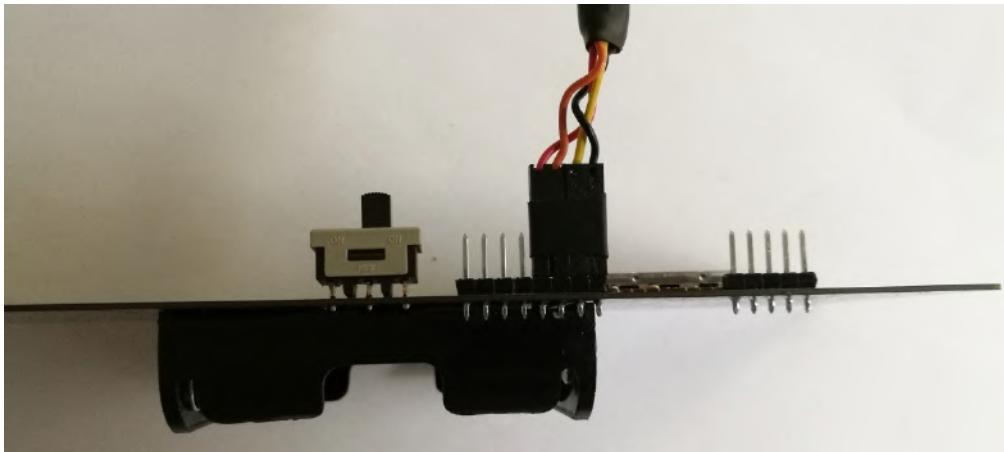


Figure 7

SOFTWARE INFORMATION

Two software products are needed for to communicate with module on the evaluation board. The first one is the VCP driver for USB-UART Cable. 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

The second software is the ETH-LORA-M-AX-01 control tool. User can download EtherLoRa Control Tool installer from Ethertronics website or contact the developers from Ethertronics.

Link: www.avx.com/products/modules/lora-module, ETH-LORA-M-AX-01 Control Tool's Installer download

Other software that can be used to communicate with the module on the evaluation board is a terminal that can support serial port communication. For example the open source terminal likes Tera Term. However the installation of the Tera Term won't be covered in this document.

INSTALLATION

INSTALLING THE DRIVER

Before cabling the FTDI UART cable with the evaluation board, user must install the driver first.

- Download the VCP Driver of the FTDI USB-UART cable from the FTDI website or contact Ethertronics personal.
- Install the driver.
- 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 (on the Left Panel)

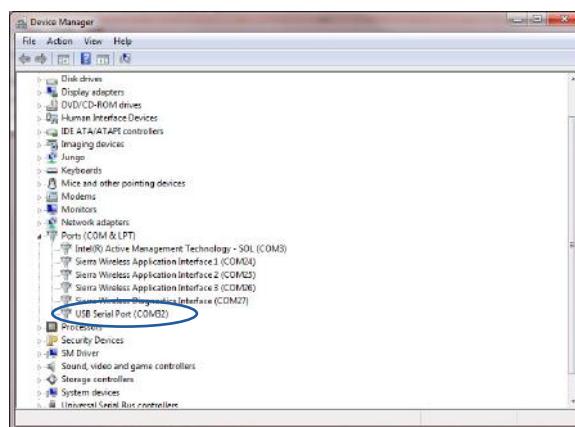


Figure 8

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INSTALLING THE ETHERTRONICS CONTROL TOOL

Upon demand, Ethertronics can provide an installer type ".msi" of the control tool to communicate with the module.

- Download the installer of the EtherLoRa Control Tool from the Ethertronics' website or contact the developers from Ethertronics
- Run the installer
- The setup wizard will be displayed, click Next
- Select the installation folder, click Next
- After couple of seconds, User Account Control is displayed, please click OK
- A shortcut with Ethertronics logo is created on the desktop automatically after the installation, user can run the tool using this shortcut

INSTALLATION WINDOWS

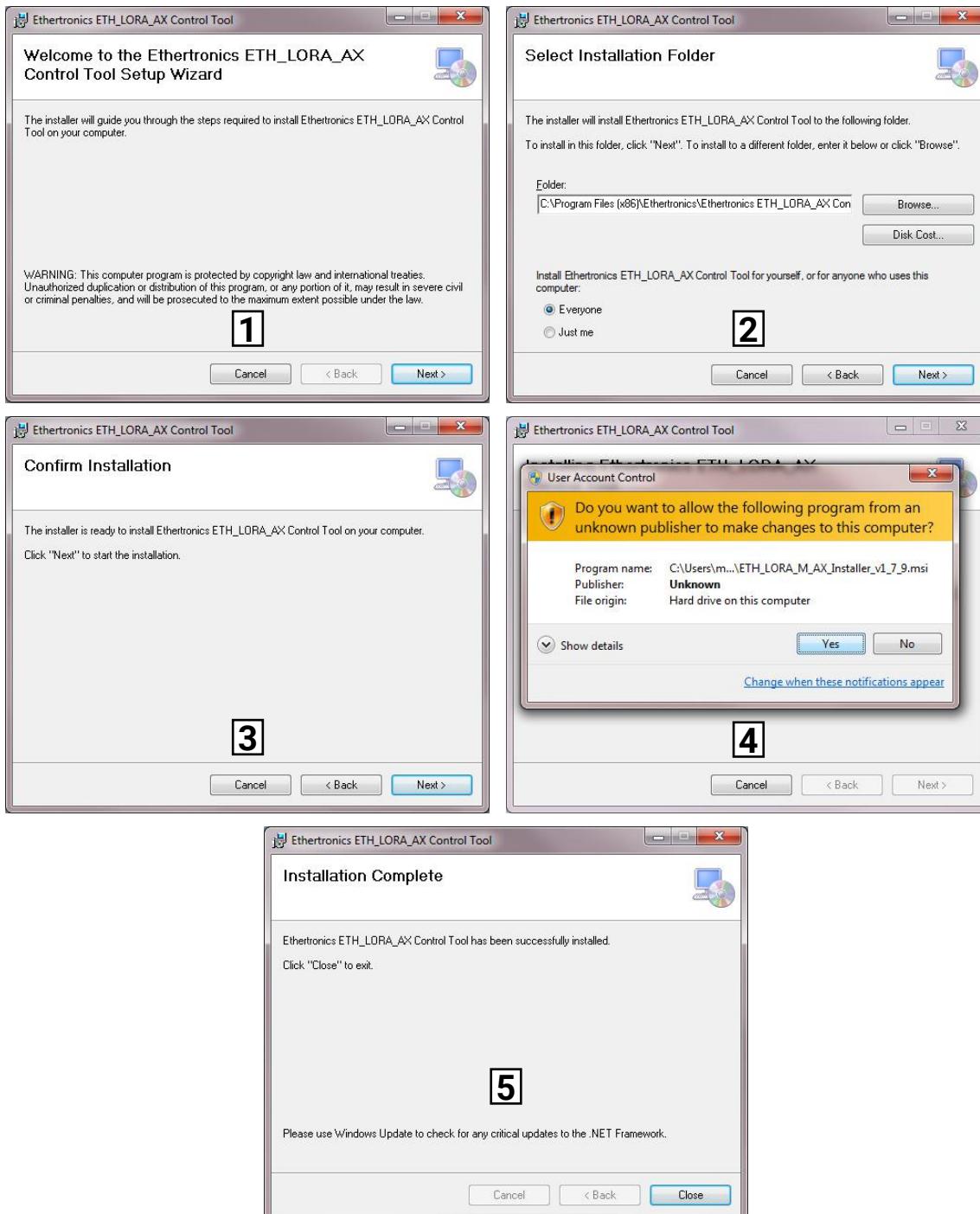


Figure 9



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QUICK START GUIDE

ETHERTRONICS CONTROL TOOL

After launch the tool, the COM Port selection window is displayed. The default parameters on this window are correct, user does not need to change the serial port parameters. User only needs to select the correct COM port from the combo box.

COM PORT SELECTION WINDOW

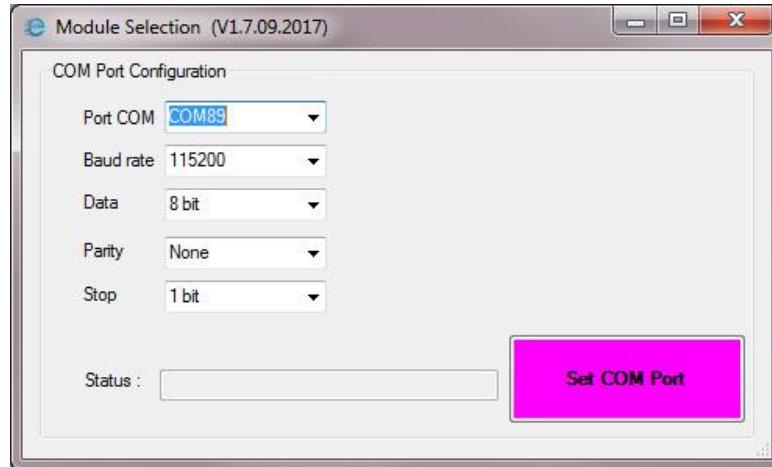


Figure 10

Once the button Set COM Port is clicked, the control tool will communicate with the ETH-LORA-M-AX-01 module to get the information about the module. This will take up couples of seconds and the status will be displayed. If everything is OK, the main application form will be displayed. Otherwise the error will be displayed.

WELCOME TAB

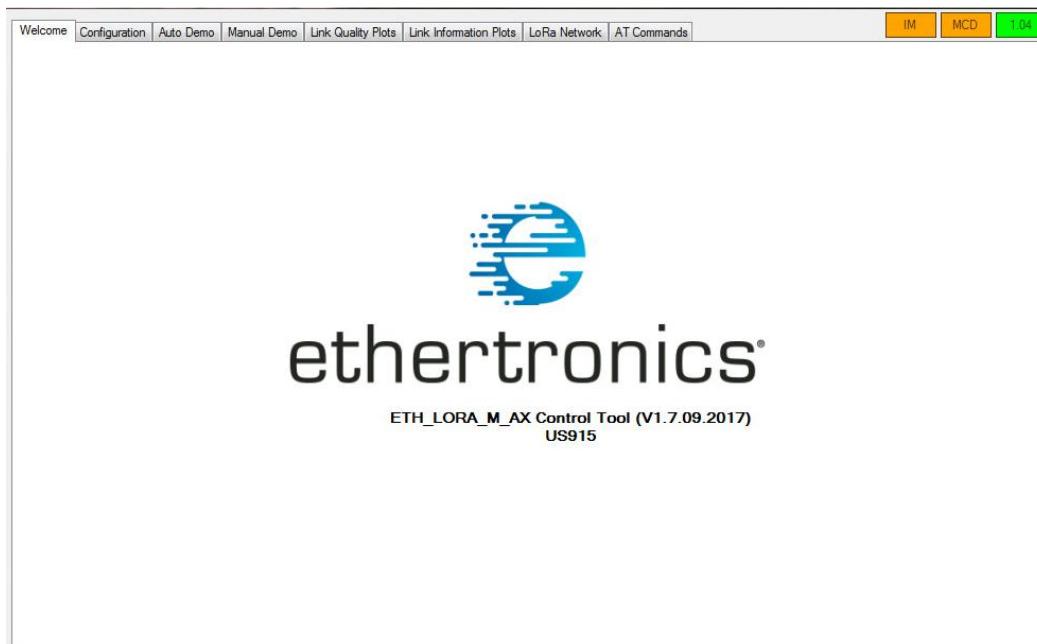


Figure 11

This welcome tab shows the name of the tool and as well as the version of the tool.



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CONFIGURATION TAB

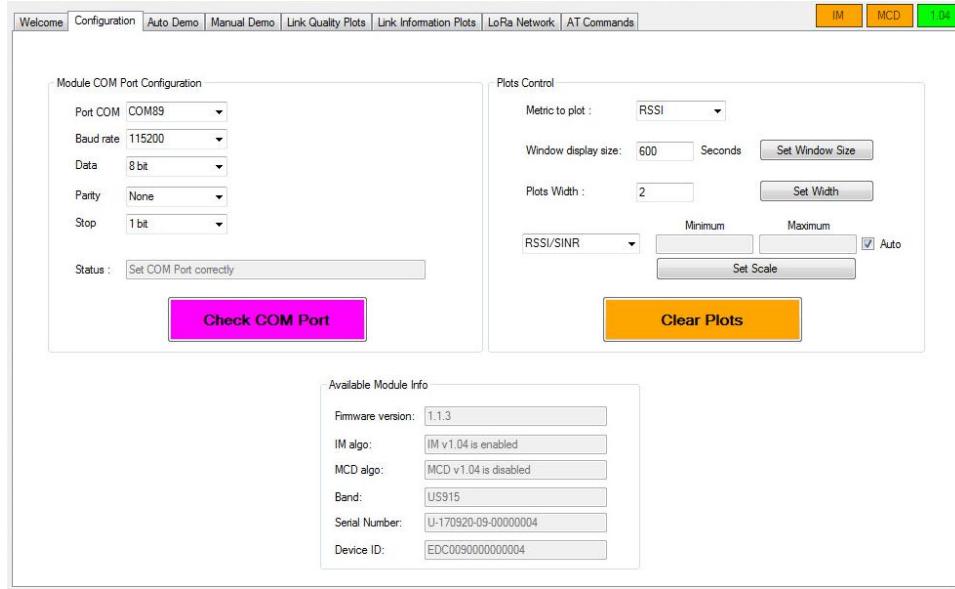


Figure 12

In this tab, user can verify the information about the detected module. Make sure that the Serial number is corresponding to the one written on the label on top of the module. If there is any problem about the information of the module, user is advised to reset the module using the reset button (red push button on the evaluation board) and click the check com port button to update the information or relaunch the tool. The plots control panel is used when the demo is launched.

AUTO DEMO TAB

This tab is used to launch the demo of the algorithms in order to evaluate their performance. To use this tab user must have a LoRa gateway at disposition. Otherwise the demo cannot be launch.

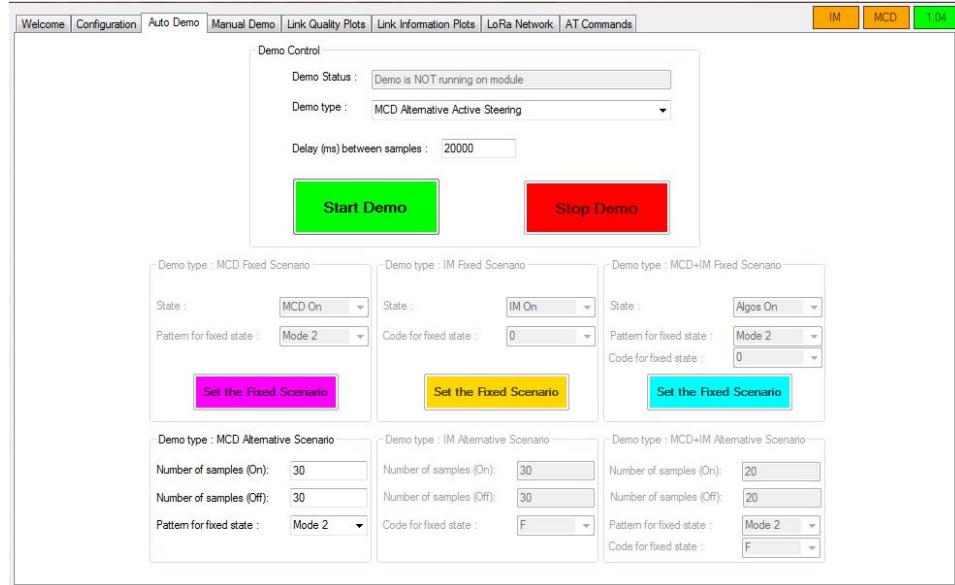


Figure 13

When the button Start Demo is clicked, if the module is not yet joined the network, the join procedure will be initiated. The join procedures will take up to ~45s. The status of the current process will be displayed inside the status text box. If the selected demo type is not supported by the module, a message box will be displayed. The MCD algorithm can only be evaluated on the active EVB. Once demo is correctly started, user can change to plots tab to see the plot of link quality and information.

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MANUAL DEMO TAB

Like the previous tab, this tab is used to launch the demo of the algorithms in order to evaluate their performance. In this tab, user must set all the parameters of the algorithms, and launch them manually before starting to join the LoRa Network. After sending the message, user can start the data flow to evaluate the algorithms. To use this tab user must have a LoRa gateway at disposition. Otherwise the demo cannot be launched.

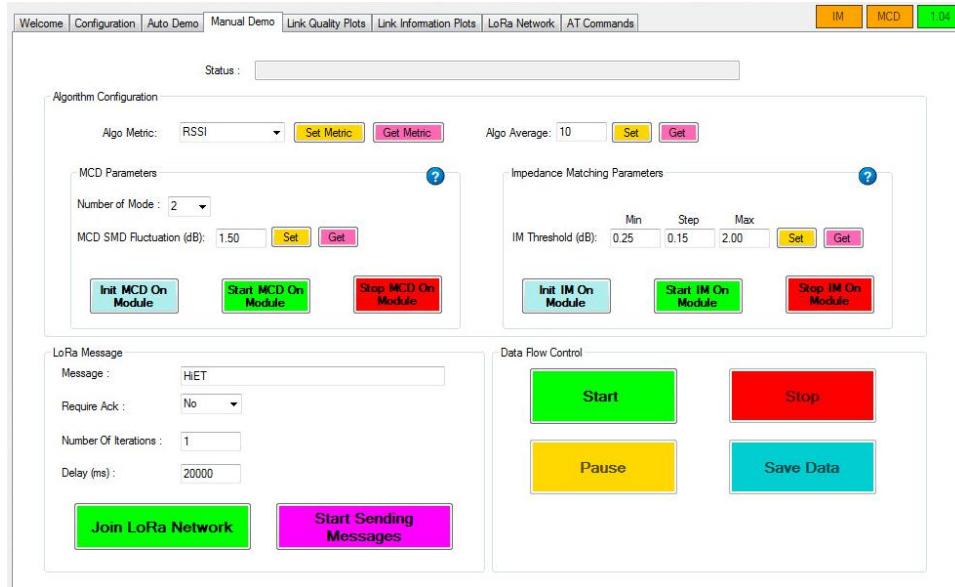


Figure 14

In this tab, user has the liberty to change the default parameters of the algorithms before start the data flow. Once the parameters are set, user need to perform the join procedure. If the join is successful, user can start the loop of sending message. In order to start the data flow, the number of iterations of the sending message loop must be at least 15. If user wishes to send the message continuously, please set the number of iteration to "-1". Then, user can start the data flow. Once demo is correctly started, user can change to plots tab to see the plot of link quality and information.

LINK QUALITY TAB

This tab is only for display purpose. When the demo is correctly launched, user can see the display of the RSSI/SNR, radiation patterns and the algorithms' result. To modify the axes of the plot, please go to Configuration Tab and adjust the values inside the Plots Control panel.

If the demo is not launched, these plots will not be displayed.

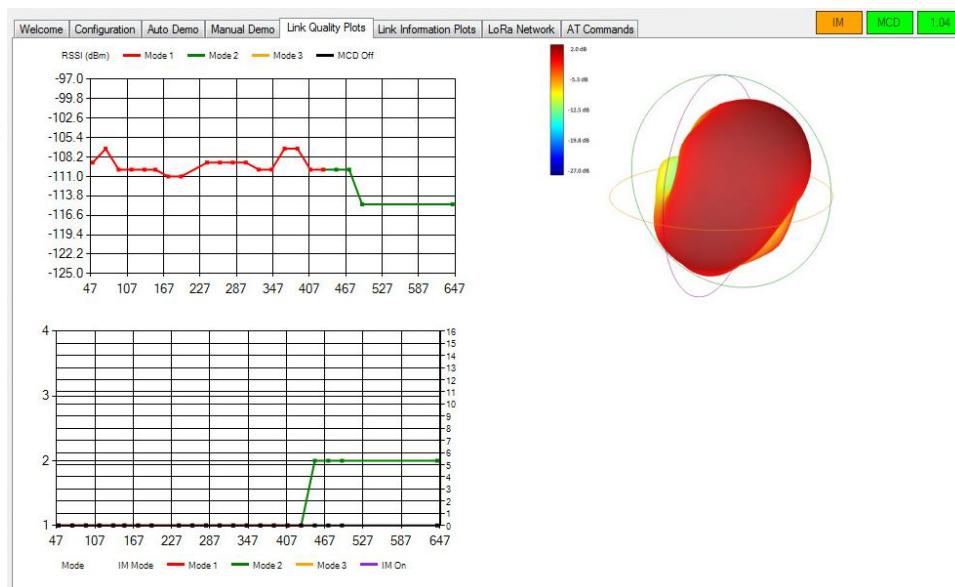


Figure 15



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LINK INFORMATION TAB

This tab is only for display purpose. When the demo is correctly launched, user can see the display of the RSSI/SNR, spreading factor and the frequency. To modify the axes of the plot, please go to Configuration Tab and adjust the values inside the Plots Control panel.

If the demo is not launched, these plots will not be displayed.

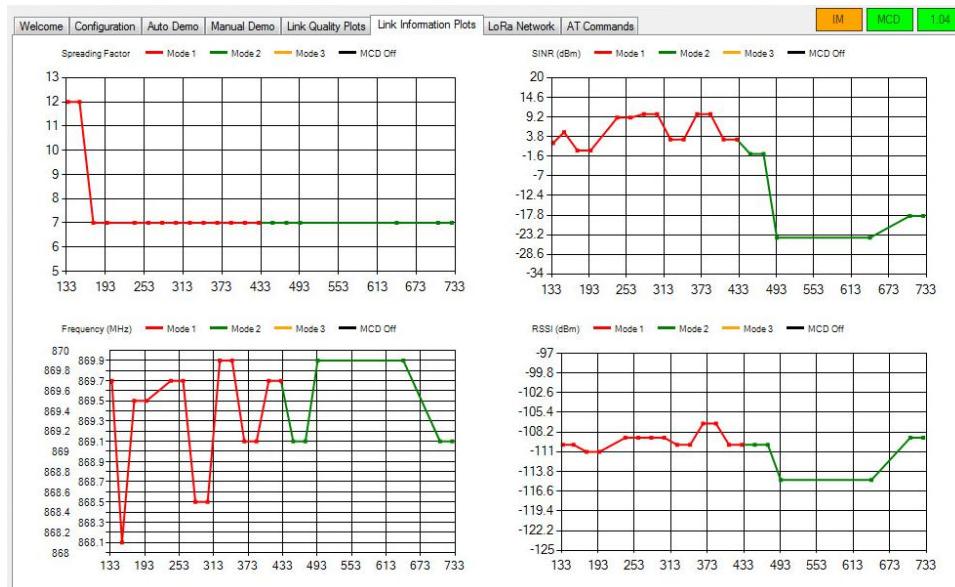


Figure 16

LORA NETWORK TAB

This tab is used to modify the LoRa parameter of the modules. Once the button Set or Get is click, user need to wait until the status of the current operation is displayed inside status text box.

If user modifies these parameters and wishes to save them even after the module reboots, user can store the new values inside the EEPROM of the module using the button Save.

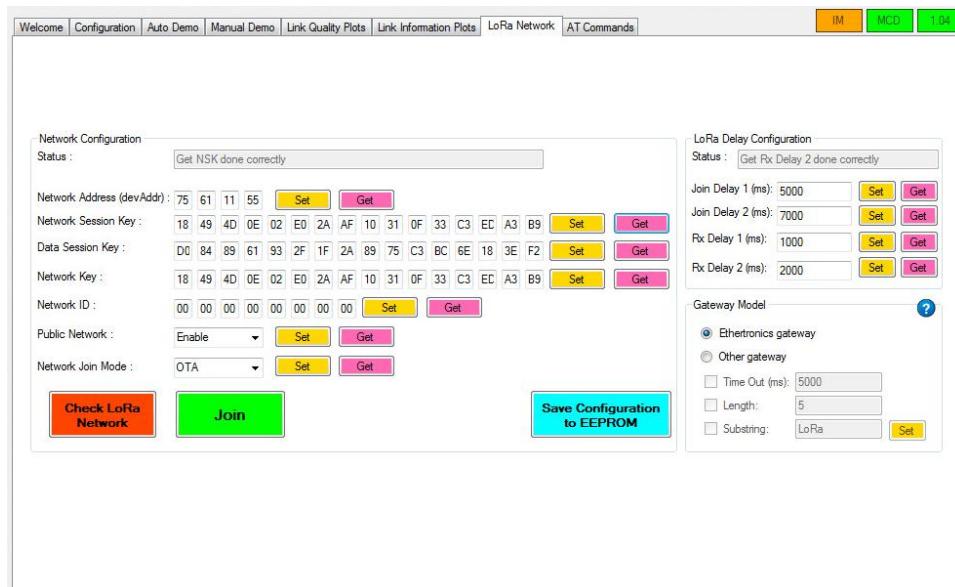


Figure 17

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AT COMMANDS TAB

This tab is used to send AT command directly to the module. User can type the AT command inside the text box and use the Key Enter to send the command to the module. The answer will be displayed.

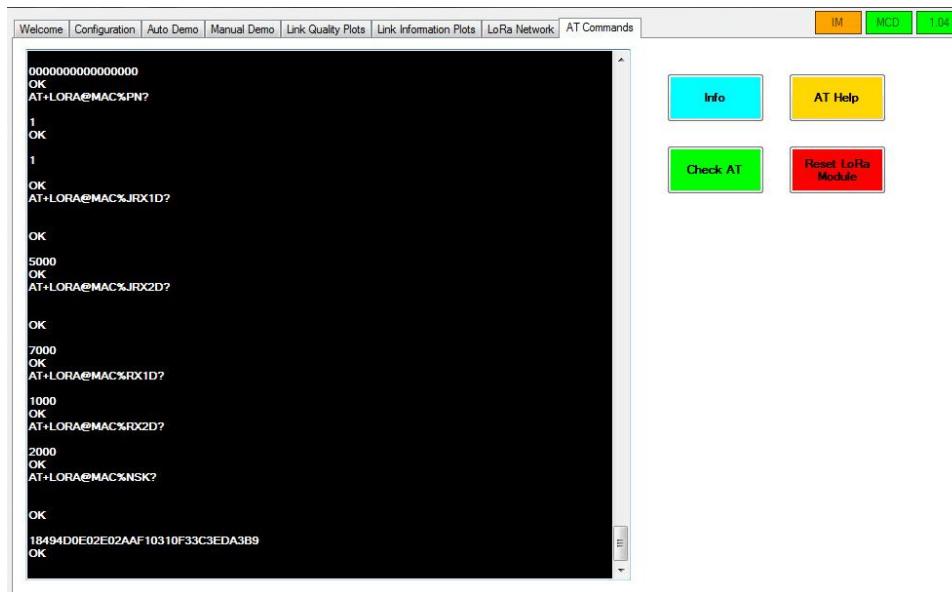


Figure 18

For more information about the AT commands, please refer to LoRa_Module_AT Command Reference Guide document from www.avx.com/products/modules/lora-module.

TERA TERM

An alternative tool to communicate with ETH-LORA-M-AX-01 is a serial port terminal. A free terminal like Tera Term can be used. 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

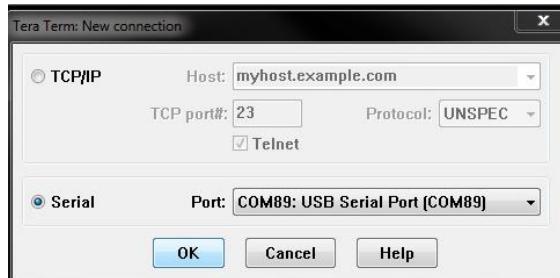


Figure 19

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

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

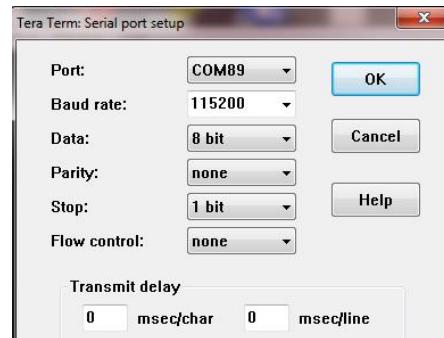


Figure 20



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User can also adjust the setup of the terminal in order to have the answer correctly displayed

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

TERA TERM TERMINAL SETUP WINDOW

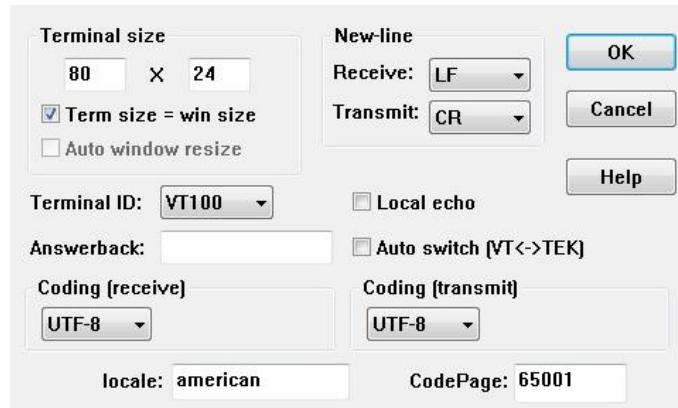


Figure 21

When everything is set up, user can start sending AT command.

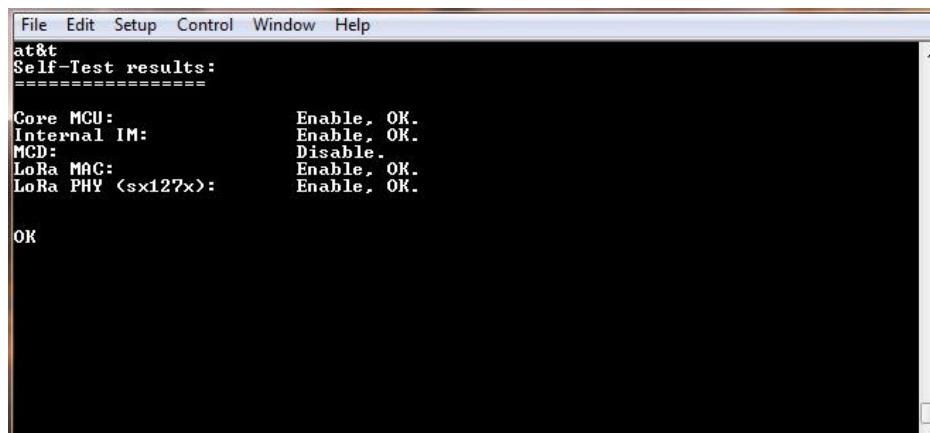


Figure 22

For more information about the AT commands, please refer to LoRa_Module_AT Command Reference Guide document from www.avx.com/products/modules/lora-module.



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Control Tool Quick Start Guide

LIST OF ABBREVIATIONS

UART: Universal Asynchronous Receiver/Transmitter
USART: Universal Synchronous/Asynchronous Receiver/Transmitter
USB: Universal Serial Bus
TTL: Transistor-transistor logic level
EVB: Evaluation Boards
LoRa: Long range
OS: Operating System
VCP: Virtual COM Port
COM: Communication port
IM: Impedance Matching
MCD: Modal Cognitive Diversity
ISM: Industrial, Scientific and Medical

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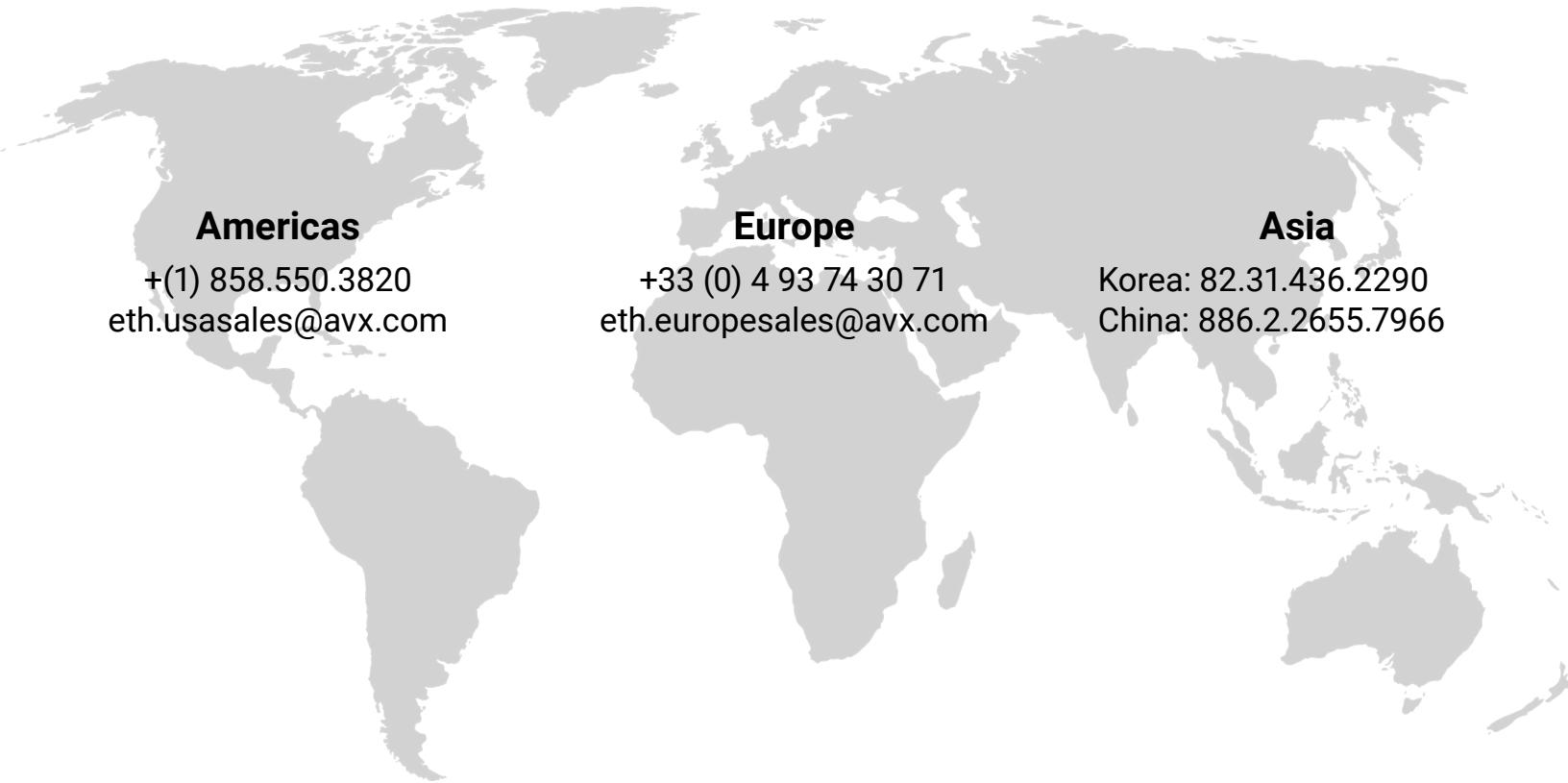
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