LANTRONIX®

Application Note:

How to Connect FOX3-2G/3G/4G to the Telenor MIC Platform

Intellectual Property

Contacts

Lantronix, Inc.
48 Discovery, Suite 250
Irvine, CA 92618, USA

Toll Free: 800-526-8766
Phone: 949-453-3990
Fax: 949-453-3995

Technical Support
Online: https://www.lantronix.com/technical-support/

Sales Offices
For a current list of our domestic and international sales offices, go to the Lantronix web site at https://www.lantronix.com/about-us/contact/.

Disclaimer

Revision History

Date	Rev.	Comments
November 2022	A	Initial document.

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation.

Overview

This application note provides guidance to setup and use FOX3 on Telenor MIC Platform.

What is Needed for this Setup

- A FOX3 model with BLE and activated LUA license

- Workbench software tool

- Telenor MIC Platform account

Initial Setup

Upgrading FOX3 Firmware

Upgrade the FOX3 series device AVL firmware to the latest version. It must be version 3.12.0 or later.

These instructions are specific to updating your LANTRONIX AVL device via COM interface (Serial Port).

1. Download the latest released firmware version for the FOX3 device from the Lantronix Tech Support page and extract the file you downloaded into a folder on your PC.

2. Download and install the Workbench software if it is not installed on your PC. Run the Workbench software.
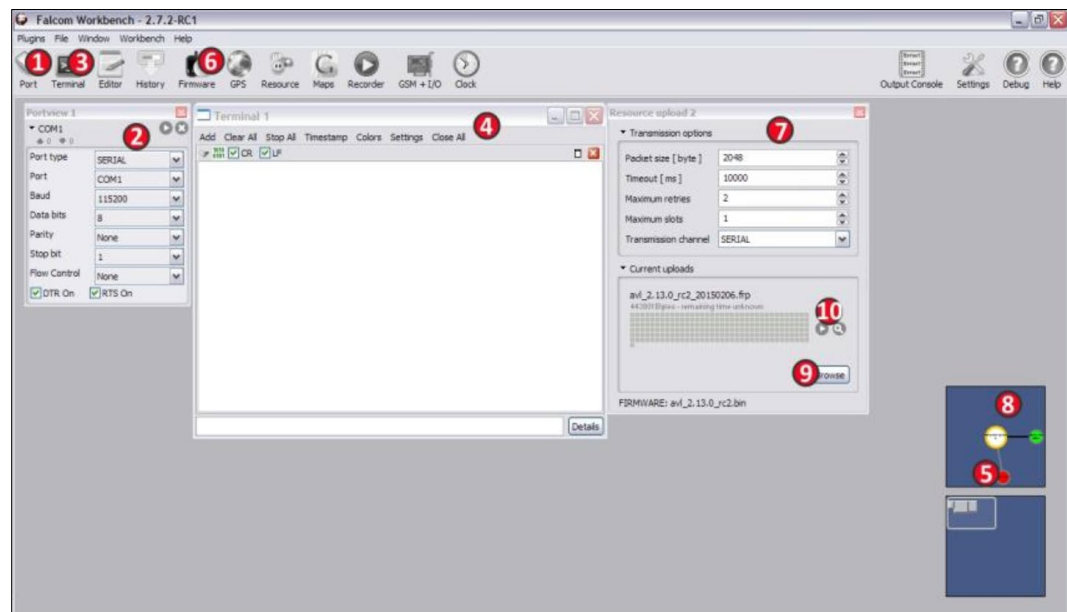
3. Begin the firmware update process (refer to the figure above).
    Connect the AVL device to your PC either directly using the programming cable or the corresponding evaluation board.

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4. Click **Port** (**1**) icon. Select the **COM1** port settings from the **PortView 1** (**2**) and click the **Play** button next to the **COM1** to open the selected COM port.

5. Click **Terminal** icon (**3**). Select the **Terminal1** (**4**) and go to the **ConnectionView** (**5**). Connect it to the **Serial Port COM1**.

6. Click **Firmware** (**6**) icon. Select **SERIAL** from the **Transmission Options** (**7**) and go to **ConnectionView** (**8**). Connect it to the **Serial Port COM1**.

7. Click **Browse** (**9**) button and select the firmware file *.frp from the temporary folder where the firmware was expanded.

8. Click **Play** (**10**) button to start the firmware update. This button appears only if the firmware file has already been selected.

9. Wait until the update process completes. While the update is running, do not send any command to the device and do not manually reboot it until the device restarts itself.

10. After the update process successfully completes, a success message will appear. Click **OK** button to restart the AVL device.

11. Open an Editor by clicking the **Editor** icon (**1**) (refer to the figure below). Click **Editor 1** (**2**) and go to the **ConnectionView** (**3**). Connect it to **the Serial Port COM1**.

12. Upload or copy and paste your device configuration into the **Editor 1** (**2**). Go to the **Editor 1** menu and click **start sending device configuration**.

Setting up FOX3 in MIC

1. Log into MIC with your username and password.

2. Create a new Thing Type by clicking the +**NEW THING TYPE** button on the top left corner.

3. Enter a name and description for the Thing Type.

Create the Thing

Your **Thing Types** will be visible in the panel on the left side of the window. When creating a new Thing it will automatically belong to the selected **Thing Type**.


To add a new Thing:

1. Click on the **"+ THINGS"** button. A pop-up window will appear.
2. De-select the **"Create batch"** and then add a **Thing Name**, a **Description** and select your **Domain** from the selection menu.
3. You should be able to see some data coming in. Now create widgets that will display your data.

View and Edit the Dashboard

1. Click the name of the created Thing in the list and the dashboard for your Thing will open. This dashboard is empty until the first data from FOX3 comes in. The dashboard is configurable. The values are called resources. For example: Temperature and Humidity can be resources.
2. Click **MOVE** button to edit the dashboard. You can move things around and create new widgets.

3. Press the button **+WIDGET** to create a new widget.
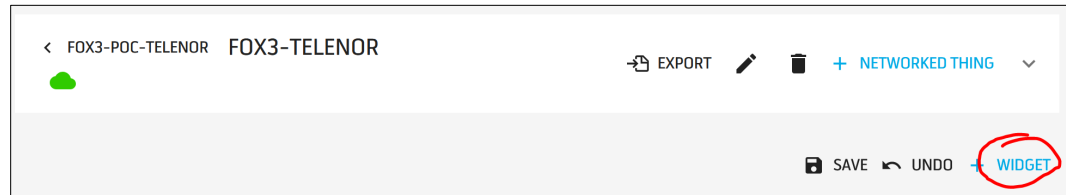
4. In the Add Widgets page, enter or select the following:

    - **Label**

    - **Widget Type**

    - **Resource**

5. Select or enter the resource parameters.

6. Press **Save** to save the widget settings.

1. In Workbench **Editor 1**, do the following:

    - Enter the Things name ID into the parameter MQTT.CLIENT.ID below.

    - Then copy all the configuration lines below and paste them into the Workbench **Editor 1** (**2**), and double click each line separately to send them to the FOX3:
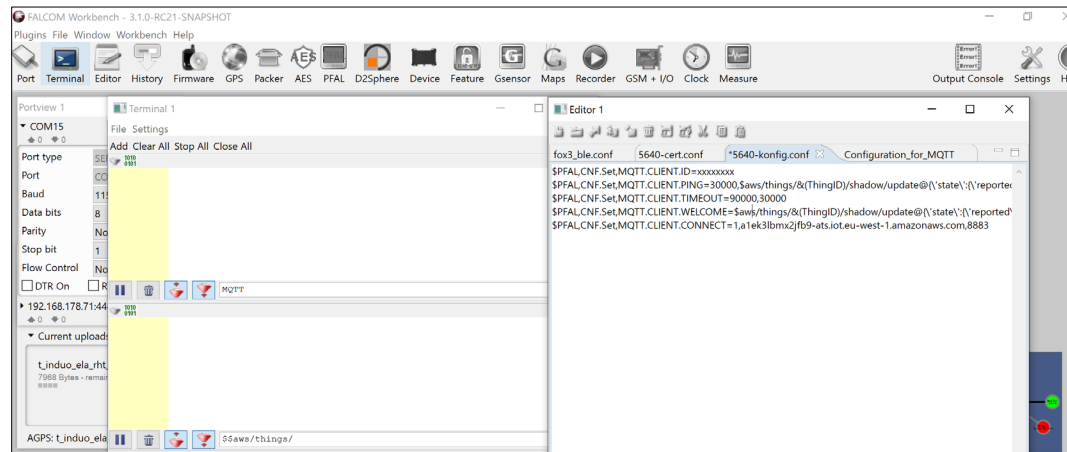
    $PFAL,CNF.Set,MQTT.CLIENT.ID=<enter ThingsID>

    $PFAL,CNF.Set,MQTT.CLIENT.PING=30000,$aws/things/&(ThingID)/shadow/upd ate@{\'state\':{\'reported\':{\'latlng\':\'&(LatLon)\',\'tcxn\':{\'connection_status\':2}}}, &(ThingToken)}
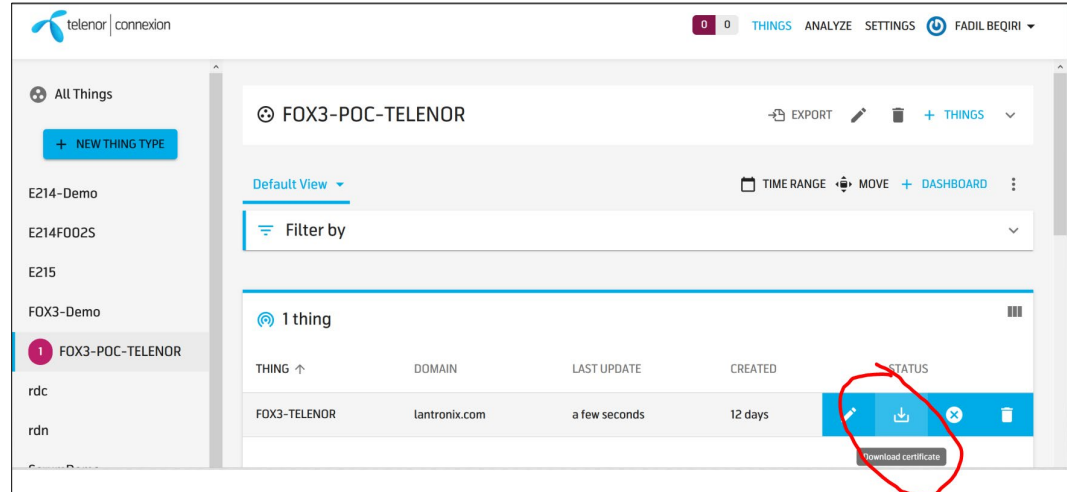
$PFAL,CNF.Set,MQTT.CLIENT.TIMEOUT=90000,30000

$PFAL,CNF.Set,MQTT.CLIENT.WELCOME=$aws/things/&(ThingID)/shadow/updat
e@{\'state\':{\'reported\':{\'tcxn\':{\'connection_status\':2,\'imei\':\'&(IMEI)\'}}}
}

$PFAL,CNF.Set,MQTT.CLIENT.CONNECT=1,<IP>,<Port>

2. Go to your MIC account, download, and unzip the Things certificate.

3. Open each certificate file, copy the content, and then paste it in the following format in the Workbench **Editor 1** (**2**). Note that each certificate requires CR+LF and a dot (.) character to terminate it. Otherwise the FOX3 will not store any certificate.

$PFAL,TCP.MQTT.SetRootCA

-----BEGIN CERTIFICATE-----

Add RootCA.pem

-----END CERTIFICATE-----

.

$PFAL,TCP.MQTT.SetCertificate

-----BEGIN CERTIFICATE-----

Add Cert.pem

-----END CERTIFICATE-----

.

$PFAL,TCP.MQTT.SetPrivateKey

-----BEGIN RSA PRIVATE KEY-----

Add privkey.pem

-----END CERTIFICATE-----

.

4. To send these certificates to the FOX3, first uncheck the **CRC** (1) at the bottom of **Editor 1**. Select the certificates and click **Start sending the configuration**. The FOX3 will stop output data on the serial port/**Terminal 1**. Once the certificate is stored in the FOX3, it starts to output the data on serial port/**Terminal 1**. This will take a bit of time. In this way you can send and store all other certificates in the FOX3. Once these steps are successfully completed, send the following commands to the FOX3 to check the certificates:

    $PFAL,TCP.MQTT.GetRootCA

    $PFAL,TCP.MQTT.GetCertificate

    $PFAL,TCP.MQTT.GetPrivateKey

5. You will see the certificates on the **Terminal 1**.
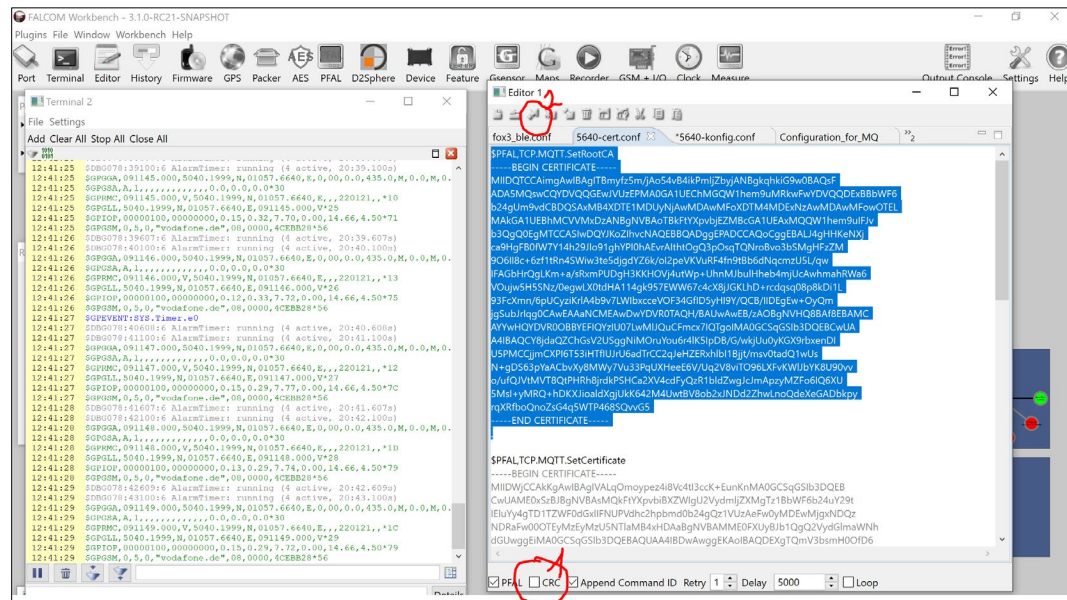
6. Insert a SIM card into the FOX3 and specify the SIM's APN and PIN, and activate the GPRS auto start with:

   $PFAL,GSM.PIN="Your SIM PIN"

   $PFAL,Cnf.Set,GPRS.APN=lpwa1.iot.telenor.se

   $PFAL,CNF.Set,GPRS.AUTOSTART=1

7. Send these settings also to the FOX3 from the **Editor 1** view.

Example

This is an example how to send the temperature based on a counter:

> $PFAL,CNF.Set,AL10=SYS.Counter.s0>350:SYS.Counter0.Set=100
>
> $PFAL,CNF.Set,AL11=TCP.MQTT.eConnected:SYS.Timer0.Start=cyclic,15000
>
> $PFAL,CNF.Set,AL12=SYS.Timer.e0:SYS.Counter0.Add=5&TCP.MQTT.Send,"$aws/things/&(ThingID)/shadow/update@{\'state\':{\'reported\':{\'Temperature\':&(counter0*0.1)}}}"

The FOX3 will try to establish a TCP connection to the Telenor MIC platform. If you see any issue with connecting to the Telenor platform, please check if the FOX3 has a valid date and time as the used certificates have a validity period. If the date and time is not approximately correct, the verification of the certificates will fail. You can also set the date and time into the device with $PFAL,Sys.SetTime,16.02.2021,10:00:00. If FOX3 already has a valid date and time, this command will return an error.

Sending BLE Sensor Data to Telenor MIC Platform

To be able to send BLE sensor data like temperature and humidity to this platform, you need to get LUA license activated on the FOX3 (Contact Lantronix sales for more information.) and write a LUA script that receives, processes, and transmits the advertised temperature and humidity data from the BLE sensors to the MIC platform.

For information on how to write Lua scripts, refer to the application note, Using LUA Scripts for FOX3-2G/3G/4G and BOLERO40 Series.

Use Cygwin and install the package bash to build **.frp** file from the **.lua** files. Finally upload the **.frp** file to the FOX3 device following the steps in section .

After uploading the Lua script to the FOX3, the data on the Telenor MIC platform may look like these screenshots below: