Arm® Cortex®-M

32-bit Microcontroller

NuMicro® Family
AliOS Things On
NuMaker-IOT-M487
Quick Start Guide

For additional information or questions, please contact: Nuvoton Technology Corporation.

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1 OVERVIEW

NuMaker-IoT-M487 board provides multiple networking, interfaces, image sensing, audio recording, playback functions, and flexible extended data storage. The front and rear side of NuMaker-IOT-M487 board are shown in Figure 1‑1. Whether you need a sensor node or a light-weight gateway, the NuMaker-IoT-M487 board is an ideal choice for IoT applications. In this guide, some steps will help you use AliOS Things on the NuMaker-IOT-M487 board. This guide includes how to get AliOS things SDK, mqttapp sample, firmware burning, and connective test.

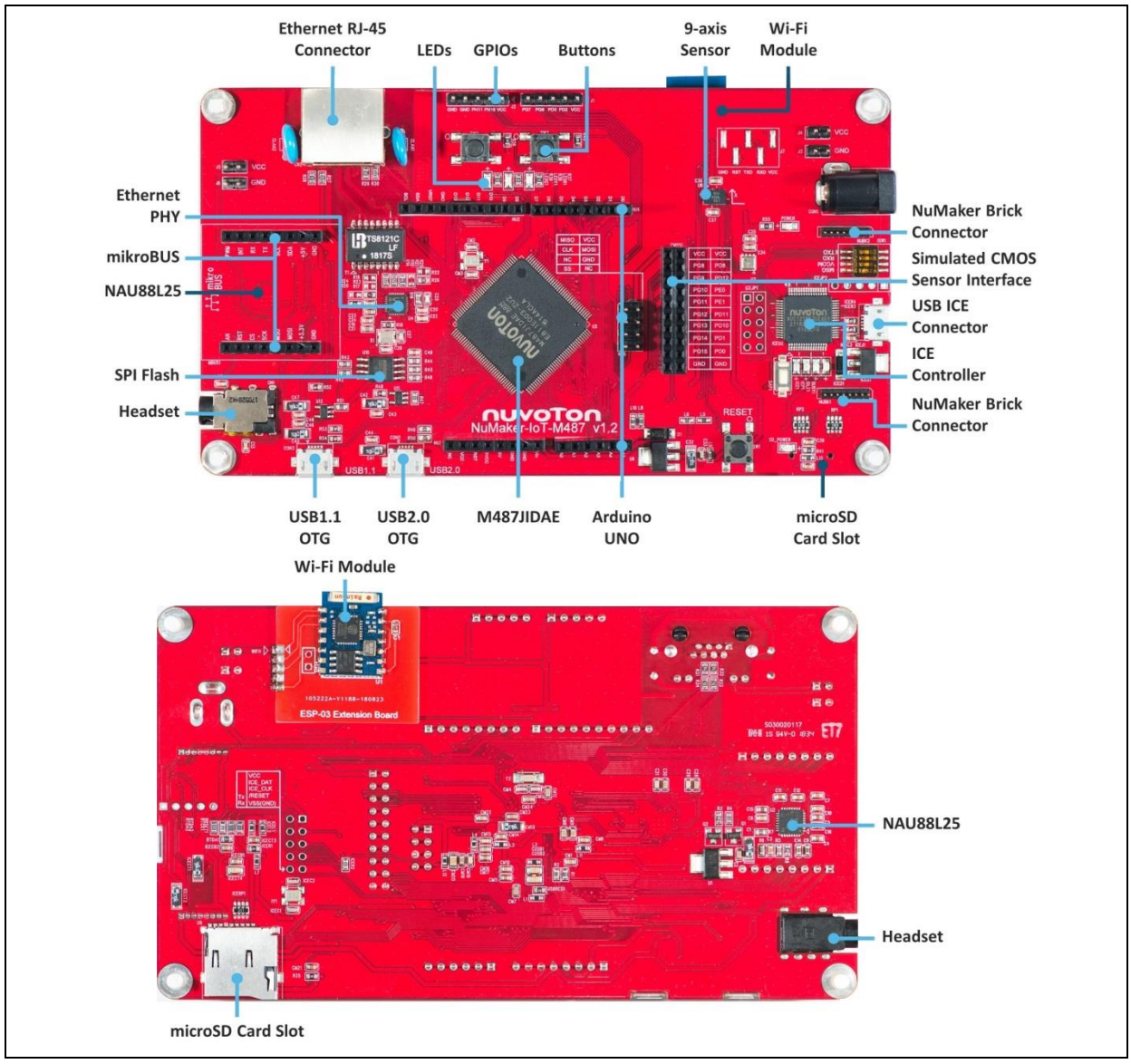

Figure 1‑1 NuMaker-IOT-M487 board - Front/Rear side

2 REQUIREMENTS

2.1 Software Requirements

1. Window 7/8/10 operating system
2. Arm® Keil MDK v5 – IDE
3. Tera Term – a terminal emulator
4. Alibaba AliOS Things Software development kit

2.2 Hardware Requirements

1. NuMaker-IOT-M487 board x 1
2. USB Micro cable x 1
3. Internet-accessible Wi-Fi Router x 1.

3 GET ALIOS THINGS SDK

You can get AliOS Things SDK using Git software or download from Github website.

3.1 Use Git Software

You can type the following commands to clone remote repository into your storage on PC.

```
# git clone https://github.com/wosayttn/AliOS-Things
# cd AliOS-Things
# git checkout numicro
```

3.2 Download from Github Website

Please open AliOS Things repository webpage on Github and follow steps as Figure 3-1. Finally, uncompress the downloaded file.

The URL of AliOS Things SDK repository: https://github.com/wosayttn/AliOS-Things/tree/numicro

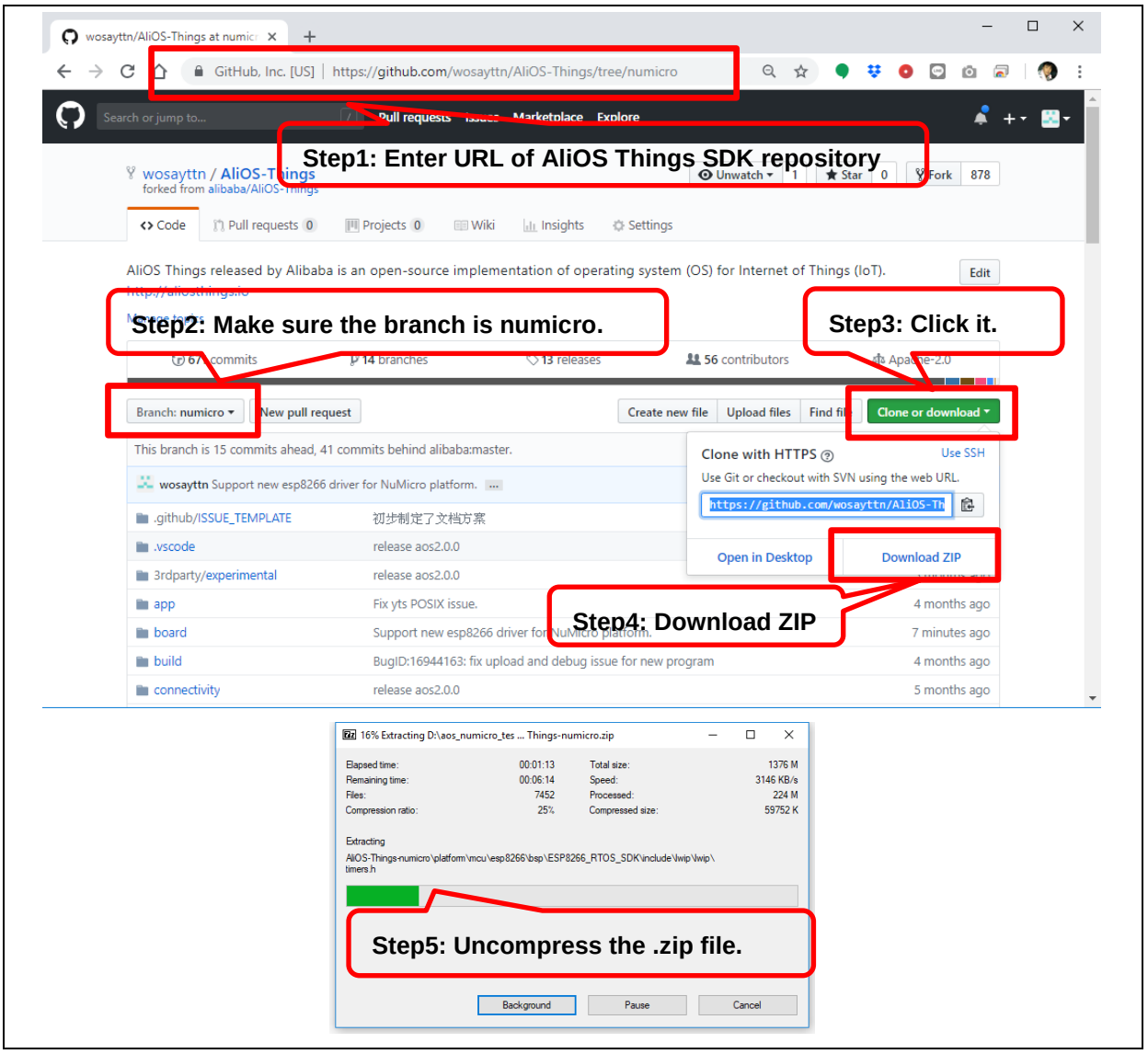

Figure 3-1 Download from Github Website

4 ALIOS THINGS MQTTAPP SAMPLE

4.1 Build mqttapp Project

Open mqttapp@numaker-iot-m487 Keil project in the uncompressed folder and click rebuild button to build mqttapp project. All steps are shown in Figure 4-1.

```
The file path of Keil project: <Path-to-AliOS-Things folder>\AliOS-
Things\projects\Keil\mqttapp@numicro-iot-m487\keil_project
```

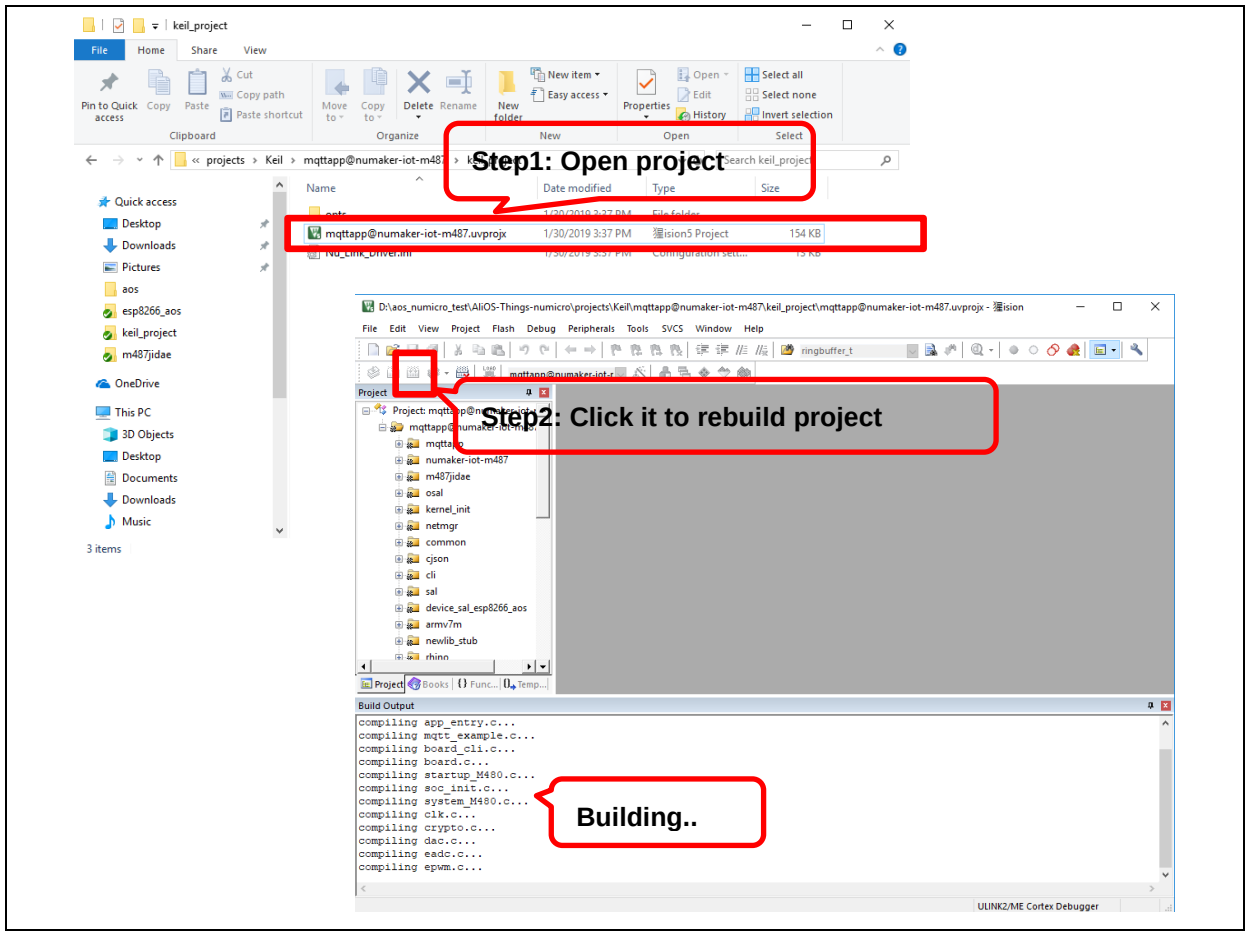

Figure 4-1 Path of Keil Project File and Rebuild Project

After building is done, it will output a binary image as shown in Figure 4-2 and its path as below.

```
<Path-to-AliOS-Things folder>\AliOS-Things\projects\Keil\mqttapp@numicro-iot-
m487\keil_project\Objects\mattapp@numaker-iot-m487.bin
```

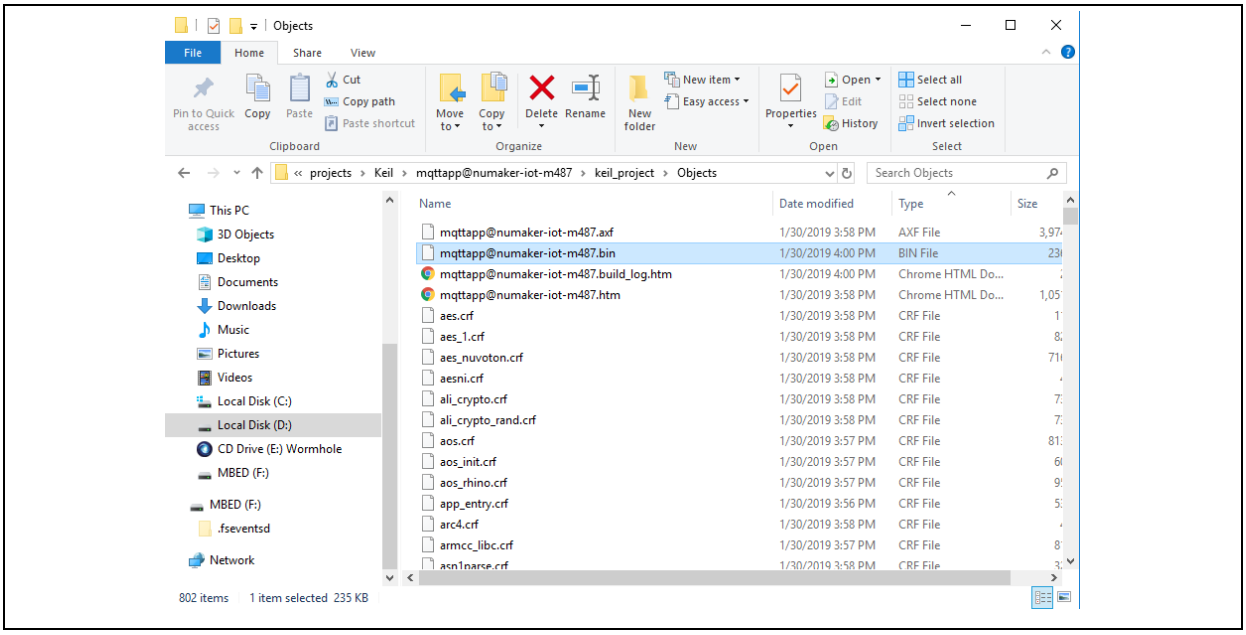

Figure 4-2 File Path of Binary Image

4.2 Burn Firmware

A simple firmware burning method is that you can drag and drop the binary image file to NuMicro MCU virtual disk to burn firmware.

4.2.1 NuMicro MCU Virtual Disk

First, you need to configure LSW1 switch on the NuMaker-IOT-M487 board. Set the four switches to '**ON**' position as shown in Figure 4-3. After the configuration is done, connect the NuMaker-IOT-M487 board and your computer using the USB Micro cable as Figure 4-4. After that, window manager will show a 'NuMicro MCU' virtual disk as Figure 4-5. Finally, you will use this virtual disk to burn firmware.

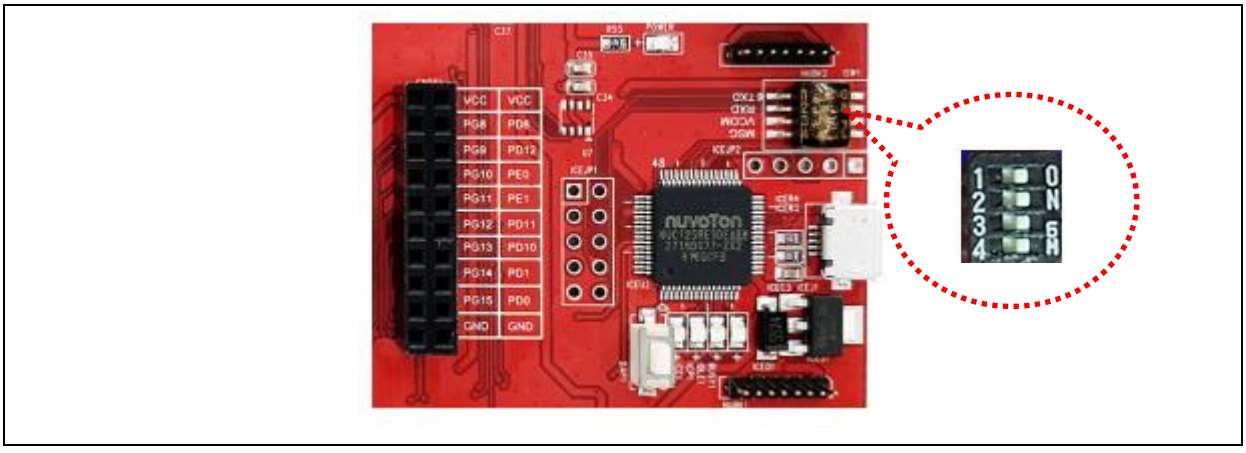

Figure 4-3 ISW1 Configuration on NuMaker-IOT-M487 board

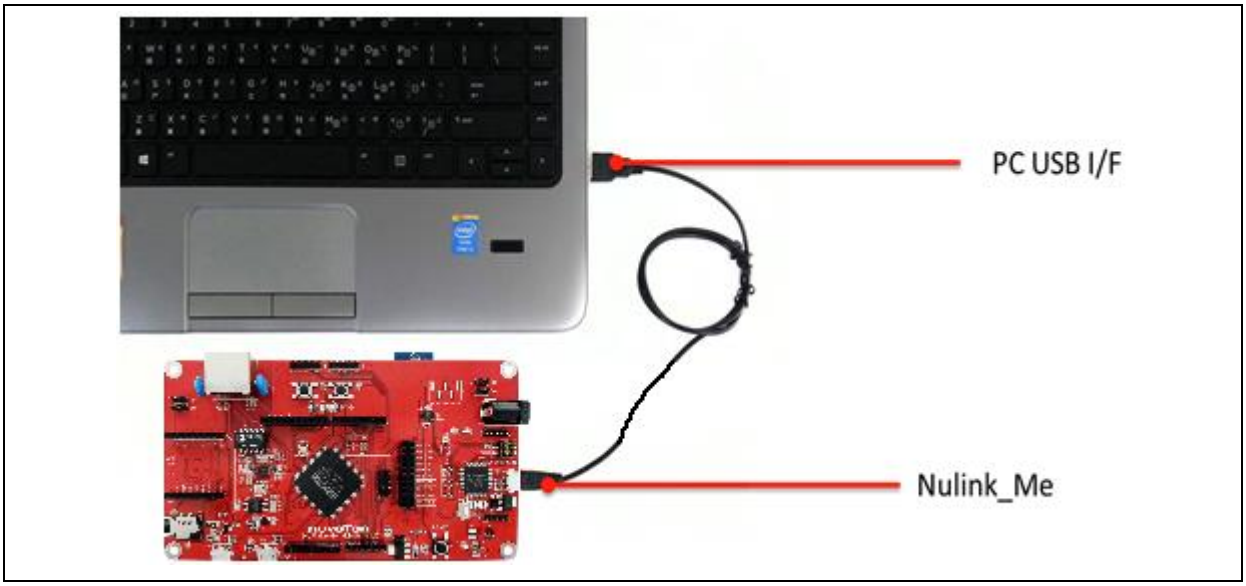

Figure 4-4 Connect NuMaker-IOT-M487 board and PC Using Micro USB Cable

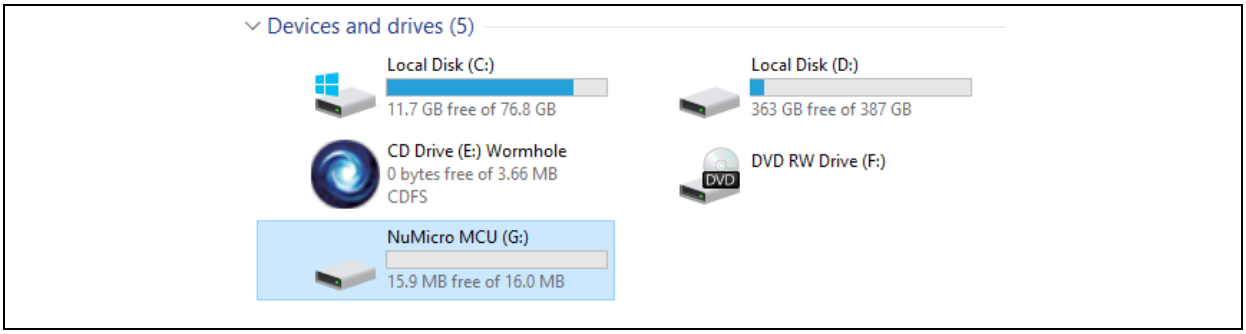

Figure 4-5 NuMicro MCU Virtual Disk

4.2.2 Drag and Drop

You can drag and drop a binary image file into the NuMicro MCU virtual disk to burn firmware as Figure 4-6. The path of mqttapp binary image file is below:

```
<Path-to-AliOS-Things folder>\AliOS-Things\projects\Keil\mqttapp@numicro-iot-m487\keil_project\Objects\mattapp@numaker-iot-m487.bin
```

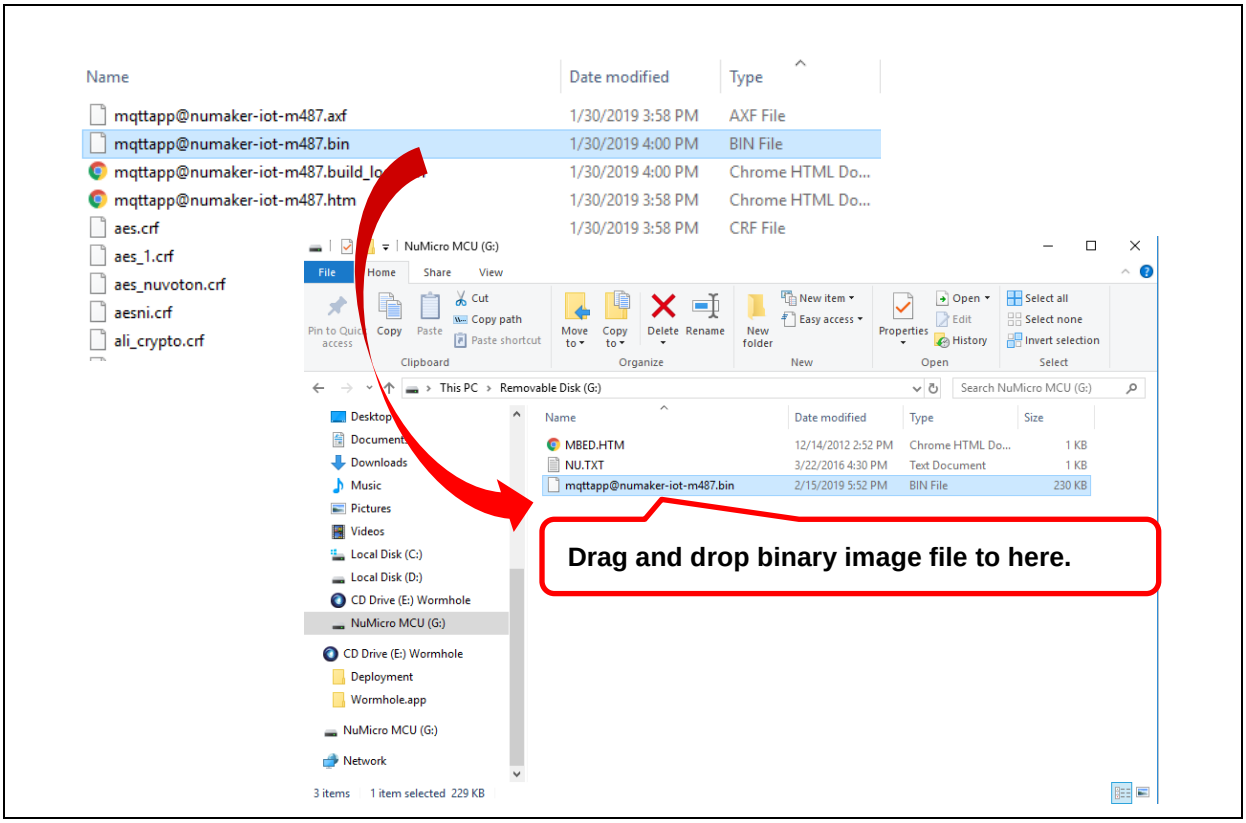

Figure 4-6 Simple Firmware Burning Method

4.3 Test Wi-Fi Local Connectivity

You can use Tera Term terminate emulator to type commands of AliOS Things OS. All parameters of serial communication are shown in Figure 4-7. Here, you can find out the corresponding port number of **Nuvoton Virtual Com Port** in window device manager. For example, the serial port is **COM30**.

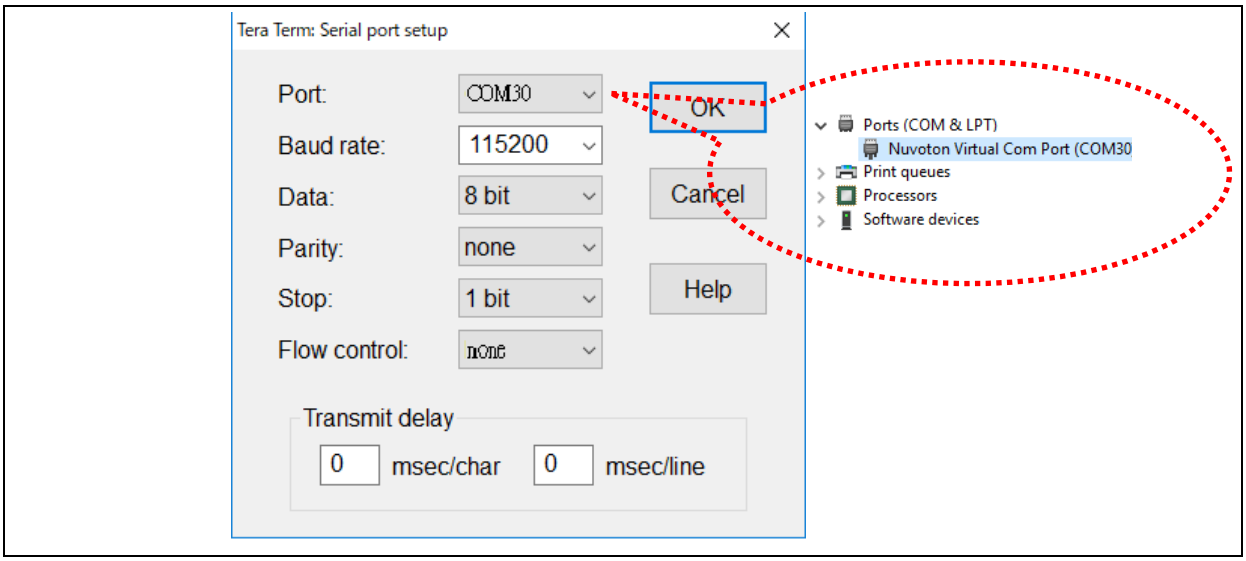

Figure 4-7 Nuvoton Virtual Serial Port Number and Serial Communication Configuration in Tera Term

Open serial communication and press Reset button on board. After system reset, Tera term terminate emulator will print messages on screen as Figure 4-8.

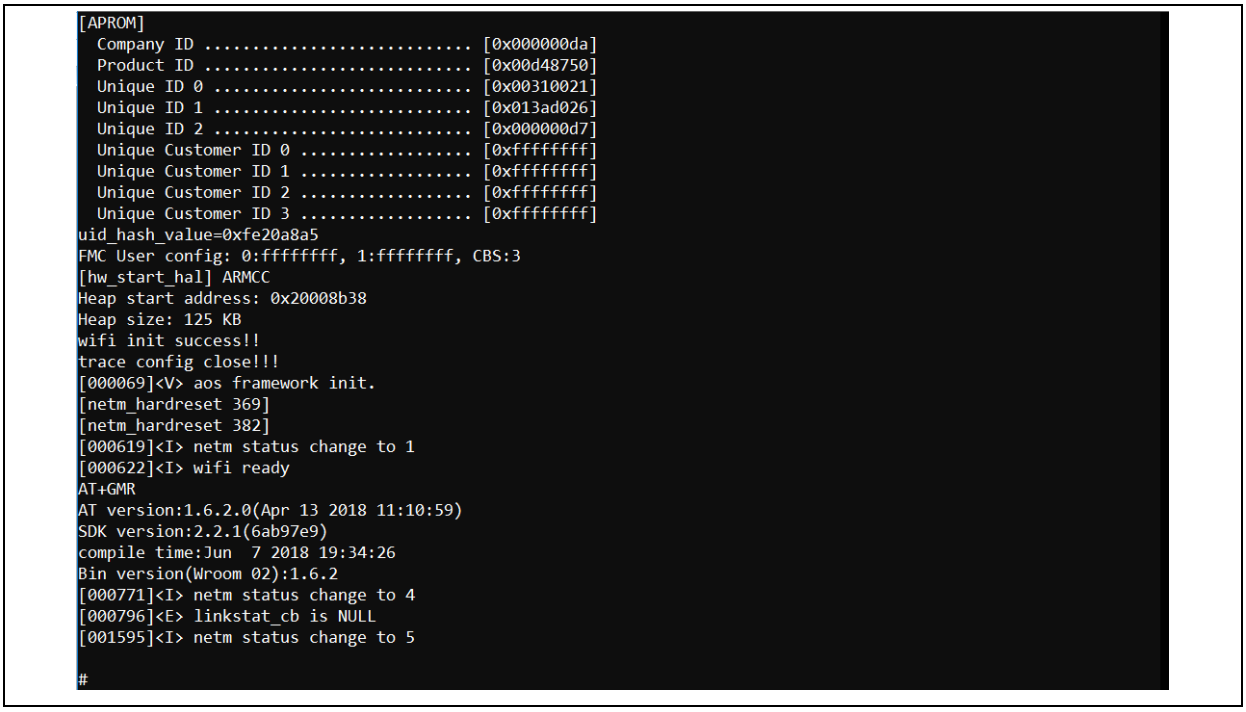

Figure 4-8 Serial Communication Using Tera Term and Boot-up Messages

First, you must set Wi-Fi SSID and password manually as Figure 4-9. Once it is associated with Wi-Fi router, these Wi-Fi SSID and password will be stored in internal Flash. The network managing command is shown below:

```
netmgr connect ssid password open|wep|wpa|wpa2

ex: ssid: NT_ZY_BUFFALO, password: 12345678
```

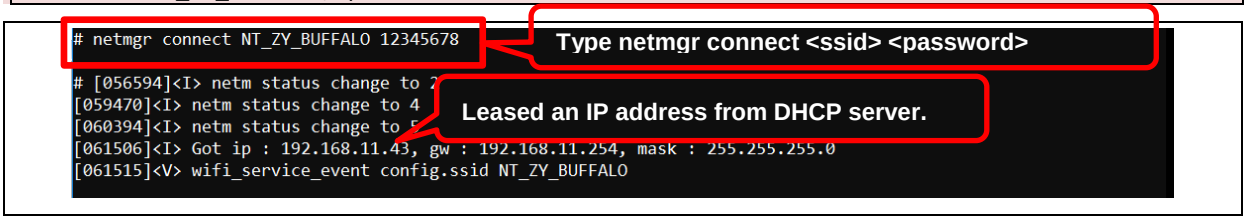

Figure 4-9 Wi-Fi Local Connectivity and get IP Address

4.4 Test Ali-Cloud Service

Before testing Ali-Cloud MQTT server, you need to get three-parameters obtained from the Ali-Cloud and update three-parameters to mqtt_example.c source code as shown in Figure 4-10. Please note the three-parameters in mqttapp source code are for demo by default. After leased an IP address from DHCP server of Wi-Fi router, mqttapp routing will connect to Ali-Cloud MQTT server automatically as shown in Figure 4-11. Please remember, the three-parameters in source code are for product development and test, do not apply it in your any product. For application and configuration of Ali-Cloud three-parameters, you can refer to AliOS Things official document. You can find it in https://github.com/alibaba/AliOS-Things/wiki/stm32-networking.zh.

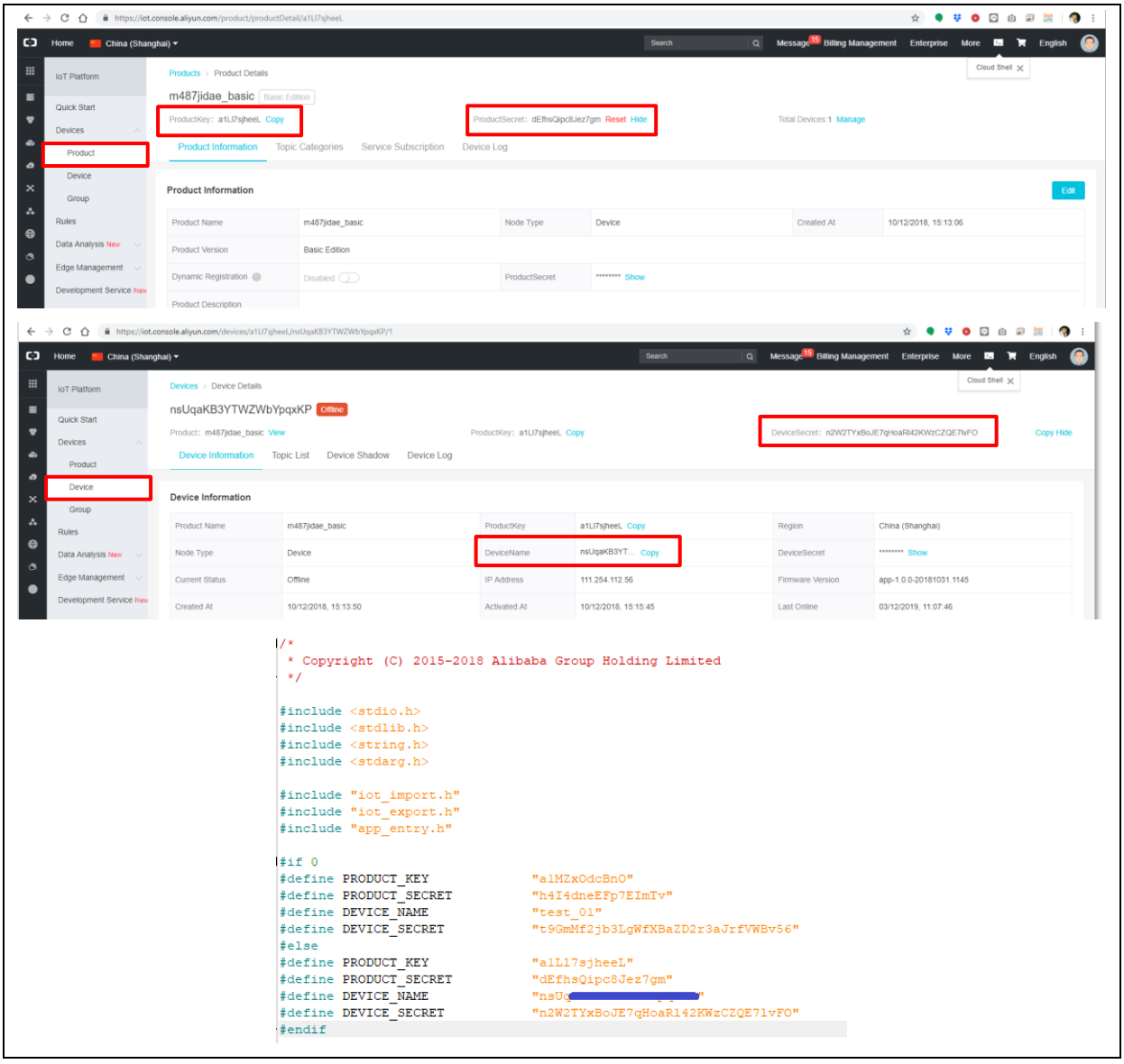

Figure 4-10 Ali-Cloud Three-parameters Configuration

Figure 4-11 Connected Ali-Cloud MQTT Server

5 CONCLUSION

From the basic end nodes to the gateways and the clouds, IoT applications require control, networking, encryption and other related technologies. Alibaba and Nuvoton provide the NuMaker-IOT-M487 development kit to help your product to market quickly.

6 REVISION HISTORY

Date	Revision	Description
2019.02.22	1.00	1. Initially issued.

Important Notice

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