

ARM® Cortex®-M
32-bit Microcontroller

NuMicro™ Family
AliOS Things On
NuMaker-IOT-M487
快速入门指南

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1 前言

NuMaker-IOT-M487 开发工具包提供多元连网方式与多种接口 (图 1-1)，不论是端点装置或轻量型的网关应用，NuMaker-IOT-M487 都是踏入物联网应用的最好选择。本指南提供一个基于 NuMaker-IOT-M487 开发工具包，通过与 Wi-Fi 模块进行 AT 指令串口通信，实现与阿里云连接的 IoT 物联典型开发应用示例。入门指南内容包含如何在您的计算机获取 AliOS Things 开发软件、AliOS Things 示例编译、固件下载以及连网、连接阿里云测试。

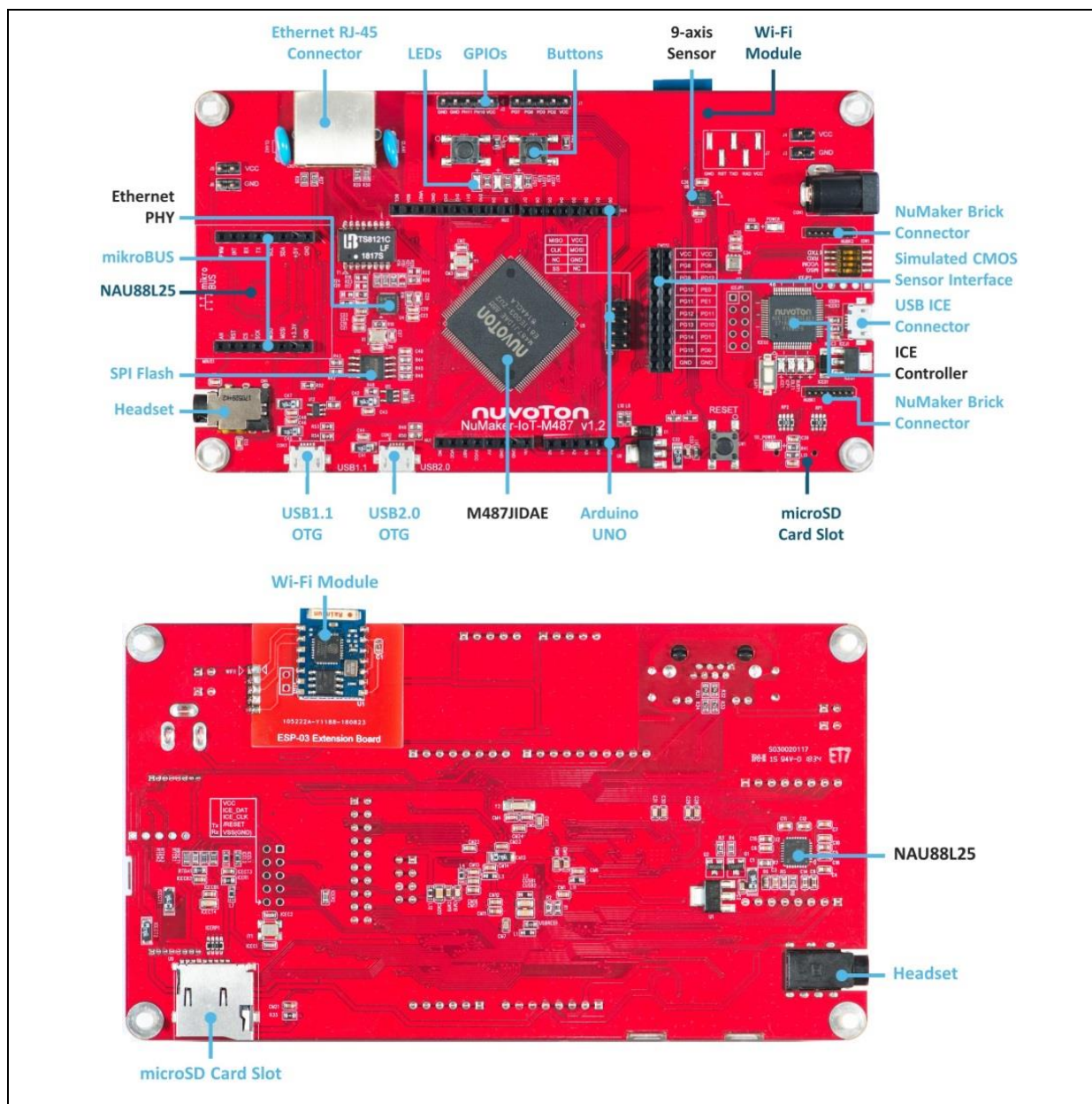


图 1-1 NuMaker-IOT-M487 (开发板正/背面)

2 软硬件需求

2.1 软件需求

1. Window 7/8/10 操作系统。
2. Arm Keil MDK v5 – 工程编译软件。
3. Tera Term – 终端联机工具。
4. 阿里巴巴 AliOS Things 开发包。

2.2 硬件需求

1. NuMaker-IOT-M487 开发工具包。
2. USB Micro 数据传输线 1 条。
3. 可连接网际网络的 Wi-Fi Router 1 台。

3 获取ALIOS THINGS开发软件

您可以选择使用 Git 软件或是从 Github website 下载 AliOS Things 开发软件。

3.1 使用Git软件

您可以在命令行输入下列指令，下载仓库代码到您的PC本地端。

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

3.2 从Github website下载

请进入 AliOS Things 代码仓库页面，操作步骤如图 3-1所示：最后，解压缩下载的档案。

AliOS Things 仓库代码页面地址：<https://github.com/wosayttt/AliOS-Things/tree/numicro>

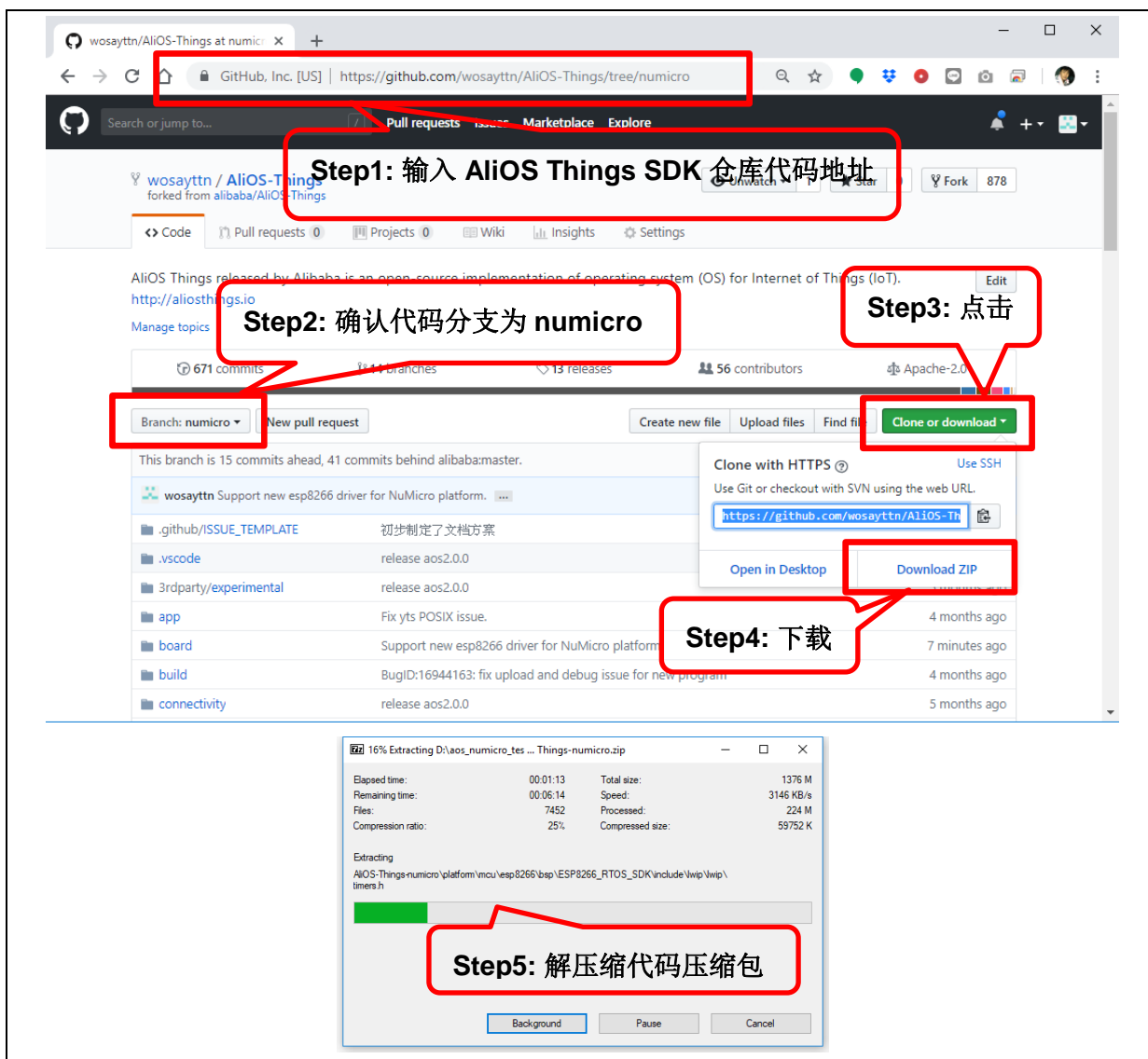


图 3-1 从Github website下载流程

4 ALIOS THINGS-MQTTAPP 示例演示

4.1 mqttapp工程编译

进入解压缩的目录并打开 mqttapp@numaker-iot-m487 Keil 工程并进行工程重新建置(图 4-1)。

Keil 工程档案路径:

<Path-to-AliOS-Things folder>\AliOS-Things\projects\Keil\mqttapp@numicro-iot-m487\keil_project

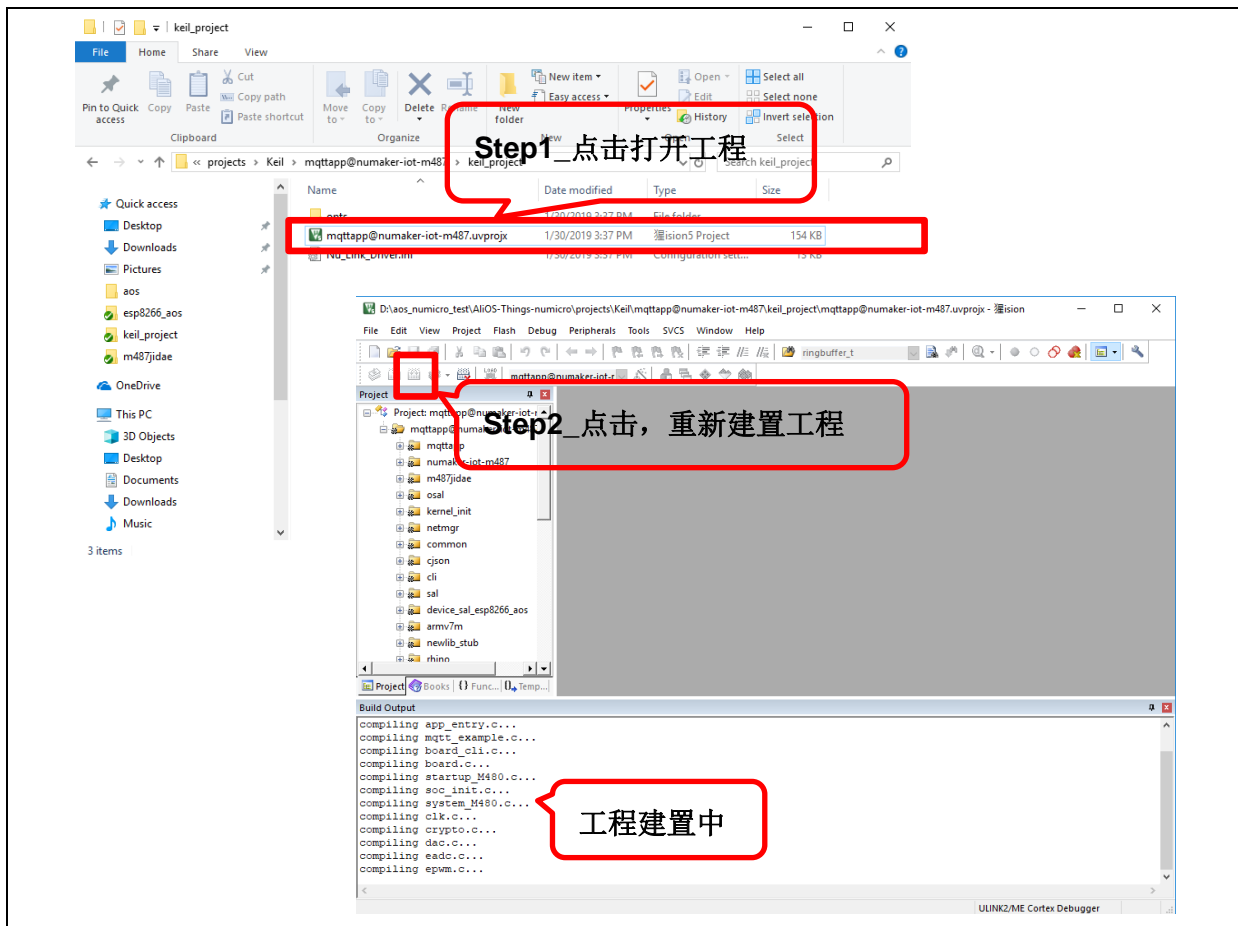


图 4-1 Keil工程档案路径 及 重新建置工程

Keil工程重新建置成功后, 输出的二进制映像档案输出路径 (图 4-2):

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

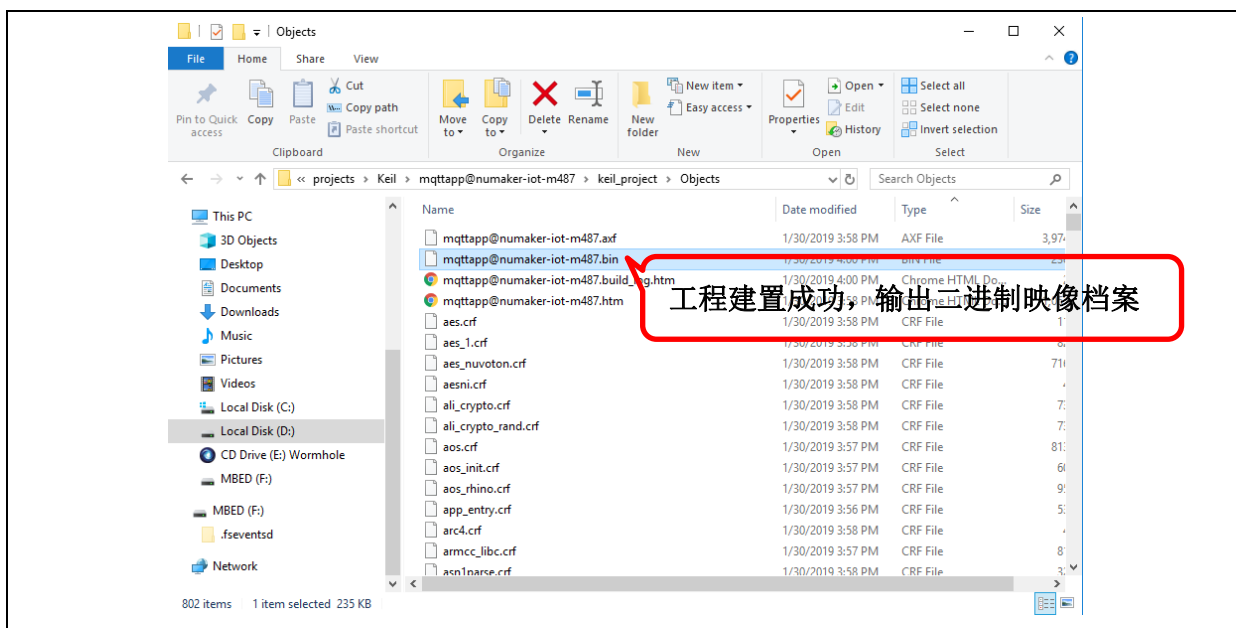


图 4-2 二进制映像档案路径

4.2 固件下载

简易的下载方法: 透过拖拉二进制映像档案到 NuMicro MCU 虚拟磁盘，即可完成固件下载。

4.2.1 NuMicro MCU 虚拟磁盘

首先，配置 NuMaker-IOT-M487 开发板上的 ISW1，将四个开关拨到 ‘ON’ 的位置，如图 4-3 所示。配置完成后，将开发板使用 Micro USB 连接线连接计算机(图 4-4)，我的计算机将出现一个 NuMicro MCU 虚拟磁盘(图 4-5)。接下来，我们将使用这个虚拟磁盘来进行固件下载。

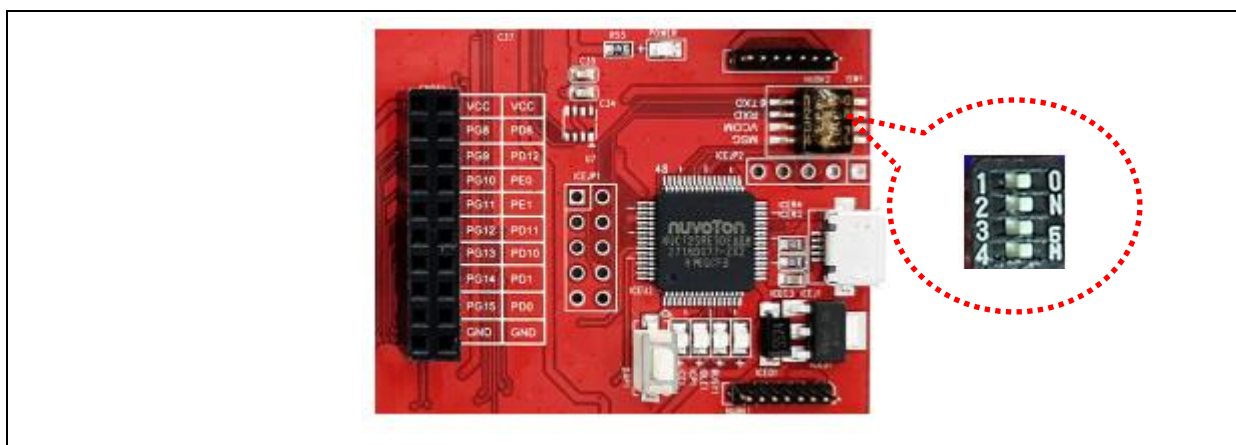


图 4-3 NuMaker-IOT-M487 开发板 ISW1 配置

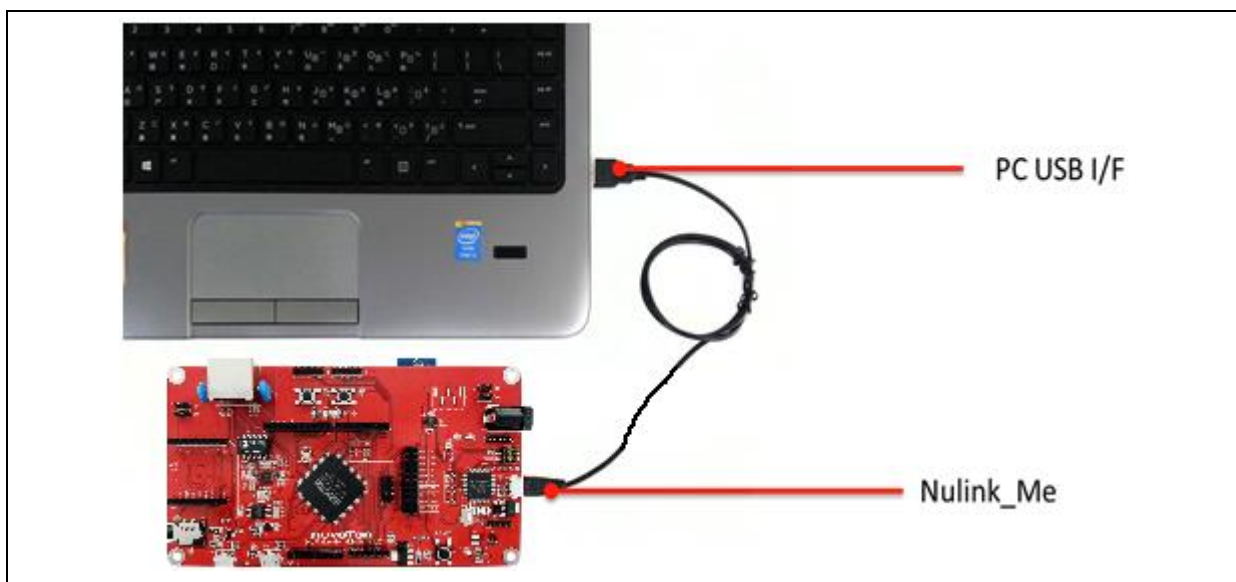


图 4-4 NuMaker-IOT-M487 连接计算机 USB 端口

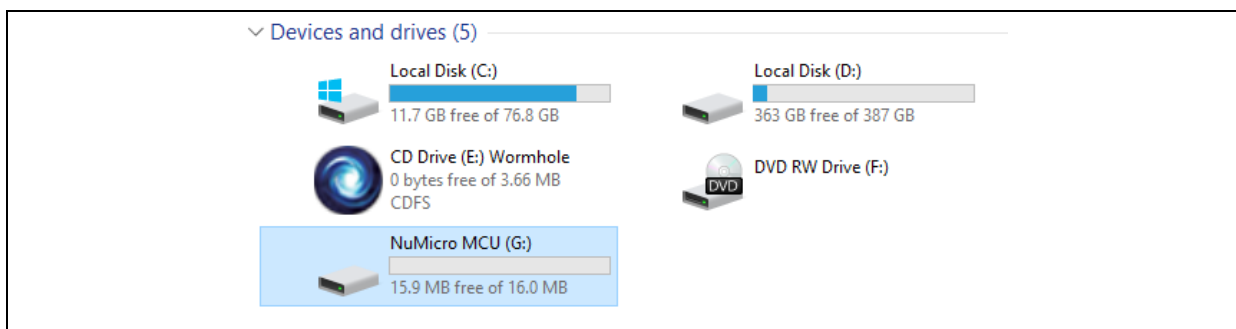


图 4-5 NuMicro MCU 硬盘

4.2.2 拖拉二进制映像档案

拖拉二进制映像档案至 NuMicro MCU 磁盘，完成固件下(如图 4-6)。mqttapp示例的二进制映像档案mqttapp@numaker-iot-m487.bin 整体路径如下。

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

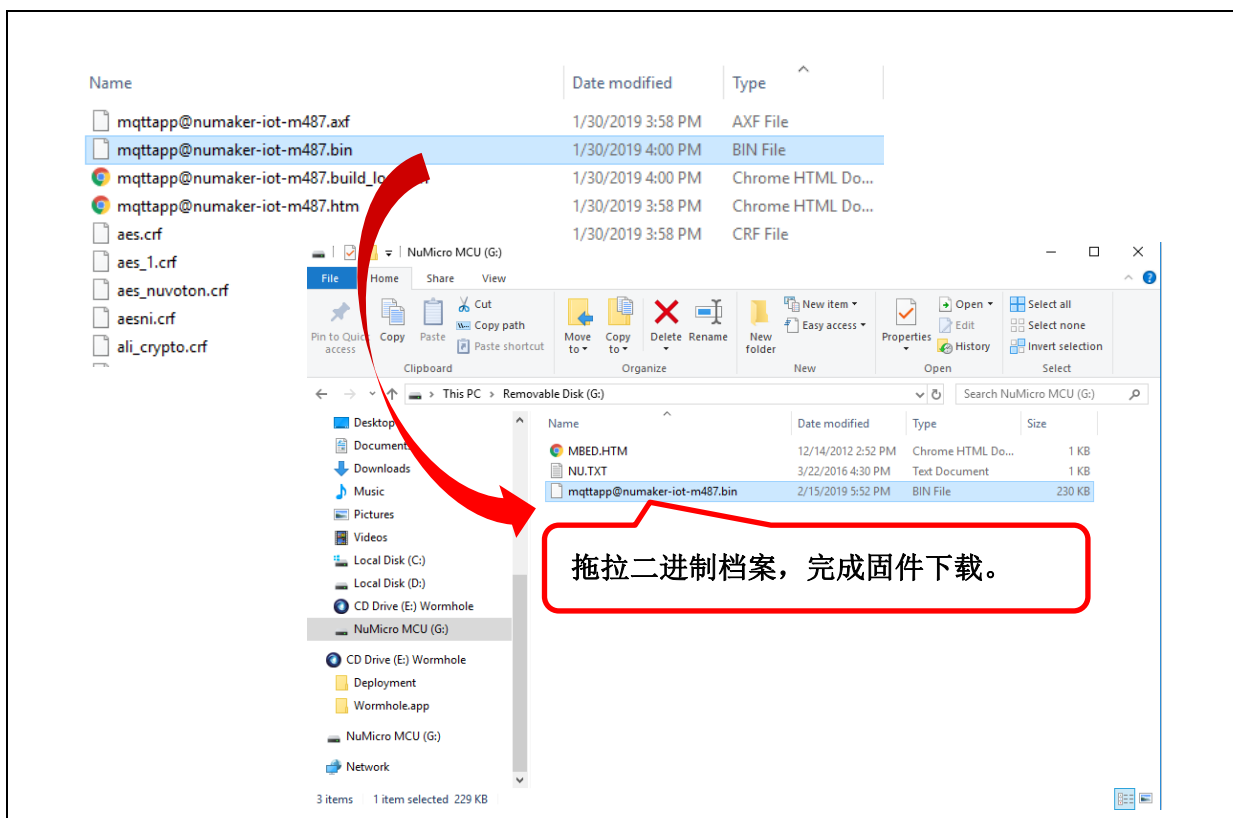



图 4-6 简易固件下载方式

4.3 测试Wi-Fi本地端连网

使用 Tera Term 终端软件，操作 AliOS Things 的命令行功能。串口的配置如图 4-7 所示。(注意: **Nuvoton Virtual Com Port** 对应的串口编号可在设备管理器内找到。例如: 串口编号为 **COM30**。)



图 4-7 Nuvoton 虚拟串口对映编号 及Tera term 串口配置

打开串口通信后并且按下板子的 **Reset** 键。待系统重置后，Tera term 终端画面印出开机信息 (图 4-8)。

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

```

COM24 - Tera Term VT
[APROM]
Company ID ..... [0x000000da]
Product ID ..... [0x00d48750]
Unique ID 0 ..... [0x00310021]
Unique ID 1 ..... [0x013ad026]
Unique ID 2 ..... [0x000000d7]
Unique Customer ID 0 ..... [0xffffffff]
Unique Customer ID 1 ..... [0xffffffff]
Unique Customer ID 2 ..... [0xffffffff]
Unique Customer ID 3 ..... [0xffffffff]
uid_hash_value=0xfe20a8a5
FMC User config: 0:ffffffff, 1:ffffffff, CBS:3
[hw_start_hal] ARMCC
Heap start address: 0x20008b38
Heap size: 125 KB
wifi init success!!
trace config close!!!
[000069]<V> aos framework init.
[netm_hardreset 369]
[netm_hardreset 382]
[000619]<I> netm status change to 1
[000622]<I> wifi ready
AT+GMR
AT version:1.6.2.0(Apr 13 2018 11:10:59)
SDK version:2.2.1(6ab97e9)
compile time:Jun 7 2018 19:34:26
Bin version(Wroom 02):1.6.2
[000771]<I> netm status change to 4
[000796]<E> linkstat_cb is NULL
[001595]<I> netm status change to 5
#
    
```

图 4-8 串口通讯及开机信息

首次启动时需要手动配网(图 4-9)，配网命令：

```
netmgr connect ssid password open|wep|wpa|wpa2
ex: ssid: NT_ZY_BUFFALO, password: 12345678
```

```

COM24 - Tera Term VT
#
# netmgr connect NT_ZY_BUFFALO 12345678
# [056594]<I> netm status change to 2
[059470]<I> netm status change to 4
[060394]<I> netm status change to 5
[061506]<I> Got ip : 192.168.11.43, gw : 192.168.11.254, mask : 255.255.255.0
[061515]<V> wifi_service_event config.ssid NT_ZY_BUFFALO
    
```

图 4-9 Wi-Fi 本地端连接及获取 局端 IP 地址

4.4 测试连接阿里云云端服务

连接阿里云 MQTT 云端服务器，需要申请三元组信息、并在 mqtt_example.c 代码内配置三元组信息 (图 4-10)，mqttapp 代码默认的三元组信息是测试使用。在成功连结 Wi-Fi 局端网络后，mqttapp 示例将自动联机至阿里云 MQTT 云端服务器 (图 4-11)。敬请自行申请的三元组信息进行产品开发与测试，关于阿里云三元组信息的申请、配置，可请参照 AliOS Things 官方的说明文件：<https://github.com/alibaba/AliOS-Things/wiki/stm32-networking.zh>。

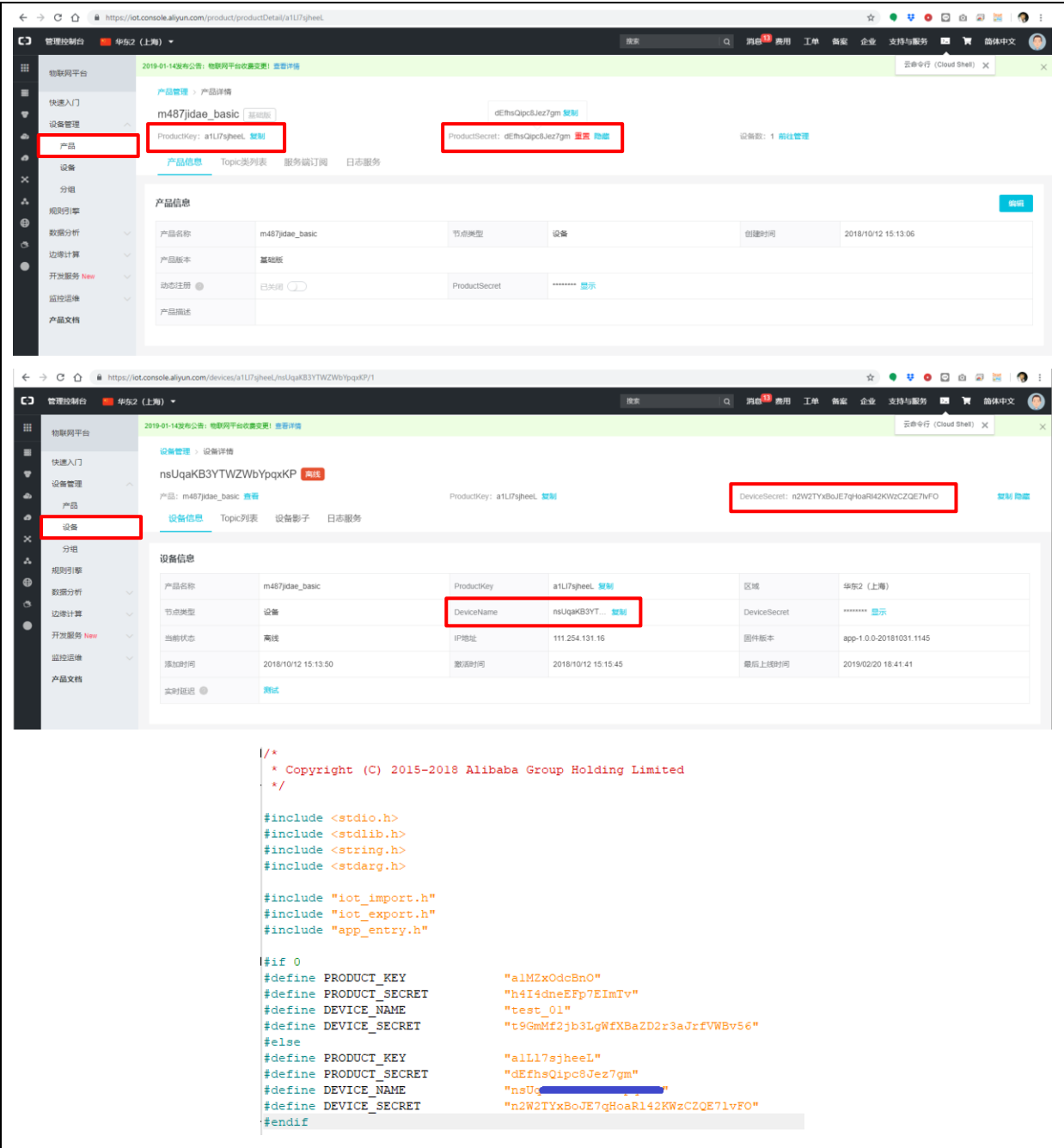


图 4-10 阿里云三元组信息配置示例

```

[061506]<I> Got ip : 192.168.11.43, gw : 192.168.11.254, mask : 255.255.255.0
[061515]<I> wifi_service_event config.ssid NY_ZY_BUFFALO
[inf] iotx_device_info_init(27): device_info created successfully!
[dbg] iotx_device_info_set(37): start to set device info
[dbg] iotx_device_info_set(51): device_info set successfully!
[inf] guider_print_dev_guider_info(268): .....
[inf] guider_print_dev_guider_info(269): ProductKey : a1MzxOdcBn0
[inf] guider_print_dev_guider_info(276): DeviceName : test_01
[inf] guider_print_dev_guider_info(277): DeviceID : a1MzxOdcBn0.test_01
[inf] guider_print_dev_guider_info(278): .....
[inf] guider_print_dev_guider_info(274): PartnerID Buf : partner_id=example.demo.partner-id
[inf] guider_print_dev_guider_info(275): ModuleID Buf : module_id=example.demo.module-id
[inf] guider_print_dev_guider_info(276): Guider URL :
[inf] guider_print_dev_guider_info(278): Guider SecMode : 2 (TLS + Direct)
[inf] guider_print_dev_guider_info(288): Guider Timestamp : 2524608000000
[inf] guider_print_dev_guider_info(289): .....
[inf] guider_print_conn_info(245): .....
[inf] guider_print_conn_info(246): [ 0 6 1 6H5o7s]t< V:> awl1MfZix_OsdecrBvni0c.ei_oetv-eanst- mcqotntf.icgn.-ssshiadn gNhiTa_iZ.Ya_lBiUyFuFnAcIs0.
com
[inf] guider_print_conn_info(247): Port : 1883
[inf] guider_print_conn_info(250): ClientID : a1MzxOdcBn0.test_01|securemode=2,timestamp=2524608000000,signmethod=hmachal,gw=0,ext=0,partner_id=example.demo.partner-id,module_id=example.demo.module-id]
[inf] guider_print_conn_info(252): TLS PubKey : 00039848 ('-----BEGIN CERTI ...')
[dbg] IOT_MQTT Construct(3098): sizeof(iotx_mc_client_t) = 180!
[inf] iotx_mc_init(2183): MQTT init success!
[061724]<I> Loading the CA root certificate ...
[061730]<I> ok (0 skipped)
[061733]<I> Connecting to /a1MzxOdcBn0.iot-as-mqtt.cn-shanghai.aliyuncs.com/1883...
netm_query_dnsserver 208.67.222.222
netm_parse_domain "a1mzxodcbno.iot-as-mqtt.cn-shanghai.aliyuncs.com"
[062205]<I> ok
[062206]<I> . Setting up the SSL/TLS structure...
[062212]<I> ok
[062214]<I> Performing the SSL/TLS handshake...
    
```

阿里云三元组信息

成功连接阿里云MQTT云端服务器

图 4-11 成功连接阿里云 MQTT 云端服务器

5 结论

物联网的应用广泛，从基础的端点到网关再延申至云端，之间需要控制、连网及加密等技术。透过阿里巴巴云端服务计算公司与新唐科技共同推出基于 NuMaker-IOT-M487 的 AliOS Things 开发工具包，能让使用者的应用更快速的导入。

6 REVISION HISTORY

Date	Revision	Description
2019.02.22	1.00	1. Initially issued.

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