GTI-RW612 Matter/ Thread Gateway-Quick Start Guide

Rev 1.0- Mar 03, 2024

Revision history

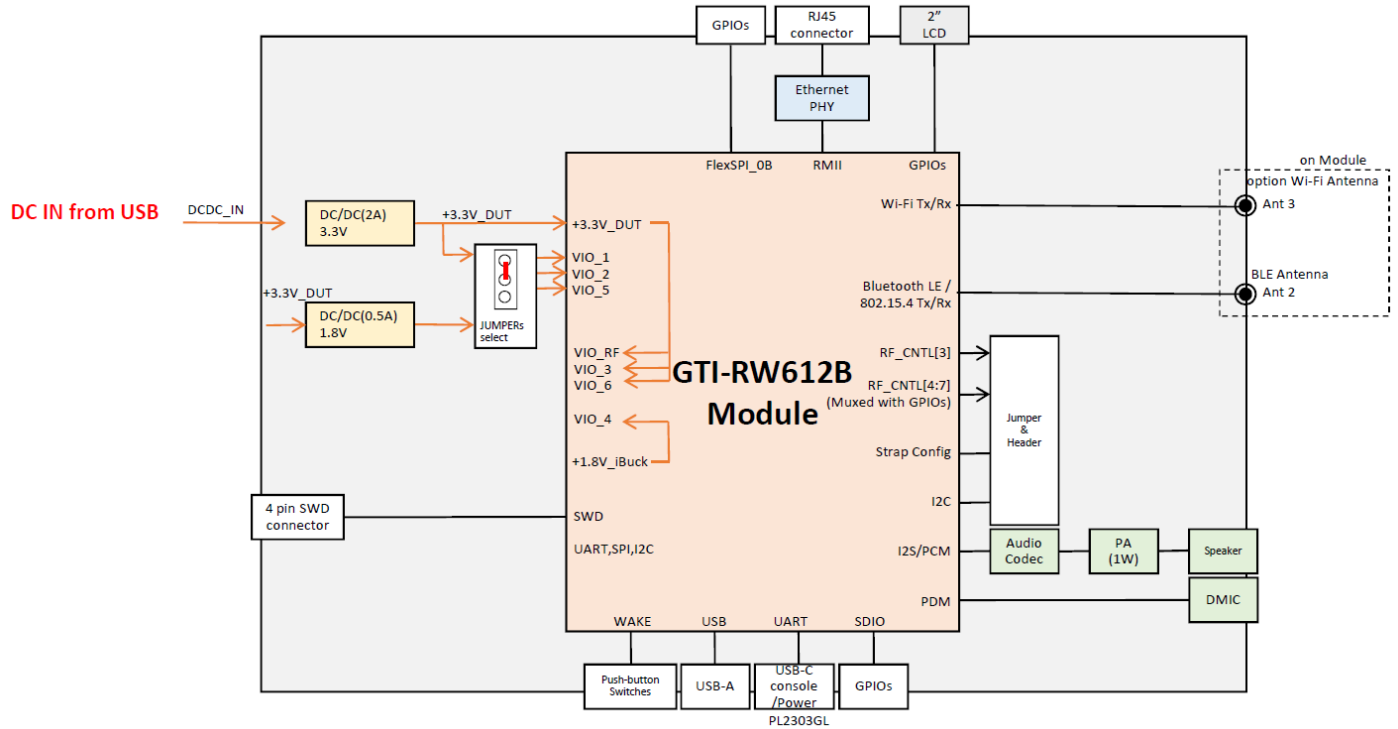| Date	Revision	Board Rev	Section/ page	Description
Mar 03, 2024	Rev 1.0			

Table of Contents

1. Overview

This document describes how to get start with the GTI-RW612 matter/ thread gateway and control your appliances or gadgets that comply with the Matter or Thread protocols.
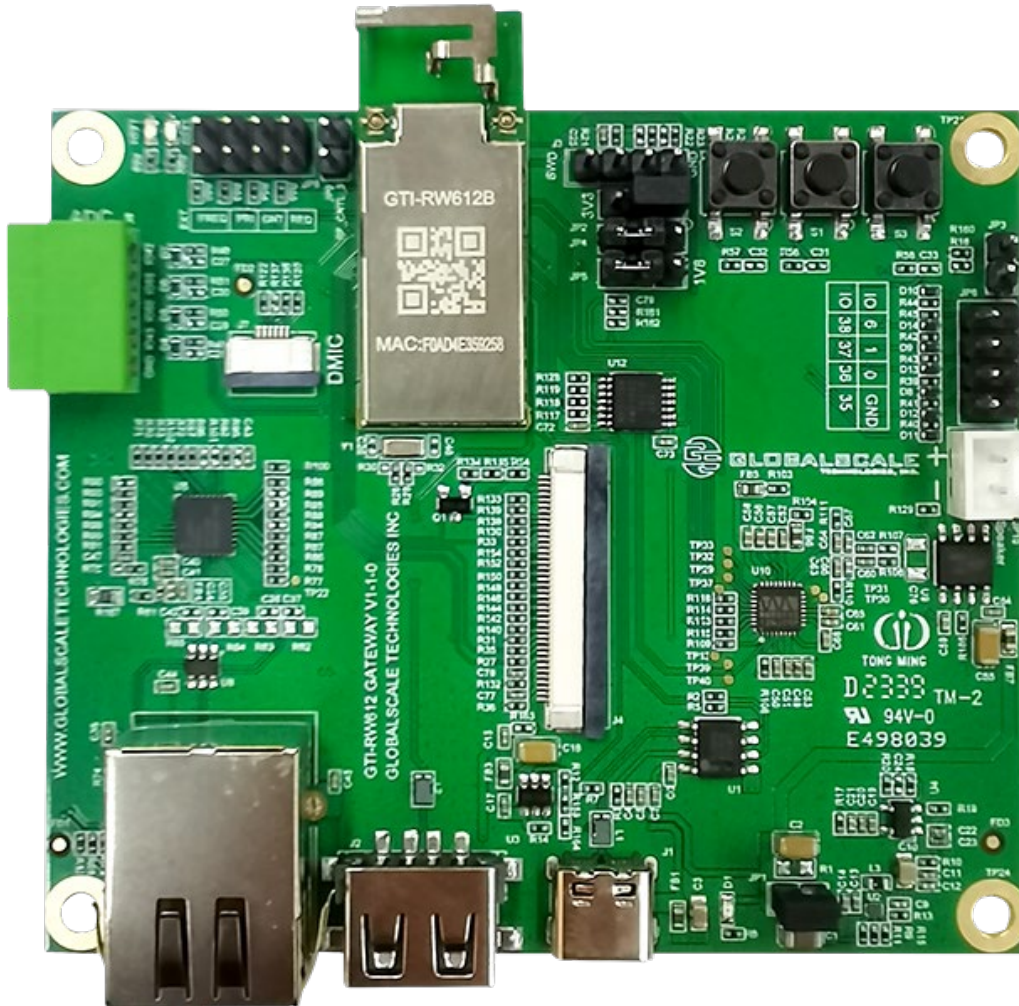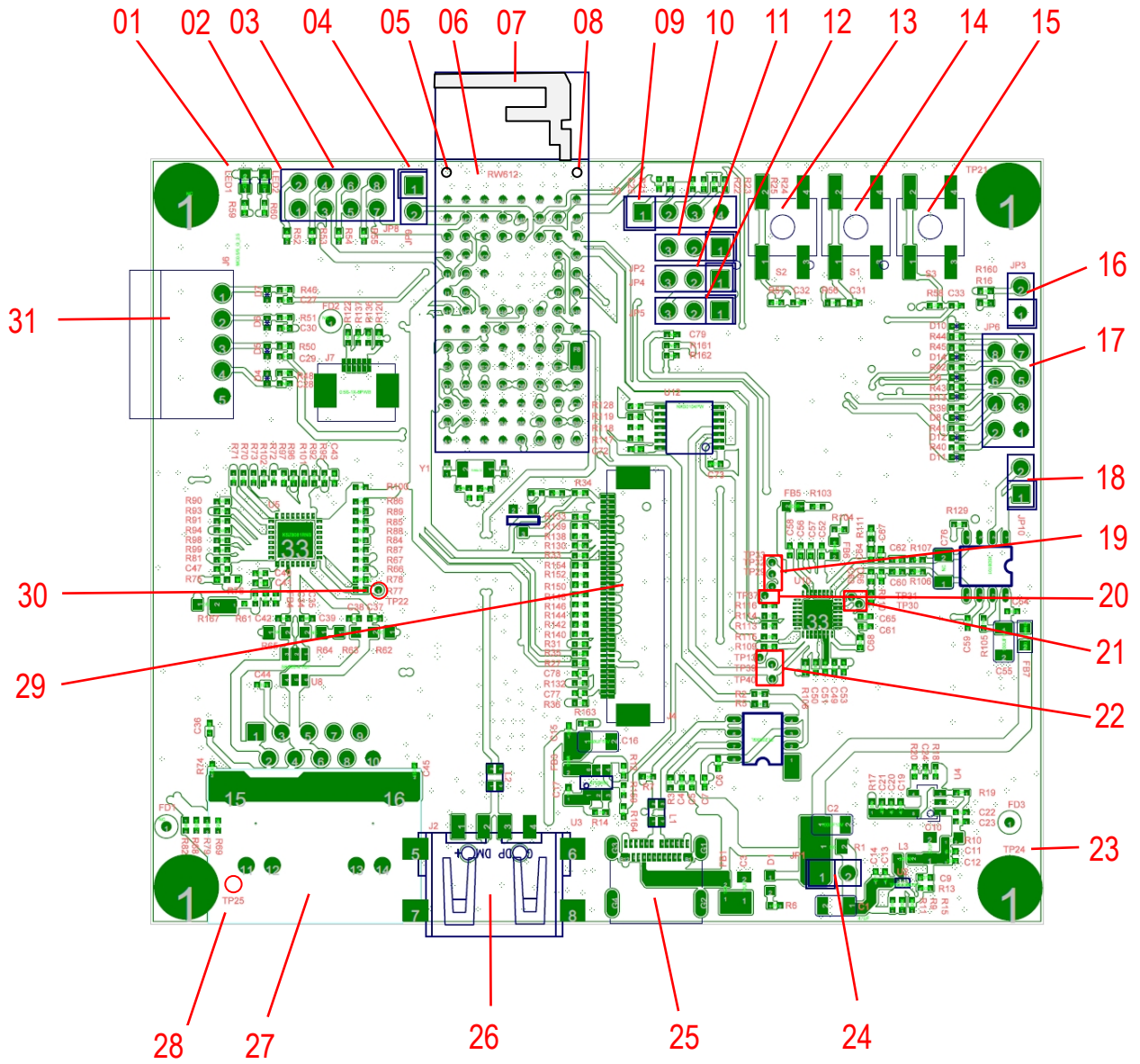
2. Block diagrams

3. Key Features

|	
MCU	• NXP 260MHz Arm Cortex-M33 with TrustZone-M
Memory	• 1.2MB integrated SRAM • 256KB on-chip Flash • 64MB QSPI Flash
RF signals	• Wi-Fi 6 • BLE 5.2 • 802.15.4 radios support matter with thread • Integrated Wi-Fi PA, LNA • T/R switch up to +20 dBm Tx power
USB ports	• USB type-C for power-in and debug console • USB Micro-B, USB2.0
Ethernet	• RJ45, 100Mbps ethernet
Audio	• Speaker, I2S audio codec with 1W PA • DMC, Microphone
Display	• LCM, 2" color, 320x240
Debugging	• SWD connector
I/O	• Reset button • ADC x1, ADC trigger x1 • DAC x1, DAC trigger x1 • User GPIOs x19

4. Appearance and I/Os

No	Parts	Func	Description
01	LED1	Green LED, 3.3V low active	GPIO_3
02	LED2	Red LED, 3.3V low active	GPIO_4
03	JP8	4x2 header for boot options	1-2, con[3](EXT_FREQ) 3-4, con[2](EXT_PRI) 5-6, con[1](EXT_GNT) 7-8, con[0](EXT_REQ) Con[3],con[2],con[1],con[0] configuration: 1111: boot from QSPI Flash(default) 1110: ISP boot 1101: serial boot 1100: SDIO boot 1011: USB boot 1010: SPI EEPROM boot
04	JP9	2-pin wire jumper (RF_CNTL_3)	RF_CNTL_3 must be high (jumper in) for the first time downloading firmware
05	Con3	Ext. ant for dual band Wi-Fi	Ext. Wi-Fi dual band antenna
06	RW612	module	GTI-RW-612B module
07	ANT0	Metal ANT for Wi-Fi	On board Wi-Fi dual band antenna
08	Con1	Ext. ant for BLE & 802.15.4	BLE and Matter ANT
09	J3	SWD JTAG	Pin1- 3.3V Pin2-SWDIO Pin3-SWDCLK Pin4-GND
10	JP2	3-pin power config for VIO_1 Default=1.8V	Pin1, +1.8V Pin2, VIO_1 Pin3,+3.3V
11	JP4	3-pin power config for VIO_2 Default=3.3V	Pin1, +1.8V Pin2, VIO_2 Pin3,+3.3V
12	JP5	3-pin power config for VIO_5 Default=3.3V	Pin1, +1.8V Pin2, VIO_5 Pin3,+3.3V
13	S2	Tact switch	GPIO_6, low active
14	S1	Tact switch	PDn , Power down then reset?)
15	S3	Tact switch	GPIO_11, low active
16	JP3		PDn , Power down then reset?)
17	JP6	User GPIOs	Pin1, GND Pin2, GPIO_35 Pin3, GPIO_0 Pin4, GPIO_36 Pin5, GPIO_1 Pin6, GPIO_37

			Pin7, GPIO_6 Pin8, GPIO_38
18	JP10	1x2 Speaker connector	Pin1, SPN (negative) Pin2, SPP (positive)
19	Test points	Test points	TP33, audio Line-in Right TP32, audio Line-in Left TP29, mic Line-in
20	Test points	Test points	TP37, I2S-MCLK (GPIO5)
21	Test points	Test points	TP31,audio HP-out right TP30,audio HP-out left
22	Test points	Test points	TP13, codec_alt_in (GPIO_10) TP39, audio SDA_CODEC TP40, audio SCL_CODEC
23	Test points	Mounting holes	TP24,TP25, TP20, TP21

S2   S1   S3

RJ45   USB2.0   USB   SPEAKER
            Type-A   Type-C
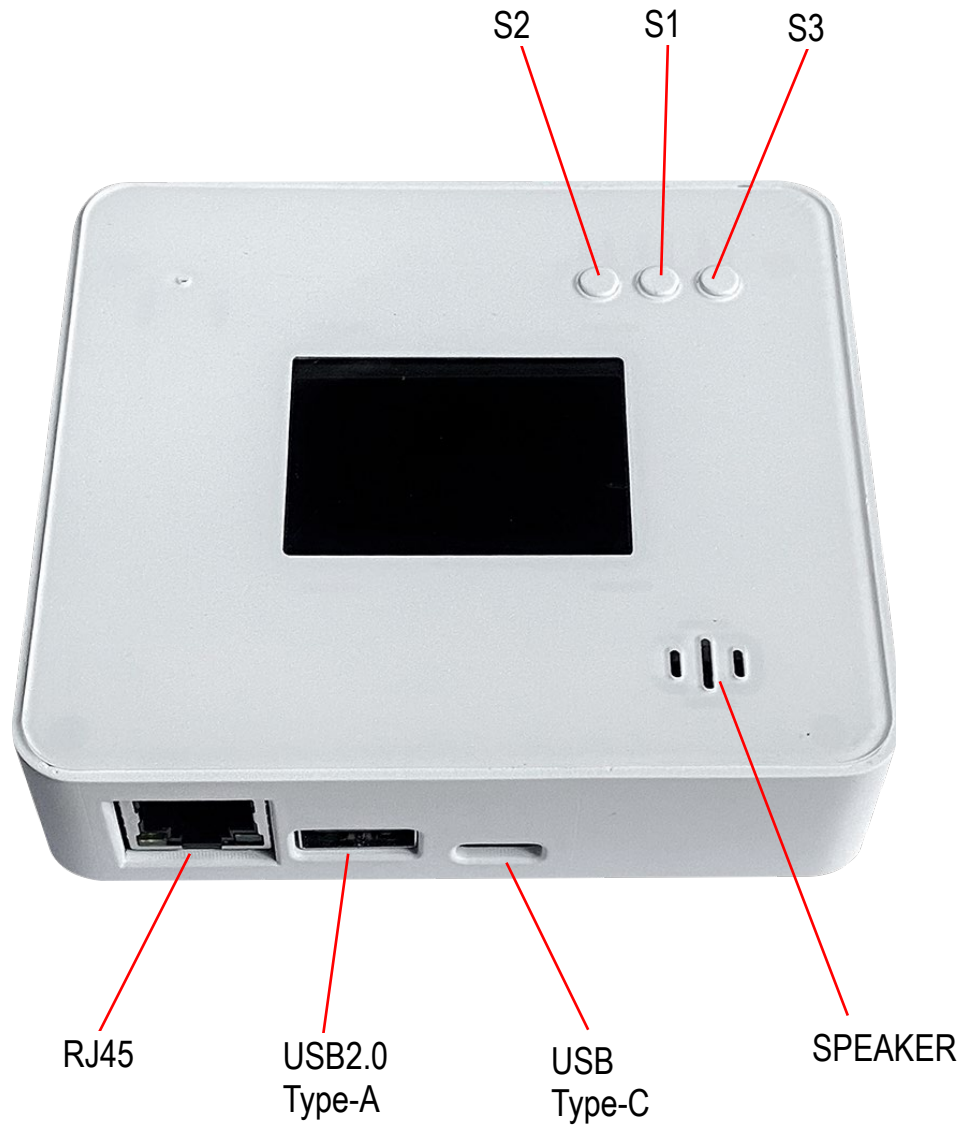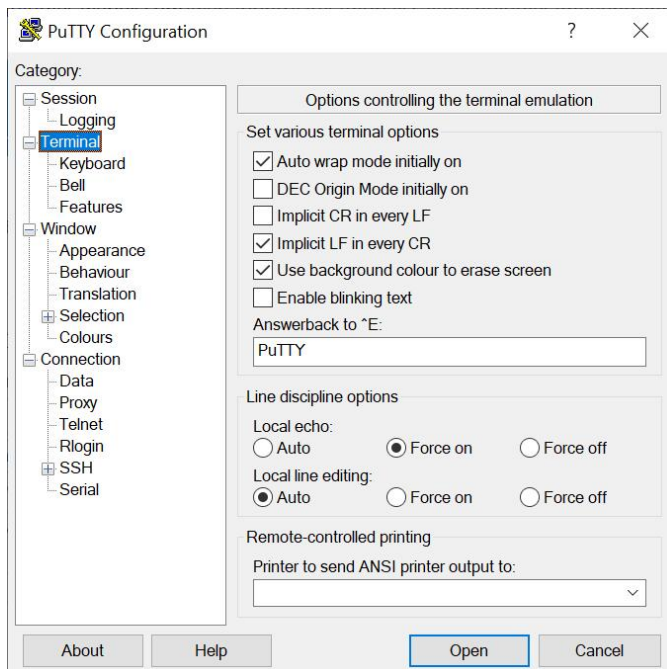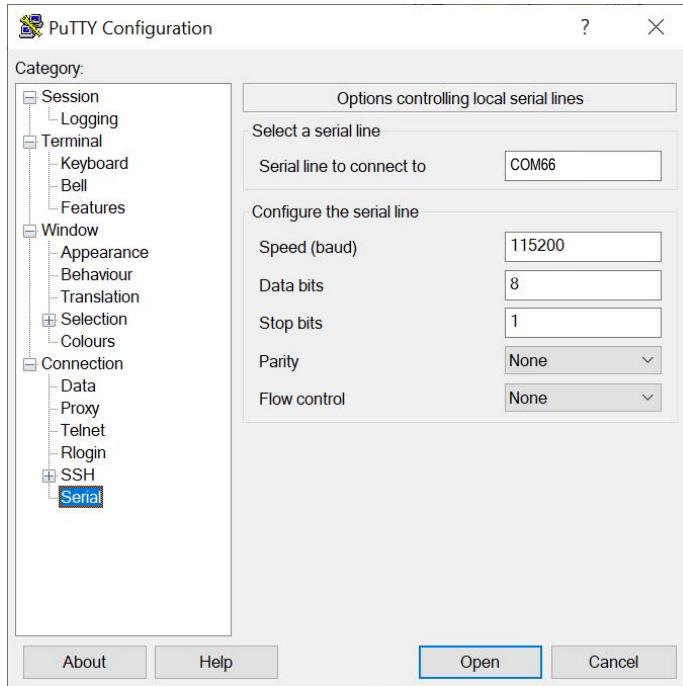
5. Set up the serial terminal in your PC

1. Download and install PL2303 USB to UART driver.
2. Open "device manager" on your PC then you will find new devices as the following pictures:
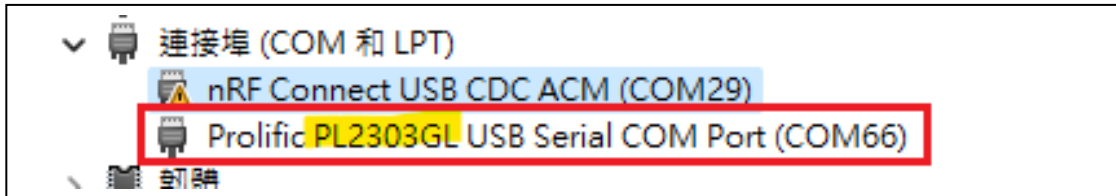
Note: The COM port number like COM66 here, will change due to different PC
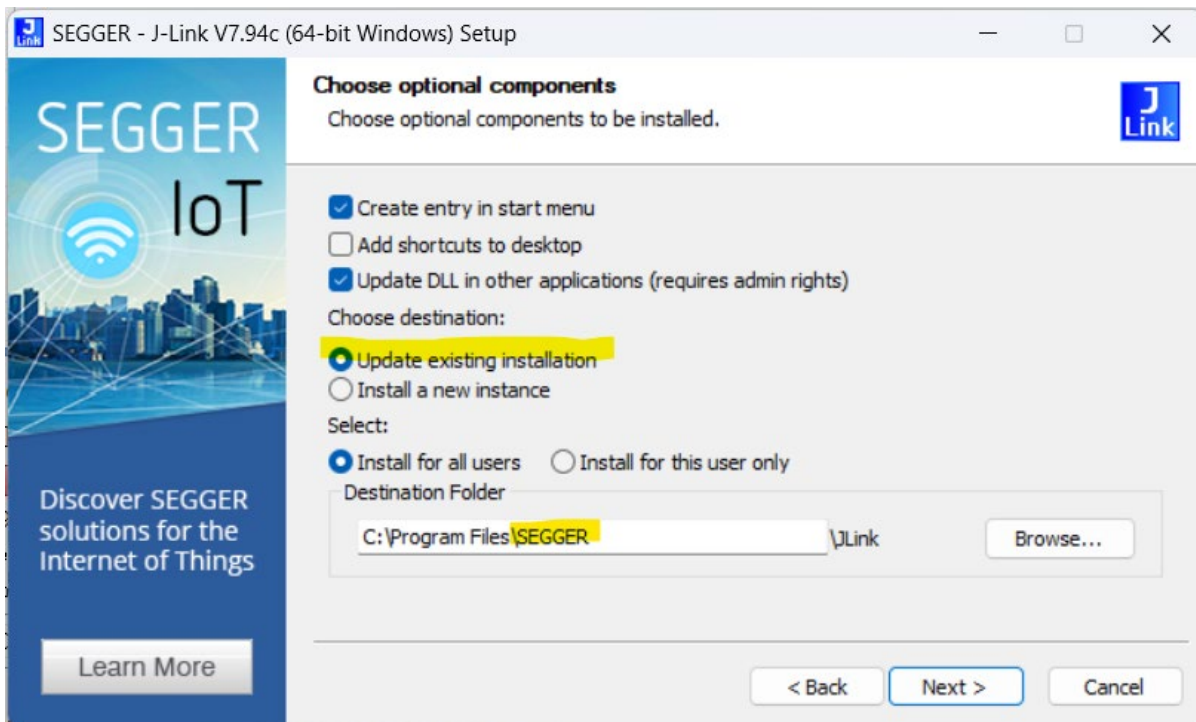
0

## 5.1   Run putty or tera term

6. Matter and Thread set up

6.1   Burning firmware

1. Download J-Link and NXP RW612 patch, then install J-Link,
    a. select   "Update existing installation" so J-Link will be installed to the directory, C:\Program Files\SEGGER\JLink

2. Unzip iar_segger_support_patch_rw610.prc_v1.zip,
    a. Find JLink.zip in the directory then unzip it.
    b. Follow readme.txt, copy the whole directory of \Devices and the file "JLinkDevices.xml " to C:\Program Files\SEGGER\JLink.

3.   Download "RW612 OpenThread Border Router firmware" (For A2 chip) then unzip it, the destination directory cannot have a space character

4.   Connect J-Link to the interface board

a. Connect the cable to J3 of RW612 gateway board, use only pin2,3,4 leave pin1 open
b. Connect the Type-C USB cable for the power supply, this Type-C USB port works as the UART console too.
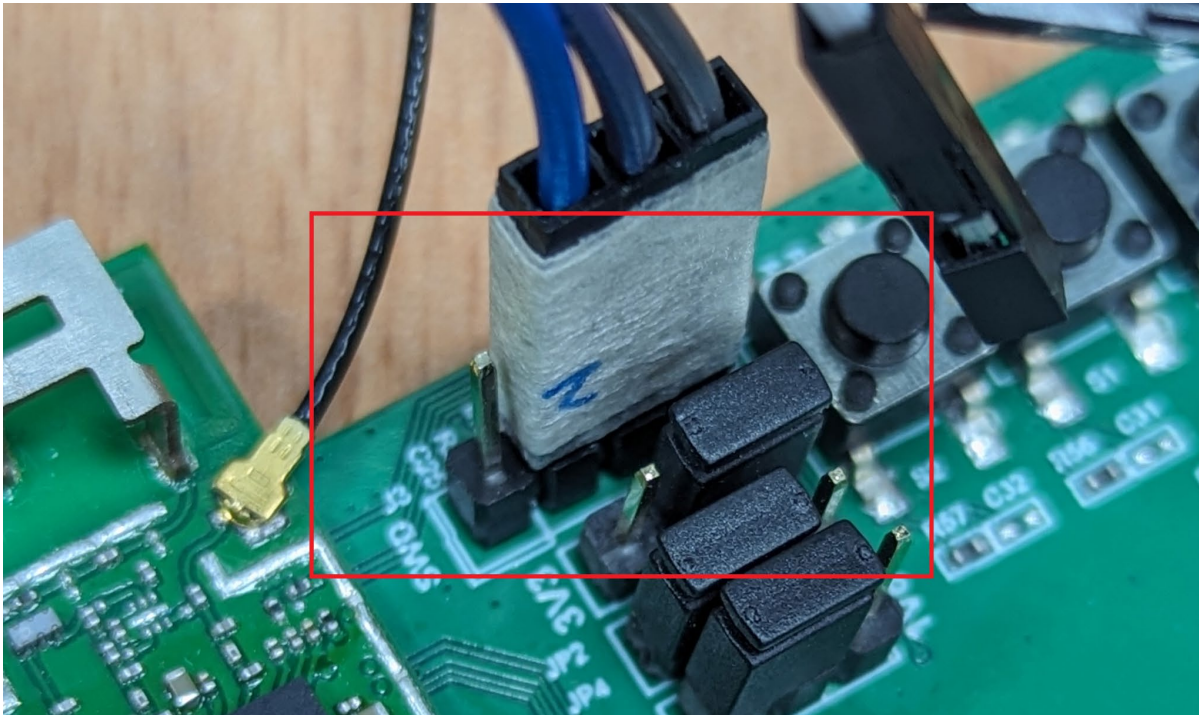
5. unzip "matter_otbr_a2_gti.zip"
   a. Run "matter_otbr_a2_gti.bat"
   b. There will be a status bar showing the progress, once done without error means the firmware burning is OK.
   c. Press the RESET button or recycle the USB cable to start the system with the new firmware.

6. If the prompt ">" shows on the console when pressing the "Enter" key, then the system is up and running.

6.2   Install NXP CHIP-Tool

1. For Matter connection, please go to Google Play, search for "Google Home app" and install it.
2. Your Android phone must have Android 8~13 (13 is preferable), download then install   app-chip-tool-v1.20.16-Rev0-release-ab2ep4-1.apk ,
3. The "NXP Chip-Tool " is owned by NXP. To use it, please obtain NXP's authorization first
4. You will see the CHIP Tool icon on your Android phone App list after installation.
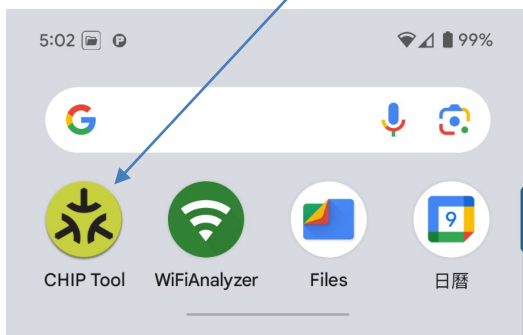
5. Go to setup-> Google -> Device and Share, you should see "Matter Device"

6. To set app permissions, long press on the Chip Tool icon, select "Application Information", then select "Permissions" to allow all permissions. Newer phones will have the "Neighbor Devices" option, which also needs to be allowed

7. Please turn on the BLE for the matter paring.

6.3   Configure and paring with Matter device

1. Use a Type-C USB cable to connect RW612 and PC
2. Run putty or Teraterm, open USB UART console (115200 8N1, no flow ctrl)
3. Enter commands as below in red.

```
> matterfactoryreset      <-- for new pairing or re-pairing
Done
> > >
> wifi connect TPC-RD rd3tpctw      <--SSID:TPC-RD, wifi password:rd3tpctw
Done

                              <-- It takes around 15s for RW612 connects to Wi-Fi AP

> ble adv stop
Stopping BLE advertising
Done
> otcli dataset init new
Done
> Done
> otcli dataset
Active Timestamp: 1
Channel: 17
Channel Mask: 0x07fff800
Ext PAN ID: e90abe8989a63e7c
Mesh Local Prefix: fdf8:6ce5:9098:8257::/64
Network Key: bed254d8b254a17f12a8b7b9fda67949
Network Name: OpenThread-881f
PAN ID: 0x881f
PSKc: 0d2767972cfed06734789ff974401afe
Security Policy: 672 onrc 0
Done
> Done
> otcli dataset channel 15
Done
> Done
> otcli dataset commit active
Done
> Done
> otcli ifconfig up
Done
> Done
> otcli thread start    <-- wait for 5~10s after execution
Done
> Done
> otcli state    <-- if the response is not "leader", run otcli state again
detached
Done
> Done
> otcli state
```

```
leader              <-- the response is "leader", execute next command
Done
> Done
> otcli dataset active
Active Timestamp: 1
Channel: 15
Channel Mask: 0x07fff800
Ext PAN ID: e90abe8989a63e7c
Mesh Local Prefix: fdf8:6ce5:9098:8257::/64
Network Key: bed254d8b254a17f12a8b7b9fda67949
Network Name: OpenThread-881f
PAN ID: 0x881f
PSKc: 0d2767972cfed06734789ff974401afe     <-- this string will be needed in the App
Security Policy: 672 onrc 0
Done
> Done
>
# If the OTBR has been set but has not been paired with the phone, after some time, the OTBR will close the pairing status,
If you want to restart it, you can execute 'matercommissioning on' or reset it.
>
> mattercommissioning on
> Done
>
```

4. After setting the OTBR, connect your phone with NXP Chip Tool to the Wi-Fi SSID in the above command
5. Prepare QR Code stickers for the Matter device, you will see the NanoLeaf stickers in the packaging box or printed on the bottom of the light bulb
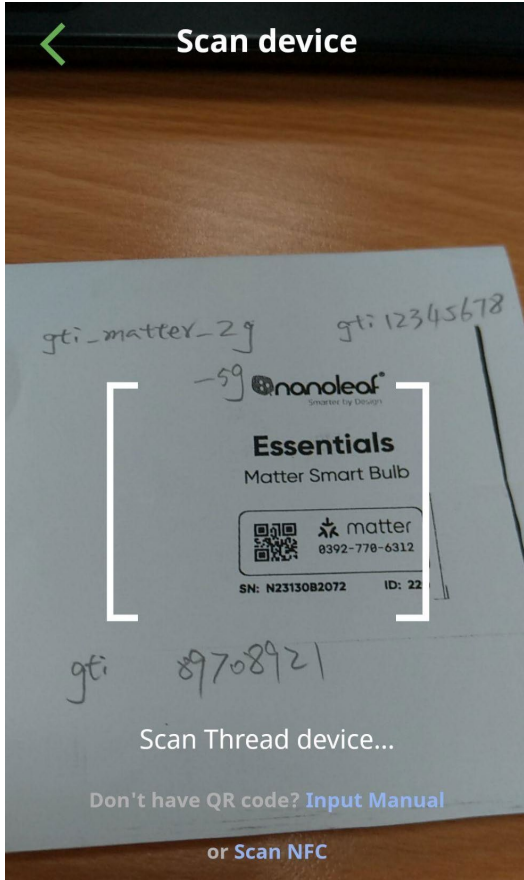
6. run Chip-Tool, select "+ Pair New Device".

NXP   Everything Connected

My Home

You don't have any devices
Please click on the button below to pair new device

＋　Pair New Device

7. select "Thread Device"

You don't have any devices
Please click on the button below to pair new device

On Network Device   ＞
Provision Matter device on Network

Wi-Fi Device   ＞
Provision Matter device with Wi-Fi

Thread Device   ＞
Provision Matter device with Thread

8. Scan the QR code on the matter device

9. Select OTBR. If you cannot find it, please press "Discover" to search again. If not, please confirm if your Wi-Fi is connected to the correct Wi-Fi router When making a selection, it is also necessary to confirm whether the OTBR name matches the one just set

Select OTBR

Select the Thread Network below
that you want to pair.

OpenThread-881f

IP: fe80::250:43ff:fe02:fe01

Discover

Input Manual

```
> otcli dataset active
Active Timestamp: 1
Channel: 15
Channel Mask: 0x07fff800
Ext PAN ID: e90abe8989a63e7c
Mesh Local Prefix: fdf8:6ce5:9098:8257::/64
Network Key: bed254d8b254a17f12a8b7b9fda67949
Network Name: OpenThread-881f
PAN ID: 0x881f
PSKc: 0d2767972cfed06734789ff974401afe
Security Policy: 672 onrc 0
```

10. After selecting OTBR, it will be required to enter Passphrase/PSK-C. Please select PSK-C and enter the PSK-C of OTBR
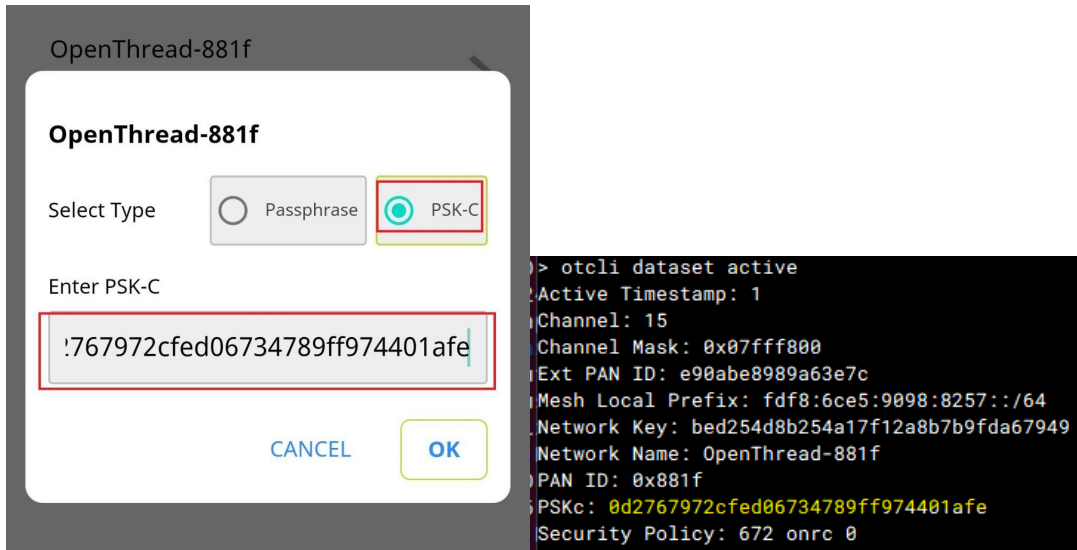

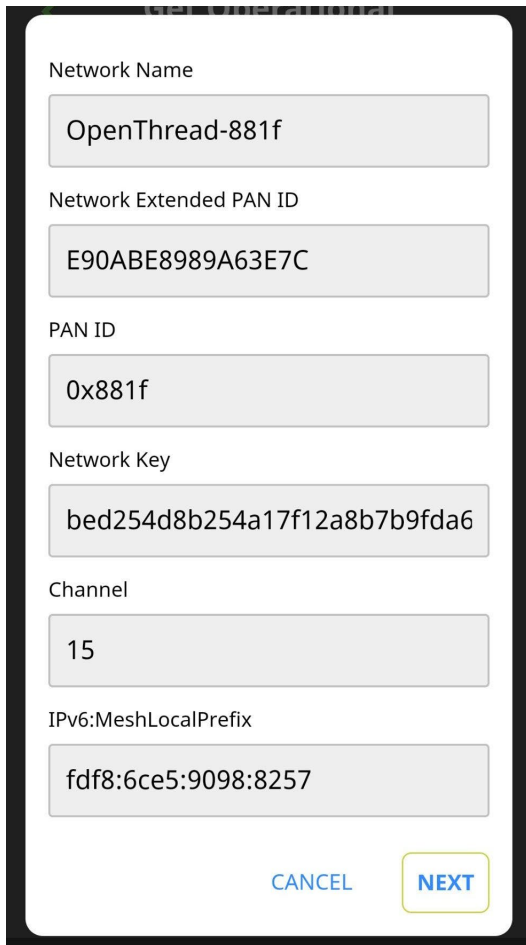PSK-C is relatively long, please input carefully.

Note: You can use communication software to send PSK-C to your phone for copying and pasting, or find a website with Text to QRcode to copy and paste PSK-C, convert it into QR code, and then scan your phone to obtain the PSK-C text and copy and paste it into the PSK-C input box below,

https://www.qr-code-generator.com/solutions/text-qr-code/

11. After filling in PSK-C and pressing OK, the APP will start obtaining the operational dataset of OTBR through the network
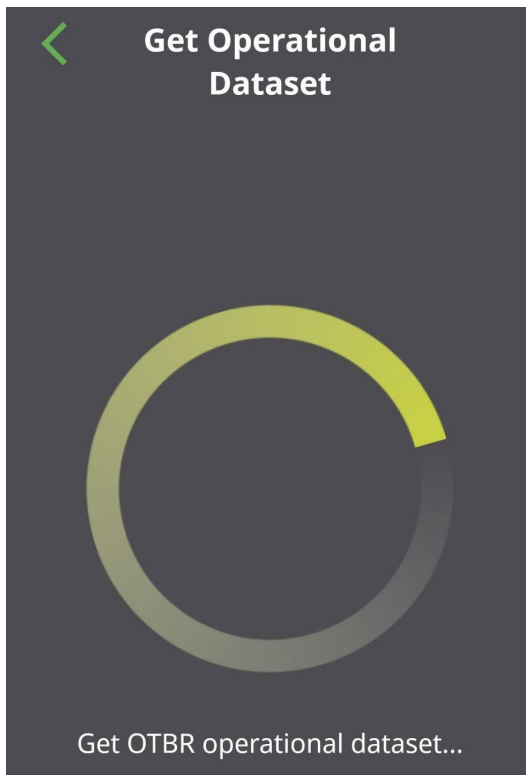
12. If there are no issues, the OTBR dataset will be displayed. Please confirm that the data is correct and do not press "NEXT" for now

Network Name

OpenThread-881f

Network Extended PAN ID

E90ABE8989A63E7C

PAN ID

0x881f

Network Key

bed254d8b254a17f12a8b7b9fda6

Channel

15

IPv6:MeshLocalPrefix

fdf8:6ce5:9098:8257

CANCEL   NEXT

13. Power on the Nanoleaf bulb and put it into pairing mode Turn off and on the power quickly 5 times, the light bulb will flash red a few times, indicating resetting the light bulb and entering pairing mode

Note: The Nanoleaf bulb uses 220V/AC,
There is a 220V to 110V voltage converter shipped with the package, you can use it for the 110V/AC power

14. Press "Next" in step 13, and the APP will start pairing the Matter device. The pairing time is a bit long, taking 2-3 minutes. If it still cannot be paired, you can go back to step 9 and pair again

Note: Just in case the RW612 OTBR halted while pairing, please check to see if the Console still has a response. If there is no response, please restart the OTBR and perform a "materfactoryreset" to start over
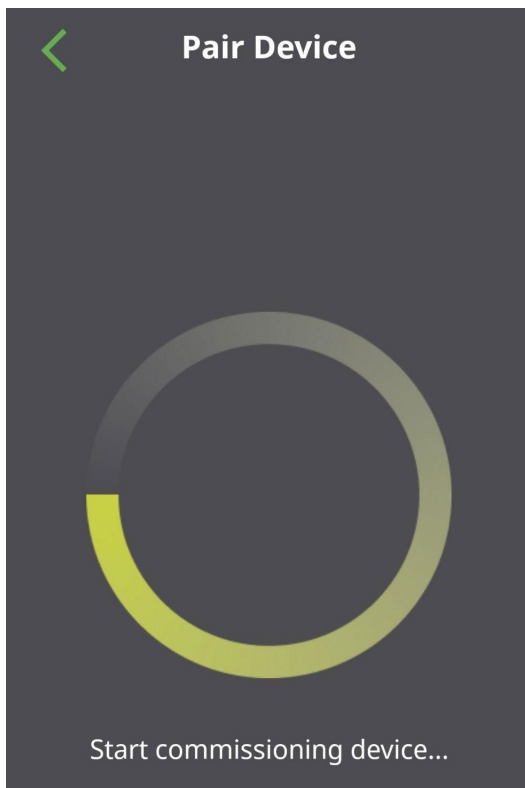
15. After successful pairing, the app will ask for the device name and device type Please enter "Lighting"

Device Name

Enter your device name below.

Device Name

office light

Device Type

Lighting ▼

Save

16. After pressing "Save", you can see the icon of the light bulb on the main screen of the APP

Everything Connected

My Home ↻ +

office light

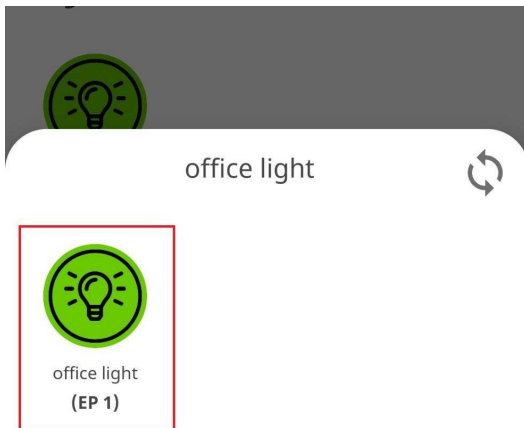17. Quickly tap twice on the light bulb icon will toggle the status of the light bulb

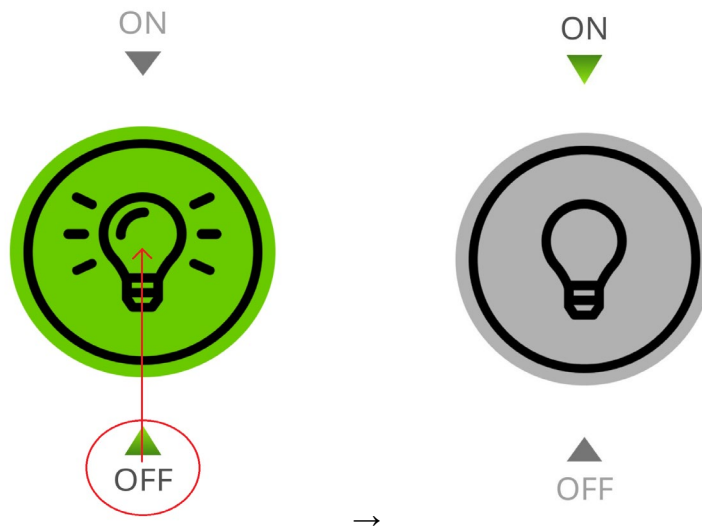18. Tap the icon once will display how many EndPoints the device has

19. Tap on EndPoint (EP1) again to enter the light bulb switch screen

office light

ON
▼

OFF

20. To switch ON or OFF of the bulb, simply tap and hold the triangle $\triangle/\triangledown$ and drag it to the light bulb area

21. If you want to Unpair this Matter device, you can tap on the "i" icon in the upper right corner to view the Device Info and drop it down to the bottom. Tap on "Unpair this Device" will delete the device

Save

<u>Unpair this Device</u>

Alternatively, you can long-press the icon on the APP homepage and select "Remove" on PopMenu to force removal of the matter device.

NXP Everything Connected

My Home   ↻   +

Control

Edit

Share

Remove

22. By default, the OTBR and Matter devices will remember the pairing information, so when restarting after a power off, there is no need to reset the OTBR and Matter devices. However, after testing, it was found that after the OTBR restarts, the Wi-Fi does not seem to reconnect to the Wi-Fi router. At this time, the following command can be executed on the USB Console to make the OTBR reconnect to the Wi-Fi router

```
> wifi connect TPC-RD rd3tpctw
Done
>
```

In addition, when opening the app, you will see a red exclamation mark symbol on the light bulb icon, indicating that the status has not been synchronized yet and needs to wait for a while. You can also press the Refresh symbol in the upper right corner to reorganize (even if you press Refresh, it will still take a short time for the status to synchronize)

Everything Connected

My Home   ↻   +

office light
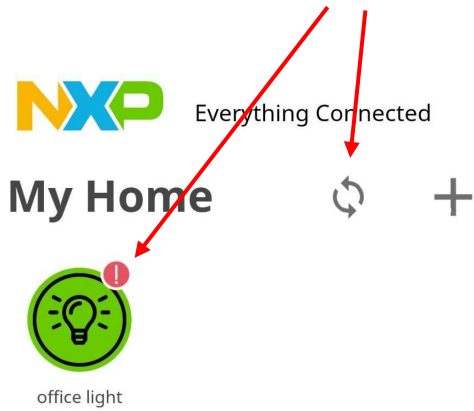
6.4   Network setting

Always make sure you have the network properly set. IPv6 is preferable

7. Contact Information

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