Smart Home/Industry IoT Gateway Hardware User's Guide

MODEL:GTW361

Room 02-04, 10/F, Block A, Building 8, Shenzhen International Innovation Valley, Dashi Road,
Nanshan District, Shenzhen, Guangdong, China

Contents

1 Introduction

1.1 Product introduction

GTW361 adopts NXP i.MX6ULL SoC solution. The SoC frequency is 792MHz~900MHz, with 512MB（256MB/1GB optional）memory , 8GB eMMC Flash (4GB optional), and the product can be configured as required. GTW361 has a 10/100M LAN port, Wifi 2.4G and LTE functions. It can expand ZigBee, Z-Wave, BLE, and other wireless functions by adding Geniatech standard IoT daughter boards, can also support LoRa remote transmission protocol,which is very convenient and flexible for different applications. GTW361 is widely used in industrial 4.0 and industrial IoT and smart homes, smart city and other fields. Because SOC is from NXP , the industrial temperature range is wide, and it is also used in some industrial fields. The product can be customized on hardware functions, software kernel,case and packaging .

1.2 Function features

- Using NXP i.MX6ULL scheme, the frequency up to 792MHz~900MHz.
- 512MB（256MB/1GB optional）memory , 8GB eMMC Flash (4GB optional)
- Support IEEE802.11 a/b/g/n standards
- Integration of ZigBee,WiFi,BLE,Z-Wave,LoRa wireless network protocols
- Dual LAN network interface for network connection and industrial control
- LoRa WAN communication gateway, supports LoRaWAN communication specification, supports uplink multi-channel concurrency, can be 8 channel uplink, 1 channel downlink uplink at the same time.
- The mature, stable and extensible Yocto system is adopted
- Unique software algorithms ensure network security
- USB2.0 data port for connecting USB storage devices and for connecting new RF modules.
- Provides RS485,RS232,GPIO interfaces for industrial use, and supports ModBus and other common protocols.
- Customization for special applications, open API interface.

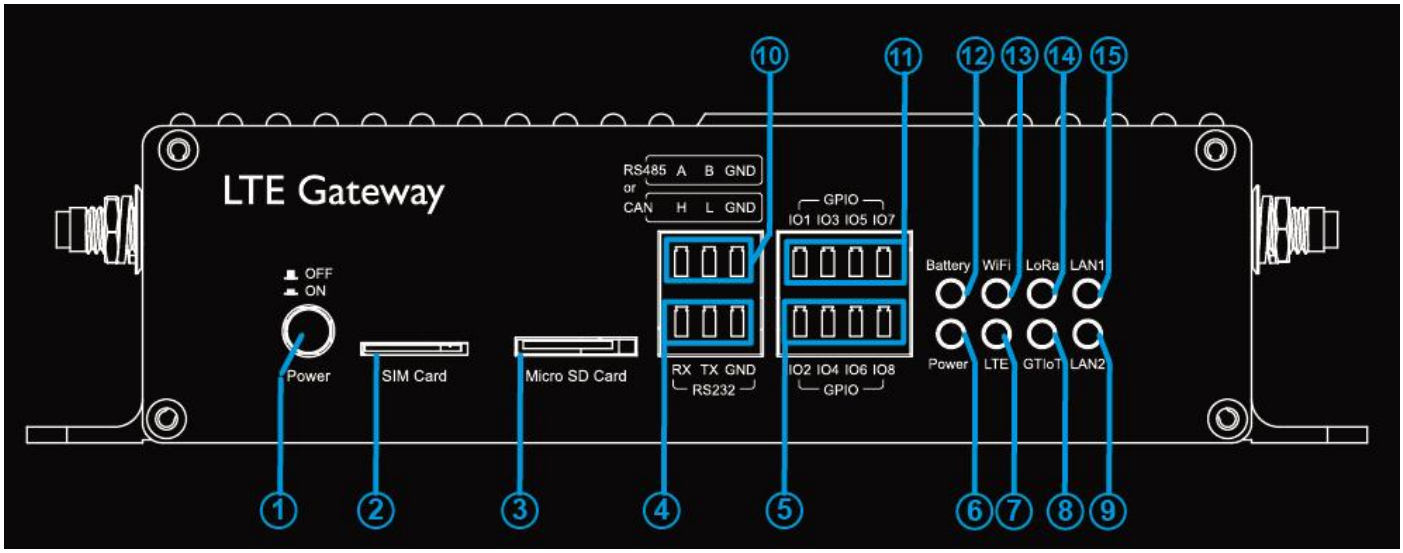
1.3 Key features:

CPU	Chip	NXP i.MX6ULL
	CPU Frequency	Single ARM Cortex-A7 792MHz~900MHz
Storage	Internal Memory	512MB(256MB/1GB optional) DDR3
	Internal Storage	8GB(4GB optional) EMMC
Network	2G/3G/4G/LTE Cat4	LTE for EU、LTE for AU、LTE for US(Optional)
	Built-in WiFi	802.11 a/b/g/n
	WiFi 2.4G Frequency Range	2.400~2.497GHz
	Ethernet port(LAN)	2*RJ45 10/100Mbps LAN
	PoE	IEEE802.3af standard， PoE PD with TVS protection（optional）
I/O interface	USB	USB-A 2.0 x 1
	Type C	for Power Supply
	RS232	3P 15EDGK-3.81mm
	RS485/CAN	3P 15EDGK-3.81mm (Choose one of the two functions)
	GPIO	4P*2 15EDGK-3.81mm
	Relay*2	4P 15EDGK-3.81mm
Protocol	ZigBee	3.0 (optional)
	Bluetooth/BLE	4.1 (5.0 optional)
	RS485	TIA485/EIA-485-A -7~+12V
	CAN	ISO11898-2:2016 and SAE J2284-1 to SAE J2284-5 ESD Protection(8kV IEC and HBM) 5Mbit/s
	LoRa	LoRaWAN communication specification, 8 channel downlink, 1 channel uplink at the same time（optional）.
	RS232	±5~±15V
Control interface	GPIO	3.3V level ±15KV(air) ±10KV(contact)
	Relay	2*3A 250VAC
Extended interface	LEDs	4G,LAN1,LAN2,IoT,Power,Wi-Fi,Battery,LoRa
	SIM Slot	Micro SIM Card
	SD Card	Micro SD Card
	GTIoT	2*5P 1.27 socket
	Debug	4P 2.0 ranking
	I2C	4P 2.0 ranking
	Button	Reset
Power pack	Supply voltage	DC5V 2A
	Battery voltage	3.7V 500mAH~2000mAH（optional）
	Energy	Within 5W(for reference only)
	RTC&Watchdog	3V 5mA

Environment	Operating temperature	0~70℃/-40-85℃
	Operating humidity	10%~90%
	IP protection levels	IP30
Mechanical properties	Size (mm)	168*95.7*41.2
	Net Weight (g)	425
Operating system(OS)	Linux/Yocto	
Other	WiFi/BT antenna*2,LoRa antenna（optional）,LTE antenna,GTIoT antenna（optional）.	

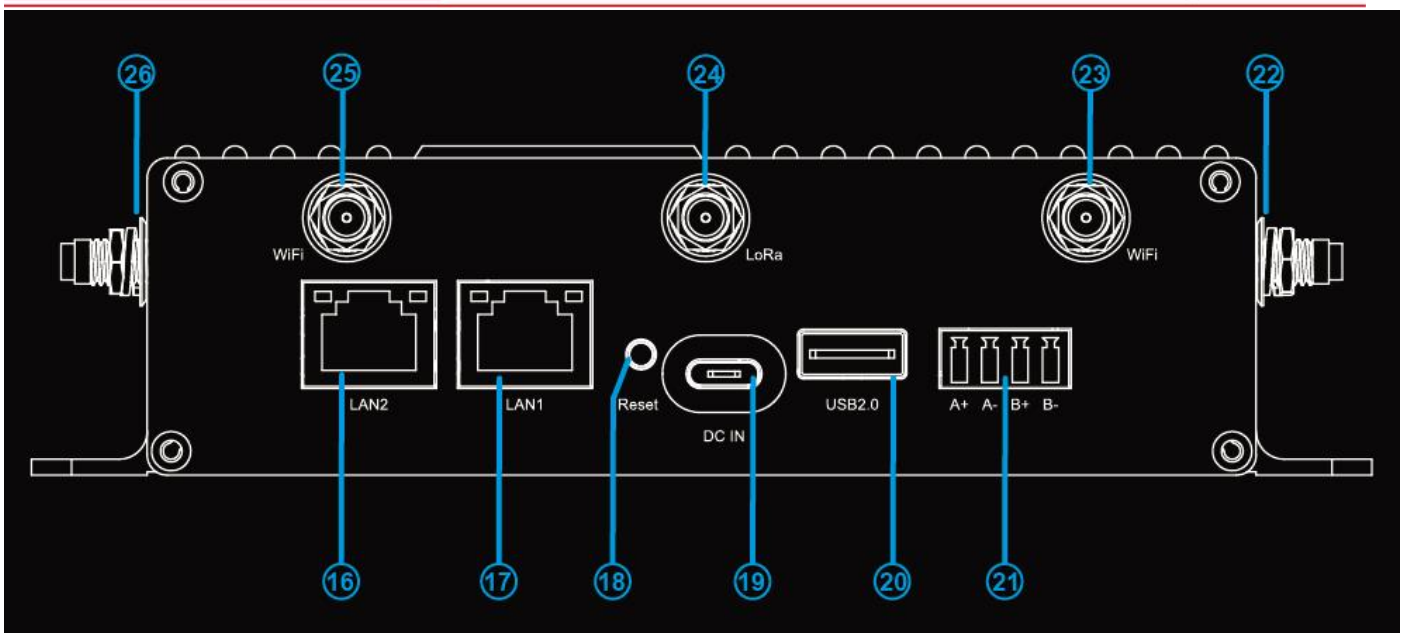
1.4 Board overview

Front panel View



Item No.	Default function	Item No.	Default function
1	Power ON/OFF	2	SIM Card Socket
3	Micro SD Card Socket	4	RS232 interface
5	GPIO interface	6	Power LED
7	LTE LED	8	GTIoT LED
9	LAN2 LED	10	RS485 or CAN interface
11	GPIO interface	12	Baterry LED
13	Bluetooth/WLAN LED	14	LoRa LED
15	LAN1 LED		

Rear panel view



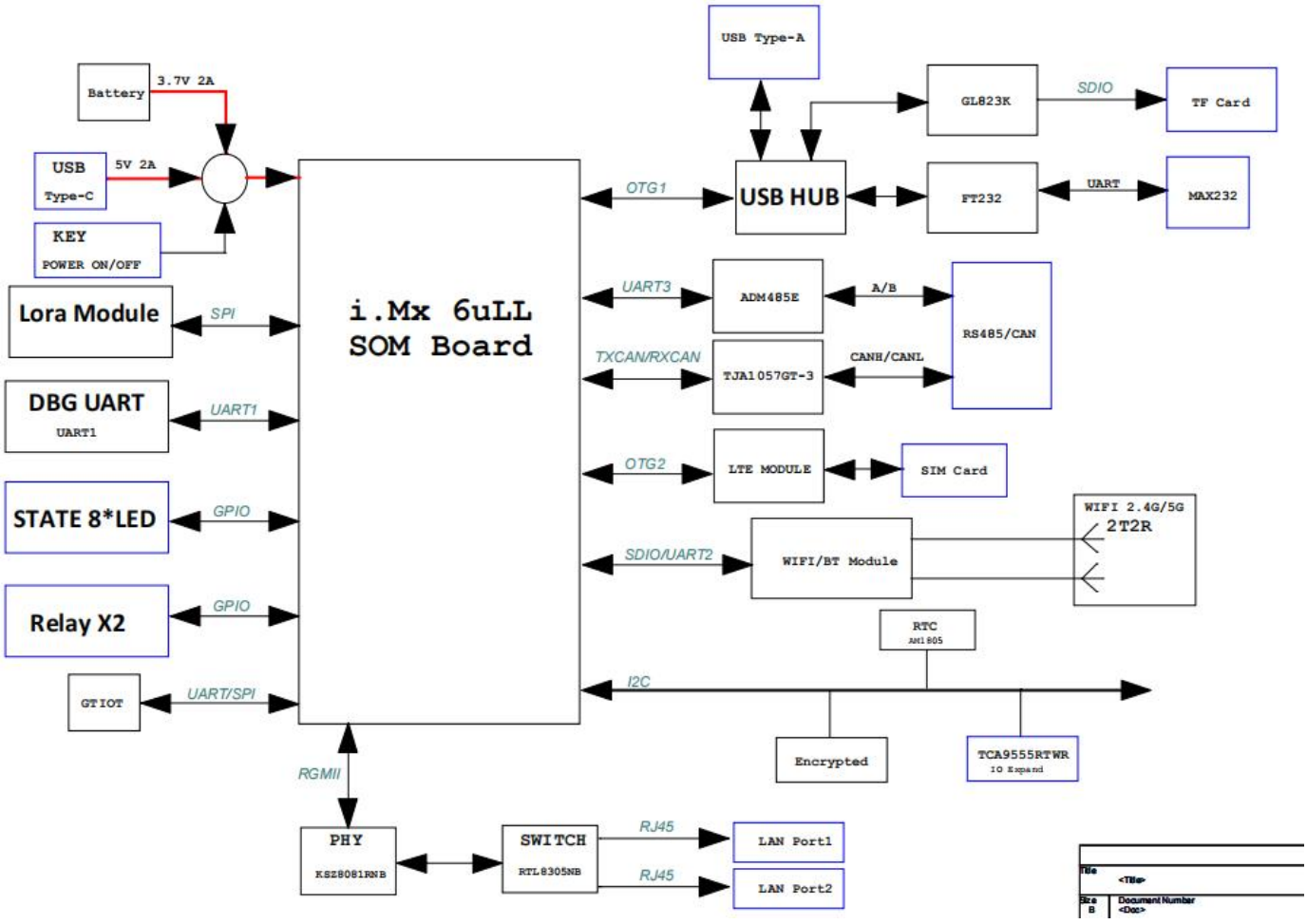
Item No.	Default function	Item No.	Default function
16	LAN2 RJ45	17	LAN1 RJ45
18	Reset button	19	Micro USB Type C and DC IN
20	USB2.0 A type	21	Relay control interface
22	LTE Antenna	23	WiFi/Bluetooth Antenna
24	LoRa Antenna	25	WiFi/Bluetooth Antenna
26	GTIoT Antenna		

2. What's in the Box

The box contains one GTW361 development board.

3.GTW361 Board Overview

3.1 System Block Diagram



3.2 Processor

GTW361 is based on NXP i.MX6ULL processor. i.MX6ULL has a single ARM Cortex A7 kernel and can run at 792MHz. It is a high-performance, super-efficient processor with an integrated power management module, which reduces the complexity of external power supply and simplifies the power time sequence. Provide a variety of storage interfaces.

3.3 Memory

The DDR3L 512MB is a 16bit width bus implementation interfacing directly to the i.MX6ULL Processor build-in LPDDR controller. The maximum DDR clock is 533MHz (800Mbps).
The eMMC is an 8bit implementation interfacing i.MX6ULL interface supporting eMMC 4.5 specifications.

3.4 MicroSDHC

The microSD card connects to the GL823K, connects to the i.MX6ULL processor via the USB, and supports the SD

2.0 specification, with up to 32GB support.

3.5 WiFi

GTW361 supports Wi-Fi (802.11 a/b/g/n/ac, 2.4GHz/5.8GHz) over WT6354 module.
The WiFi module is interfacing with i.MX6ULL Processor SD1 interface .
Module is certified with PCB trace antenna.

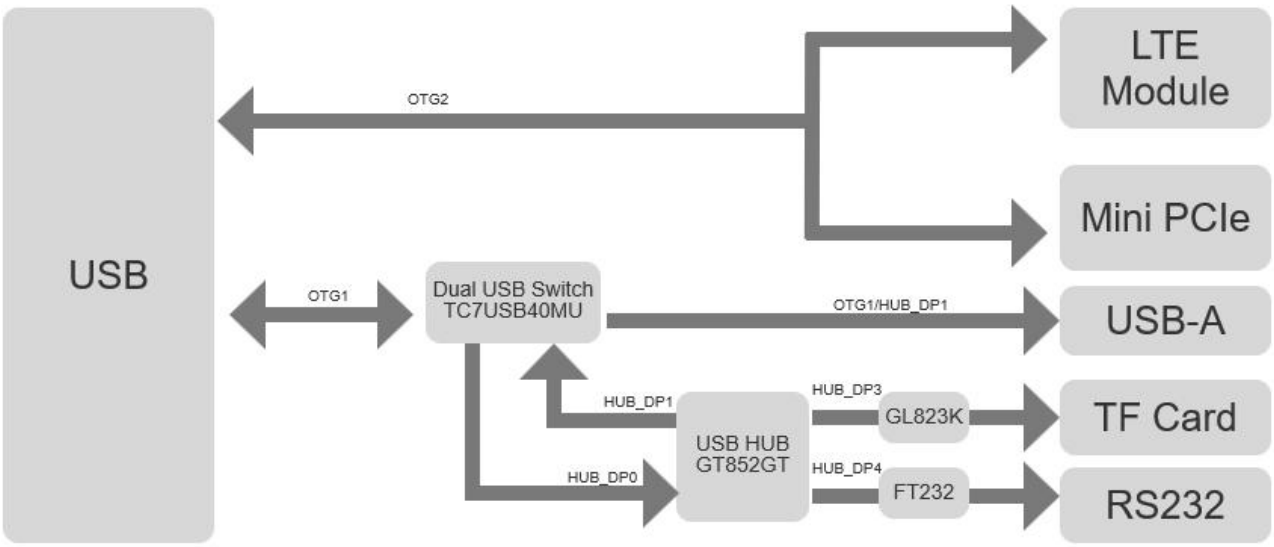
3.6 Bluetooth

GTW361 supports Bluetooth 4.1 over WT6354 module.
Bluetooth is used for Audio streaming and BLE sensor communication.
UART communication is used to transfer data between processor and connected Bluetooth device.
UART interface is used for Audio streaming over Bluetooth.
BLE is also supported in the Module.

3.7 Ethernet

GTW361 supports two 100Mbps Ethernet connection. 10/100Mbps Ethernet Transceiver Suitable for IEEE 802.3 Applications.

3.8 USB Port



3.8.1 USB-Host ports

The i.MX6ULL includes two USBOTG channels, OTG1 and OTG2, and the OTG2 interface is used directly used to connect the LTE module. OTG1 realizes USBOTG and USB HUB functions through the dual USB switch. The dialing switch SW3 is USB HUB in ON state, and USBOTG in OFF state. When using USB HUB function, connect directly to USB-A interface, connect all the way directly to GL823K, realize TF Card function, connect all the way to FT232, and realize RS232 function.

3.8.2 USB-Device port

The GTW361 implements a device port. The port is located at J5.

3.9 Debug

3.9.1 Debug UART

GTW361 supported through debug UART using 4 pin connector at 2J2.

3.9.2 USB debug

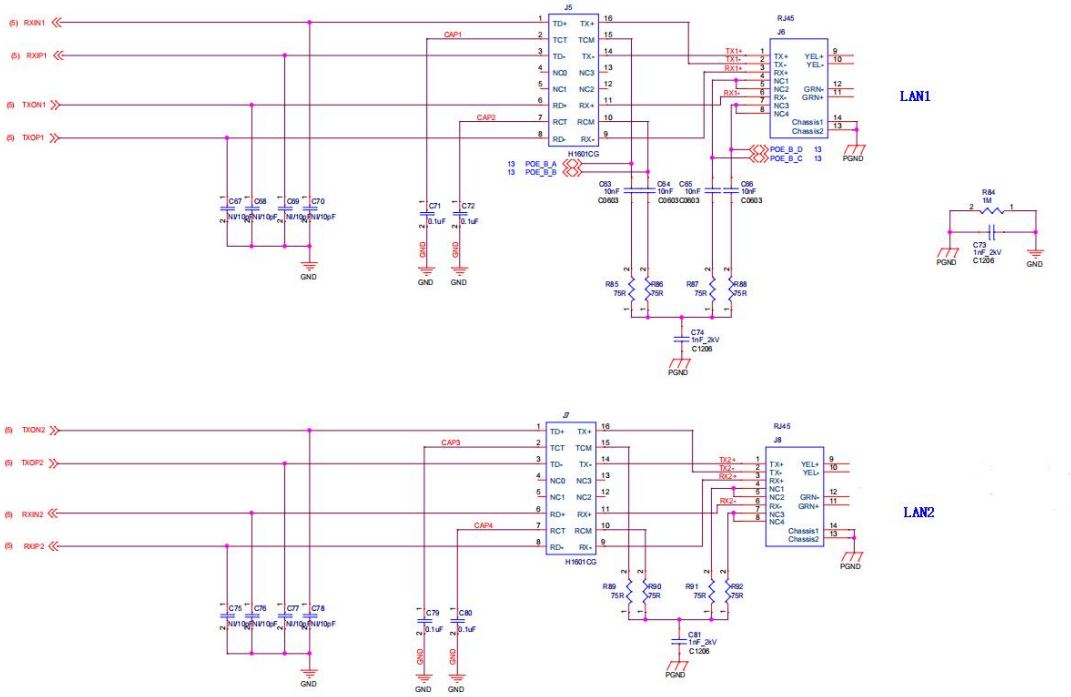
GTW361 supported Type C USB debug at J1.

4 Interface function introduction

4.1 Ethernet interface

Dual 100M Ethernet port output, Ethernet port 1 supports POE PD power supply, Ethernet port 2 universal network function.

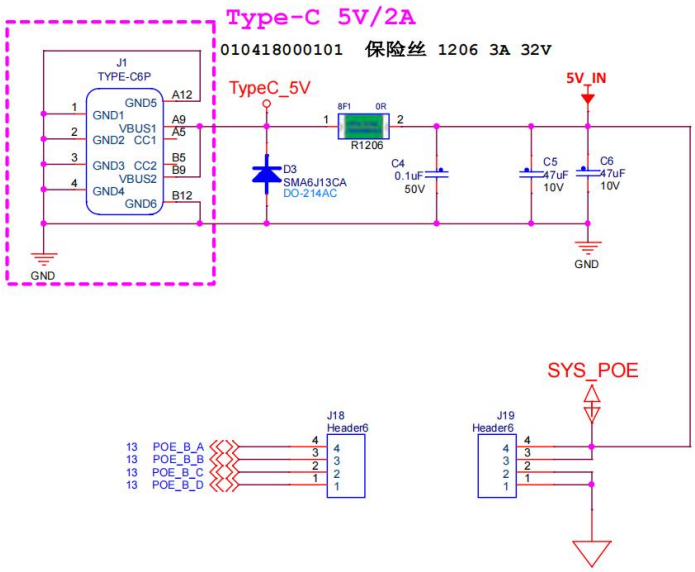
Each Ethernet port has an independent transformer, data transmission is more stable and reliable, the cable configuration is correct that you can access the Internet



4.2 Type C USB interface

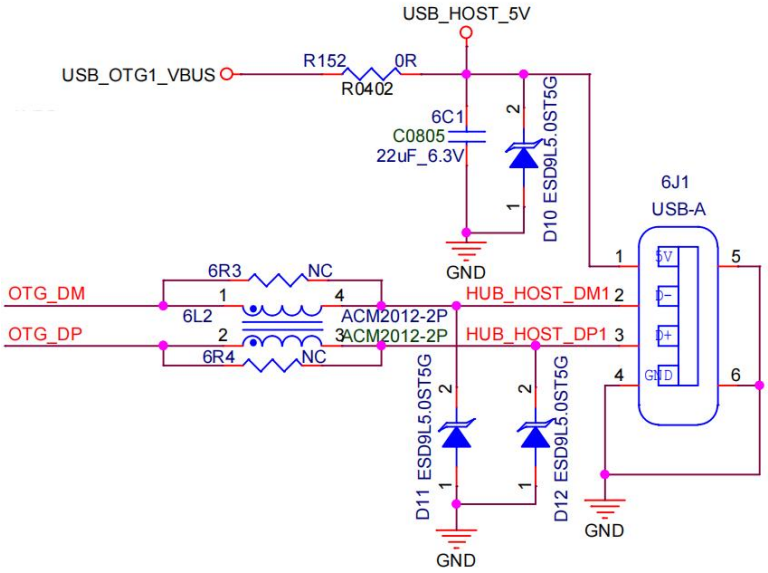
Type C USB interface is used for product power supply and can access DC5V 2A external power supply to power the equipment.

Debugging via the USB download line.



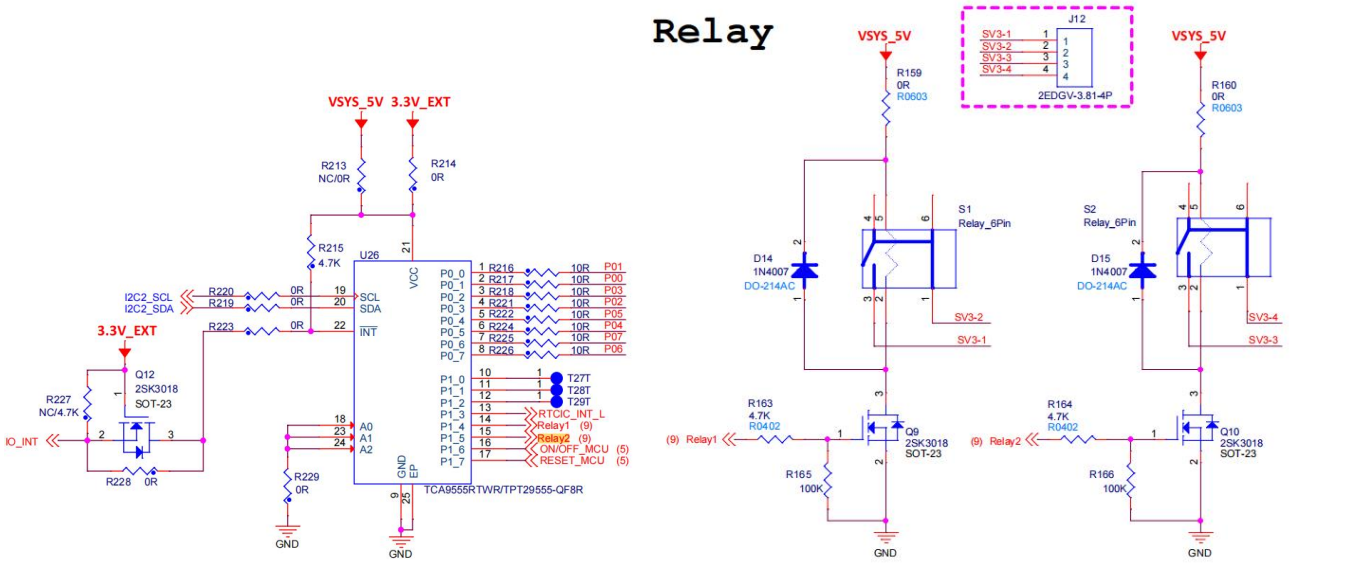
4.3 USB2.0 interface

USB_HUB extended USB HOST interface; support high speed, full speed USB devices, can connect to USB-WiFi module, USB-3G module, Bluetooth module, USB mouse and keyboard, U disk and other devices.



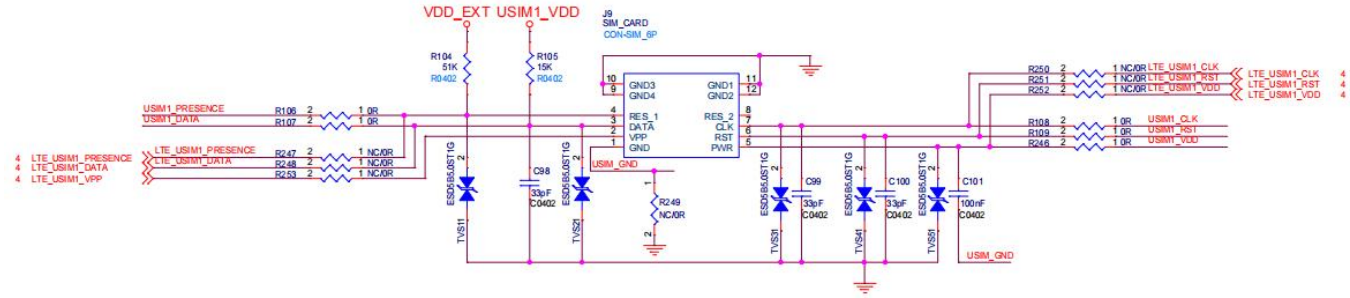
4.4 Relay control interface

Turn on and disconnect the control relay through the GPIO port, and conduct the real surface DO control.



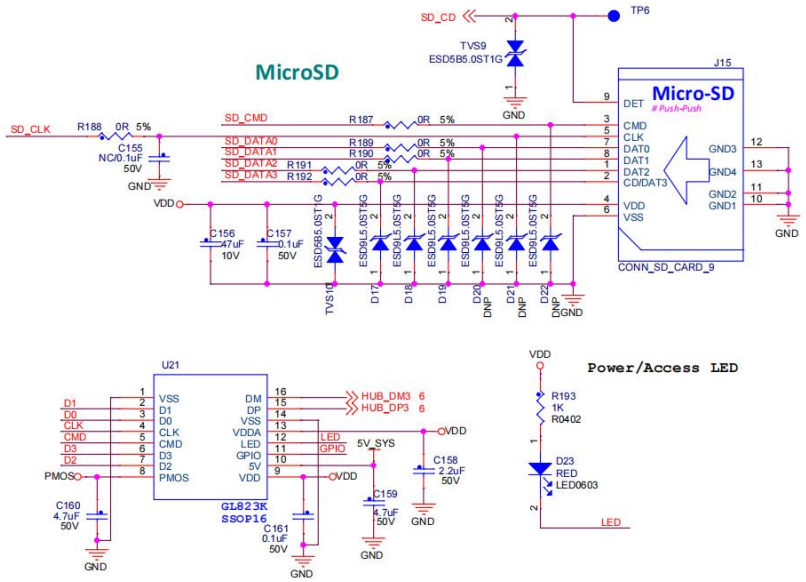
4.5 SIM Card Slot

Provide SIM card slot support Micro SIM card, SIM card interface directly connected to the LTE module.



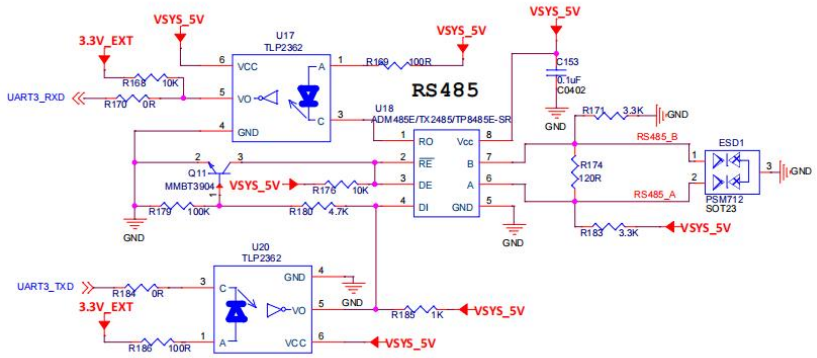
4.6 Micro SD Card Slot

The GTW361 implements a full SD master, CLK, CMD, DAT(3:0) all connect directly to the GL823K. These signals are driven at 3.3V.

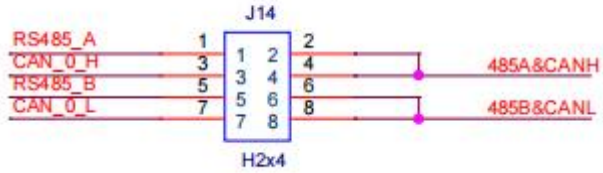


4.7 RS485 interface

The GTW361 provides an RS485 interface, using the 15EDGV-3.81 interface standard,The GTW361 provides an RS485 interface, using the 15EDGV-3.81 interface standard.

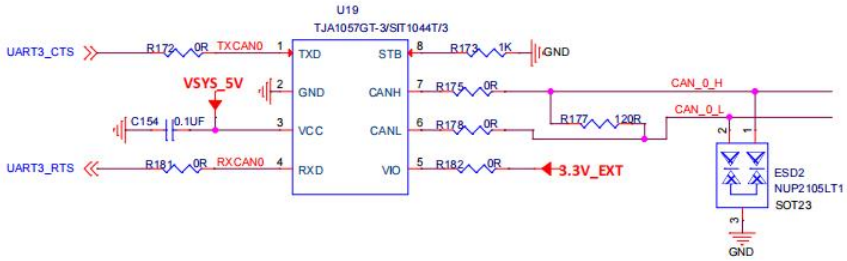


RS485 and CAN are tionally selected by the jumper cap, enabling RS485 function on the 1-2 5-6 connection

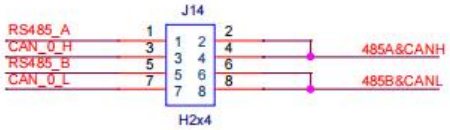


4.8 CAN interface

The GTW361 provides an RS485 interface, using the 15EDGV-3.81 interface standard.Connect to the UART3 of the iMX6ULL via the TJA1057GT.

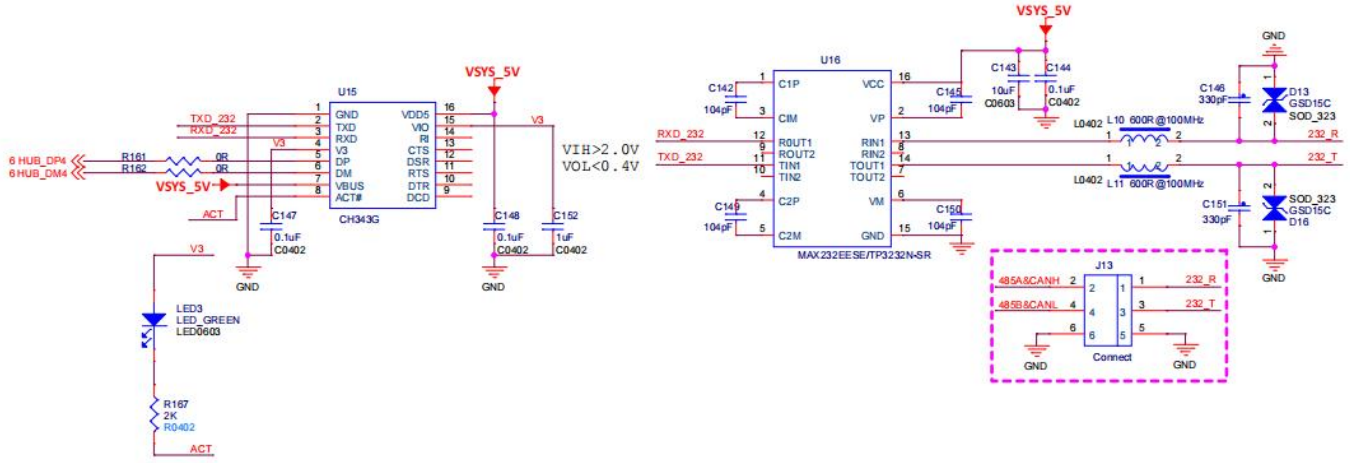


RS485 and CAN are selected by the jumper cap, enabling CAN function on the 3-4 7-8 connection



4.9 RS232 interface

GTW361 provides an RS232 interface, using the 15EDGV-3.81 interface standard,Connect to the serial port to USB chip CH343G via MAX232 and then to the USB HUB_4 channel.



4.10 GPIO {1,2,3,4,5,6,7,8}

GTW361 implements 8 GPIOs are routed to the TCA9555RTWR .

GPIO 1 - Connects to P0_1 of TCA9555RTWR, It is a 3.3V signal

GPIO 2 - Connects to P0_0 of TCA9555RTWR. It is a 3.3V signal

GPIO 3 - Connects to P0_3 of TCA9555RTWR. It is a 3.3V signal.

GPIO 4 - Connects to P0_2 of TCA9555RTWR. It is a 3.3V signal.

GPIO 5 - Connects to P0_5 of TCA9555RTWR, It is a 3.3V signal

GPIO 6 - Connects to P0_4 of TCA9555RTWR. It is a 3.3V signal

GPIO 7 - Connects to P0_7 of TCA9555RTWR. It is a 3.3V signal.

GPIO 8 - Connects to P0_6 of TCA9555RTWR. It is a 3.3V signal.

5 Power management

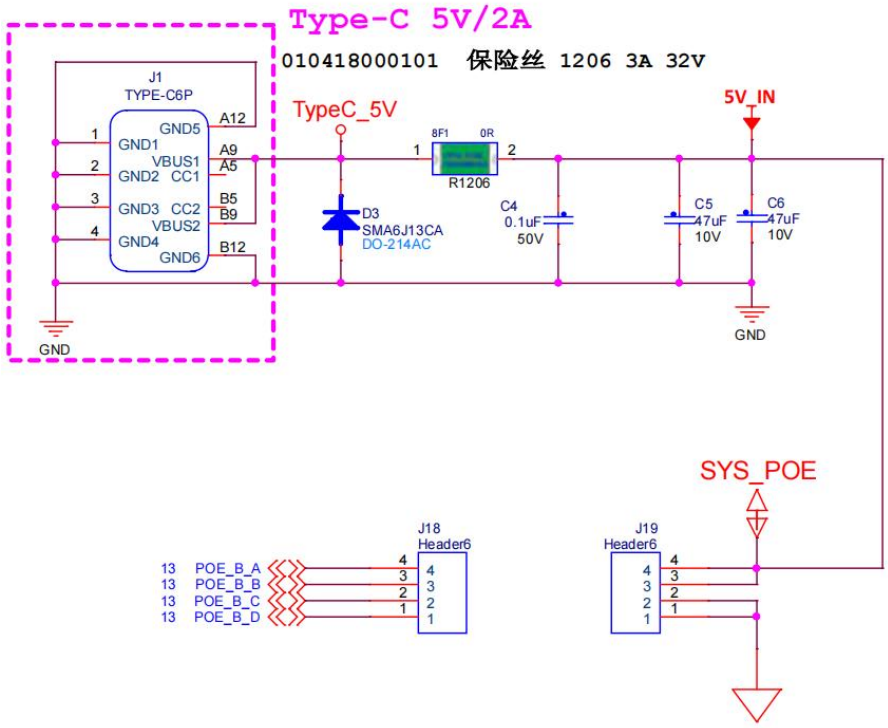
GTW361 supports 5V DC for the input supply to power up processor and all its peripherals.

The processor and peripherals requires different voltage supplies and current for their normal functionality. The power supply section is designed to generate all required voltage rails with respective current requirements.

5.1 Input Power Supply

For protection of input power supply, below components are used

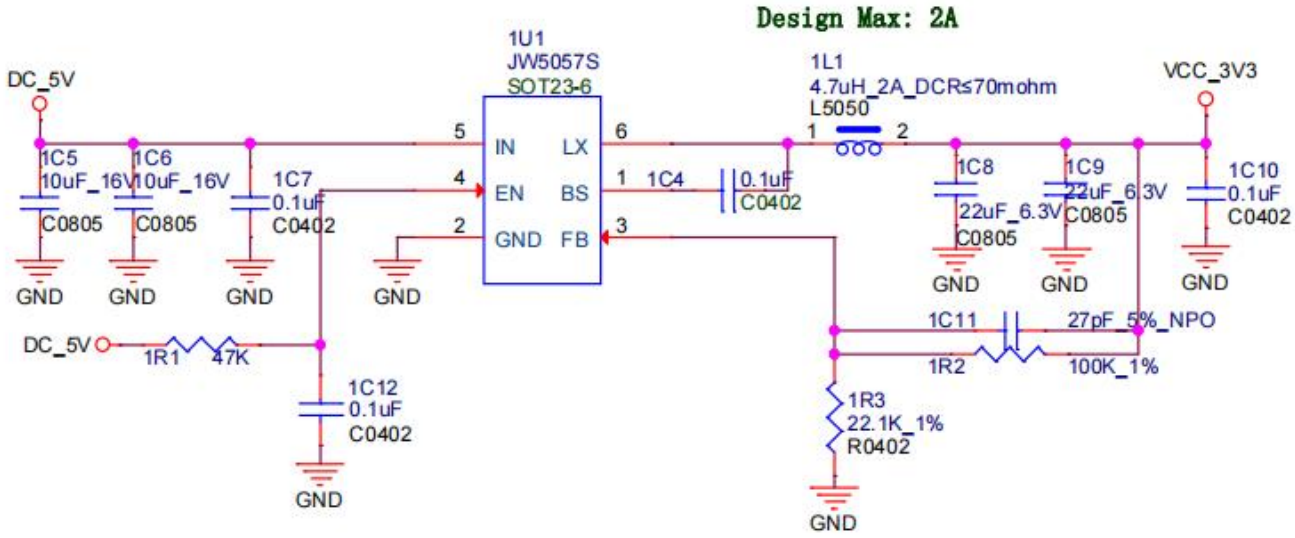
1. Fuse
2. TVS Diodes



5.2 5V to 3.3V@2A JW5057S

JW5057 is selected to convert 3.3V from 5V input power supply.

This JW5057 is in always in ON condition.



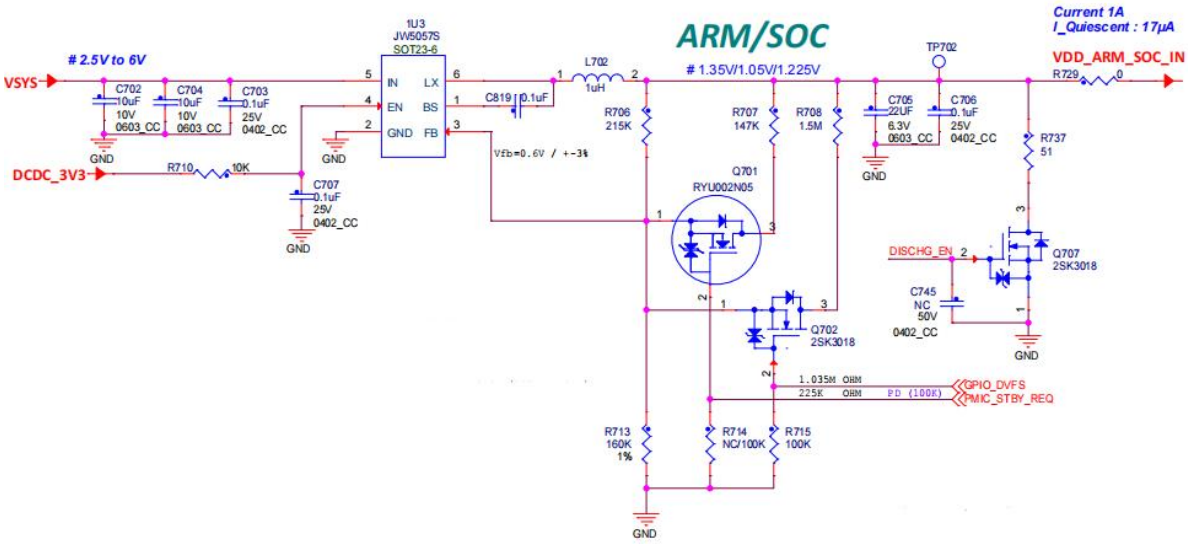
5.3 ARM SoC Power Supply JW5057S

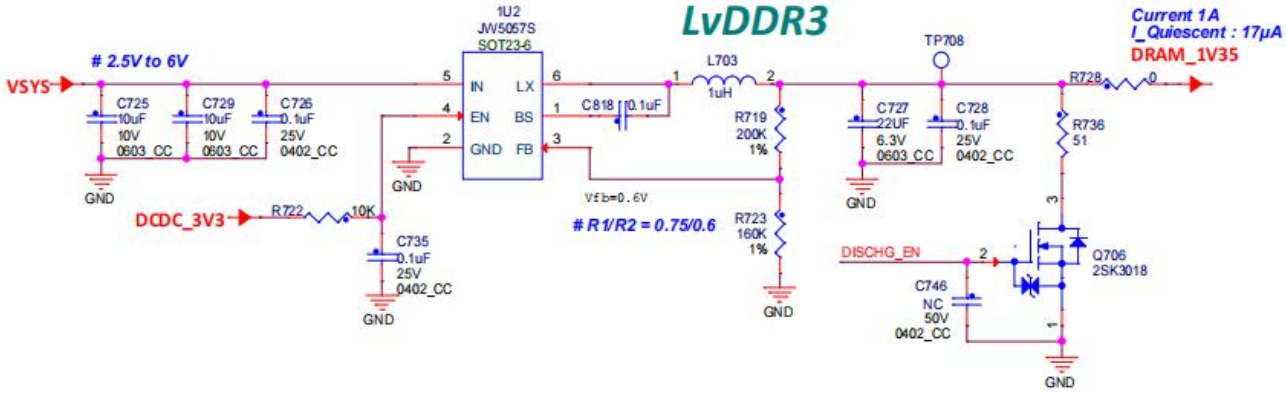
Input operating voltage range: 2.5V–6V

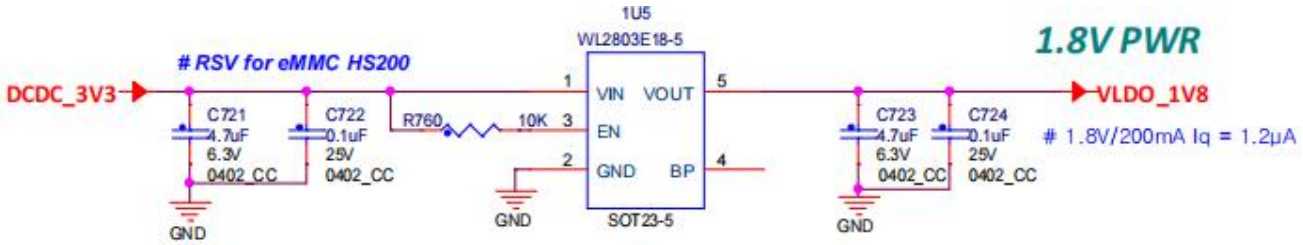
supporting 1.35V,1.225V,1.05V for iMX6ULL

Provide 1.35V support for DDR memory

Provides 1.8V for eMMC flash







6 Status LED's

Battery status

This LED reflects the status of the battery.

Power status

This LED reflects the status of the power.

WiFi status

This LED reflects the status of the Wi-Fi device.

LTE status

This LED reflects the status of the LTE.

LoRa status

This LED reflects the status of the LoRa.

GTIoT status

This LED reflects the status of the GTIoT.

LAN1 status

This LED reflects the status of the ethernet1.

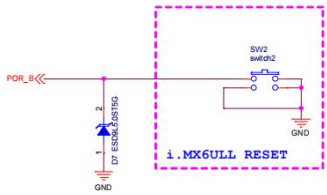
LAN2 status

This LED reflects the status of the ethernet2.

7 Switch and Key

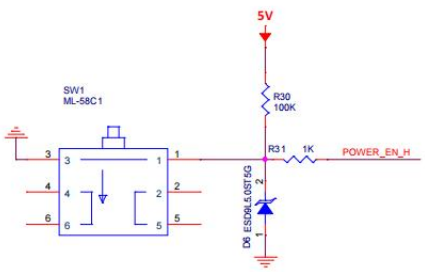
7.1 Reset key

GTW361 provides the Reset restart button, and the automatic restarts of the system after pressing the restart button. You can force a system restart with the system exception.



7.2 Power Switch

The GTW361 provides the power switch. Press the power switch to power supply the GTW361, and then press the power switch key to disconnect the power supply.



8 Boot Configuration

Boot Mode Selection Switch

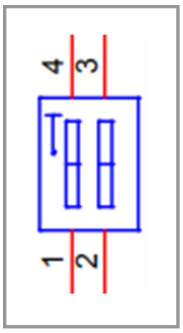
Below are the Boot mode switch selection settings to boot the board.

Boot Device	Boot Mode		Internal Boot			
eMMC/MMC	BOOT_MODE 1	BOOT_MODE 0	0	1	1	0

BOOT TYPE:

00 Boot From Fuses 01 Serial Downloader

10 Internal Boot (Development) 11 Reserved



9 Mechanical specification

Board dimensions