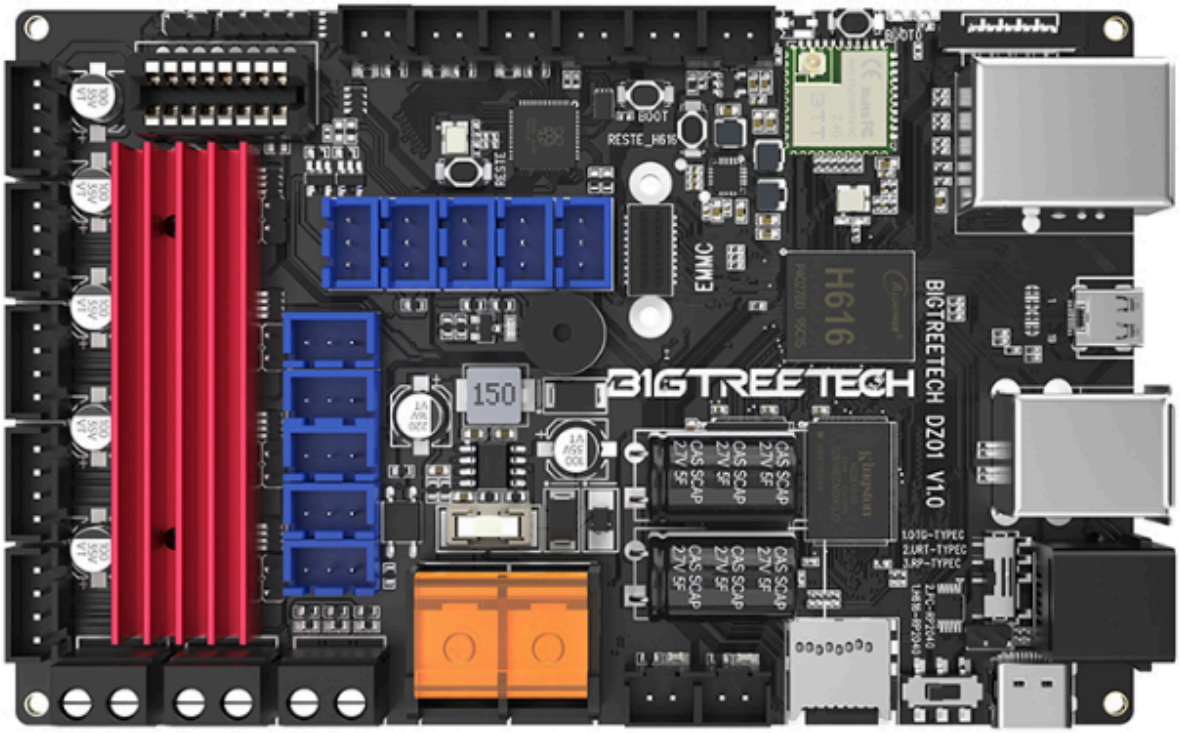
DZ01



Product Profile

The BIGTREETECH DZ01 is a powerful motherboard featuring the Allwinner H616 SoC, a quad-core Cortex-A53 @1.5 GHz, with 1GB DDR3L RAM, and support for high-performance Klipper running. It includes a 32-bit RP2040 MCU for precise multi-axis motion control, onboard TMC2209 drivers, Wi-Fi connectivity, and 4K HDMI output, making it an all-in-one solution for your 3D printing projects.

Feature Highlights

- MCU: 32-bit ARM Cortex-M0+ series RP2040, running at 133MHz;
- SoC: Allwinner H616, Quad-core Cortex-A53 @1.5GHz;
- GPU: Mali G31 MP2, supports OpenGL 3.2;
- RAM: 1GB DDR3L SDRAM;

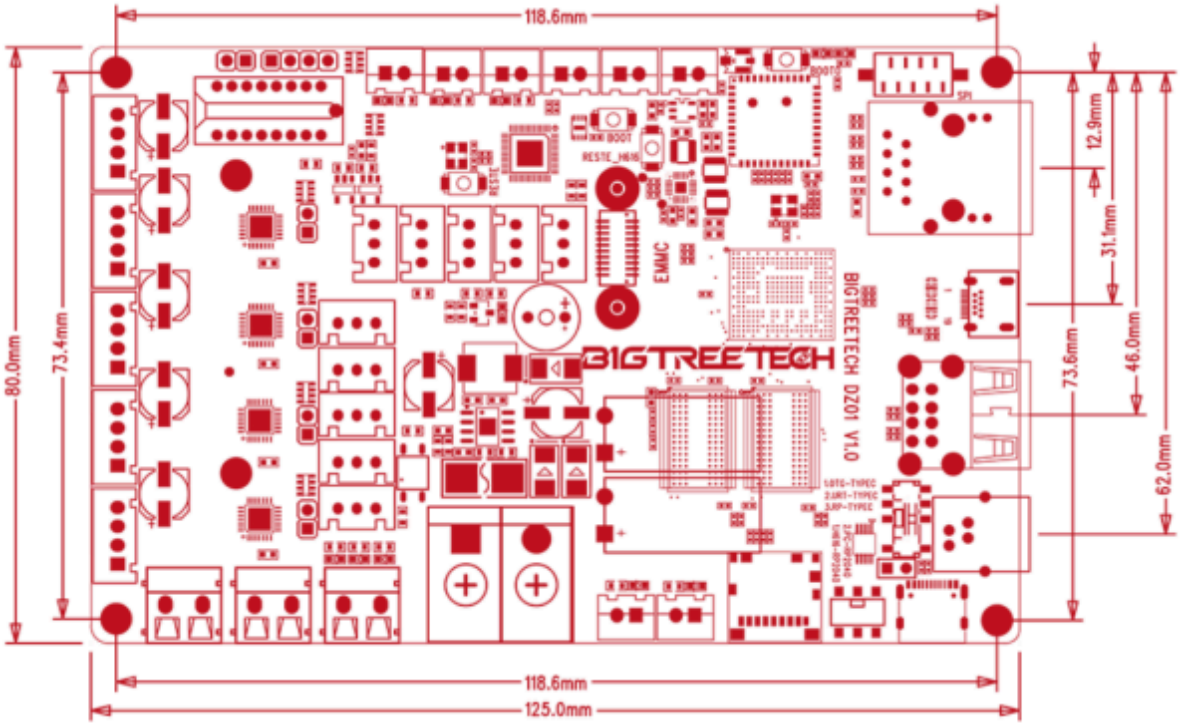
- Display Output: HDMI 2.0A, supports 4K monitors;
- Two USB 2.0 ports;
- Serial Port Output;
- Networking: 100Mbps Ethernet + 100Mbps Wi-Fi;
- Contains a TPS5450-5A power chip which supports DC12/24V power input. This chip provides an output current of up to 5A, peaking at 6A;
- A reserved BOOT button within the motherboard allows users to update the bootloader using the DFU mode;
- A specially designed circuit on the motherboard protects the signal coming back from the thermistor, preventing MCU damage from shorted heated beds and heater cartridge connections;
- Users can upgrade the MCU firmware via an SD card, or update the MCU firmware through DFU using the make flash command in Klipper;
- Includes specific interfaces that are reserved for Filament Detection, Auto Power-Off, BLTouch, RGB, etc.
- High-performance MOSFETs assist in reducing heat generation by controlling the flow of electrical current;
- Includes replaceable fuses;
- Proximity Switch Interface: Reserved;
- SPI Expansion Interface: Reserved for connecting external accelerometers for Klipper input shaping.

Specifications

- Dimensions: 80mm*125mm
- Mounting Dimensions: For details, please refer to BIGTREETECH DZ01.pdf
- SoC: ALLWINNER H616, Quad-core Cortex-A53 @1.5GHz
- MCU: 32-bit ARM Cortex-M0+ series RP2040 with a clock speed of 133MHz
- Driver Input Voltage: 24V
- Motherboard Input Voltage: VIN=DC12V or DC24V
- Heated Bed Input Voltage: BED IN=DC12V or DC24V
- Logic Voltage: DC3.3V
- Heating Interface: Heating Interface: Heated Bed (HB), Heater Cartridge (HE0, HE1)

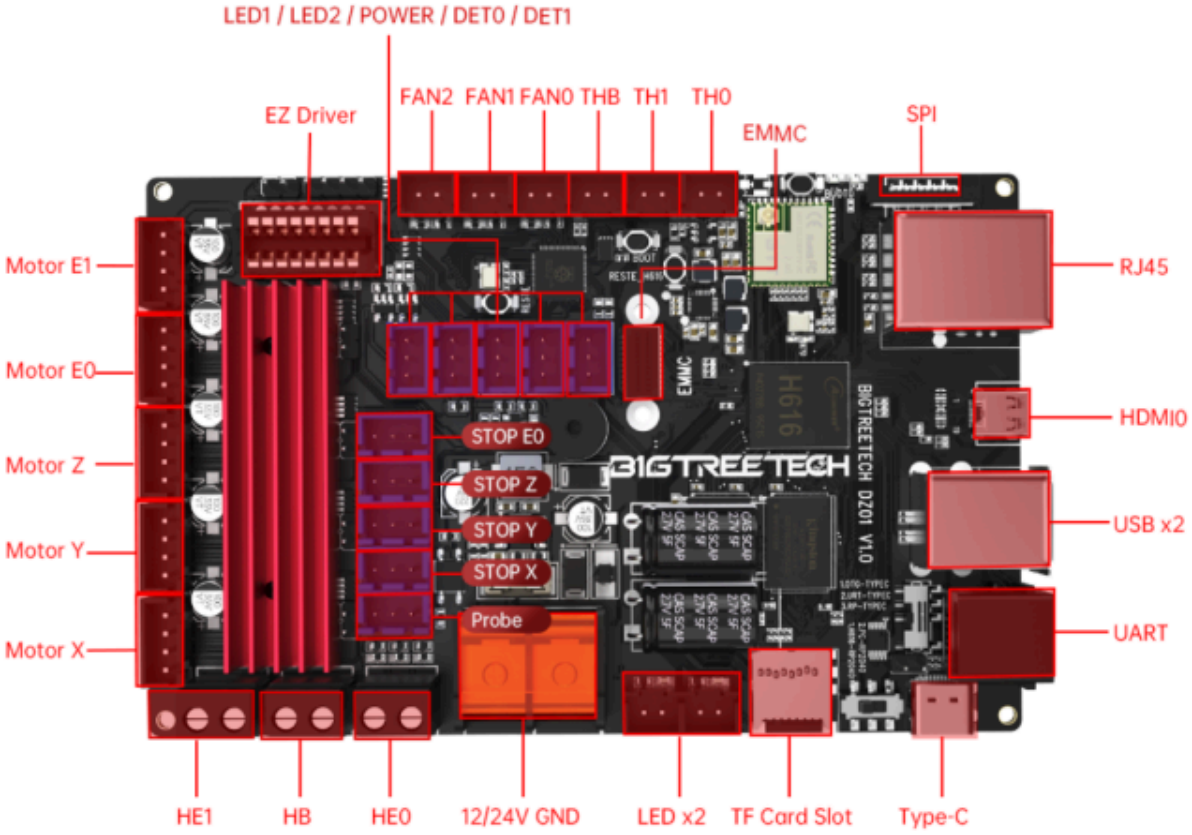
- Max Heated Bed Output Current: 10A, peak 12A
- Max Heater Cartridge Output Current: 5.5A, peak 6A
- Fan Interfaces: 2-pin PWM Fans (FAN0, FAN1, FAN2), Voltage fixed at 24V
- Max Fan Output Current: 1A, peak 1.5A
- Total Current for Heater Cartridge+Drivers+Fans: Less than 12A
- Expansion Interfaces: BLTouch (Servos, Probe), PS-ON, Fil-DET, RGBx2, SPI, USB 2.0 x2, HDMI0, SOC-Card, Wi-Fi
- Motor Drivers: TMC2209 x4
- Driver Modes: SPI, UART, STEP/DIR
- Motor Interfaces: Motor X, Motor Y, Motor Z, Motor E0, Motor E1 (5 total)
- Temp Sensor Interfaces: 3x 100K NTC
- Display: SPI Touchscreen
- PC Communication: Type-C
- Supported Kinematics: Cartesian, Delta, Kossel, Ultimaker, CoreXY
- Recommended Slicer/Console: Cura, Simplify3D, Pronterface, Repetier-host, Makerware

Dimensions



Peripheral Interface

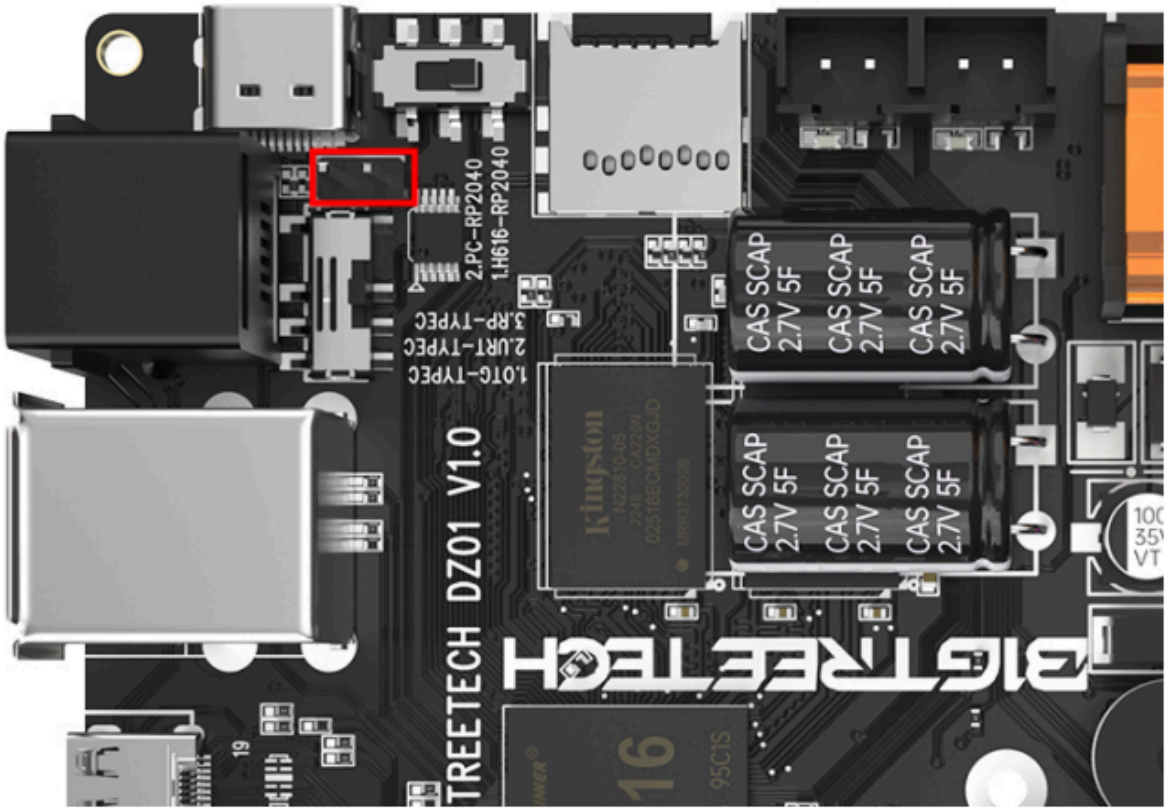
Interface Diagram



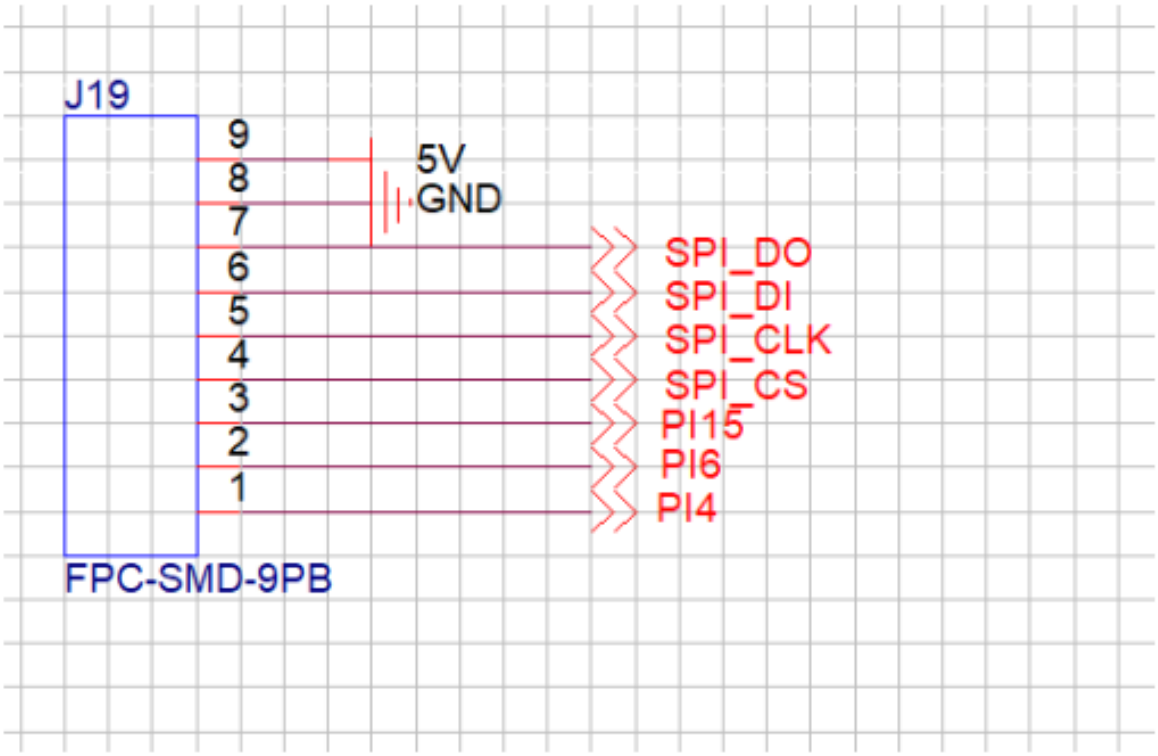
Interface Introduction

USB Power Supply

The power light on the upper left corner of the MCU turns red when DZ01 is powered on, indicating a normal power supply. The VUSB power select pin needs to be shorted by placing the jumper over the pin, however this is only necessary when a USB is required to supply power to the board.

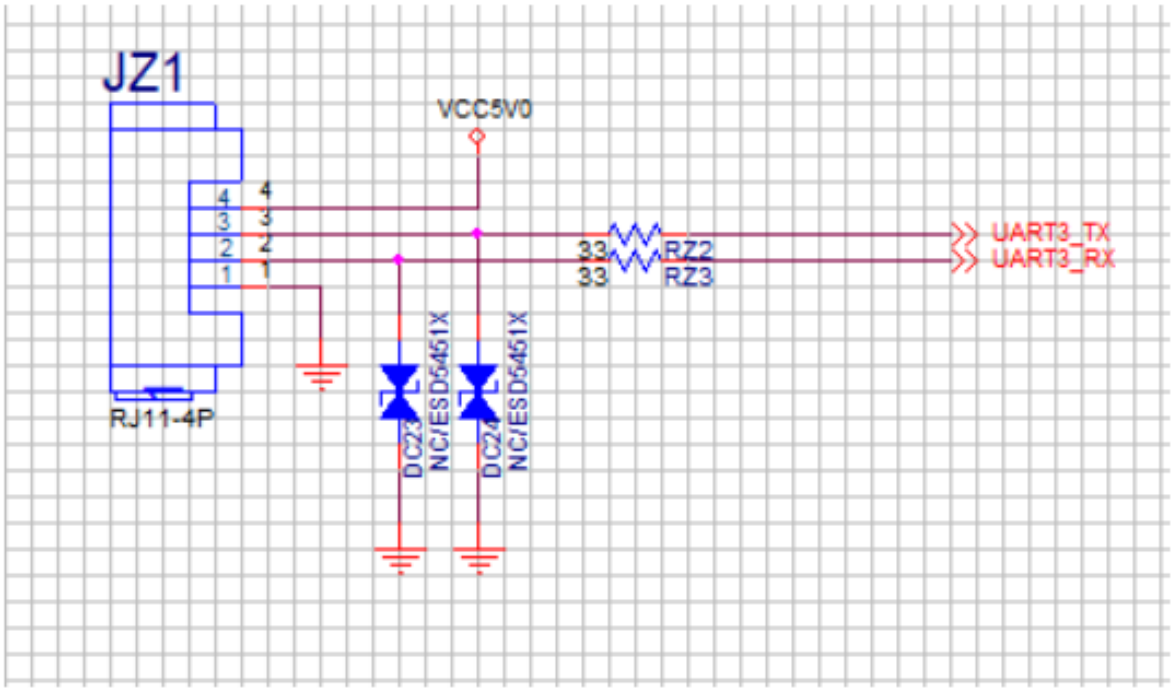


SPI Interface



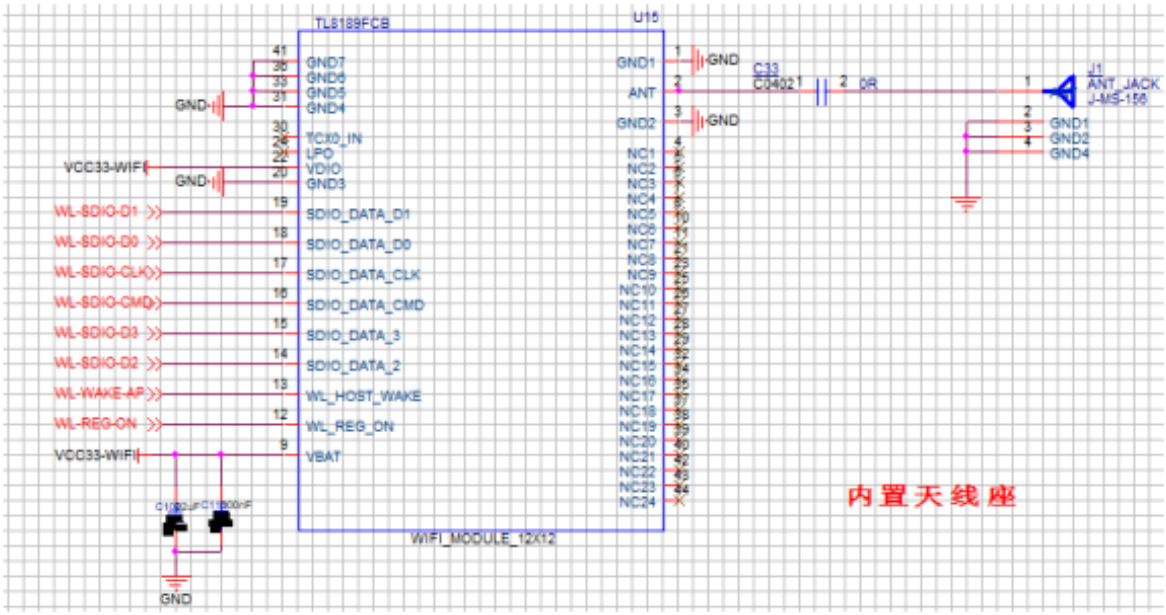
1. SPI_DO H616-PH8
2. SPI_DI H616-PH7
3. SPI_CLK H616-PH6
4. SPI_CS H616-PI14
5. SPI_RES H616-PI15
6. SPI_SDA H616-PI6
7. SPI_SCL H616-PI4

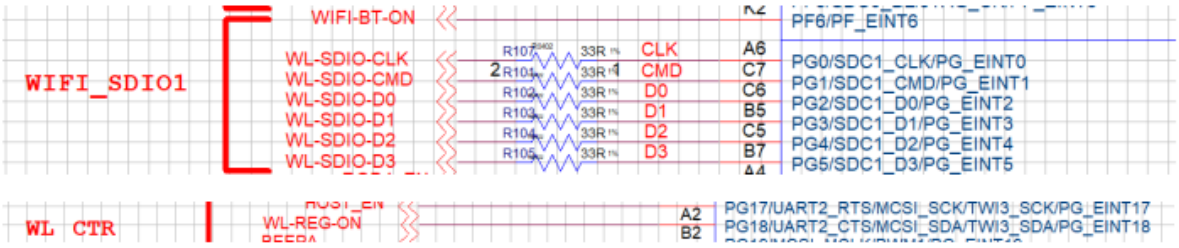
Serial Port Interface



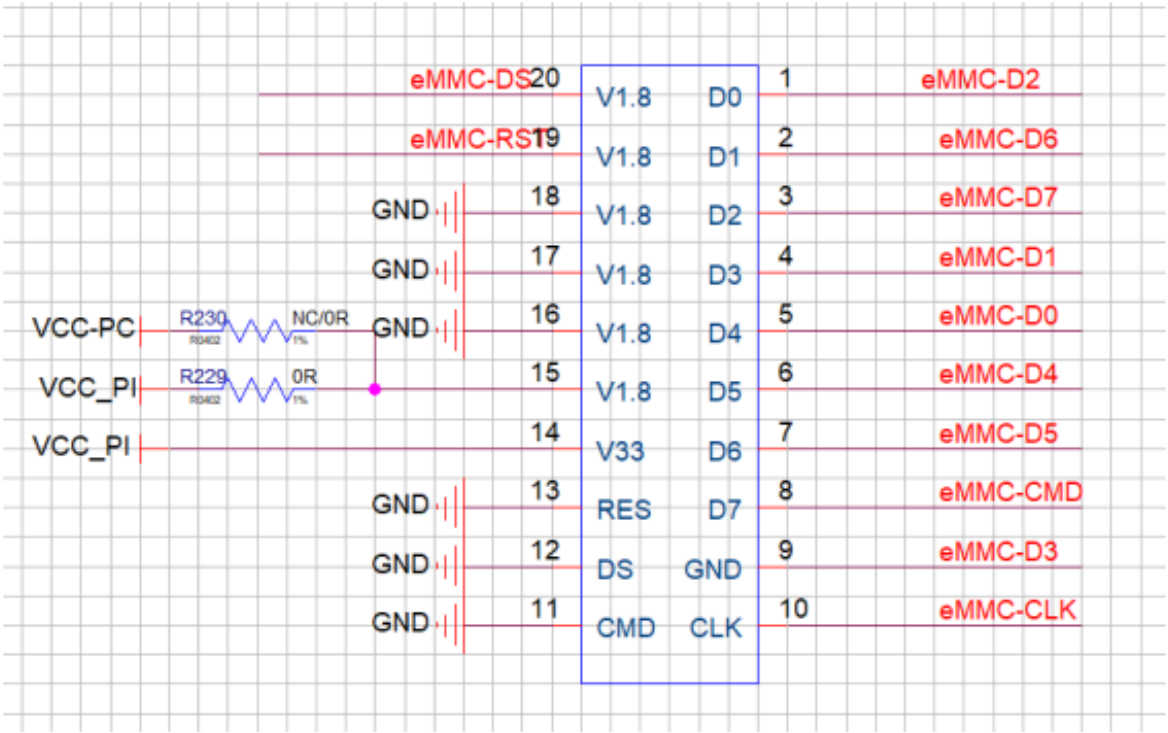
1. UART3_TX H616-PI4 PI9
2. UART3_RX H616-PI4 PI10

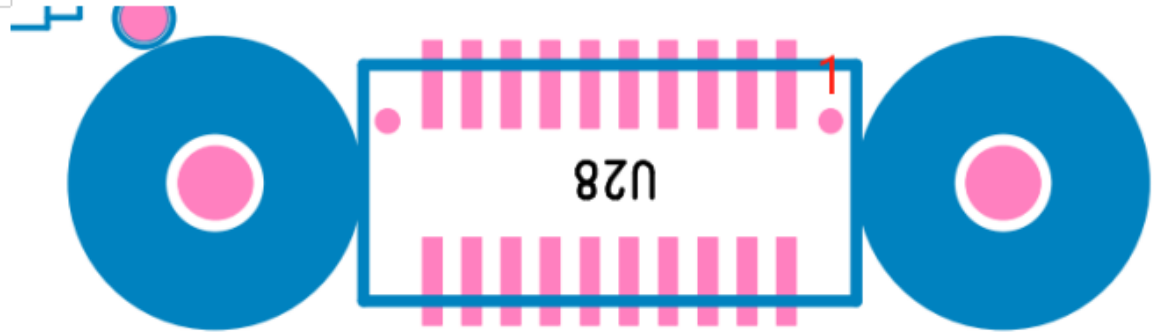
Wi-Fi Interface

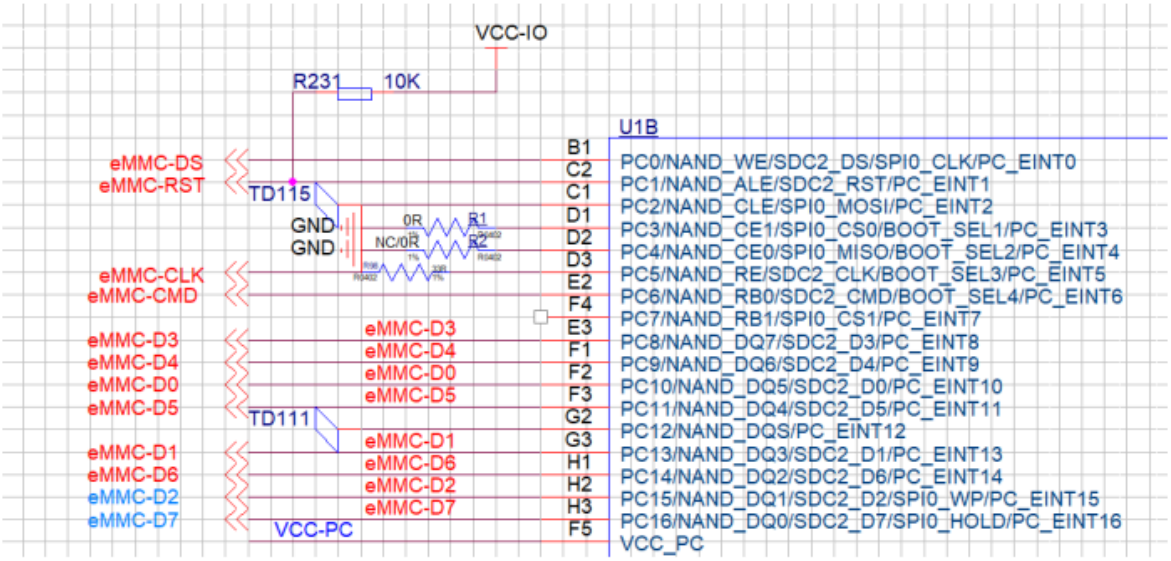




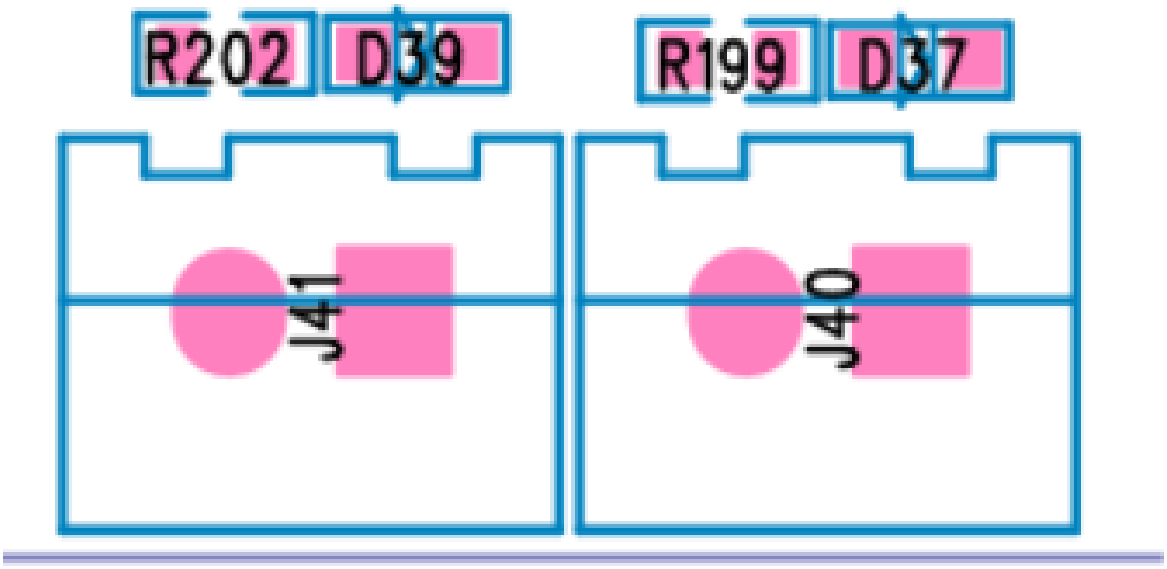
EMMC Interface

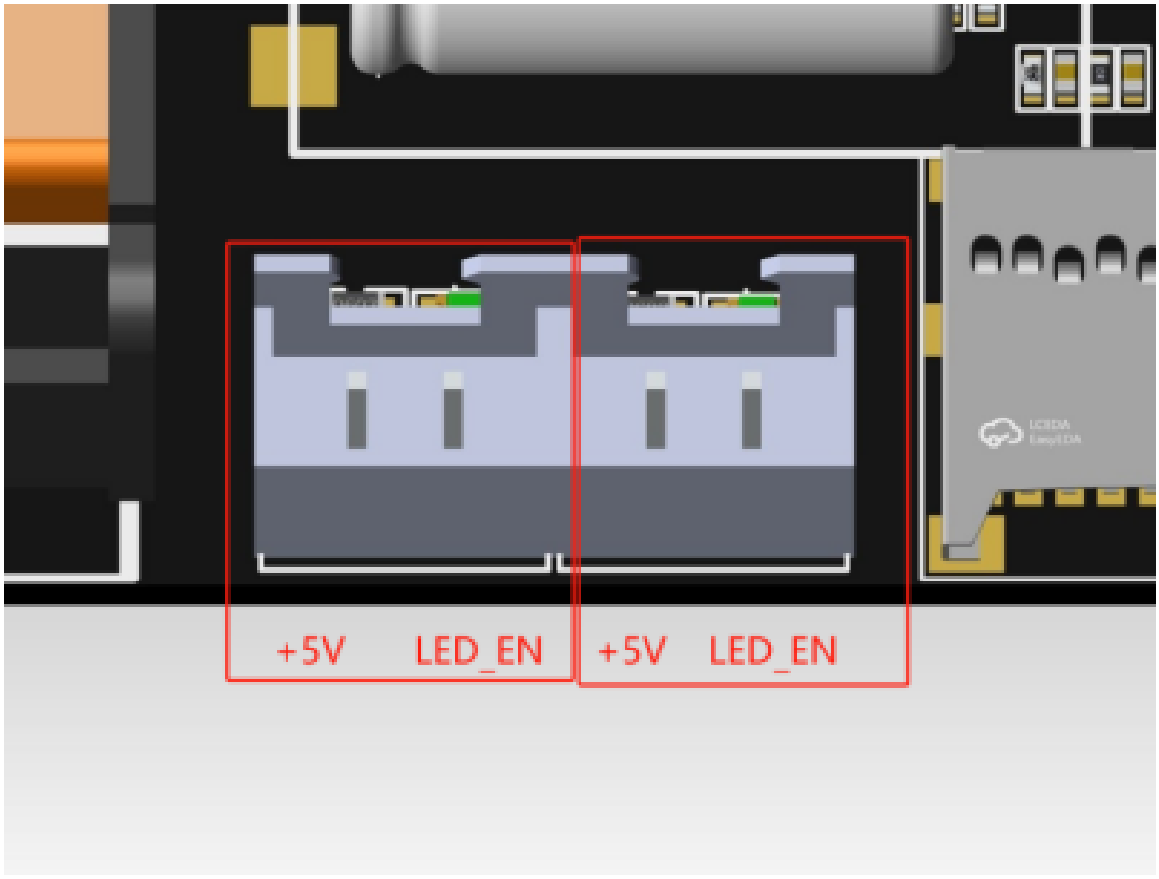


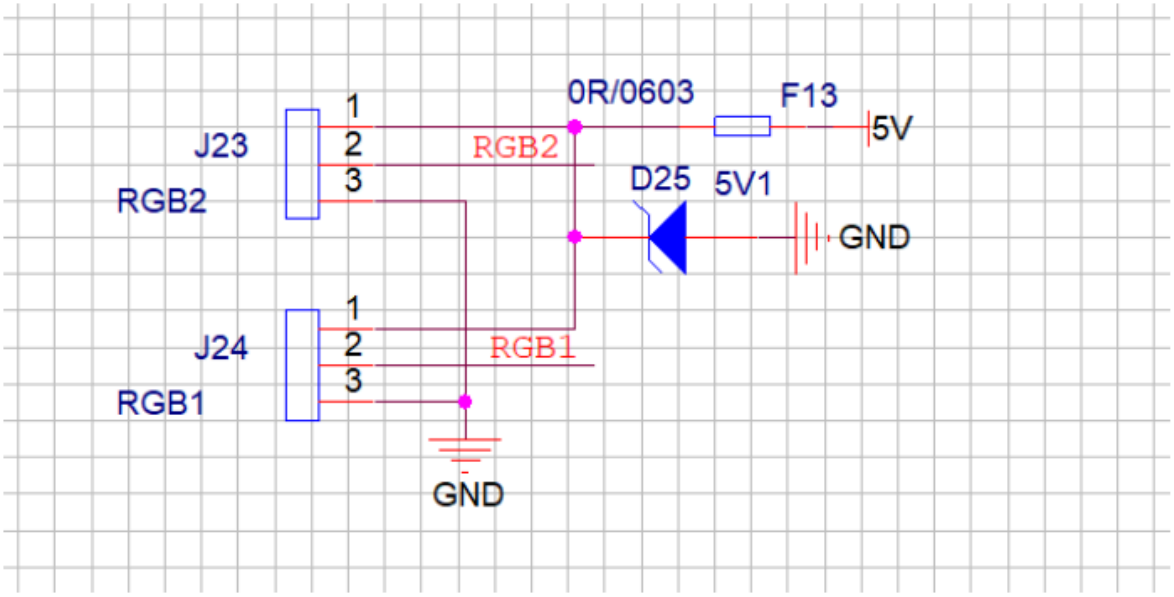


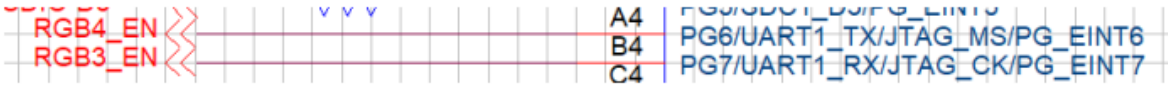


LED Interface



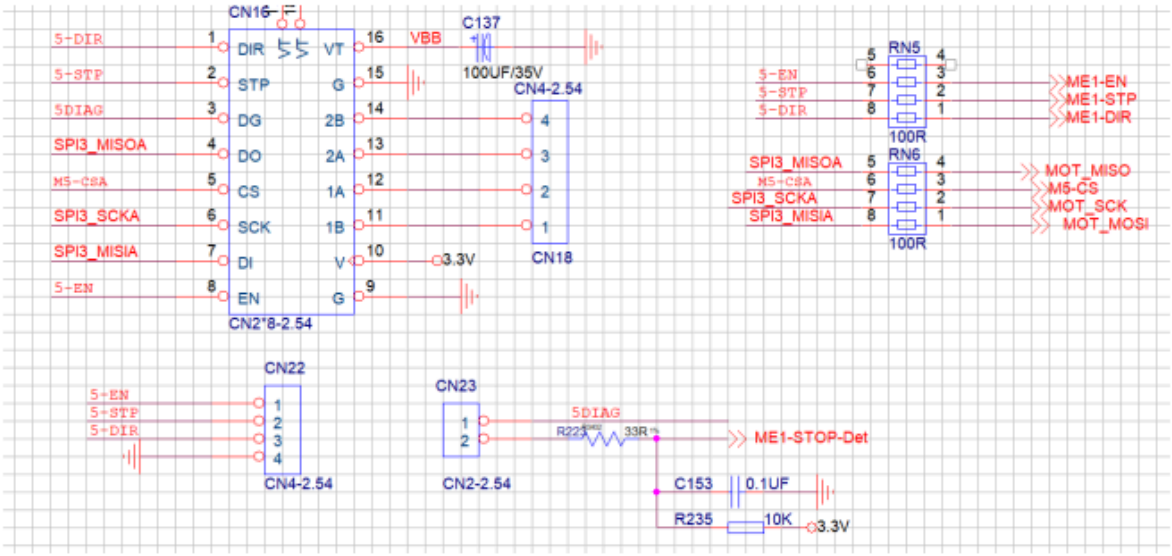

+5V
LED_EN
+5V
LED_EN


J23
RGB2
1
2
3
0R/0603
F13
5V
RGB2
D25
5V1
GND
J24
RGB1
1
2
3
RGB1
GND


RGB4_EN
RGB3_EN
A4
B4
C4
PG6/UART1_TX/JTAG_MS/PG_EINT6
PG7/UART1_RX/JTAG_CK/PG_EINT7

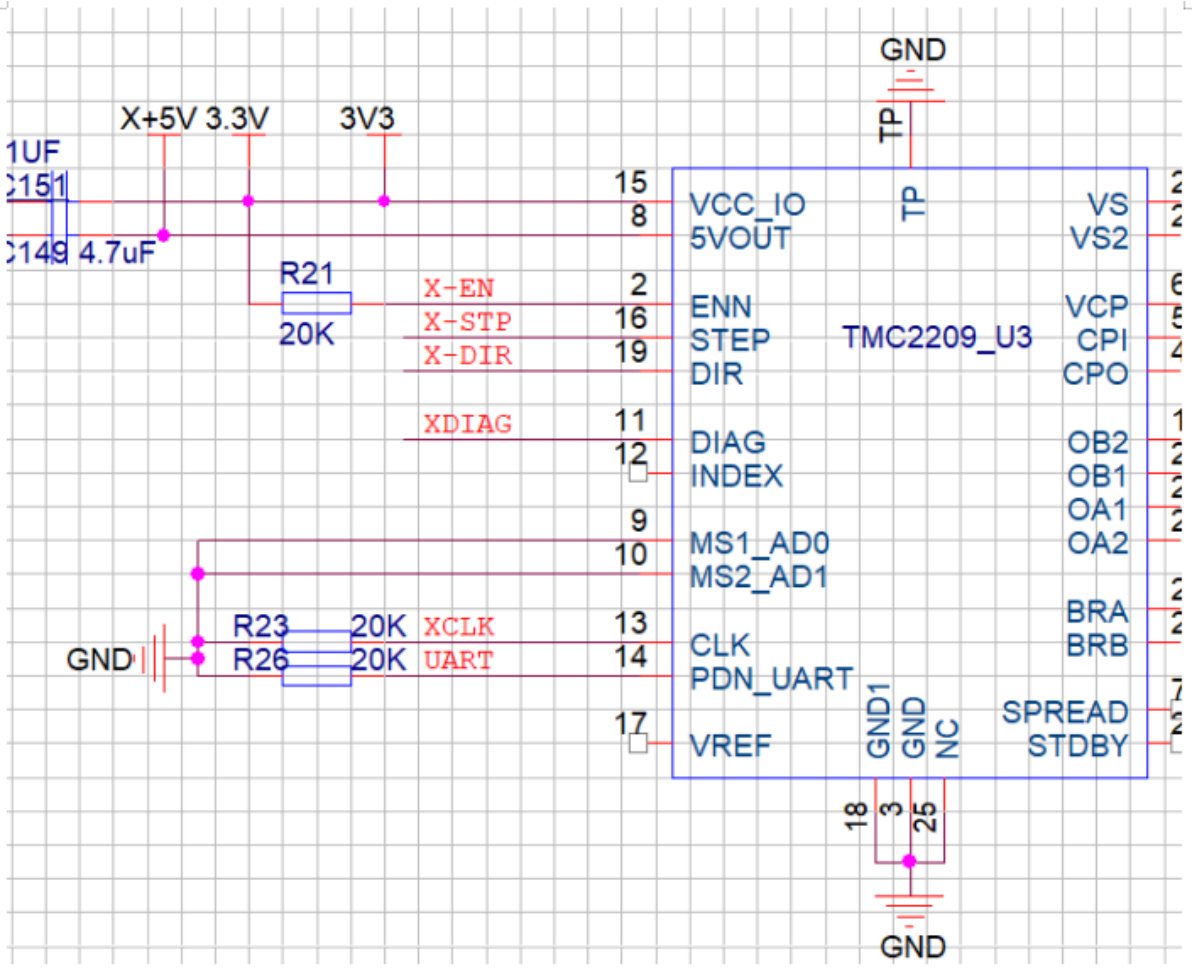
- J41 EN H616-PG6
- J40 EN H616-PG7
- J23 PWM RP2040- GPIO6
- J24 PWM RP2040- GPIO5

CN16 Interface



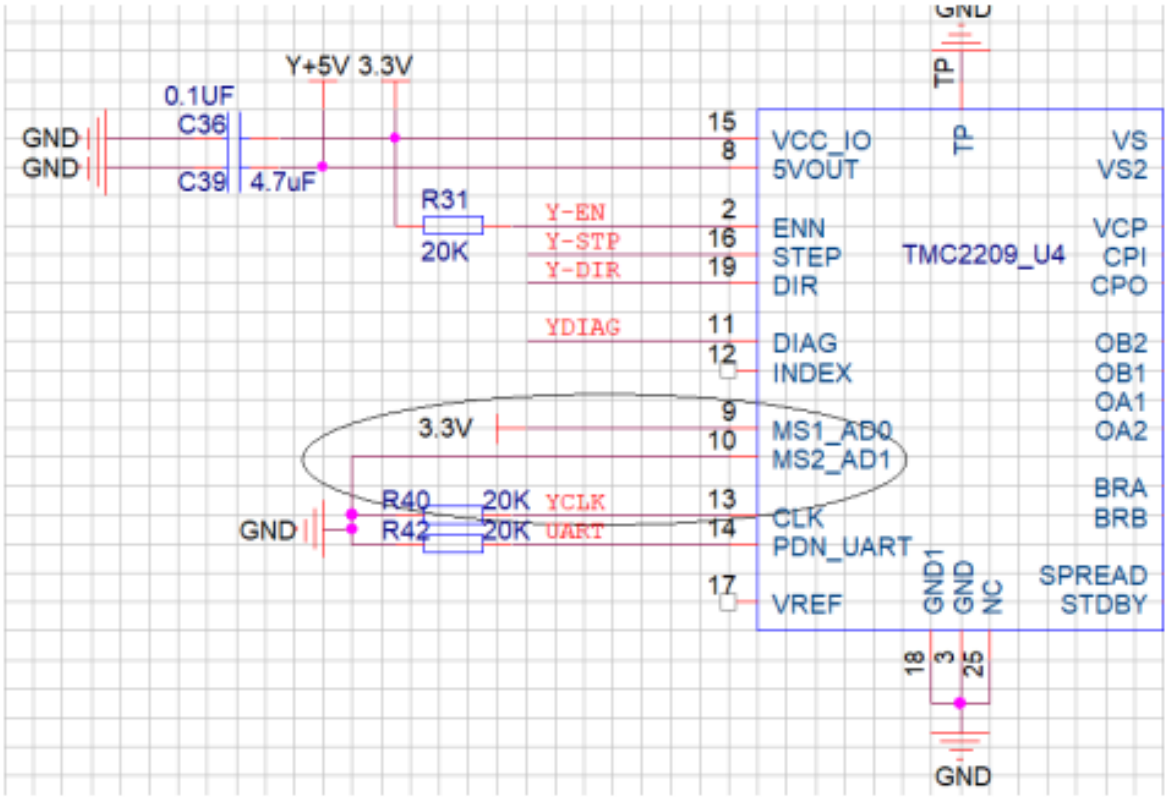
1. STOP H616-PI8
2. EN H616-PI12
3. STP RP2040- GPIO2
4. DIR RP2040- GPIO3
5. MISO RP2040- GPIO16
6. CS RP2040- GPIO24
7. SCK RP2040- GPIO18
8. MOSI RP2040- GPIO19

MOTOR X Interface



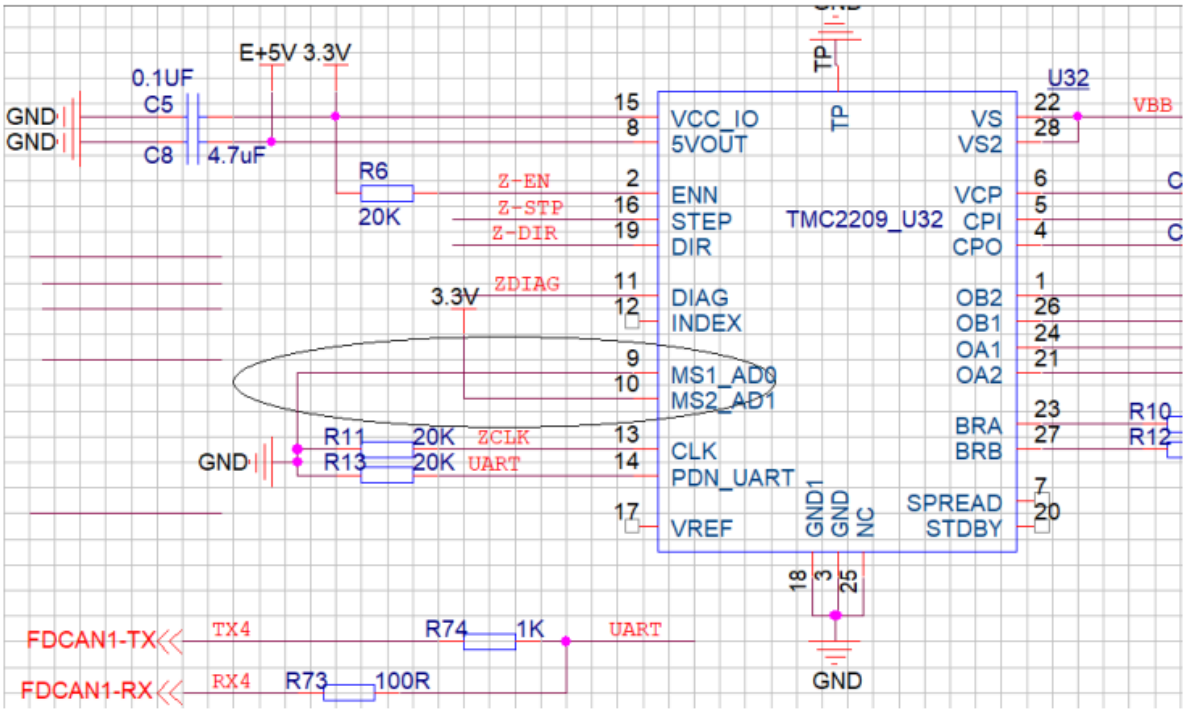
1. STOP H616-PI1
2. EN H616-PI3
3. STP RP2040- GPIO15
4. DIR RP2040- GPIO14
5. UART RP2040- GPIO0 TX/GPIO1 RX

MOTOR Y Interface



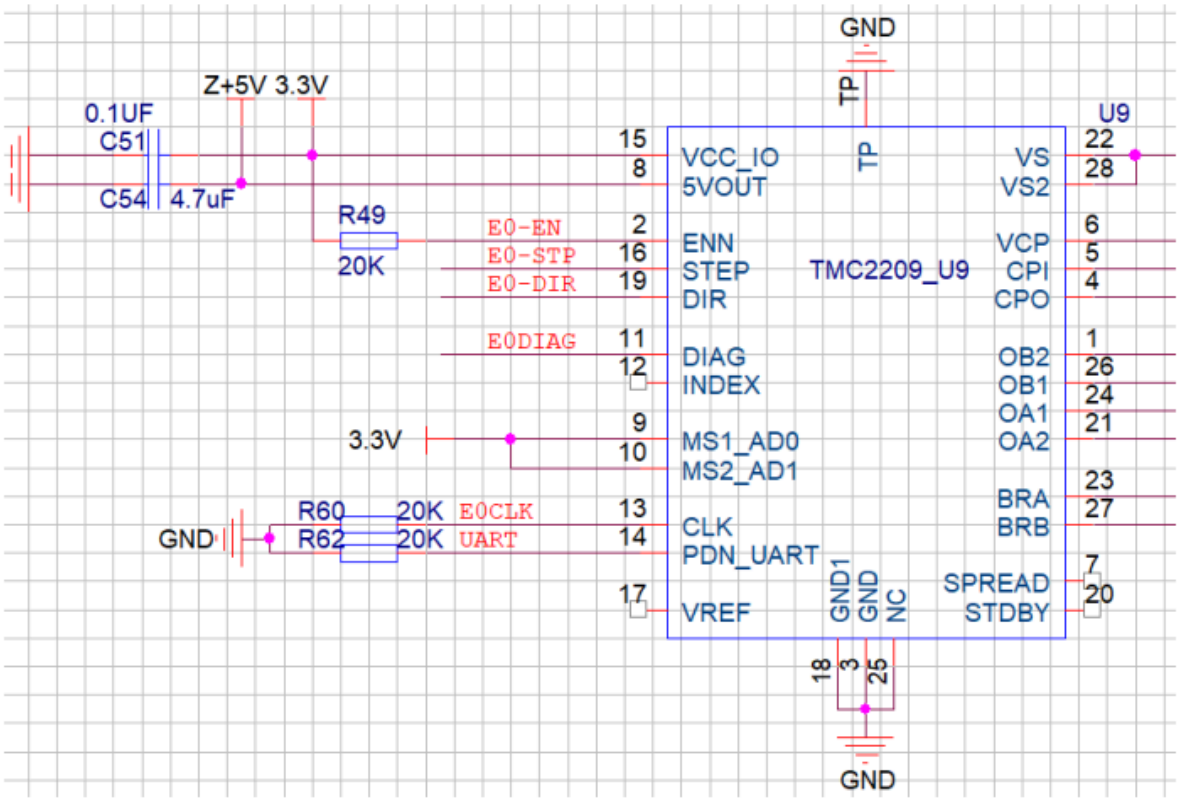
1. STOP H616-PI5
2. EN H616-PI0
3. STP RP2040- GPIO13
4. DIR RP2040- GPIO12
5. UART RP2040- GPIO0 TX/GPIO1 RX

MOTOR Z Interface



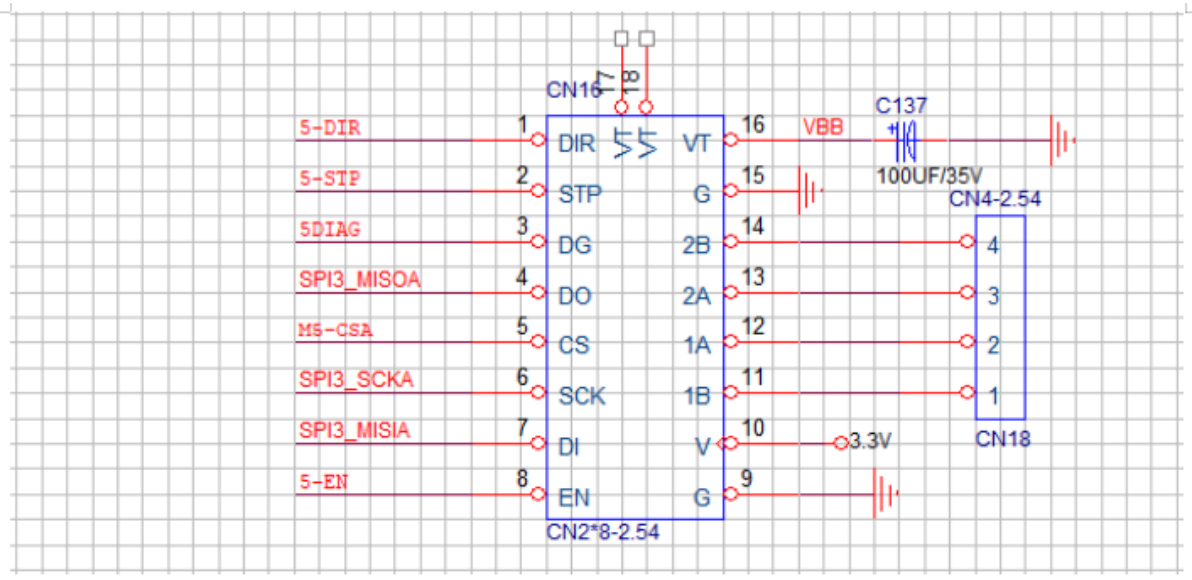
1. STOP H616-PI13
2. EN H616-PI7
3. STP RP2040- GPIO10
4. DIR RP2040- GPIO9
5. UART RP2040- GPIO0 TX/GPIO1 RX

MOTOR E0 Interface



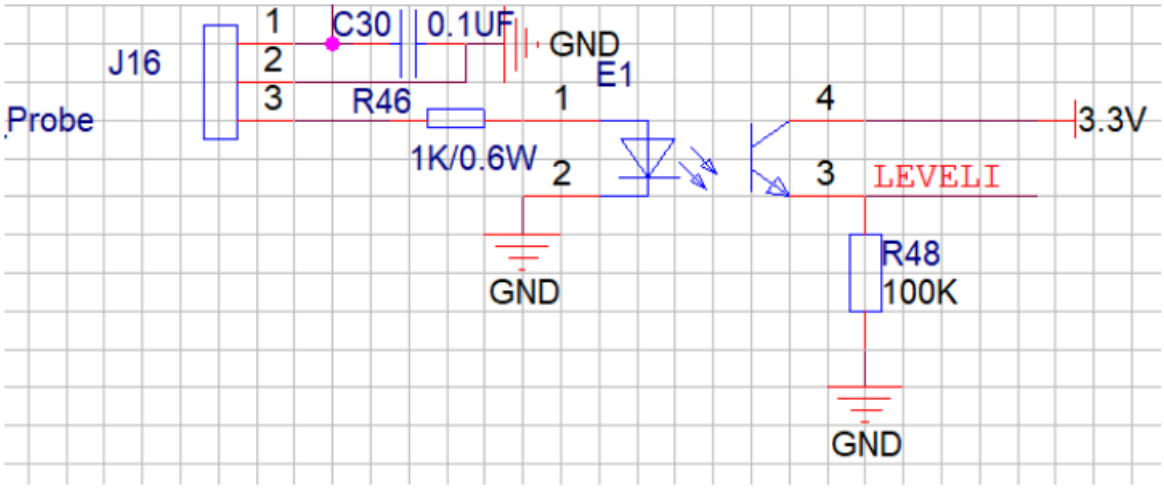
1. STOP H616-PI1
2. EN H616-PI2
3. STP RP2040- GPIO8
4. DIR RP2040- GPIO7
5. UART RP2040- GPIO0 TX/GPIO1 R

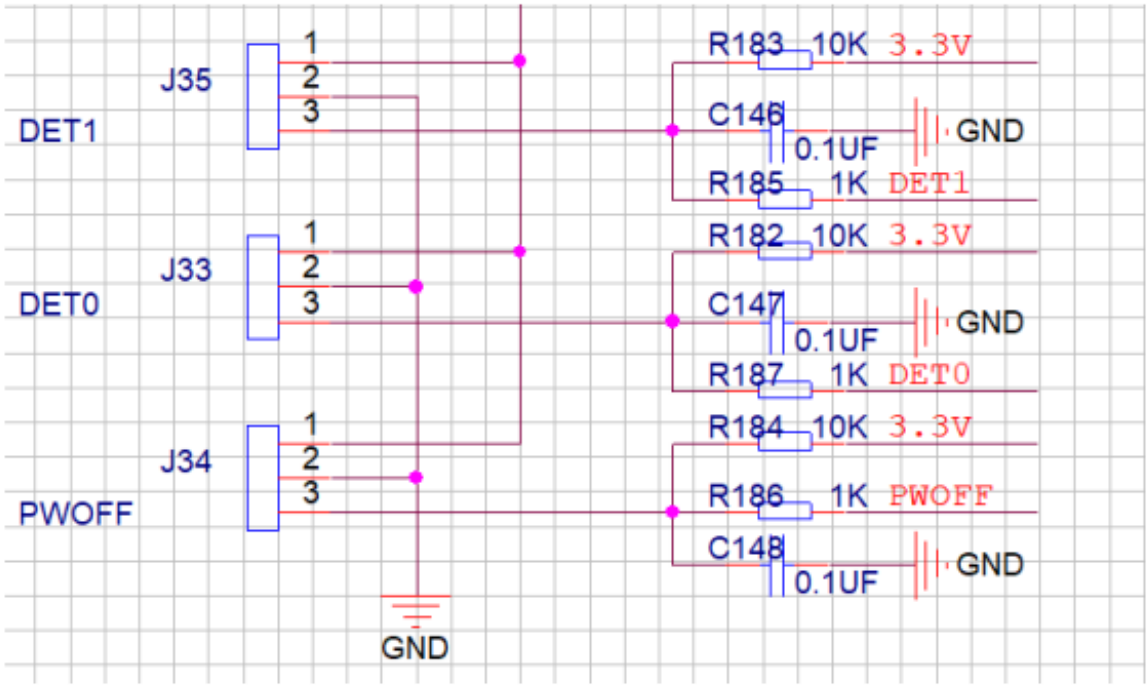
MOTOR E1 Interface

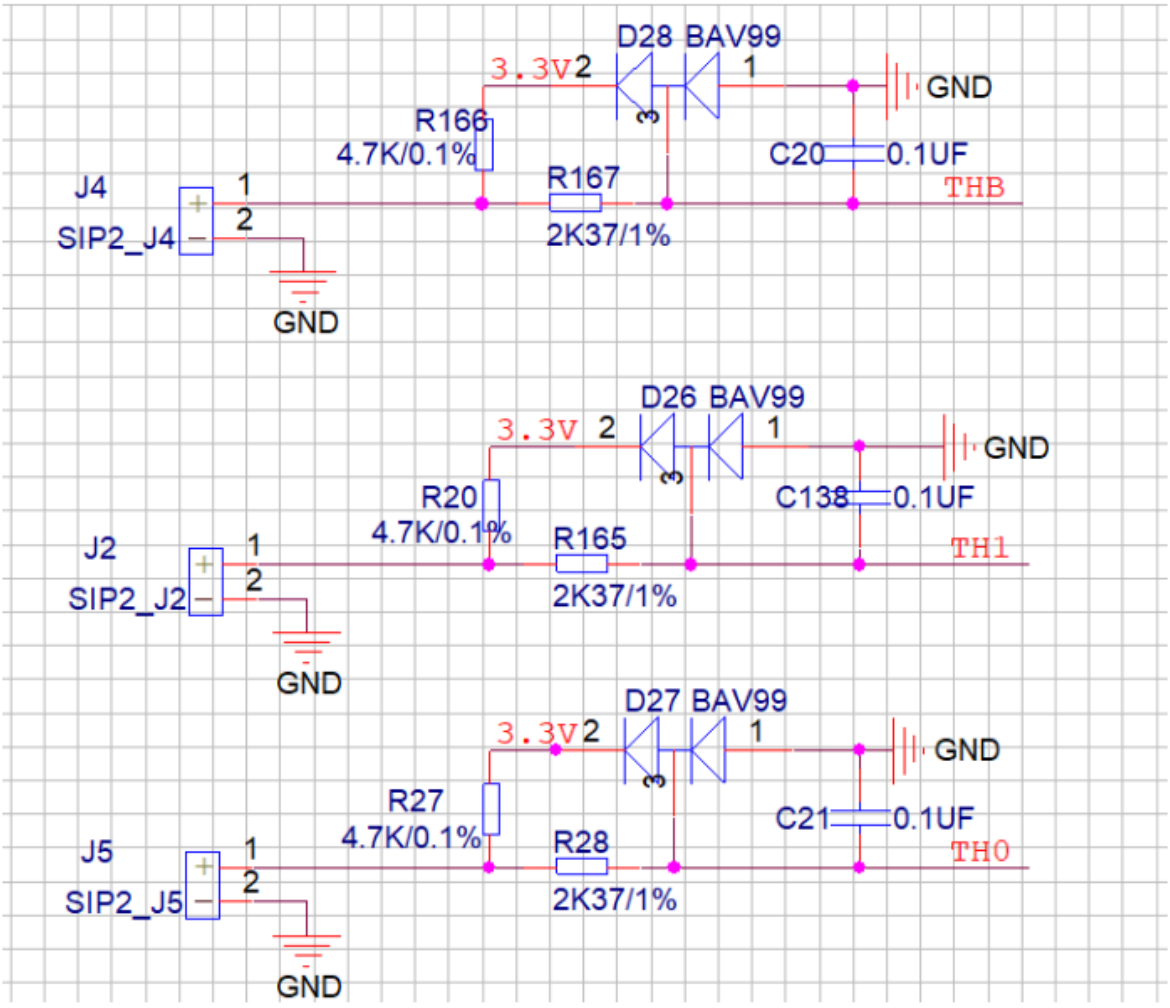


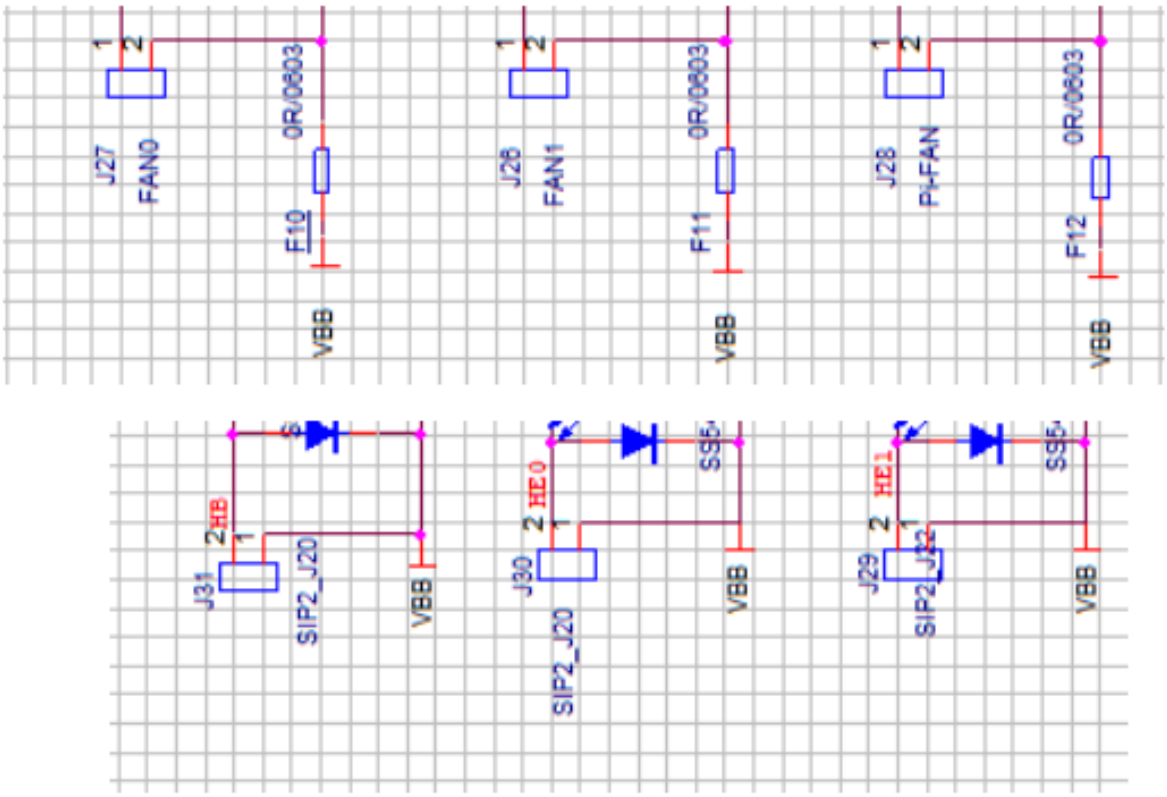
1. EN H616-PI12
2. STP RP2040- GPIO2
3. DIR RP2040- GPIO3
4. MISO RP2040- GPIO16
5. CS RP2040- GPIO24
6. SCK RP2040- GPIO18
7. MISI RP2040- GPIO19

Other Interfaces



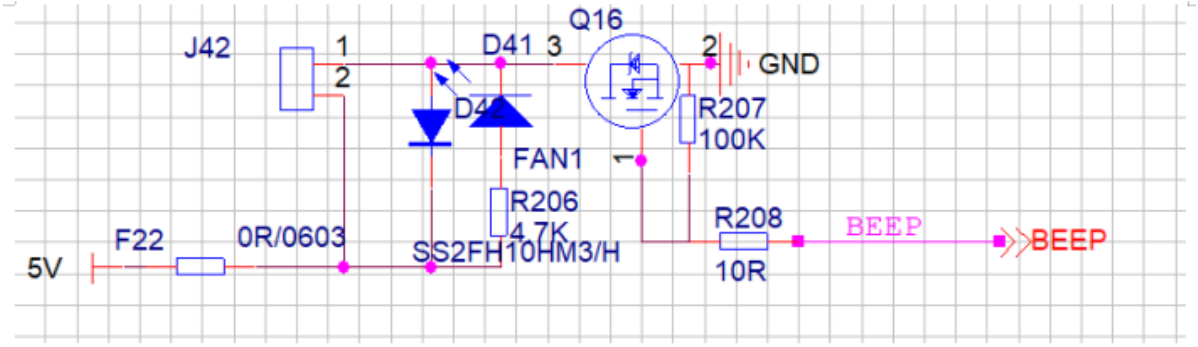

J35
1
2
3
DET1
J33
1
2
3
DET0
J34
1
2
3
PWOFF
GND
R183 10K 3.3V
C146
0.1UF
GND
R185 1K DET1
R182 10K 3.3V
C147
0.1UF
GND
R187 1K DET0
R184 10K 3.3V
R186 1K PWOFF
C148
0.1UF
GND


D28 BAV99
3.3V
2
1
3
GND
R166
4.7K/0.1%
C20
0.1UF
R167
THB
J4
SIP2_J4
2K37/1%
GND
D26 BAV99
3.3V
R20
4.7K/0.1%
C138
R165
TH1
J2
SIP2_J2
GND
D27 BAV99
R27
4.7K/0.1%
C21
R28
TH0
J5
SIP2_J5
GND



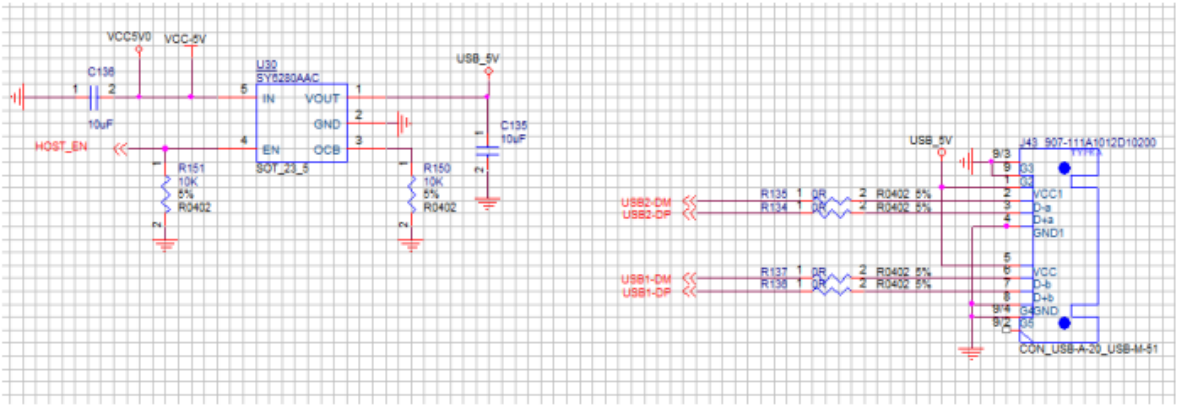
1. DET1 H616-PG11
2. DET0 H616-PG16
3. POWER RP2040- GPIO25
4. LEVELI RP2040- GPIO20
5. THB RP2040- GPIO28
6. TH1 RP2040- GPIO27
7. TH0 RP2040- GPIO26
8. FAN0 RP2040- GPIO29
9. FAN1 RP2040- GPIO4
10. FAN2 RP2040- GPIO11
11. HB RP2040- GPIO23
12. HE1 RP2040- GPIO22
13. HE0 RP2040- GPIO21

Buzzer Interface



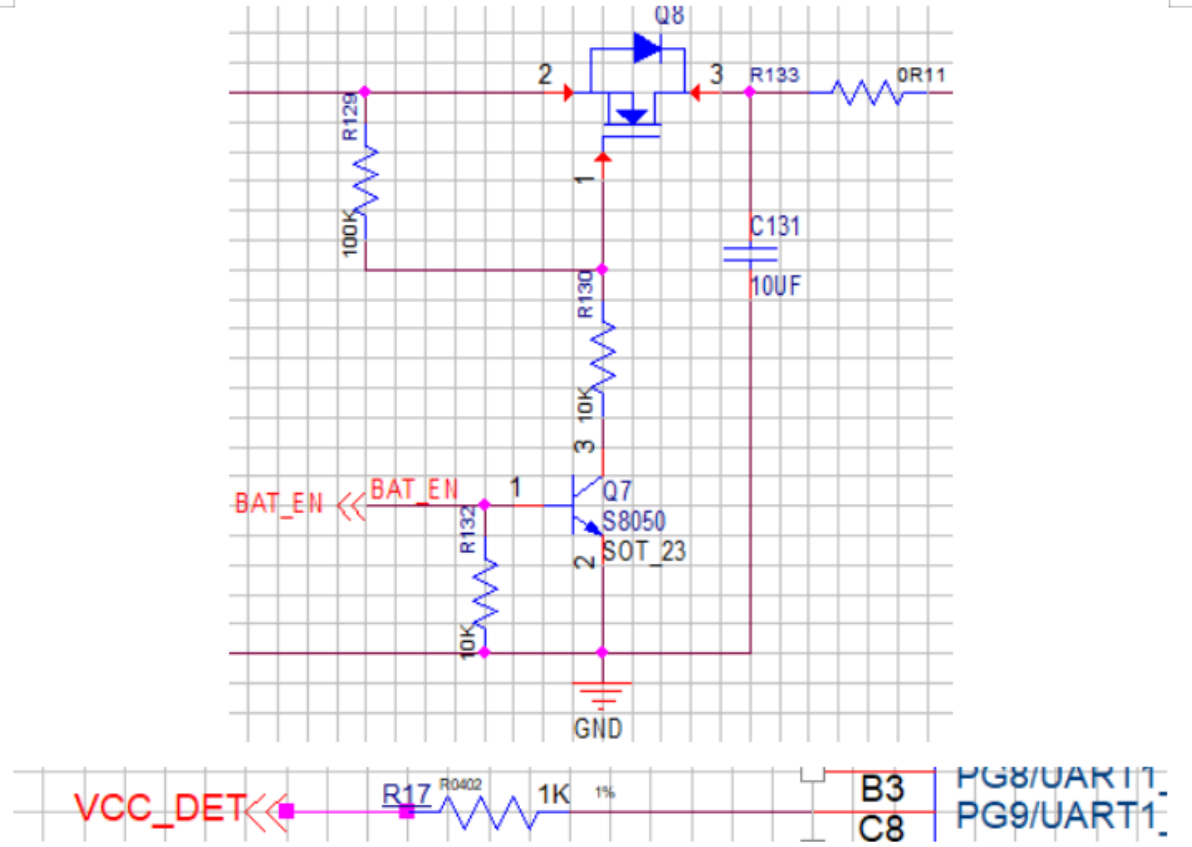
BEEP H616-PG19

USB Power Supply Interface



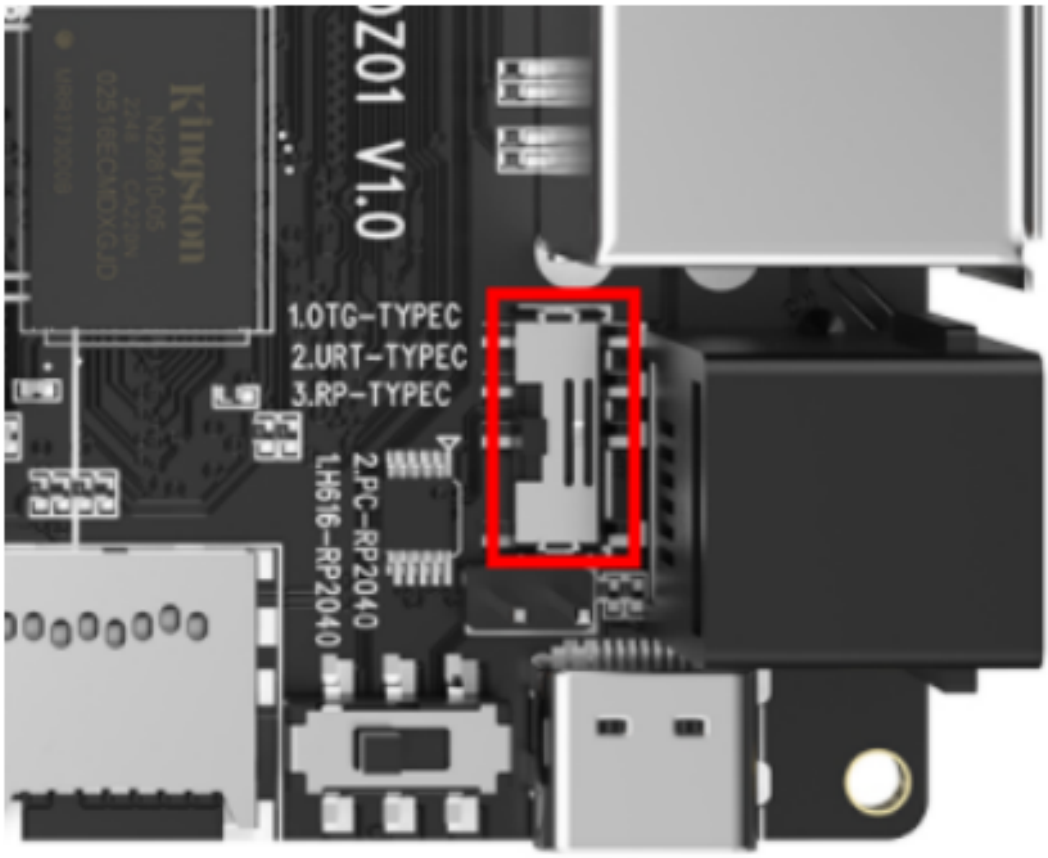
HOST_EN H616-PG17

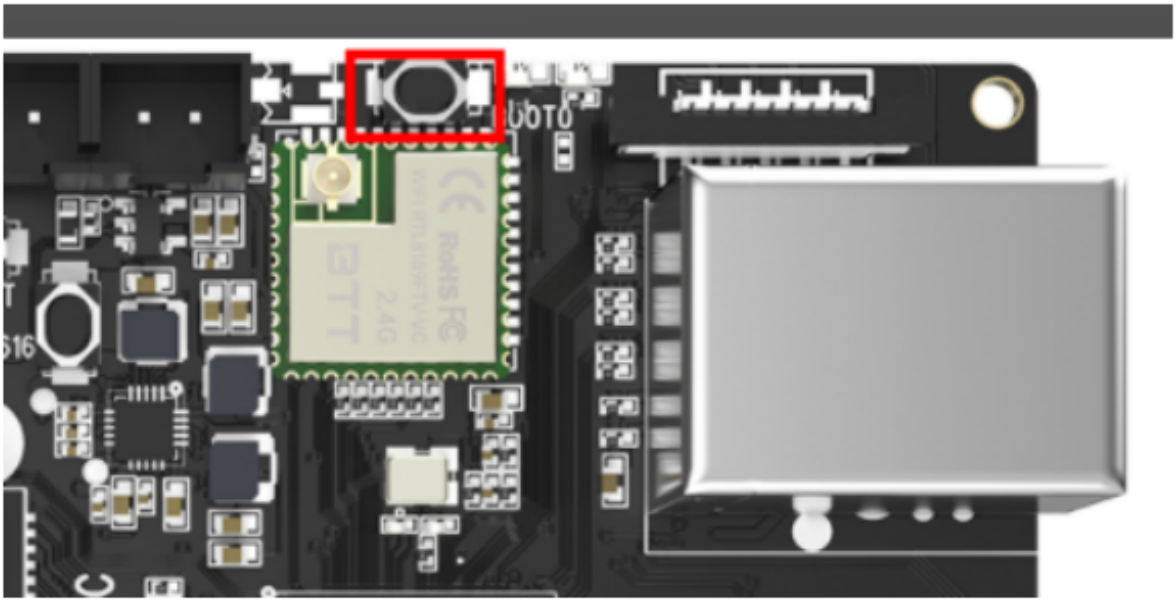
Battery Power Supply Interface



- BAT_EN H616-PG14
- VCC_DET H616-PG9
- (Note: H616 enters saved data and shuts down when PG9 detects 0)

Serial Communication and Firmware Flashing Instructions





1. To flash EMMC on H616, set switch to position 1 and hold BOOT0.

2. For serial output on H616, set switch to position 2.

3. To flash RP2040, set switch to position 3, and set switch 2 to PC-RP2040.

4. For communication between RP2040 and H616, set switch 2 to H616-RP2040.