

ESP32 Module

The diagram shows an ESP32 module (U1) connected to various components. The module is labeled "ESP32-WROOM-32D".

Power and Grounding:

- 3.3V:** Connected to pins 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1.
- GND:** Connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39.

Resistors:

- R7 (10k):** Connected between pins 39 and 38.
- R8 (10k):** Connected between pins 38 and 37.
- R3 (10k):** Connected between pins 37 and 36.
- R4 (10k):** Connected between pins 36 and 35.

Capacitors:

- C15 (22uF):** Connected between pins 39 and 38.
- C12 (100nF):** Connected between pins 38 and 37.
- C8 (100nF):** Connected between pins 39 and 38.
- C11 (100nF):** Connected between pins 39 and 38.

Switches:

- SW1 (RESET):** Connected between pins 39 and 38.
- SW2 (BOOT):** Connected between pins 39 and 38.

Other Connections:

- EN:** Connected to pin 39.
- NEO-PIXELS:** Connected to pins 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39.
- PEN-DIR:** Connected to pins 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39.
- J18 (E-Stop):** Connected to pins 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39.

Limit Switches

The diagram illustrates the wiring for two limit switches, J5 and J19, connected to a +3.3V supply. J5 is labeled 'X Limit Switch' and J19 is labeled 'Y Limit Switch'. Both switches have three pins, with pins 1 and 2 connected to the +3.3V supply through resistors R1 and R2 (both 100 ohms). Pin 3 of each switch is connected to ground. The output of R1 is connected to the X Limit input, and the output of R2 is connected to the Y Limit input. Both inputs are also pulled down to ground by capacitors C4 and C5 (both 100nF).

Auxiliary Ports (JTAG, SPI, I2C, NeoPixel, Pen (Spindle) Direction)

The diagram illustrates the wiring for various auxiliary ports on a microcontroller board. It includes connections for SPI (J6), I2C (J16), NeoPixel LEDs (J14), Pen Direction (J15), and ARM JTAG (J1).

J6 Aux Port (SPI):

- Pin 1: Vin
- Pin 2: +3.3V
- Pin 3: +5V
- Pin 4: MOSI
- Pin 5: MISO
- Pin 6: SCK
- Pin 7: CS_AUX
- Pin 8: GND

J16 Aux Port (I2C):

- Pin 1: Vin
- Pin 2: +3.3V
- Pin 3: +5V
- Pin 4: SCL
- Pin 5: SDA
- Pin 6: GND

J14 Neo Pixel LEDs:

- Pin 1: +5V
- Pin 2: NEO_PIXELS_JTAG_TCK
- Pin 3: GND

J15 Pen Direction:

- Pin 1: PEN_DIR_JTAG_TDO
- Pin 2: GND

J1 ARM JTAG 10pin:

- Pin 1: Vref1
- Pin 2: RESET
- Pin 3: SWDCLK/TCK
- Pin 4: NEO_PIXELS_JTAG_TCK
- Pin 5: SWDIO/TMS
- Pin 6: JTAG_TMS
- Pin 7: SWO/TDO
- Pin 8: PEN_DIR_JTAG_TDO
- Pin 9: NC/TDI
- Pin 10: JTAG_TDI
- Pin 11: GND Detect
- Pin 12: GND
- Pin 13: GND

Micro SD Card Socket

The diagram illustrates the electrical connections for a Micro SD Card Socket (J8, Micro_SD_Card_TF-01A). The socket is shown with its internal components and the card it holds. The connections are as follows:

- Power Supply:** A 3.3V supply is connected to the VDD pin (pin 4) and the Sense pin (pin 9). A 100nF capacitor (C14) is connected between the 3.3V supply and ground.
- Control Signals:**
 - CS_SD (Chip Select) is connected to pin 1 (DAT2).
 - MOSI (Master Out Slave In) is connected to pin 2 (DAT3/CD).
 - SCK (Serial Clock) is connected to pin 5 (CLK).
 - MISO (Master In Slave Out) is connected to pin 7 (DAT0).
- Data Signals:**
 - DAT0 is connected to pin 7.
 - DAT1 is connected to pin 8.
 - Sense is connected to pin 9.
- Grounding:** Ground (GND) is connected to pins 10, 11, 12, and 13.

The card inside the socket is labeled J8 Micro_SD_Card_TF-01A.

Power

Comms

The image displays three circuit diagrams for TMC2130 stepper motor drivers, each configured for a different axis: X, Y, and Pen_LIFT.

X Axis Driver Circuit

Pinout:

Pin	Function
1	StepEn
2	MOSI
3	SCK
4	CS_X
5	MISO
6	X_Step
7	X_Dir
8	EN
9	GND
10	VDD
11	STEP
12	DIR
13	2A
14	2B
15	GND
16	VMOT

Wiring:

- Power:** +3.3V supply connected to EN (pin 8) via a 10k resistor (R9) and to VDD (pin 10). GND is connected to pin 9.
- Control:** X_Limit (J7 pin 1) to EN (pin 8), X_Step (pin 6) to STEP (pin 11), and X_Dir (pin 7) to DIR (pin 12).
- Motor:** VMOT (pin 16) to X Motor (J12 pin 1). GND (pin 15) to X Motor (J12 pin 2).
- Capacitor:** 47uF 35V capacitor (C6) connected across VDD (pin 10) and GND (pin 9).

Y Axis Driver Circuit

Pinout:

Pin	Function
1	StepEn
2	MOSI
3	SCK
4	CS_Y
5	MISO
6	Y_Step
7	Y_Dir
8	EN
9	GND
10	VDD
11	STEP
12	DIR
13	2A
14	2B
15	GND
16	VMOT

Wiring:

- Power:** +3.3V supply connected to EN (pin 8) via a 10k resistor (R10) and to VDD (pin 10). GND is connected to pin 9.
- Control:** Y_Limit (J9 pin 1) to EN (pin 8), Y_Step (pin 6) to STEP (pin 11), and Y_Dir (pin 7) to DIR (pin 12).
- Motor:** VMOT (pin 16) to Y Motor (J13 pin 1). GND (pin 15) to Y Motor (J13 pin 2).
- Capacitor:** 47uF 35V capacitor (C7) connected across VDD (pin 10) and GND (pin 9).

Pen_LIFT Driver Circuit

Pinout:

Pin	Function
1	StepEn
2	MOSI
3	SCK
4	CS_PEN
5	MISO
6	PEN_Step
7	PEN_Dir
8	EN
9	GND
10	VDD
11	STEP
12	DIR
13	2A
14	2B
15	GND
16	VMOT

Wiring:

- Power:** +5V supply connected to EN (pin 8) via a 10k resistor (R11) and to VDD (pin 10). GND is connected to pin 9.
- Control:** PEN_Lift (J10 pin 1) to EN (pin 8), PEN_Step (pin 6) to STEP (pin 11), and PEN_Dir (pin 7) to DIR (pin 12).
- Motor:** VMOT (pin 16) to PEN_LIFT (J11 pin 1). GND (pin 15) to PEN_LIFT (J11 pin 2).
- Capacitor:** 47uF 35V capacitor (C8) connected across VDD (pin 10) and GND (pin 9).

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