

E-STOP

The schematic diagram illustrates the wiring for an E-STOP circuit using an Arduino Nano 3.0. The circuit is powered by a 5V supply and includes a USB port for programming and power. The Arduino's digital pins are connected to a red LED (R1) and a blue LED (R3) through 200Ω resistors. The red LED is connected to digital pin D11 (MOSI) and the blue LED to digital pin D10 (MISO). The circuit also includes a 3296W-1.103LF R6 component connected to the Arduino's analog pins. The diagram is labeled 'E-STOP' and includes a table of pin connections.

Arduino Pin	Component / Connection
VCC	5V
GND	GND
CE	N-D8
CSN	N-D10
CSK	N-D13
MOSI	N-D11
MISO	N-D12
RD	N-D12
D1/TX	J1.1
D0/RX	J1.2
RST.1	J1.3
GND.1	J1.4
D2	J1.5
D3	J1.6
A7	J1.7
A6	J1.8
A5	J1.9
A4	J1.10
A3	J1.11
A2	J1.12
A1	J1.13
A0	J1.14
AREF	J1.15
D11/MOSI	J1.16
D10/MISO	J1.17
D9	J1.18
D8	J1.19
D7	J1.20
D6	J1.21
D5	J1.22
D4	J1.23
D3	J1.24
D2	J1.25
D1	J1.26
D0	J1.27
D-1	J1.28
D-2	J1.29
D-3	J1.30
D-4	J1.31
D-5	J1.32
D-6	J1.33
D-7	J1.34
D-8	J1.35
D-9	J1.36
D-10	J1.37
D-11	J1.38
D-12	J1.39
D-13	J1.40
D-14	J1.41
D-15	J1.42
D-16	J1.43
D-17	J1.44
D-18	J1.45
D-19	J1.46
D-20	J1.47
D-21	J1.48
D-22	J1.49
D-23	J1.50
D-24	J1.51
D-25	J1.52
D-26	J1.53
D-27	J1.54
D-28	J1.55
D-29	J1.56
D-30	J1.57
D-31	J1.58
D-32	J1.59
D-33	J1.60
D-34	J1.61
D-35	J1.62
D-36	J1.63
D-37	J1.64
D-38	J1.65
D-39	J1.66
D-40	J1.67
D-41	J1.68
D-42	J1.69
D-43	J1.70
D-44	J1.71
D-45	J1.72
D-46	J1.73
D-47	J1.74
D-48	J1.75
D-49	J1.76
D-50	J1.77
D-51	J1.78
D-52	J1.79
D-53	J1.80
D-54	J1.81
D-55	J1.82
D-56	J1.83
D-57	J1.84
D-58	J1.85
D-59	J1.86
D-60	J1.87
D-61	J1.88
D-62	J1.89
D-63	J1.90
D-64	J1.91
D-65	J1.92
D-66	J1.93
D-67	J1.94
D-68	J1.95
D-69	J1.96
D-70	J1.97
D-71	J1.98
D-72	J1.99
D-73	J1.100

Regulator

The diagram illustrates a voltage regulation circuit. A 24V input (24VIN) is connected to the input of a 1A fuse (U2). The output of the fuse is connected to the input of a P78E05-1000 regulator (PS1). The regulator's output is +5V, which is filtered by a 22uF capacitor (C3). The input of the regulator is also filtered by a 10uF capacitor (C4). The regulator's ground is connected to GND.

Solenoid Driver

The diagram illustrates a solenoid driver circuit. The central component is the DRV103H IC, which is configured with the following connections:

- Pin 1 (DUTYCYCLEADJ):** Connected to a 22 kΩ resistor (R8) leading to GND.
- Pin 2 (DELAYADJ):** Connected to a 0.1 μF capacitor (C5) leading to GND.
- Pin 3 (STATUSOKFLAG):** Connected to a 47 kΩ resistor (R9) leading to GND.
- Pin 4 (OSC FREQ ADJ):** Connected to GND.
- Pin 5 (VS+):** Connected to the positive terminal of a 24V supply.
- Pin 6 (VS-):** Connected to the negative terminal of the 24V supply.
- Pin 7 (N-D6):** Connected to a 10 kΩ resistor (R7) leading to GND.
- Pin 8 (OUT):** Connected to the anode of a diode (D1), which is also connected to the SOLENOID.

Brake Driver

The circuit diagram illustrates a brake driver system. It begins with a BRAKE-SIGNAL input connected to pin B of IC1 (74VHC1G08GW.125). Pin A of IC1 is grounded, and pin Y provides a +5V output. This +5V signal drives the base of transistor Q1 (NVD5C668NLT4G) through a 100Ω resistor R10. The emitter of Q1 is grounded, and its collector is connected to the BRAKE1 terminal, which also has a +24V supply connected through a diode D2. Similarly, the output of IC1 (pin 5) drives the base of transistor Q2 (NVD5C668NLT4G) through a 100Ω resistor R11. The emitter of Q2 is grounded, and its collector is connected to the BRAKE2 terminal, which also has a +24V supply connected through a diode D3.

VOLTAGE DIVIDER

The diagram illustrates a voltage divider circuit. A +24V DC source is connected to a 10K resistor (P12). The other end of P12 is connected to a 2.2K resistor (P13). The output voltage is measured across P13, with the output terminal labeled A0. A capacitor C6 is connected from the output node to ground.

Display

The diagram shows the internal circuit of the RS-485 module. It features a central IC3 MAX487CSA+ chip. The chip's pins are connected as follows:

- Pin 1 (RO):** Connected to the RX5 pin of the RS-485 connector.
- Pin 2 (RE):** Connected to the 487-ENABLE pin of the RS-485 connector.
- Pin 3 (DE):** Connected to the TX5 pin of the RS-485 connector.
- Pin 4 (DI):** Connected to the TX5 pin of the RS-485 connector.
- Pin 5 (GND):** Connected to the common ground (GND).
- Pin 6 (A):** Connected to the TX+ line of the RS-485 connector.
- Pin 7 (B):** Connected to the TX- line of the RS-485 connector.
- Pin 8 (VCC):** Connected to the TX+ line of the RS-485 connector.

 A 120 ohm resistor (R18) is connected between the TX+ and TX- lines. The TX+ line is also connected to the TX5 pin of the RS-485 connector. The TX- line is connected to the TX5 pin of the RS-485 connector. The TX5 pin is also connected to the TX5 pin of the RS-485 connector. The TX5 pin is also connected to the TX5 pin of the RS-485 connector.

Raspberry Pi

Legend:

- UART0 - Expansion
- UART3 - Motor Controller
- UART5 - RS485
- 487/Enable - max487 RO and DE pin
- Brake Signal - high to disengage brakes
- Soft Estop - Low to put robotclaw into estop mode

40-Pin Header Pin List:

Pin	Signal	Pin	Signal
1	5V	21	SCLK
2	5V	22	MISO
3	3.3V	23	MOSI
4	3.3V	24	CE0
5	3.3V	25	CE1
6	5V	26	TX3
7	5V	27	ID_SD
8	3.3V	28	ID_SC
9	3.3V	29	GND
10	TX0	30	GND
11	RX0	31	GND
12	GND	32	GND
13	GND	33	GND
14	GND	34	GND
15	GND	35	GND
16	GND	36	GND
17	GND	37	GND
18	GND	38	GND
19	GND	39	GND
20	GND	40	GND

Wiring Details:

- Power:** 5V and GND connections to the module.
- Data Lines:** SDA and SCL connections to the module.
- Control Lines:** TX0, RX0, TX3 connections to the module.
- Resistors:** 10K resistors are used for pull-up/pull-down on the data lines.
- Diodes:** RS485 transceivers are used for the data lines.

Port Expander

SCREW TERMINALS

Expansion Ports

The diagram illustrates four expansion ports and their connections:

- MCP Expansion:** Pins 1-6 are connected to MISO, M4, M3, M2, M1, and M0 respectively. +5V and GND are also shown.
- SPI:** Pins 7-11 are connected to SCLK, MISO, MOSI, M2, and CE1. +5V and GND are also shown.
- I2C:** Pins 12-14 are connected to SCL, SDA, and +5V. GND is also shown.
- ModBus Out:** Pins 15-18 are connected to GLX-S-88M, B, A, and X4. +5V and GND are also shown.

A Roboclaw Out section shows a 70246-1604 connector with pins 1-16. Pins 1-16 are connected to RX3, TX3, and SOFT-ESTOP. A 10K resistor (R23) is connected between +5V and RX3.