# SRA DEVELOPMENT BOARD – 2023/24

## MICROCONTROLLER

### ESP32

U1
ESP32-DEVKITC-32D

J1 — Conn_01x19_Male

| | | | |
|---|---|---|---|
| 1 | ESP_3V3 | 3V3 | 1 |
| 2 | EN | EN | 2 |
| 3 | 36 | SENSOR_VP | 3 |
| 4 | 39 | SENSOR_VN | 4 |
| 5 | 34 | IO34 | 5 |
| 6 | 35 | IO35 | 6 |
| 7 | 32 | IO32 | 7 |
| 8 | 33 | IO33 | 8 |
| 9 | 25 | IO25 | 9 |
| 10 | 26 | IO26 | 10 |
| 11 | 27 | IO27 | 11 |
| 12 | 14 | IO14 | 12 |
| 13 | 12 | IO12 | 13 |
| 14 | GND | GND1 | 14 |
| 15 | 13 | IO13 | 15 |
| 16 | SD2 | SD2 | 16 |
| 17 | SD3 | SD3 | 17 |
| 18 | 11 | CMD | 18 |
| 19 | 5V_P | EXT_5V | 19 |

J5 — Conn_01x19_Male

| | | | |
|---|---|---|---|
| 20 | GND | GND3 | 20 |
| 21 | 23 | IO23 | 18 |
| 22 | D-22 | IO22 | 17 |
| 23 | TX | TXD0 | 16 |
| 24 | RX | RXD0 | 15 |
| 25 | D+21 | IO21 | 14 |
| 26 | GND | GND2 | 13 |
| 27 | 19 | IO19 | 12 |
| 28 | 18 | IO18 | 11 |
| 29 | 5 | IO5 | 10 |
| 30 | 17 | IO17 | 9 |
| 31 | 16 | IO16 | 8 |
| 32 | 4 | IO4 | 7 |
| 33 | 0 | IO0 | 6 |
| 34 | 2 | IO2 | 5 |
| 35 | 15 | IO15 | 4 |
| 36 | SD1 | SD1 | 3 |
| 37 | SD0 | SD0 | 2 |
| 38 | CLK | CLK | 1 |

Note: IO0 – Boot Pin    EN – Reset Pin

## POWER CIRCUITRY

### 12V-GND Terminal
T3
Screw_Terminal_01x02
2 — 12V_U
1 — GND

### 12V-DC Power Jack
J6
DCJ200-10-A-XX-X_REVA
1 — 12V_U
GND

### LM2576: Buck Regulator
Converts 12V Input to 5V Output
U5 — LM2576S-5
VIN, FB, ON/OFF, GND, OUT
D12 SS24
C1 100uF
D14 SS34
C2 470uF
L1 100uH
5V
12V_U
GND
1N5399 <=> SS24 (2A rated Schottky diode)
1N5822 <=> SS34 (3A rated Schottky diode)

### AMS1117: Linear Regulator
Converts 5V Input to 3.3V Output
U2 — AMS1117-3.3
VI, VO, GND
AMS_IN → 3V3
C6 10uF   C3 0.1uF   C5 22uF   C4 0.1uF
GND

## MOTOR PORTS

### Output Terminal Blocks
J16 — Screw_Terminal_01x05
1 GND
2 OUT1A
3 OUT2A
4 OUT3A
5 OUT4A

## STANDARD VOLTAGE PORTS
### 5V, 3.3V & GND
J11 Conn_01x05_Male → 5V
J12 Conn_01x05_Male → 3V3
J13 Conn_01x05_Male → GND

## DPDT SWITCHES

### 12V Input–>Motor Supply
12V_U — D9 SS34 — F1 3A — 12V_SW1 — 12V_P
SW_Push_DPDT
12V_U: Raw Input 12V
12V_P: 12V with protection circuit
1N5822 <=> SS34 (3A Schottky diode)
RUEF160 PTC Resetable Fuse
I_trip = 3.2A; I_hold = 1.6A

### 5V Regulated–>MCU Supply
5V_P — AMS_IN
5V — D13 SS14 — F2 300mA — 5V_SW1 — 5V_P
SW_Push_DPDT
5V: Raw Regulated 5V
5V_P: 5V with protection circuit
1N581* (1N5819/1N5419) <=>
SS15 (Vf=0.7V)
SS12 (Vf=0.5V)
(1A Schottky rectifier)
RXEF050 PTC Resetable Fuse
I_trip = 1A; I_hold = 0.5A

## PUSH BUTTONS

### Motor Forward–Backward
SW1 SW_Push_Dual — GND, 4
SW4 SW_Push_Dual — GND, 14
SW2 SW_Push_Dual — GND, 2
SW3 SW_Push_Dual — GND, 27

## TESTPOINTS

### Motor Output Pins
TP1 OUT2A — TestPoint
TP2 OUT3A — TestPoint

## MOTOR DRIVER

### TB6612FNG
U3 — TB6612FNG

| Pin | Net | | Pin | Net |
|---|---|---|---|---|
| 16 | PWMA | 3V3 | | VCC | 3V3 |
| 10 | PWMB | 3V3 | | VM | 12V_P |
| 14 | AI1 | 12 R11 1k | | AO1 | OUT1A |
| 15 | AI2 | 13 R12 1k | | AO2 | OUT2A |
| 9 | BI1 | 25 R13 1k | | BO1 | OUT3A |
| 10 | BI2 | 26 R14 1k | | BO2 | OUT4A |
| 13 | STBY | 3V3 | | GND | GND |

## LED ARRAY

| 12 | 13 | 25 | 26 | 15 | 5 | 18 | 19 | AMS_IN | 3V3 |
|---|---|---|---|---|---|---|---|---|---|
| D1 LED | D2 LED | D3 LED | D4 LED | D5 LED | D6 LED | D7 LED | D8 LED | D10 LED | D11 LED |
| R1 330 | R2 330 | R3 330 | R4 330 | R5 330 | R6 330 | R7 330 | R8 330 | R9 470 | R10 330 |
| GND | GND | GND | GND | GND | GND | GND | GND | GND | GND |

## SENSOR PORTS (JST CONN.)

### LSA
J7 — Conn_01x07_Male
| 1 | 32 |
| 2 | 35 |
| 3 | 34 |
| 4 | 39 |
| 5 | 36 |
| 6 | GND |
| 7 | 3V3 |

### MPU
J8 — Conn_01x06_Male
| 1 | D+ 21 |
| 2 | D- 22 |
| 3 | GND |
| 4 | 23 |
| 5 | 3V3 |
| 6 | |

## Voltage divider for battery charge sensing
12V_U — R16 10K — 33 — R17 1K — GND

## Battery Port
J14 — B2B-XH-A_LF__SN_
1 12V_U
2 GND

## SPI Port
J17 — Conn_01x06_Male
| 6 | GND |
| 5 | 3V3 |
| 4 | 5 |
| 3 | 23 |
| 2 | 18 |
| 1 | 19 |

## SERVO PORTS

### 3-Pin 5V Servos
J2 — Conn_01x03_Male
1 5
2 5V
3 GND

J3 — Conn_01x03_Male
1 19
2 5V
3 GND

J4 — Conn_01x03_Male
1 18
2 5V
3 GND

J10 — Conn_01x03_Male
1 15
2 5V
3 GND

## DRILLS

### Mounting Holes
H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

## OLED PORT
J9 — Conn_01x04_Female
| 1 | GND |
| 2 | 3V3 |
| 3 | 21 D+ |
| 4 | 22 D- |
D+ → D+
D- → D-
GPIO 21 – SCL
GPIO 22 – SDA
GPIO 23 – INT