Servo 2040 – RP2040 et al

USB-C connector

LDO

ADC Multiplexer

Crystal oscillator

Flash memory

Combined USB boot & user switch

Need PIO to use all 18 servos at once, as there's only 16 PWM channels
Servo 2040 – Power and Connectors

### Servo Connectors

<table>
<thead>
<tr>
<th>SERVO 1_18</th>
<th>SERVO 7_12</th>
<th>SERVO 13_18</th>
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<tbody>
<tr>
<td>3x6 SERVO</td>
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<tr>
<td>COM_MID</td>
<td>MID1% SERVO POWER</td>
<td>MID1% SERVO POWER</td>
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<tr>
<td>COM_BOT</td>
<td>BOT1% SERVO GND</td>
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### Sensor Connectors

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### Screw Terminal Power Input & Voltage Sense

- **SERVO POWER**
- **SCREW_TERM_GND**
- **C21**
- **220uF 20V A768KE227M1DLAE029**
- **5V**
- **PS1**
- **PS2**

### Screw Terminal Reverse Voltage Protection

- **SCREW_TERM_GND**
- **SERVO_POWER**

### Current Sense

- **GS8331**
- **3V3**
- **CUR_SENSE**
- **1k**
- **R15**
- **R10**
- **Resistor power at 10A:**
  - $10^3 \times 0.003 = 0.3W$
  - Or $15A = 0.675W$
- **Max voltage across sense resistor:**
  - $0.003 \text{ ohm} \times 15A = 0.045V$
  - $0.003 \text{ ohm} \times 20A = 0.060V$
- **With 1k and 68k resistors, gain is 69x.**
- **Thus 0.045V becomes 3.105V.**

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Servo 2040 – Header & LEDs

Extension header

RGB LEDs

GND
GND
GND
GND
GND
ADC2
ADC1
ADC0
SWCLK
SWDIO
I2C_SCL
I2C_SDA
RESET
LED_DATA
USER SW
GND
GND
GND
GND
VCC
GND
VCC
GND
VCC
GND
VCC
GND
VCC
GND
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