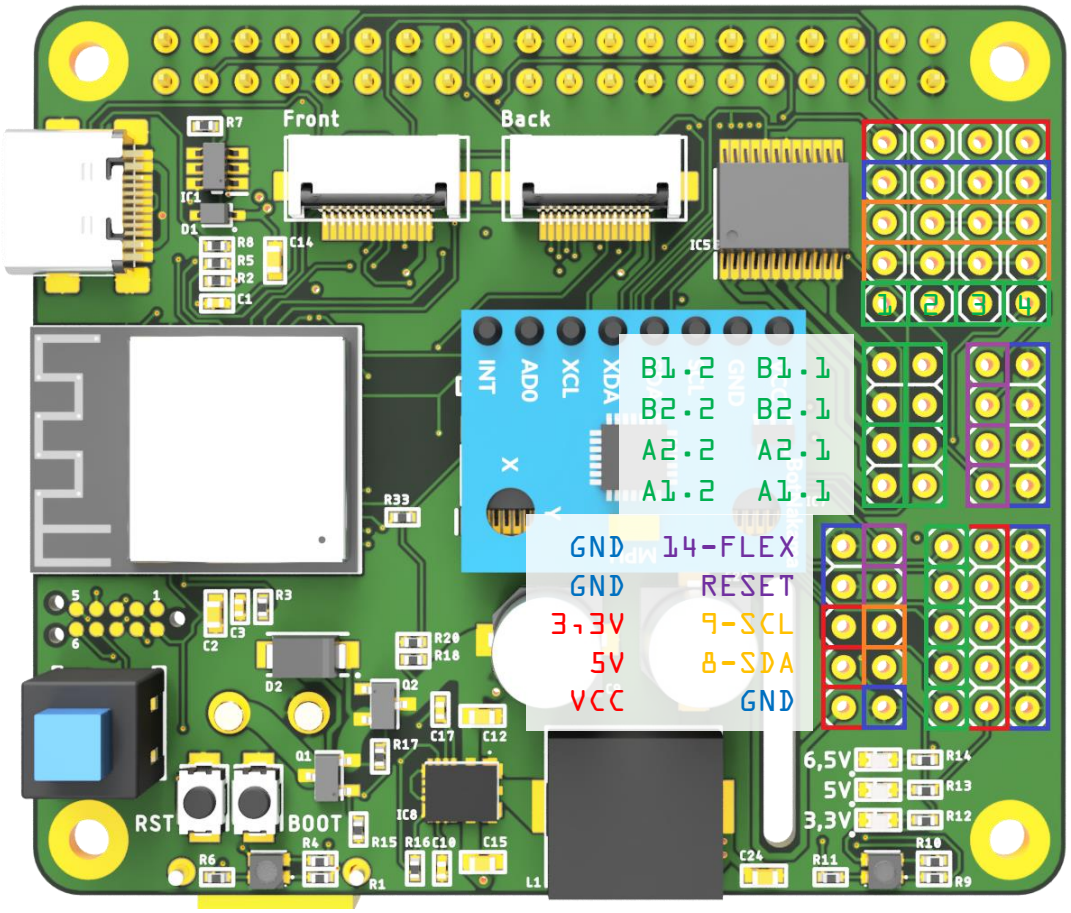
# RoboCoreV3.2 Manual

## Pinout




Voltage
GND/Zero potential
Communication protocol
Digital output
Analog/Digital input

## Warning before use!

- *Do not load a program onto the ESP32-S3 which continuously sends serial packets via USB.*
- *After powering up the RoboCore, always make sure that nothing is connected to the wrong pins.* Always use the pinout diagram each time you change pins!
- *Whenever the system is re-plugged or modified, ensure that the battery is always disconnected.* Otherwise short circuits may occur on the PCB!

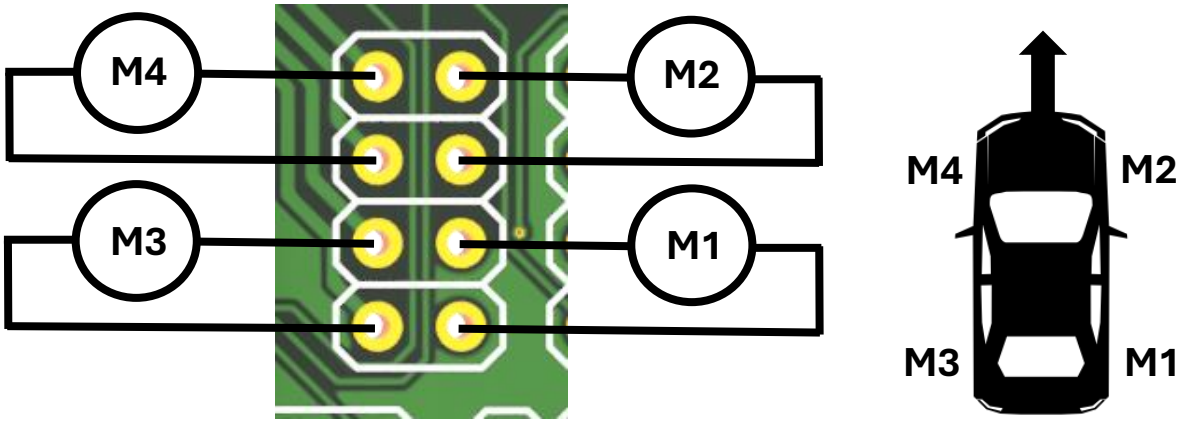
## Download Mode


If no program can be uploaded to the ESP32-S3, it must be set to download mode. The following steps are necessary to do this:

1. Press and hold the BOOT and RESET button
2. Connect the RoboCore to the computer via USB
3. Release the RESET button while still holding the BOOT button
4. Release the BOOT button after a few seconds

## Motor Connection

Use the following wiring diagram to connect the motors:




## Pinout

| ESP32 GPIO | Pin name | Description |
|---|---|---|
| 1 | 1-PT_REF_L | Reflection sensor left. |
| 2 | 2-PT_L_1 | Light sensor left outside. |
| 4 | 4-PT_L_0 | Light sensor left inside. |
| 5 | 5-PT_R_0 | Light sensor right inside. |

| | | |
|---|---|---|
| 6 | 6-PT_R_1 | Light sensor right outside. |
| 7 | 7-PT_REF_R | Reflection sensor right. |
| 8 | 8-SDA | Data lines for I2C. |
| 9 | 9-SCL | Data lines for I2C. |
| 10 | 10-PT_L_3 | Light sensor left outside. |
| 11 | 11-PT_L_2 | Light sensor left inside. |
| 12 | 12-PT_R_2 | Light sensor right inside. |
| 13 | 13-PT_R_3 | Light sensor right outside. |
| 14 | 14-FLEX | A Flex sensor can be read out here. |
| 15 | 15-VBAT | The battery voltage can be measured with this pin. |
| 16 | 16-T_E | An input pull-up must be defined in the software! Buttons can be connected to this pin. LOW = pressed |
| 17 | 17-T_R | An input pull-up must be defined in the software! Buttons can be connected to this pin. LOW = pressed |
| 18 | 18-T_L | An input pull-up must be defined in the software! Buttons can be connected to this pin. LOW = pressed |
| 21 | 21-PWMA1 | This pin determines the motor speed. |
| 33 | 33-PWMA2 | This pin determines the motor speed. |
| 34 | 34-PWMB1 | This pin determines the motor speed. |
| 35 | 35-PWMB2 | This pin determines the motor speed. |
| 36 | 36-WHITE_L | Light sensor strip LED white left. HIGH = ON |
| 37 | 37-WHITE_R | Light sensor strip LED white right. HIGH = ON |
| 38 | 38-WHITE | Light sensor strip LED white. HIGH = ON |
| 39 | 39-RED | Light sensor strip LED red. HIGH = ON |
| 40 | 40-GREEN | Light sensor strip LED green. HIGH = ON |
| 41 | 41-T_M | An input pull-up must be defined in the software! Buttons can be connected to this pin. LOW = pressed |
| 42 | 42-DS | New data enters the register. |
| 47 | 47-STCP | Latches shifted data into output registers. |
| 48 | 48-SHCP | Controls data shifting within the register. |

| Shiftregister GPIO | Pin Name | Description |
|---|---|---|
| Q0.0 | AIN1.1 | Determines the motor direction. |
| Q1.0 | AIN2.1 | Determines the motor direction. |
| Q2.0 | BIN1.1 | Determines the motor direction. |
| Q3.0 | BIN2.1 | Determines the motor direction. |
| Q4.0 | AIN1.2 | Determines the motor direction. |
| Q5.0 | AIN2.2 | Determines the motor direction. |
| Q6.0 | BIN1.2 | Determines the motor direction. |
| Q7.0 | BIN2.2 | Determines the motor direction. |
| Q0.1 | STBY1 | If the pin is set LOW, the motor driver is off and at HIGH it is on. |
| Q1.1 | STBY2 | If the pin is set LOW, the motor driver is off and at HIGH it is on. |
| Q2.1 | XSHT1 | A HIGH activates the TOF sensor. |
| Q3.1 | XSHT2 | A HIGH activates the TOF sensor. |
| Q4.1 | XSHT3 | A HIGH activates the TOF sensor. |
| Q5.1 | XSHT4 | A HIGH activates the TOF sensor. |
| Q6.1 | Q6 | External digital pin. |
| Q7.1 | Q7 | External digital pin. |

| PWM Bus | Pin Name | Description |
|---|---|---|
| CH0 | SV01 | A servo can be connected to this pin. |
| CH1 | SV02 | A servo can be connected to this pin. |
| CH2 | SV03 | A servo can be connected to this pin. |
| CH3 | SV04 | A servo can be connected to this pin. |
| CH4 | SV05 | A servo can be connected to this pin. |
| CH5 | CH5 | External PWM pin. |

| | | |
|---|---|---|
| CH6 | CH6 | External PWM pin. |
| CH7 | CH7 | External PWM pin. |
| CH8 | RED_L | RoboCore RGB red left, PWM inverted! 255 = OFF, 0 = ON |
| CH9 | GREEN_L | RoboCore RGB green left, PWM inverted! 255 = OFF, 0 = ON |
| CH10 | BLUE_L | RoboCore RGB blue left, PWM inverted! 255 = OFF, 0 = ON |
| CH11 | RED_R | RoboCore RGB red right, PWM inverted! 255 = OFF, 0 = ON |
| CH12 | GREEN_R | RoboCore RGB green right, PWM inverted! 255 = OFF, 0 = ON |
| CH13 | BLUE_R | RoboCore RGB blue right, PWM inverted! 255 = OFF, 0 = ON |

| GPIO | Input | Output | Pin assignment | Note | Arduino pinMode() |
|---|---|---|---|---|---|
| 0 | NO | NO | 0-STAT | Strapping Pin, Responsible for boot configuration, BOOT | |
| 3 | YES | YES | / | Strapping Pin, JTAG, ADC 12Bit (4096), RTC, TOUCH3 | |
| 45 | YES | YES | / | Strapping Pin, VSPI | |
| 46 | YES | YES | / | Strapping Pin, use no pullup or pulldown resistor, LOG | |
| 43 | YES | YES | TXD0 | TXD0 | |
| 44 | YES | YES | RXD0 | RXD0 | |
| 1 | YES | YES | 1-PT_REF_L | ADC 12Bit (4096), RTC, TOUCH | |
| 2 | YES | YES | 2-PT_L_1 | ADC 12Bit (4096), RTC, TOUCH | |
| 4 | YES | YES | 4-PT_L_0 | ADC 12Bit (4096), RTC, TOUCH | |
| 5 | YES | YES | 5-PT_R_0 | ADC 12Bit (4096), RTC, TOUCH | |
| 6 | YES | YES | 6-PT_R_1 | ADC 12Bit (4096), RTC, TOUCH | |
| 7 | YES | YES | 7-PT_REF_R | ADC 12Bit (4096), RTC, TOUCH | |
| 8 | YES | YES | 8-SDA | SDA, ADC 12Bit (4096), RTC, TOUCH | |
| 9 | YES | YES | 9-SCL | SCL, ADC 12Bit (4096), RTC, TOUCH | |
| 10 | YES | YES | 10-PT_L_3 | SPI3_CS, ADC 12Bit (4096), RTC, TOUCH | |
| 11 | YES | YES | 11-PT_L_2 | SPI3_MOSI, ADC 12Bit (4096), RTC, TOUCH | |
| 12 | YES | YES | 12-PT_R_2 | SPI3_CLK, ADC 12Bit (4096), RTC, TOUCH | |
| 13 | YES | YES | 13-PT_R_3 | SPI3_MISO, ADC 12Bit (4096), RTC, TOUCH | |
| 14 | YES | YES | 14-FLEX | ADC 12Bit (4096), RTC, TOUCH | |
| 15 | YES | YES | 15-VBAT | ADC 12Bit (4096), RTC | |
| 16 | YES | YES | 16-T_E | ADC 12Bit (4096), RTC | INPUT_PULLUP |
| 17 | YES | YES | 17-T_R | ADC 12Bit (4096), RTC | INPUT_PULLUP |
| 18 | YES | YES | 18-T_L | ADC 12Bit (4096), RTC | INPUT_PULLUP |
| 19 | YES | YES | D- | D-, ADC 12Bit (4096), RTC | |
| 20 | YES | YES | D+ | D+, ADC 12Bit (4096), RTC | |
| 21 | YES | YES | 21-PWMA1 | RTC | |
| 26 | YES | YES | / | | |
| 33 | YES | YES | 33-PWMA2 | | |
| 34 | YES | YES | 34-PWMB1 | | |
| 35 | YES | YES | 35-PWMB2 | SPI2_MOSI | |
| 36 | YES | YES | 36-WHITE_L | SPI2_CLK | HIGH = ON |
| 37 | YES | YES | 37-WHITE_R | SPI2_MISO | HIGH = ON |
| 38 | YES | YES | 38-WHITE | | HIGH = ON |
| 39 | YES | YES | 39-RED | SPI2_CS | HIGH = ON |
| 40 | YES | YES | 40-GREEN | | HIGH = ON |
| 41 | YES | YES | 41-T_M | | INPUT_PULLUP |
| 42 | YES | YES | 42-DS | | |
| 47 | YES | YES | 47-STCP | | |
| 48 | YES | YES | 48-SHCP | | |