

Micromouse - Kit Overview

MTRN3100 - UNSW School of Mechanical and Manufacturing Engineering

1 Introduction

This kit provides all the necessary components to be competitive for the Micromouse challenge. This document provides an overview of the components within the kit as well as the PCB wiring.

1.1 IMPORTANT NOTE

DO NOT SOLDER THE CORE COMPONENTS DIRECTLY TO THE PCB. YOU MUST USE THE PROVIDED HEADERS. IF YOU SOLDER COMPONENTS DIRECTLY TO THE PCB AND ENCOUNTER A PROBLEM WE WILL NOT SUPPLY REPLACEMENT PARTS.

2 Component Overview

2.1 Core components

These components are supplied initially, Replacements will not be provided unless you can prove the component was damaged when you received it.

| COMPONENT | DESCRIPTION | MAUFACTURER | PART No. |
|-------------|---|------------------|--------------|
| HARDWARE | USB-A to Micro USB cable | | |
| XA1 | Arduino Nano | Arduino | A000005 |
| XA2 | IMU | Core Electronics | 018-MPU-6050 |
| XA3 | Dual Motor Driver Carrier, DRV8835 (for Motor-Driver) | Pololu | 2135 |
| HARDWARE | 2x Micro Metal Gearmotor 100:1 w/Encoder | DF Robot | FIT0483 |
| HARDWARE | Pololu Wheel 32*7mm Pair - White | Pololu | 1088 |
| XA4 | OLED screen, White, 64x128 pixels | Core Electronics | CE09493 |
| A2, A3 & A4 | TOF Distance Sensor (Lidar) | Pololu | 2489 |
| HARDWARE | Li-Ion battery holder - 2 Cell | | |
| HARDWARE | 2x Li-Ion battery | | |
| HARDWARE | Micromouse PCB | | |

Figure 1: Bill of Materials for core components.

2.2 Trolley components

These components can be found in a trolley within the mechatronics lab. Please only take the required amount. If you damage one of these components you may replace it. If your team decides to make your own custom PCB you are free and encouraged to take these components such that you do not solder a sensor directly to your PCB.

| COMPONENT | DESCRIPTION | MAUFACTURER | PART No. |
|-----------------|--|---------------------|----------------|
| D1 | Diode, Schottky, 30V, 5A, 480mV (for Pwr) | Vishay | SB530-E3/54 |
| D2 | LED, 5mm, Red, Round (for Batt Pwr) | | |
| D3 | LED, 5mm, Green, Round (for Pwr On) | | |
| F1 | Fuse Holder - PCB Mount for MINI, Horizontal | Littelfuse | 01530007Z |
| FUSE | Fuse, MINI, 4A | Littelfuse | 0297004.WXNV |
| HARDWARE | Standoff - M3 x 11mm, F-F (for IMU) | Würth Elektronik | 970110365 |
| HARDWARE | M3x6 SEMS Screw (for IMU) | Hobson Engineering | 23P36FS |
| HARDWARE | Standoff - M2 x 12mm, F-F (for OLED) | Essentra Components | HTSN-M2-12-5-1 |
| HARDWARE | M2x6 PH Screw (for OLED) | Hobson Engineering | 21PS26 |
| HARDWARE | M2 Spring Washer (for OLED) | Brighton Best | 71PS2 |
| J1 | DC Socket, PCB Mount, Right Angle, 5A, 12VDC | RS PRO | 8051699 |
| J2, J6 & J7 | Socket Head, Single Row, 2 way (for Spare AIO, 5V & 3.3V) | Würth Elektronik | 61300211821 |
| J4, J5 & J13 | Socket Head, Single Row, 4 way (for I2C, GND & OLED) | Würth Elektronik | 61300411821 |
| J3 | Socket Head, Single Row, 6 way (for Spare DIO) | Würth Elektronik | 61300611821 |
| J8, J9, J14-J16 | Socket Head, Single Row, 7 way (for Motor-Driver & Lidars) | Würth Elektronik | 61300711821 |
| J12 | Socket Head, Single Row, 8 way (for IMU) | Würth Elektronik | 61300811821 |
| J10 & J11 | Socket Head, Single Row, 15 way (for Nano) | Amphenol | 76341-315LF |
| R1 & R4 | Resistor - 330 Ohm, 0.6W, 1%, TC50 (for Batt Pwr LED) | | |
| R2 | Resistor - 2K2, 250mW, 1%, 50ppm (for Batt Mon R5) | | |
| R3 | Resistor - 3K3, 250mW, 1%, 50ppm (for Batt Mon R6) | | |
| ST1 & ST2 | Screw Terminals - 6 way | Buchanan | 282834-6 |
| SW1 | Switch, SPDT, Right Angle (for Pwr) | E-Switch | 100SP1T2B4M6QE |

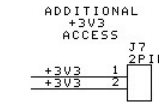
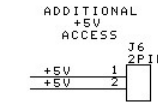
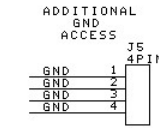
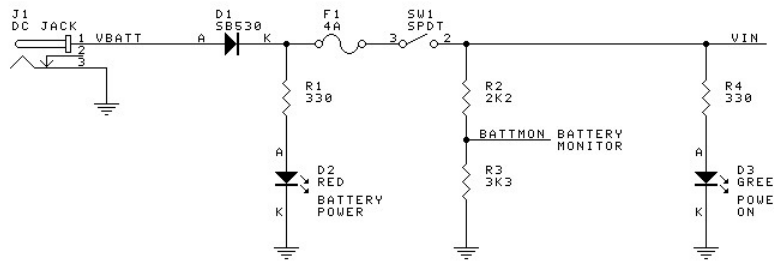
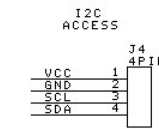
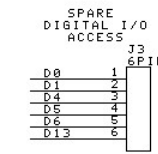
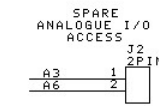
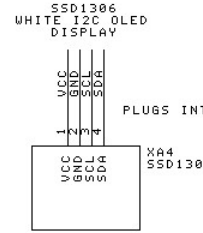
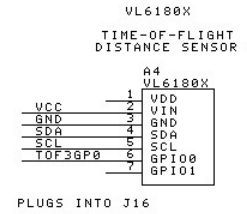
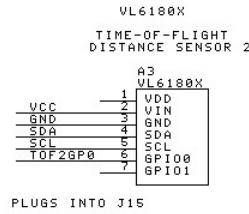
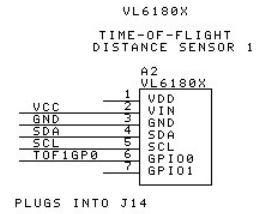
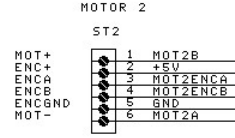
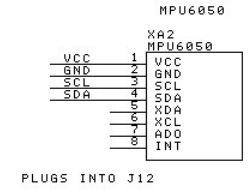
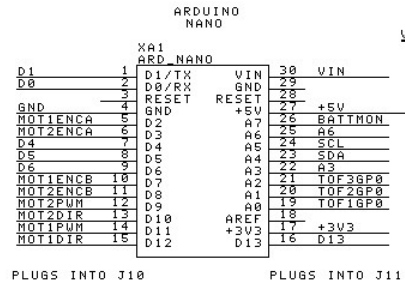
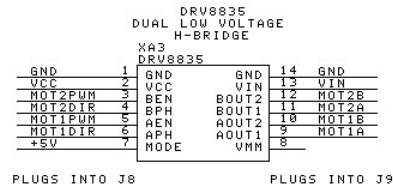
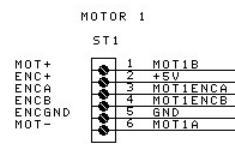
Figure 2: Bill of Materials for trolley components.

2.3 Batteries

Batteries will be charged in the mechatronics lab, Demonstrators are responsible for charging batteries. If you need new batteries ask a demonstrator and they will exchange them. Your team is only allowed 2 Li-Ion cells at a time.

3 Wiring information

Wiring information for the PCB has been supplied in the schematic attached to this document.



NOTES:
ALL DRAWING NUMBERS REFER TO MECHATRONICS DRAWINGS UNLESS SPECIFIED OTHERWISE.
EXAMPLE: ABCDX12C/3A REFERS TO MECHATRONICS DRAWING NUMBER ABCD, X = (Schematic,
Wiring diagram, Cable assembly or PCB), SHEET 1, VERSION 2, REVISION C, SHEET REFERENCE COLUMN 3, ROW A.



UNSW
SYDNEY
2024



PCB NO: MDIP126

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|----------------------------------|-------------------|----------|
| Title MECHATRONICS | | |
| MTRN3100 - MICRO DRONE INTERFACE | | |
| SCHEMATIC | | |
| Size | Number | Revision |
| A3 | MDIS14 | G |
| Date: 7-MAY 2024 | Sheet 1 of 2 | |
| File: MDIS146/1 | Drawn By: S.KUHLE | |