Robot Shield Instructions

This document describes the steps to make the robot shield.

Right angle header pins for servo arm

XH2.54 right angle connector for motor A

XH2.54 right angle connector for motor B

XH2.54 right angle connector for battery pack

4 pin header for ultrasonic sensor

Mini victory motor drive break-out board

6 pin header for bluetooth module

Solder straight header pins to the connector pads to push into the Arduino Uno board

Diode

8 pin header for MPU 6050

LED current limiting Resistor – 330ohms

Dual green/red LED

Reset button

Circuit diagram of the robot shield
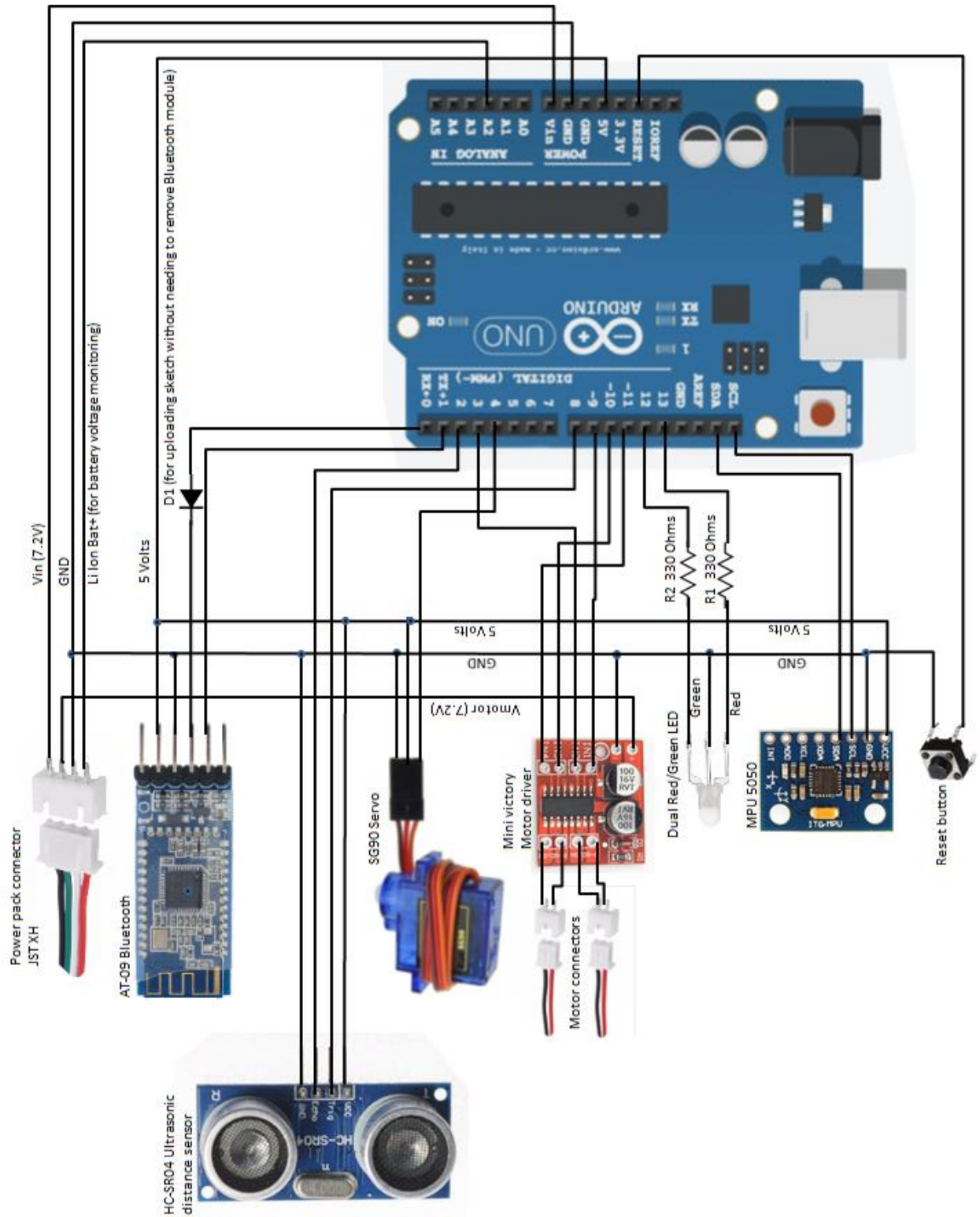
Parts and make steps

Note: the links to suppliers are provided to give more information about the part or is a supplier I have used in the past – however I do not endorse or otherwise recommend the supplier - the parts are widely available from many suppliers.

To make the shield, you will need to get the shield PCB manufactured. To do this you need to upload the Gerber files to the manufacturer. It's only a few dollars to get the shield PCB manufactured.

Example manufacturers include:

https://www.pcbway.com/

https://easyeda.com/order

Once you have the PCB it's just a matter of soldering in the components. Study the shield PCB above to find the location of each of the parts listed on the following pages.
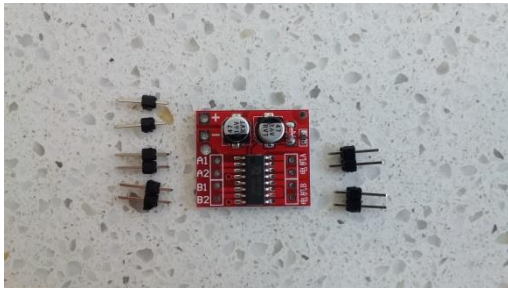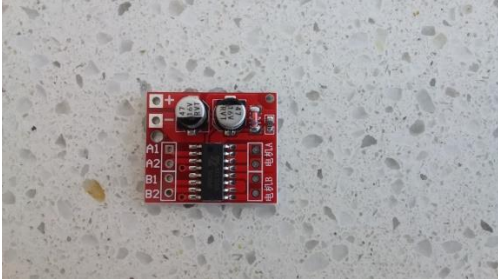
Motor Driver break-out board.

I am using the mini victory break out board for the motor driver, it is small and suitable for the motors used on this robot. e.g.

https://www.aliexpress.com/item/5pcs-lot-2-DC-motor-drive-module-reversing-PWM-speed-dual-H-bridge-stepper-motor-Mini/32646853740.html?spm=a2g0s.9042311.0.0.dca74c4dEIRh6q

Use header pins to mount the break-out board onto the shield. Solder the header pins to the break-out board and on the shield. Cut off excess length of the header pins.

Note there are at least two different break-out boards available with slightly different positions for the pins.

Even if the supplier shows one particular board in their photos, it is possible you will get the other.

The robot shield PCB has been designed for the break-out board which has a 3mm spacing between the Motor A and Motor B pin sets, and between A and B input pin sets. However, it is possible you will get the break-out board with closer spacing's at 2.5mm.

The break-out board with the smaller pin spacing's still fits into the shield PCB except you need to bend the header pins slightly to align with the holes in the PCB board.

Alternatively you could change the pin spacing in Fritzing, this is quite a lot of work and probably not worth the effort.

XH2.54mm pitch right angle pin connector:
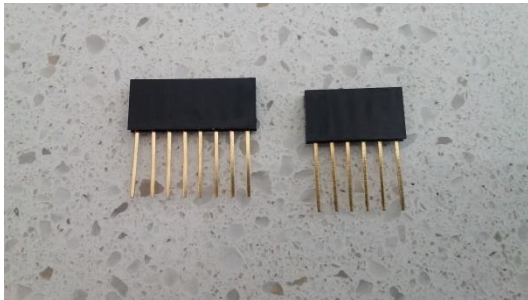- 1 x 4pin
- 2 x 2pin.

e.g.

https://www.aliexpress.com/item/50PCS-Lot-XH2-54-Right-Angle-Pin-Header-Connector-2P-3P-4P-5P-6P-7P-8P/32822859426.html?spm=a2g0s.9042311.0.0.dca74c4dEIRh6q

The 4pin is for the power connection

The 2 x 2pin is for the motor connections

Solder these onto the shield (as shown on the shield above)

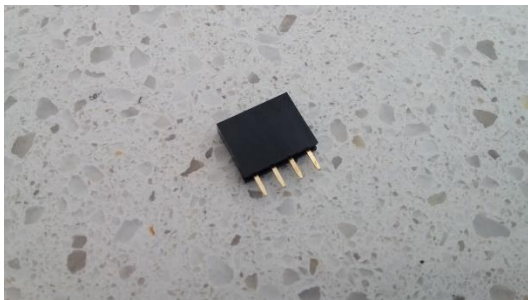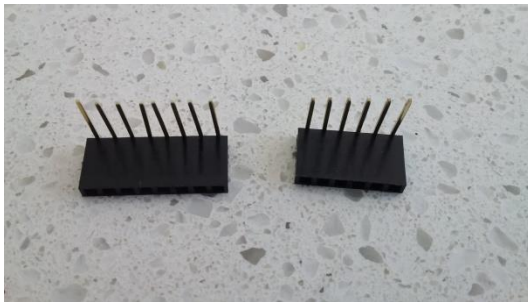6 pin and 8 pin female long needle header strip, e.g.

https://www.aliexpress.com/item/10PCS-2-54MM-6Pin-10MM-Long-Needle-Female-Pin-Header-Strip-Stackable-Header/32719157053.html?spm=a2g0s.9042311.0.0.dca74c4dEIRh6q

https://www.aliexpress.com/item/10PCS-2-54MM-8Pin-10MM-Long-Needle-Female-Pin-Header-Strip-Stackable-Header/32720200767.html?spm=a2g0s.12269583.0.0.75c86183CJJoMM

The 6pin header is for the Bluetooth module.

The 8pin header is for the MPU6050.

Bend the pins to a right angle and solder onto the shield (as shown above).

4 pin female header strip e.g.

https://www.aliexpress.com/item/10-pcs-4P-4pin-Female-Single-Row-Straight-Header-Strip-Socket-Connector-Pitch-2-54mm/32442087495.html?spm=a2g0s.9042311.0.0.dca74c4dEIRh6q

This is used for the ultrasonic sensor.

Solder onto the location on the shield (as shown above)

	Tactile push button 6x6mm e.g. https://www.aliexpress.com/item/100PCS-Lot-6x6x5MM-4PIN-Tactile-Tact-Micro-Switch-Touch-Button-Self-reset-Button-6-6-5mm/32852036043.html?spm=a2g0s.9042311.0.0.27424c4d1Ij93B Solder onto the shield
	Dual green/red LED. Solder onto the shield (note the orientation of the LED).
	2 x 330ohm resistors. You may need to adjust these resistor values to obtain the same brightness for red and green dual LED. I have found that dual colour LEDs have different brightness for red and green. 1 x diode (IN4001 or IN4148 are suitable). Solder the resistors and diode onto the shield (note the orientation of the diode).

	Right angled header pins – for the servo connector. https://www.aliexpress.com/item/10-Pcs-New-40Pin-2-54mm-Single-Row-single-pin-curved-Pin-Header-Connector-Strip-Curved/32810575284.html?spm=a2g0s.9042311.0.0.27424c4d1Ij93B Break off 3 pins and solder into the shield PCB.
	Straight header pins – for plugging the shield into the Arduino Uno. https://www.aliexpress.com/item/Free-shipping-1Set-20PCS-40Pin-2-54mm-Single-Row-Straight-Male-Pin-Header-Connector-Strip-For/32552698181.html?spm=a2g0s.9042311.0.0.27424c4d1Ij93B Solder these pins onto the connector holes on the shield PCB to enable the shield to plug into the Arduino Uno.