Appendix A: Hardware Connections

November 4, 2015

1 Mobile Robot

1.1 Power Board

The following tables are the pin connectors located on the power board. Connectors X2, X3 and X5 are connected internally to the Pololu Hbridge motor driver circuit, and all inputs to the motor drivers are instead connected to the power board.

Pin	Signal
1	+11 V to +20.0 V Input
2	+0.0 V Ground

Table 1: Connector X1

Pin	Signal
1	+5 V Supply to Encoder 1
2	Encoder 1 A Output
3	Encoder 1 B Output
4	+0.0 V Ground

Table 2: Encoder 1 Connector X5

Pin	Signal
1	+5 V Supply to Encoder 2
2	Encoder 2 A Output
3	Encoder 2 B Output
4	+0.0 V Ground

Table 3: Encoder 2 Connector X6

Pin	Signal
1	+ Motor Power Output
2	Motor Power Ground

Table 4: Motor driver power Connector X7

Pin	Signal
1	+12 V to +30 V input
2	+0.0 V Ground

Table 5: External Power Connector X8

Pin	Signal
1	+0.0 V Ground
2	Battery Voltage Output
3	+0.0 V Ground

Table 6: External power Connector X9

Pin	Signal
1	Motor 1 Enable
2	Motor 1 Input A
3	Motor 1 Input B
4	Motor 1 PWM Input
5	(no signal)
6	Encoder 1 A Output
7	Encoder 1 B Output

Table 7: Connector P2

Pin	Signal
1	Motor Driver Ve+
2	+0.0 V Ground
3	+5 V Supply Output
4	+0.0 V Ground
5	Motor Driver Ve+

Table 8: Connector P3

Pin	Signal
1	Motor 2 Enable
2	Motor 2 Input A
3	Motor 2 Input B
4	Motor 2 PWM Input
5	(no signal)
6	Encoder 2 A Output
7	Encoder 2 B Output

Table 9: Connector P4

Pin	Signal
1	+5 V Supply Output
2	ENABLE MTR PWR Input
3	PWR SW FULL Output
4	+0.0 V Ground

Table 10: Connector P5

1.2 PIC pin Connections

The following tables show the pin connections that the PIC provides for interfacing with external hardware. The pins are labelled in Figure 1.

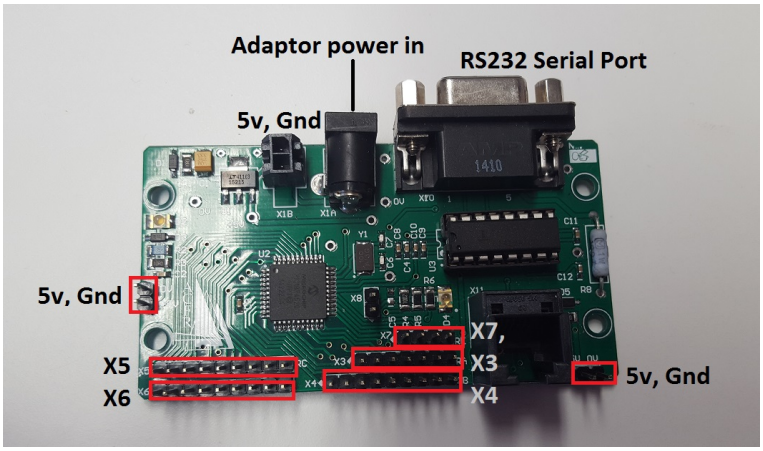

Figure 1: The PIC18f4520 microcontroller on the minimal board

Pin	Signal
X3.1	PortA.0
X3.2	PortA.1
X3.3	PortA.2
X3.4	PortA.3
X3.5	PortA.4
X3.6	PortA.5
X3.7	+0 V

Table 11: PORT A connector, X3

Pin	Signal
X4.1	PortB.0
X4.2	PortB.1
X4.3	PortB.2
X4.4	PortB.3
X4.5	PortB.4 (LED)
X4.6	PortB.5
X4.7	PortB.6
X4.8	PortB.7
X4.9	+0 V

Table 12: PORT B connector, X4

Pin	Signal
X5.1	PortC.0
X5.2	PortC.1
X5.3	PortC.2
X5.4	PortC.3
X5.5	PortC.4
X5.6	PortC.5
X5.7	PortC.6
X5.8	PortC.7
X5.9	+0 V

Table 13: PORT C connector, X5

Pin	Signal
X6.1	PortD.0
X6.2	PortD.1
X6.3	PortD.2
X6.4	PortD.3
X6.5	PortD.4
X6.6	PortD.5
X6.7	PortD.6
X6.8	PortD.7
X6.9	+0 V

Table 14: PORT D connector, X6

Pin	Signal
X7.1	PortE.0
X7.2	PortE.1
X7.3	PortE.2
X7.4	+0 V

Table 15: PORT E connector, X7