Robocup

Documentation

Parts Summary

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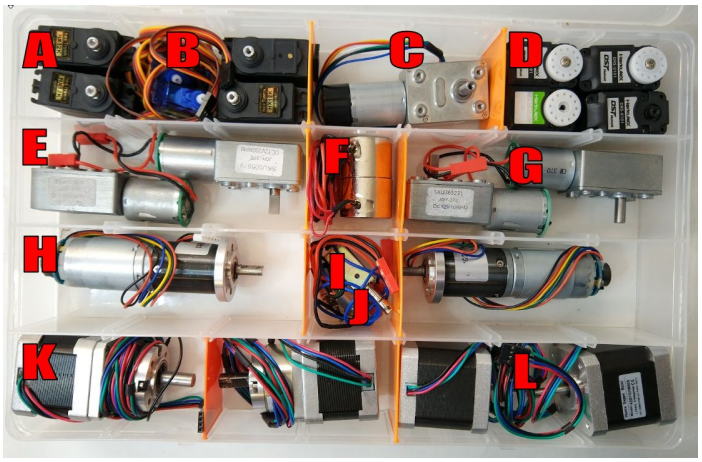
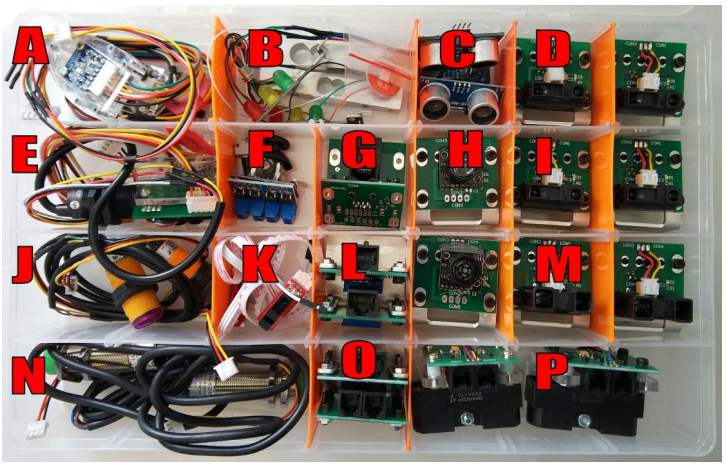
Parts Summary

Actuators



Sensors



Hardware Box 1

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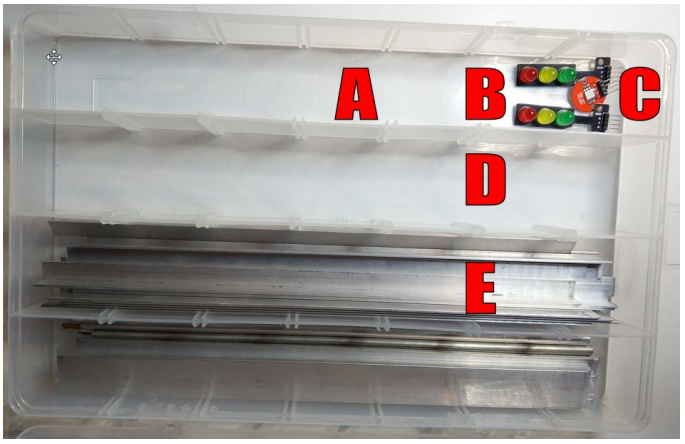
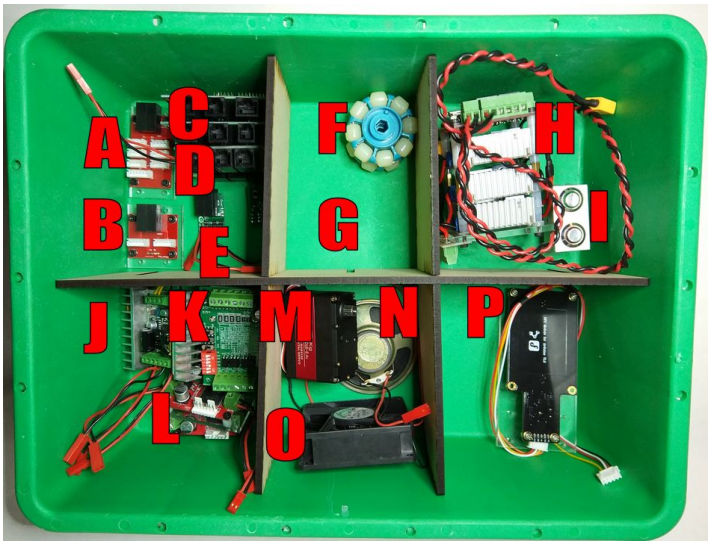
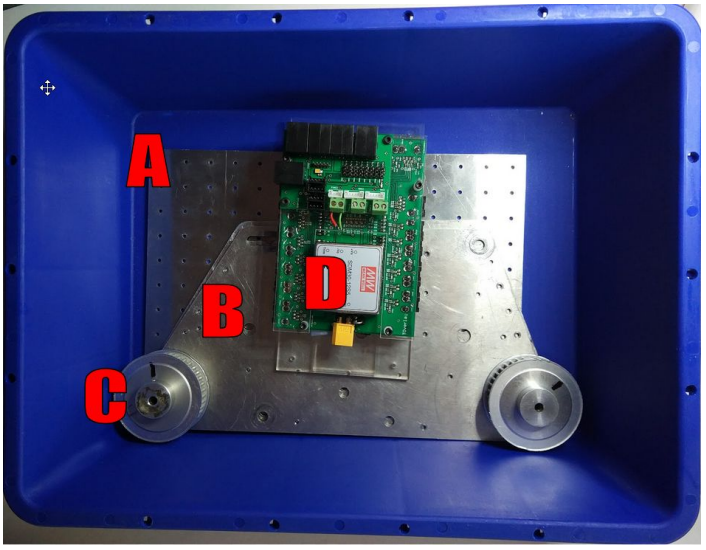


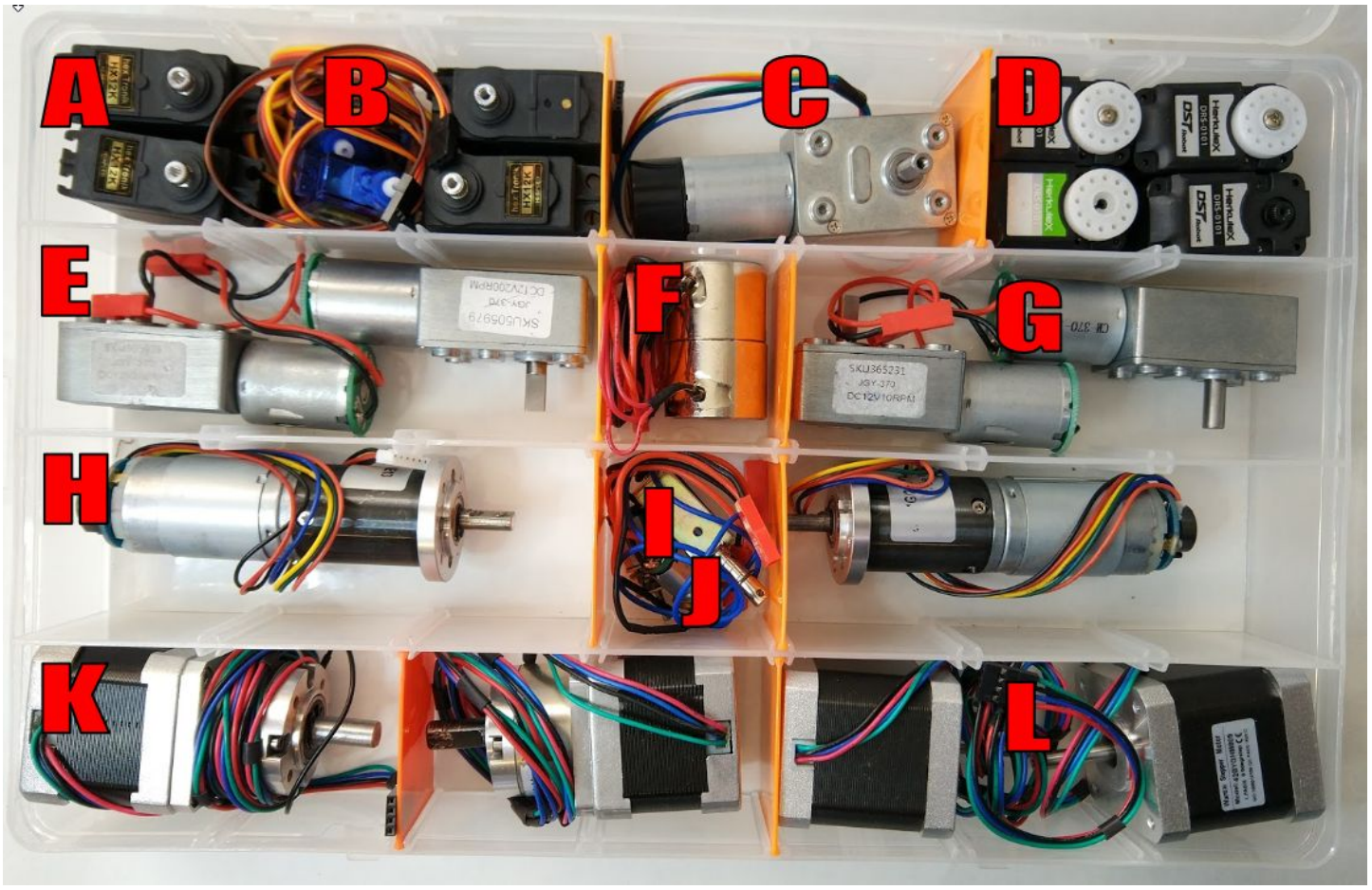
Green Box



Blue Box



Actuators

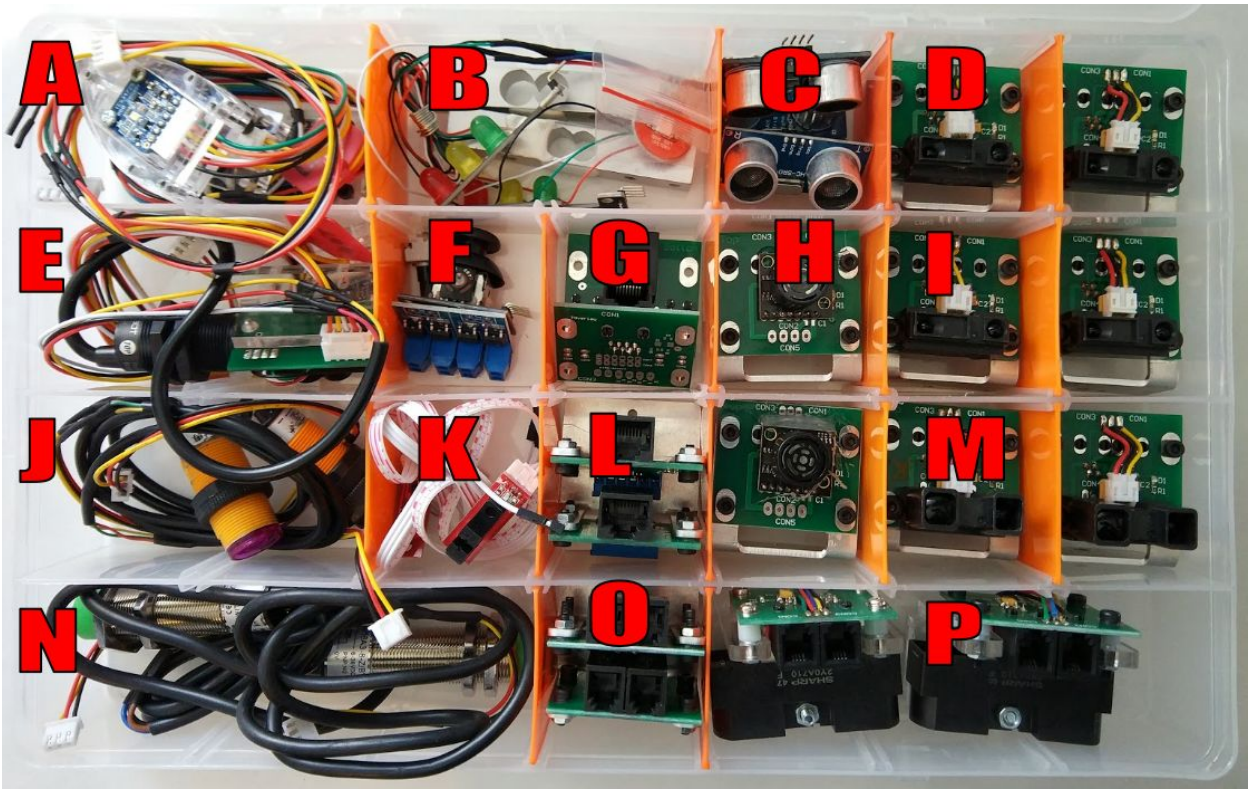


ID	Qty	Cost	Description	Part Number	Major Parameters
A	4	14.0	Standard servo	HX12K	7.4V, 9.4kg.cm
B	2	02.5	Small servo	SG90	5V 1.5kg.cm
C	1	22.0	DC Motor 90RPM , includes gearbox and encoder	JGY-370	12V, 90RPM
D	4	58.0	Smart servo	DRS-0101	7.4V, 12kg.cm, Gear: 1:266
E	2	15.0	DC Motor 200RPM, includes gear box	SKU505979	12V, 200RPM
F	2	06.6	Electromagnet	JK-P30/22	12V, 0.4A, 10kg
G	2	15.0	DC Motor 10RPM, includes gearbox	SKU365231	12V, 10RPM
H	2	70.0	DC Motor 143RPM, includes gearbox and encoder	28PA51G	12V, 143RPM, 3.6A, 5.5kgf.cm
I	1	03.8	Solenoid	TAU-0530T	12V, 1.5A, 0.4N-7N
J	1	04.8	Small DC Motor with gearbox	N20	12V, 0.3A, 148RPM
K	2	50.0	Stepper motor with gearbox NEMA17	36PA5.2G/42BYG40-160-4A	1.6A,1.8deg/step
L	2	32.0	Stepper motor NEMA17	42BYGHM809	1.7A, 0.9deg/step

From Green box

M	1	60.0	Large Servo	RDS5160	7.4V, 5A, 65kg.cm, 270deg
N	1	01.6	Speaker	MP001193	0.5W, 8ohm
O	1	04.0	Fan	MC32893	12V, 0.15A

Sensors

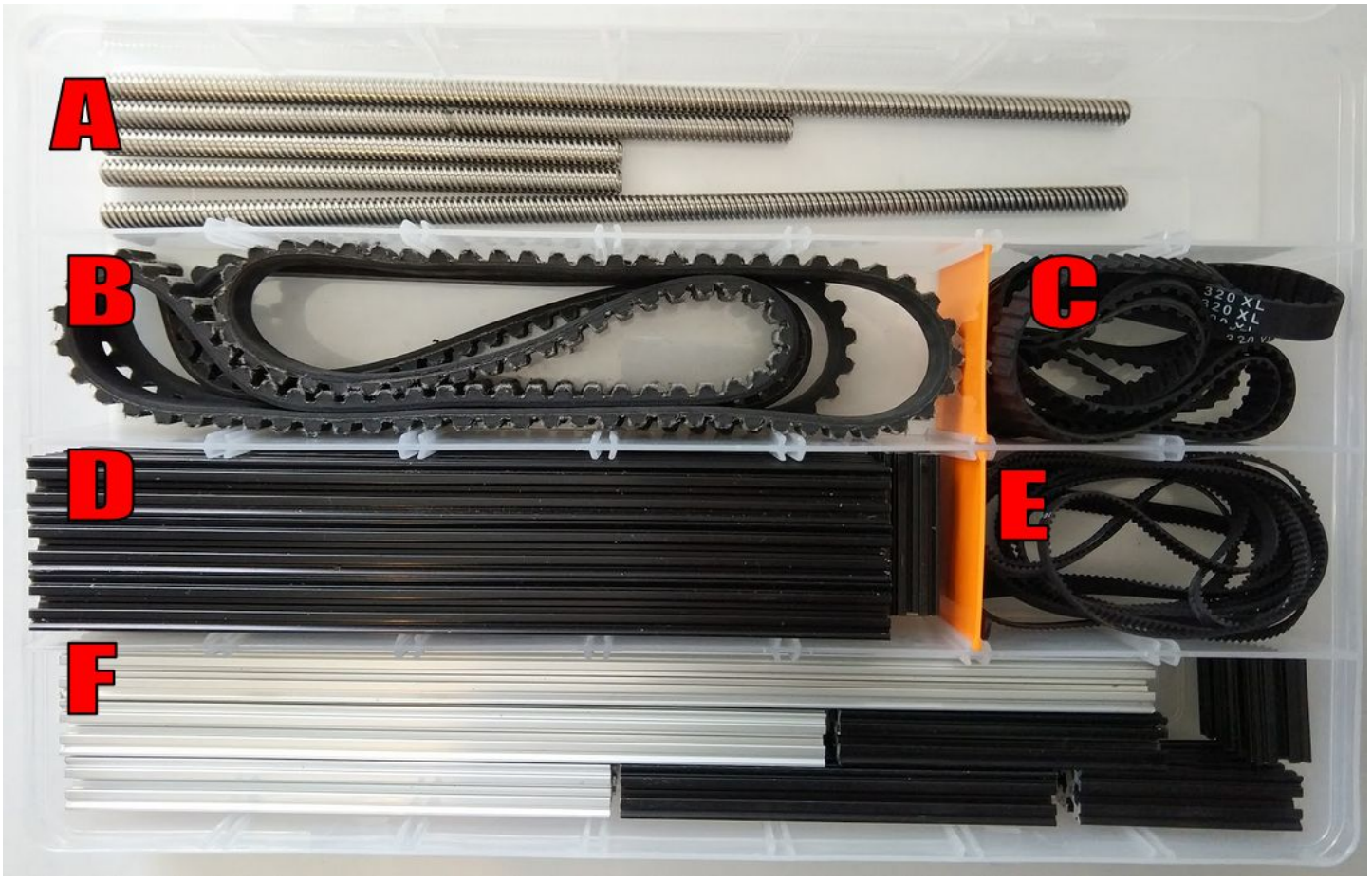


ID	Qty	Cost	Description	Part Number	Major Parameters
A1	1	14.0	Color Sensor	TCS34725	
A2	1	36.0	IMU	SEN0253	BNO055+BMP280
A3	1	02.0	Load Sensor	HX711	
B1	2	03.5	Load Cell		1kg, 10kg
B2	5	00.5	Microswitches	SV-163-1C25	
C	4	01.8	Low cost ultrasound sensors	HC-SR04	
D	2	08.0	IR Distance Sensor	0A41SK	4-30cm
E1	1	30.0	IR Camera	SEN0158	
E2	2	04.8	TOF Camera I2C	VL53L0XV2	
E3	1	60.0	TOF Camera Serial	TFmini	
F1	1	01.5	Analogue Joystick		
F2	1	01.5	Digital Joystick		
F3	1	02.2	Rotary Encoder		
F4	2	01.0	Variable resistor		10k
F5	2	02.0	Digital Switch		
G	2	02.5	Digital Breakout board, Digital pullup		
H	2	60.0	Ultrasonic distance sensor	HRLV-MaxSonar-EZ0	300-5000mm`
I	2	08.0	IR Distance Sensor	GP2Y0A21YK0F	10 to 80cm
J	2	06.0	IR Distance Sensor, Adjustable, Digital Out		
K	2	01.0	Optical Endstop		
L	2	02.5	Digital Breakout board		
M	2	08.0	IR Distance Sensor	GP2Y0A02YK0F	20-150cm
N	2	25.0	Inductive Proximity		
O	2	02.5	Analogue Breakout board		
P	2	25.0	IR Distance Sensor	2Y0A710K	100-500cm

Hardware Box 1

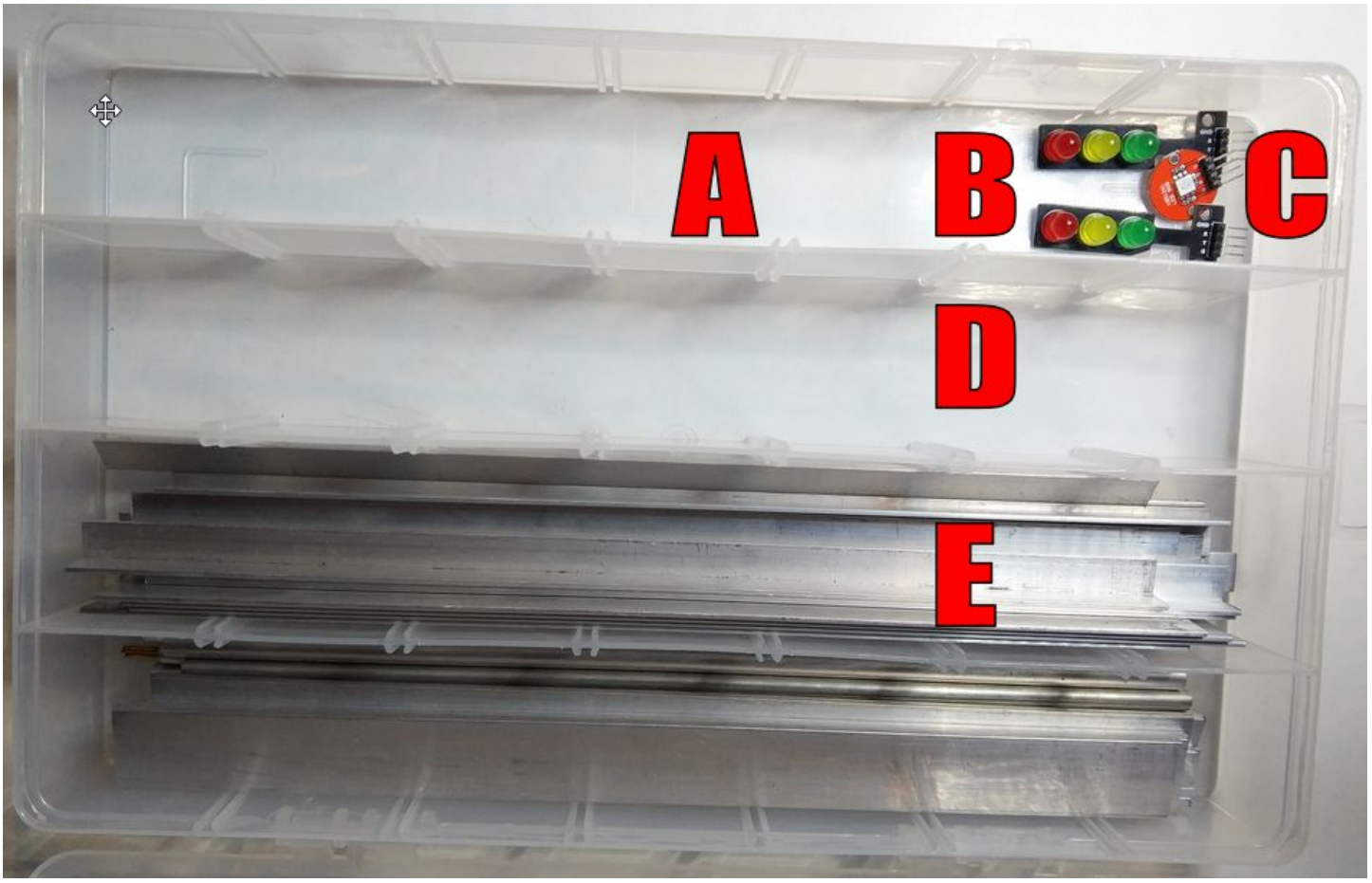
ID	Qty	Cost	Description	Part Number	Major Parameters
A1	1	02.2	Anti Backlash Nut		T8 screw Lead 8mm
A2	1	01.8	Anti Backlash Nut		T8 screw Lead 8mm
B	2	03.5	Trapezoidal lead screw block		
C	1	02.0	Linear rail support block		
D1	3	02.0	Shaft Coupler		
D2	2	01.0	Shaft Coupler		
E1	1	03.5	Rod ends		
E2	1	02.5	Rod ends		
F	4	01.8	Rigid Flange Coupling		
G	2	02.5	Trapezoidal lead screw nut		
H	4	01.2	Linear Ball Bearings,	LM8UU, 8mm	
I1	1	02.2	Servo arm Aluminum 25T		
I2	1	05.0	Servo arm Aluminum 25T Long		
J	2	02.5	Pillow block bearing	KP08	
K	2	04.5	Flange pillow block bearing,	KFL08	
L	4	00.8	Plastic pulley wheels, Nylon		
M	4	00.6	Aluminum 90 degree bracket		
N	6	02.5	Pulley GT2		
O	2	06.0	Pulley XL	20-XL-10BF	
P	8	02.5	Aluminum cutouts		
Q	6	02.5	Aluminum cutouts		
R	5	00.6	Plastic hinge		
S	16	01.0	Flanged bearings	F608ZZ	
T	12	03.0	Drive track support hardware		
U	2	18.0	Linear rail	MGN9 C	200mm long

Hardware Box 2



ID	Qty	Cost	Description	Part Number	Major Parameters
A1	2		Trapezoidal lead screw 300mm		300, 150, 100mm available
A2	2		Trapezoidal lead screw 150mm		
A3	2		Trapezoidal lead screw 100mm		
B	2		Robot tracks	880-8M	
C	2		Timing belt.	320 XL	
D	9		Open beam Aluminum profile, Robot main chassis support,		223.5mm
E1	1		Timing belt open ended,	GT2	2m open ended, closed loop
E2	1		Timing belt	GT2	
E3	1		Timing belt	GT2	
F	16		Open beam Aluminum profile		300, 210, 150, 120, 90, 60, 45, 30mm

Hardware Box 3



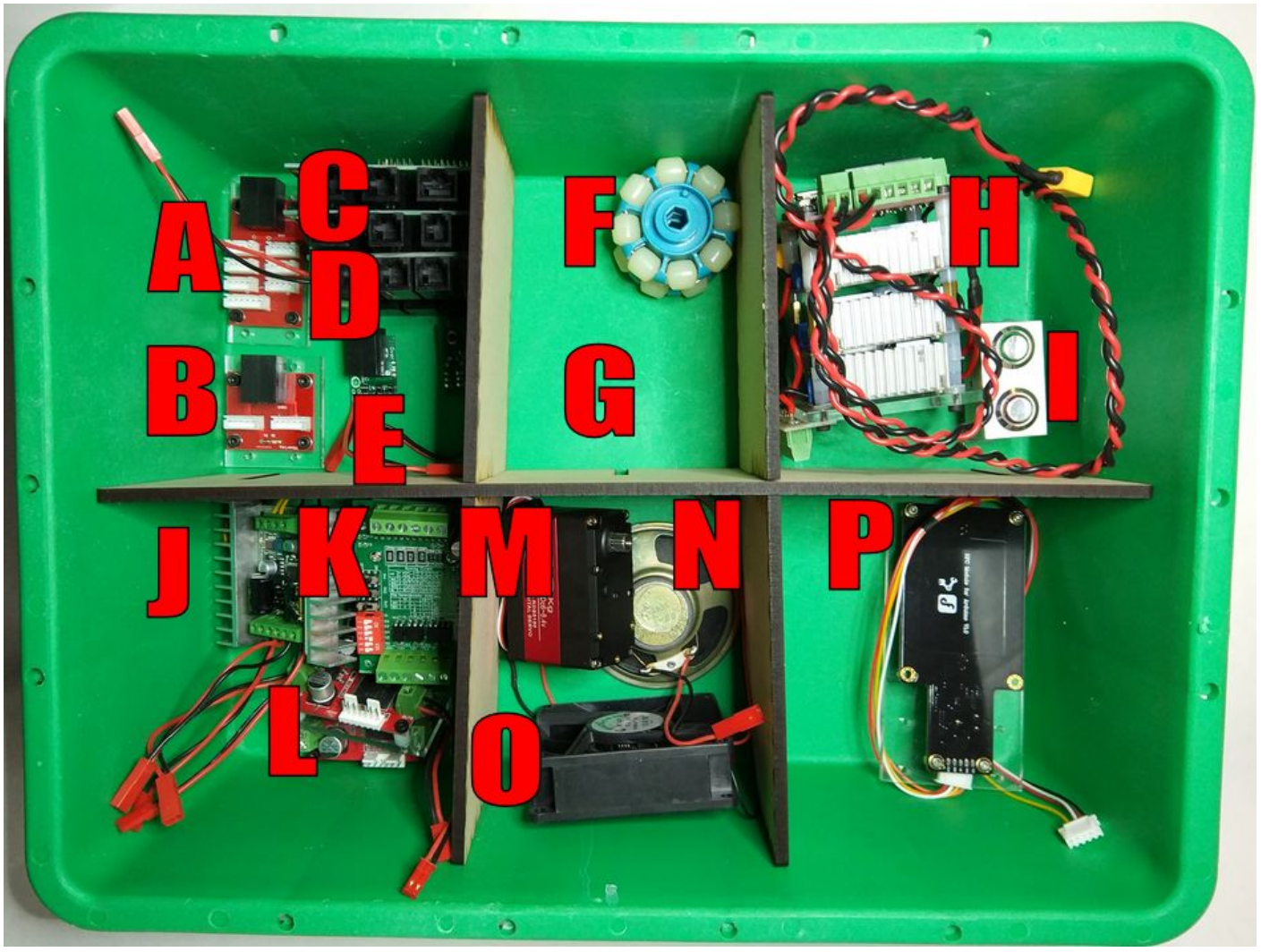
ID	Qty	Description
A	2	Smart LED
B	2	Traffic light LED
C	1	RGB LED
D	1	Cables
E	1	Aluminium extrusion profiles, 300mm lengths

A selection of the following lengths are in the kit...

- A 25mm right angle aluminium
- B 12mm right angle aluminium
- C 12mm box section aluminium
- D 12mm U shaped aluminium
- E 25mm flat bar aluminium
- F 12mm flat bar aluminium
- G 8mm round bar aluminium
- H 6.5mm round bar aluminium

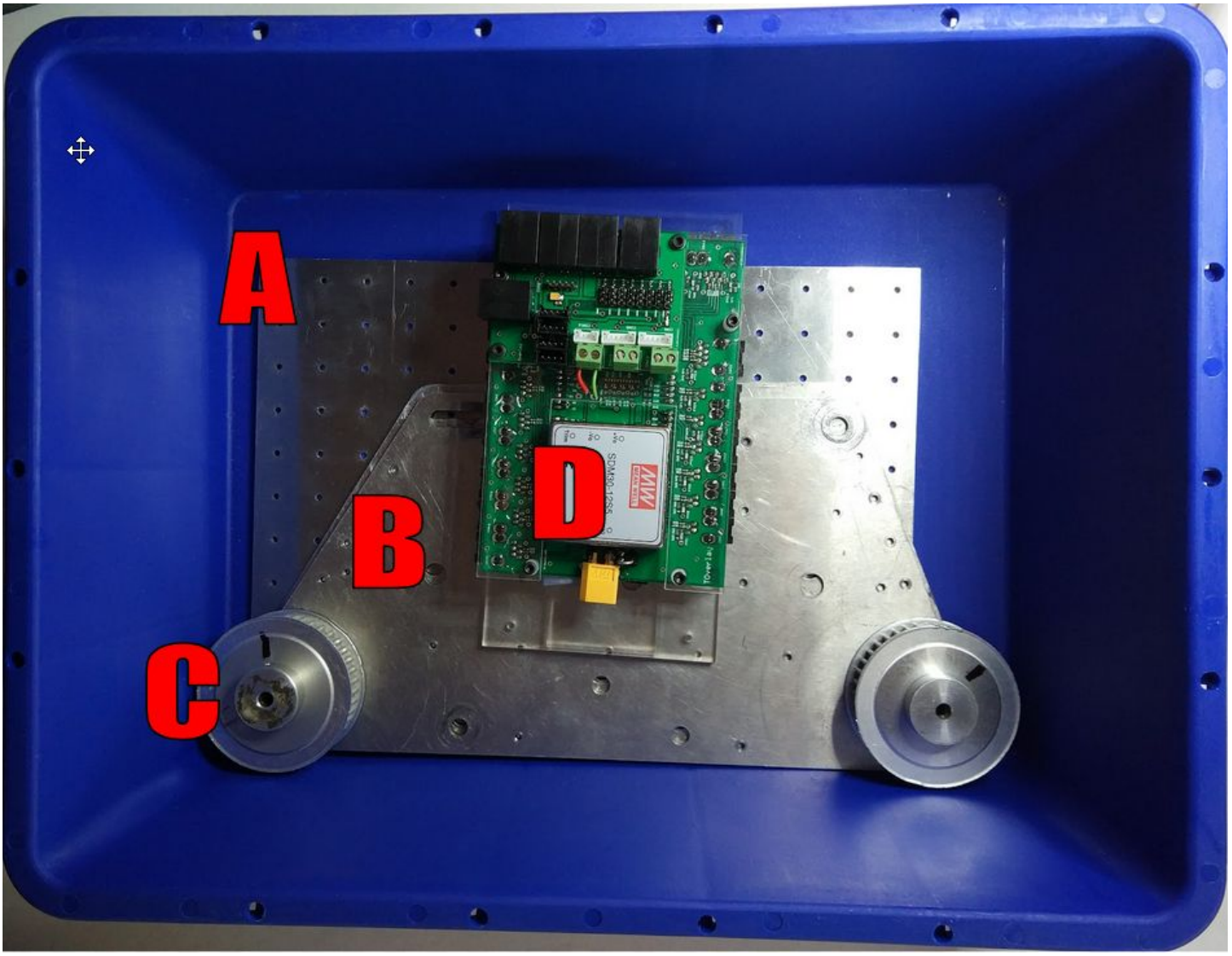
Longer lengths of Aluminium extrusion profiles are available on request.

Green Box



ID	Qty	Cost	Description	
A	1	02.5	I2C distribution board	
B	1	02.5	Serial distribution board	
C	2	04.0	IO Test board	
D	1	04.0	Servo distribution board 12 channel	
E	2	02.5	Servo distribution board mini, 2 channel	
F	2	04.0	Omni wheel	
G1	2	07.5	Skate wheel	
G2	2	20.0	Mecanum Wheel	
H	1	25.0	Power supply protection and distribution module	
I	1	02.5	Power switch, green on, red off	
J	1	125.0	DC motor drive board, 2 channel	Sabertooth dual 12A motor driver
K	2	08.0	Stepper motor drive board	
L	2	08.0	DC motor drive board	
M	1	60.0	Large servo	
N	1	01.6	Speaker	
O	1	04.0	Fan	
P	1	25.0	RFID Board	

Blue Box



ID	Qty	Cost	Description
A	1		Robot top plate, holes spaced 20mm apart, 3mm hole
B	2		Robot side plate, see file **Body02.zip** in **08Models** for hole layout
C	2		Main drive pulley, held on flat of drive motor shaft with two grub screws, 2mm hex tool to tighten
D	1		CPU, Arduino Mega with custom connectors and safety features

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Additional Materials

ID	Qty	Cost	Description
A	2	02.5	Corflute sheet 600*600*3mm
B1	2	06.0	MDF sheet 600*600*6mm
B2	2	04.0	MDF sheet 600*600*4.75mm
C	2	04.0	Aluminium sheet 300*300*2mm
D	2	04.0	Perspex sheet 300*300*2mm
E	2	06.0	Perspex sheet 300*300*4.5mm
F	2	09.0	Perspex sheet 300*300*6mm
G	1	16.0	Perspex sheet 300*300*10mm
H	1	12.0	3D Printing Filament 200g, 6c per gram for PLA
I	1	15.0	Additional 1m of open beam Aluminium extrusion
J	3	01.0	Magnets, Countersunk Ring Magnets 22mm x 5mm, Hole: 5.2mm, N50 Neodymium Magnet

Larger sizes of materials are available on request

Services Available

Email or see Julian Murphy with your job requests.

Specialised 3D Printing, supply file in STL or 3MF file format, Max size 250*210*210mm
Laser cutting, supply file in DXF file format, Max size 1200*900*10mm
Waterjet cutting, supply file in DXF file format, Max size 300*300*20mm
Power guillotine, supply printed diagram or marked out on sheet to cut, straight lines only
Parts repair and or replacement
Parts purchasing, supply links of website to purchase in email

Tools Available

Mechatronics Lab(24 Hour access)
Soldering iron, Oscilloscope, Signal Generator, Power supply
Tools can be found on the peg board, or in the Yellow boxes

3D Printing(24 Hour access)
PRUSA I3 MK3s printer with 0.4mm nozzle

Student Workshop (Open 9-5 week days, Non Supervised)
Drill, Drill with XY table, power sander, bandsaw
Bender, roller, hand guillotine, notcher
To use powered tools you must see a staff member and explain what you want to do before power is turned on in the room. Hand tools can freely be used without an explanation.

Student Training Workshop (Available 9-4 Friday, and by appointment other days, Supervision)
Lathe, mill, drill, bandsaw

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This documentation brought to you by the letter R, the number 1.6181 and King Julian