Signoff – 1/25/22 - Switch and E-stop

Saturday, January 22, 2022 1:11 PM

The competition rules state that the robot must have a clear on/off switch. The rules also stron recommend adding an e-stop into the design of the robot. The rules are found below in **Figure** link below.

7. Robots must have a clearly labeled start switch.
8. It is strongly recommended that robots include an emergency stop.
    a. In the event of damage or malfunction gameplay must be halted.
    b. This may be a button, switch, mechanism, easily accessible power line, etc

Figure 1: Competition Specifications
https://ieeesoutheastcon.org/wp-content/uploads/sites/309/2022_SoutheastCon_HardwareR Final.pdf

For this reason, the team has picked out a switch and an emergency stop that will meet both requirements. The switch can be seen below in **Figure 2**. The team has decided to include two switches. One switch will be the interim between the battery and the boost converter while th will be the input that the microcontroller is watching for to start the competition. The data she **Figure 3** shows that the switch is above the needed rating which justifies the switch for the circ data sheet on the providers website also clarifies that the switch is able to withstand 10 Amps above what the team needs.

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Figure 2: Switch

Category	Switches Toggle Switches	○ ◉
Mfr	NKK Switches	☐
Series	S	☐
Package	Bulk ⓘ	☐
Part Status	Active	☐
Mounting Type	Panel Mount	☐
Circuit	DPDT	☐
Switch Function	On-On	☐
Current Rating (Amps)	20A (AC/DC)	☐
Voltage Rating - AC	125 V	☐
Voltage Rating - DC	30 V	☐
Actuator Type	Standard Round	☐
Actuator Length	17.50mm	☐
Illumination	Non-Illuminated	☐
Illumination Type, Color	-	☐
Illumination Voltage (Nominal)	-	☐
Termination Style	Solder Lug	☐
Panel Cutout Dimensions	Circular - 12.50mm Dia	☐
Bushing Thread	M12 x 1	☐
Ingress Protection	IP67 - Dust Tight, Waterproof	☐
Features	-	☐
Operating Temperature	-30°C ~ 70°C	☐

Figure 3: Switch Data Sheet

The emergency stop that the team has chosen can be found in **Figure 4**. The data sheet that the channels can stand 10 Amps which is well above the teams currents (1.5 Amps and 2.4 the servo shield and H-Bridges. The emergency stop was picked due to the two channel capabil team will utilize this feature so that the 5 Volts going into the adafruit servo shield and the 12 V going into the H-Bridges will have to clear the emergency stop before powering the robot to m Likewise, pushing the emergency stop will stop the movement from the robotic arm and dc mo the wheels, but leave the microcontrollers running. Doing this, will let the robot handler stop th from causing more damage if havoc ensues. Both the switch and E-stop connections can be see **Figure 5** below. A more zoomed in depiction can be seen in **Figure 6, Figure 7** and **Figure 8**. Like

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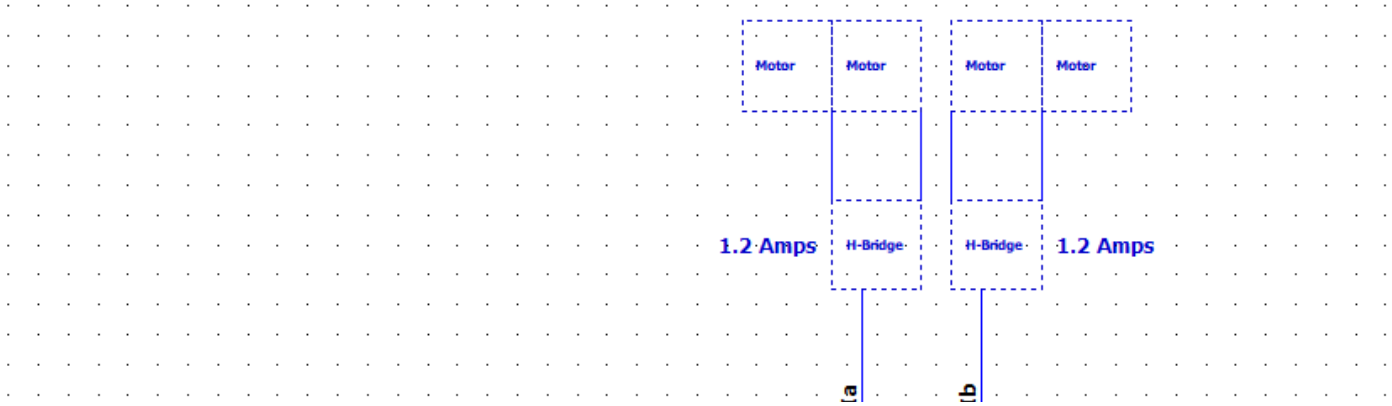
the second switch will be connected to an input with the microcontoller.

Figure 4: Emergency Stop Switch



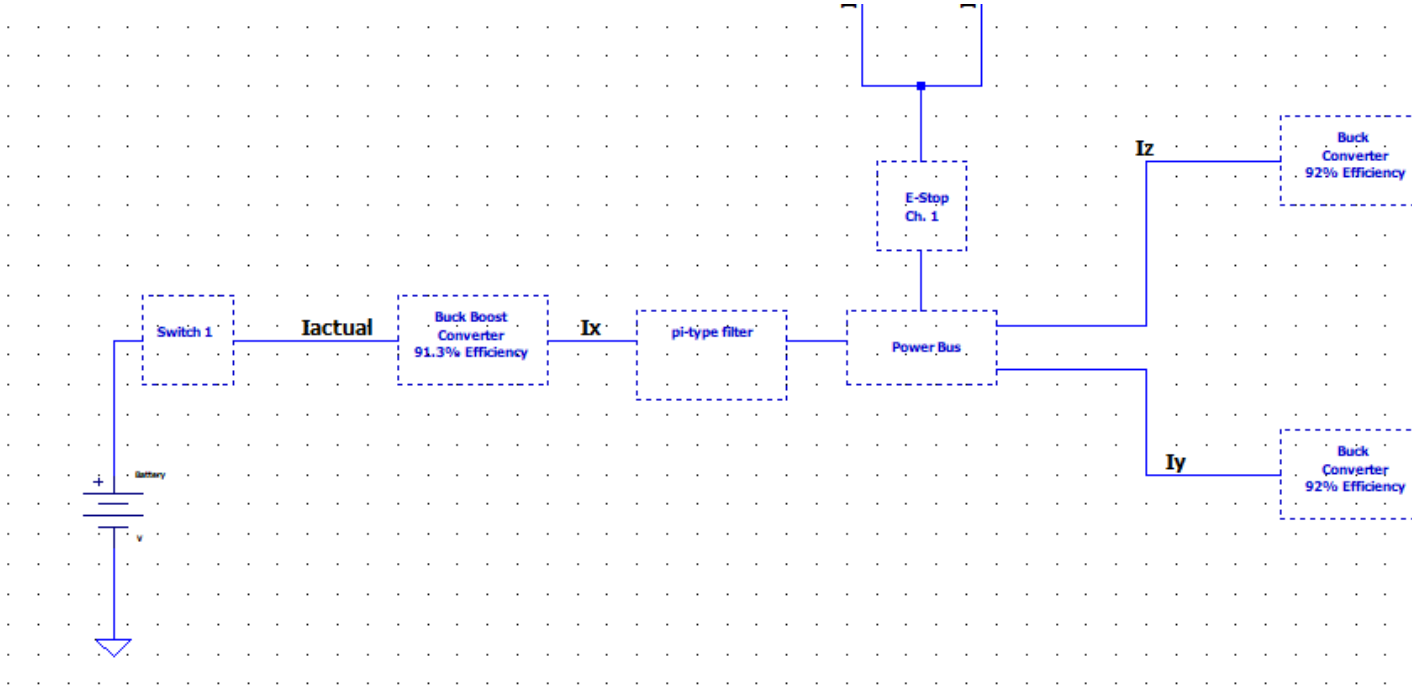
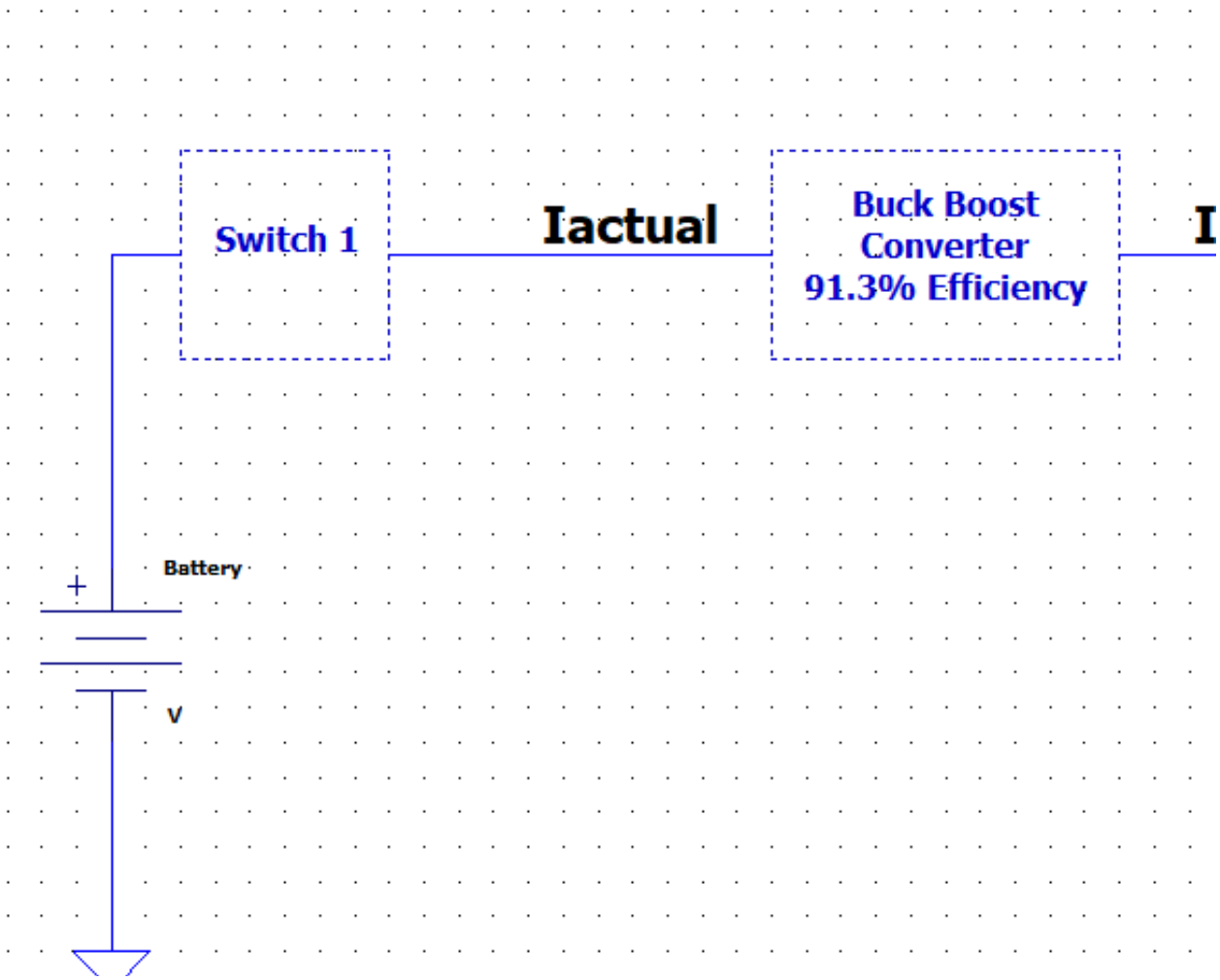


Figure 5: Circuit schematic with switch and E-stop



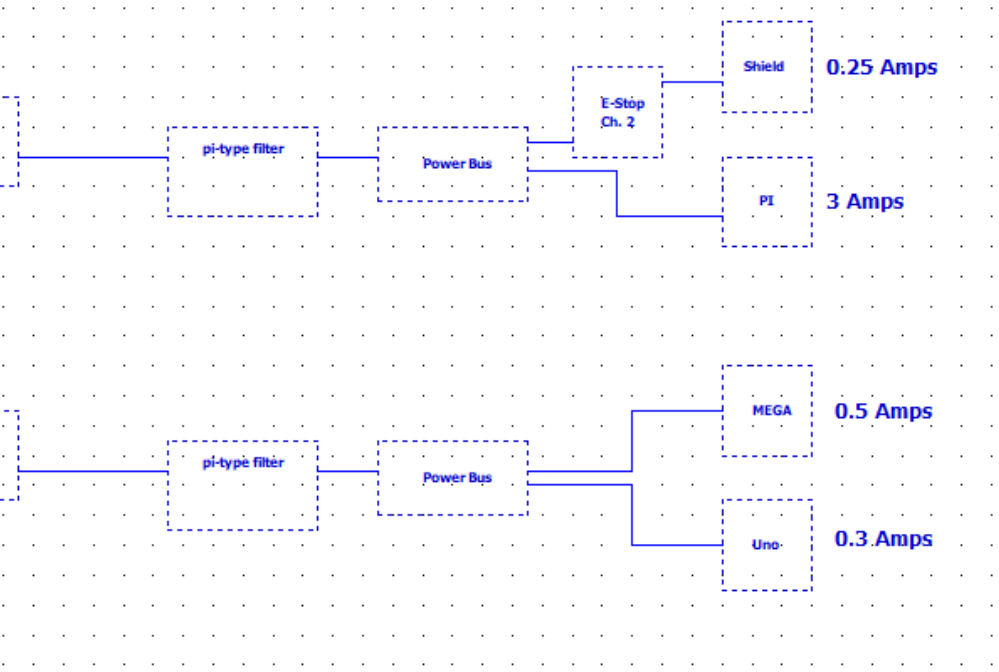

pi-type filter
Power Bus
E-Stop
Ch. 2
Shield
0.25 Amps
PI
3 Amps
pi-type filter
Power Bus
MEGA
0.5 Amps
Uno
0.3 Amps

Figure 6: Power Switch

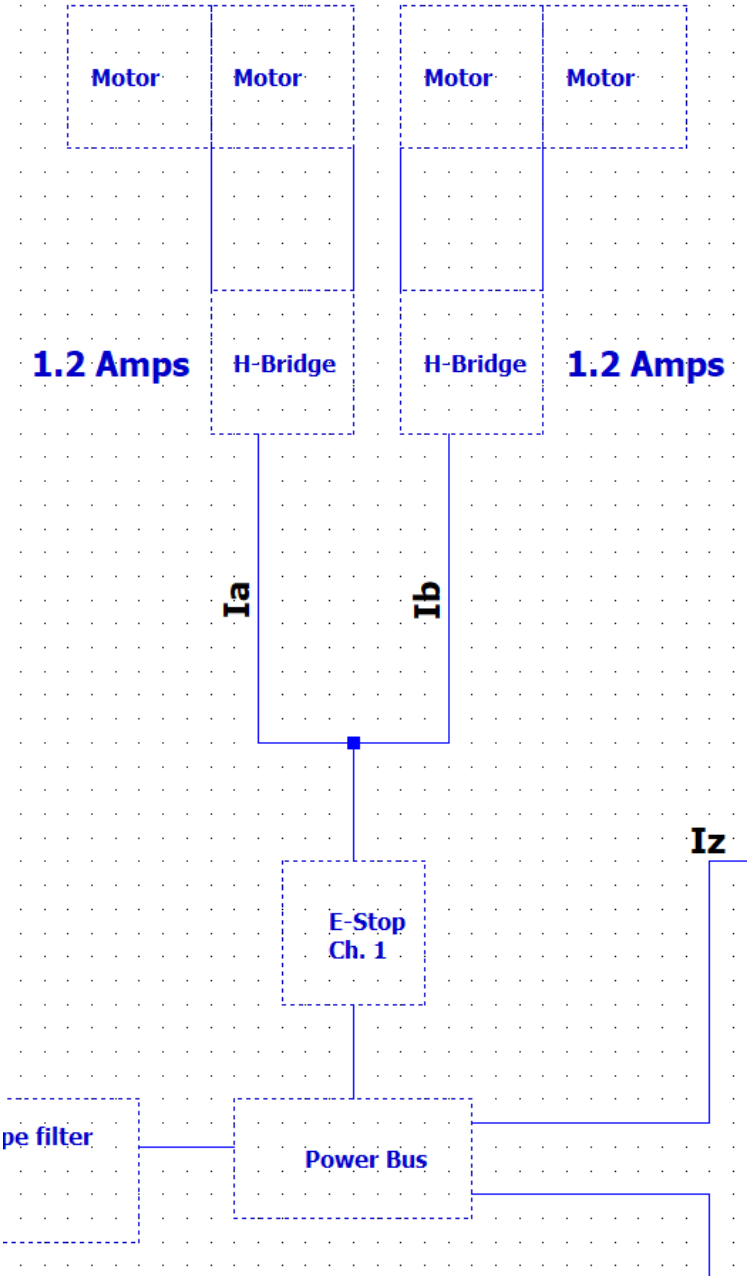
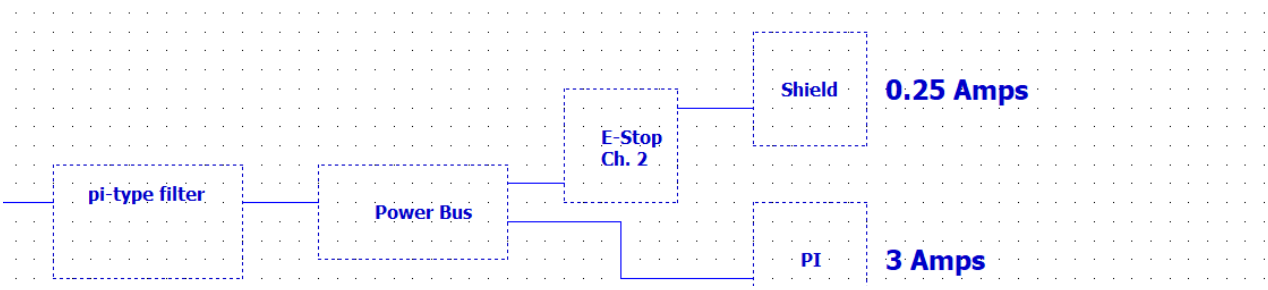


Figure 7: E-stop Channel 1



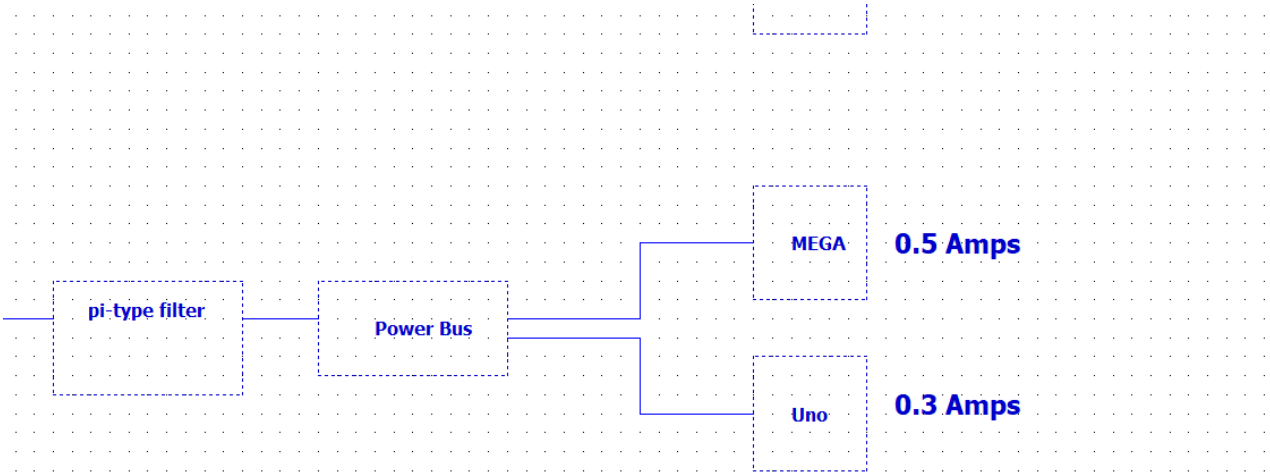


Figure 8: E-stop Channel 2

Component List:

Switch x2

S6AW NKK Switches | Switches | DigiKey

Emergency Stop x1

TWTADE / 22mm 2 NC Red Mushroom Latching Emergency Stop Push Button Switch 10A 600V (Warranty 3 years) YW1B-V4E02R: Amazon.com: Industrial & Scientific