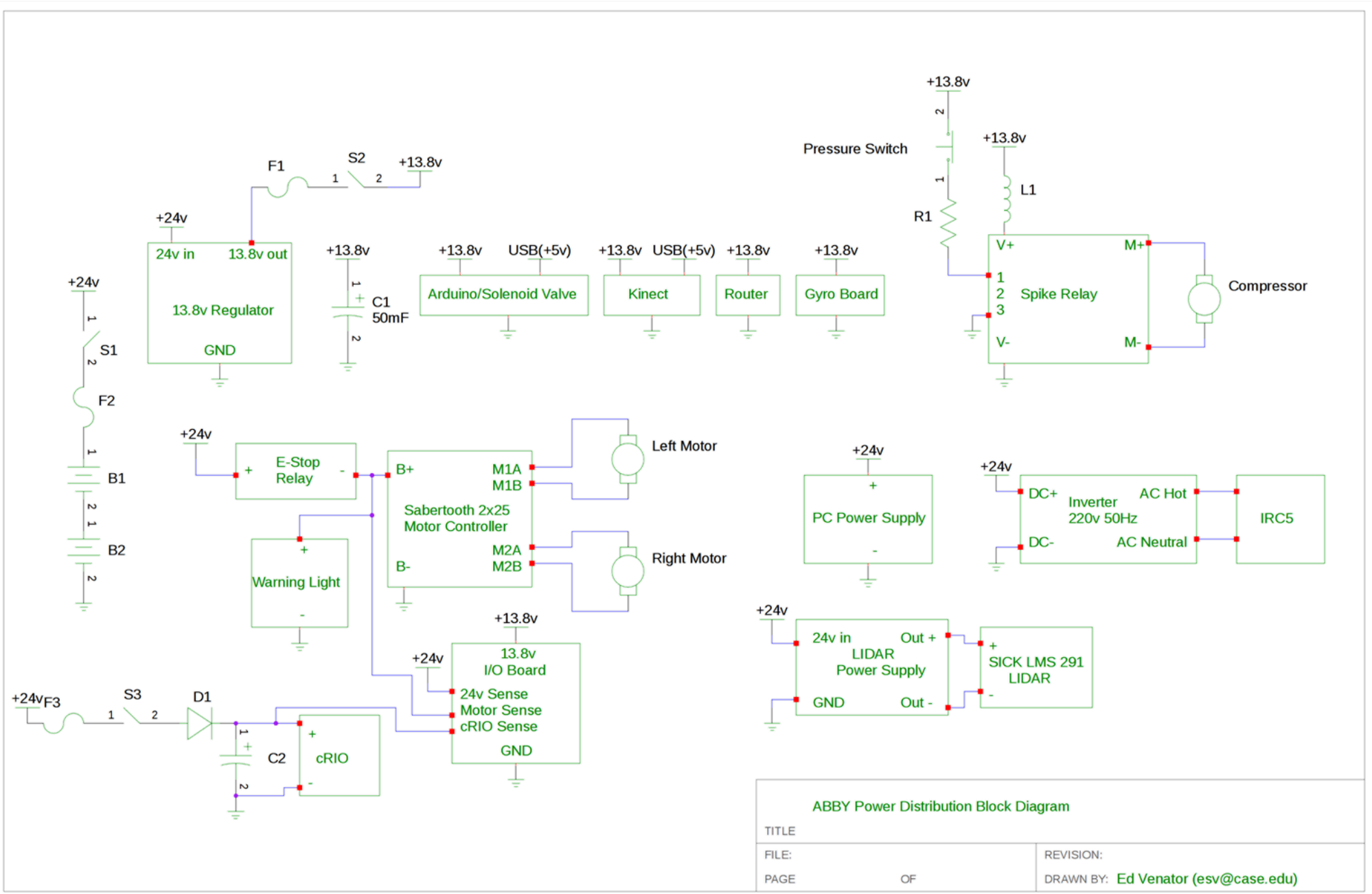
+24v
S1
F2
B1
B2
F1
S2
+13.8v
24v in
13.8v out
13.8v Regulator
GND
C1
50mF
Arduino/Solenoid Valve
Kinect
Router
Gyro Board
USB(+5v)
Pressure Switch
R1
L1
V+
M+
1
2
3
Spike Relay
V-
M-
Compressor
E-Stop
Relay
Warning Light
B+
B-
M1A
M1B
M2A
M2B
Sabertooth 2x25
Motor Controller
Left Motor
Right Motor
PC Power Supply
DC+
DC-
Inverter
220v 50Hz
AC Hot
AC Neutral
IRC5
13.8v
I/O Board
24v Sense
Motor Sense
cRIO Sense
GND
F3
S3
D1
C2
cRIO
24v in
LIDAR
Power Supply
Out +
Out -
SICK LMS 291
LIDAR
ABBY Power Distribution Block Diagram
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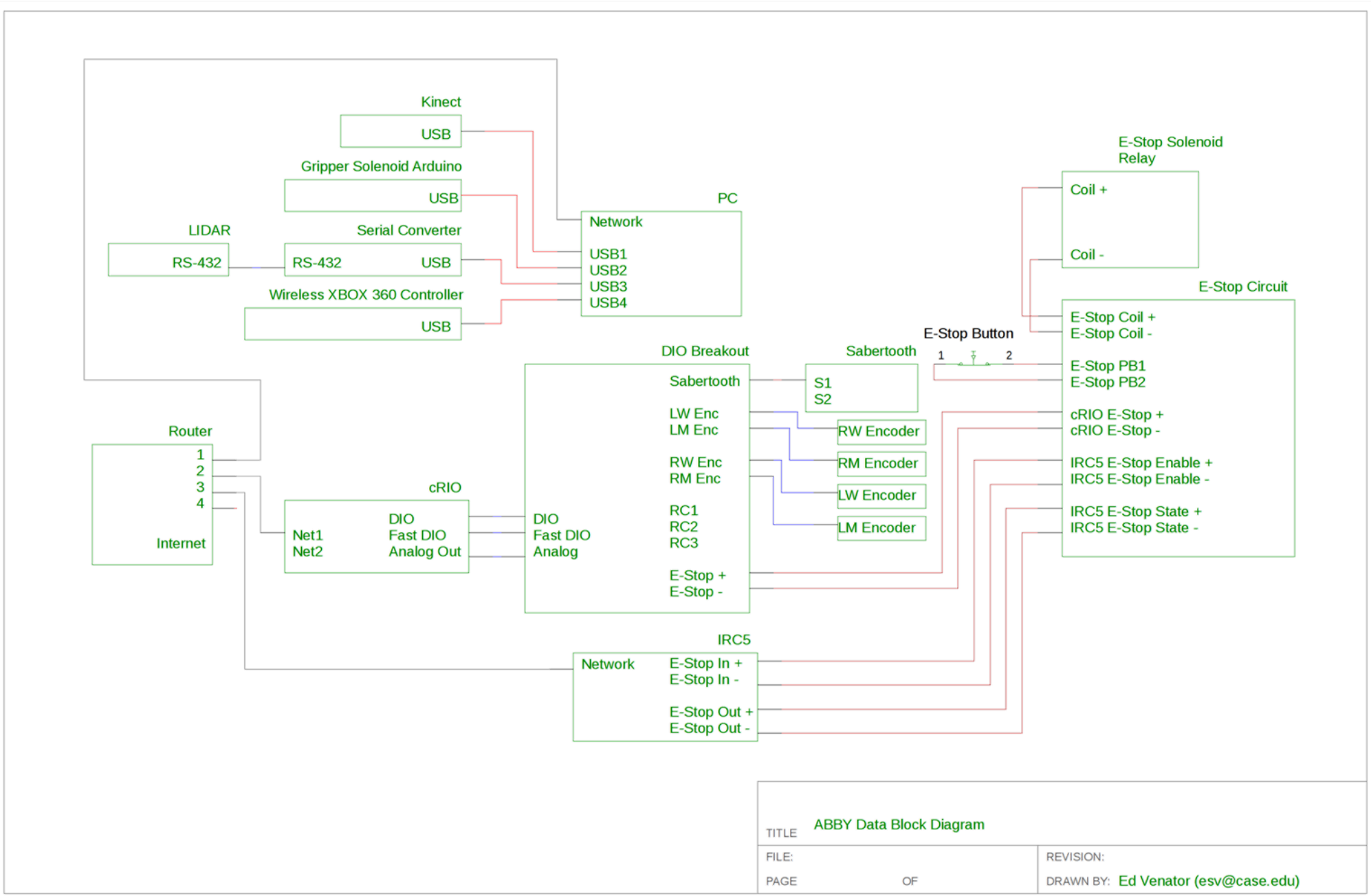
Kinect
USB
Gripper Solenoid Arduino
USB
LIDAR
RS-432
Serial Converter
RS-432
USB
Wireless XBOX 360 Controller
USB
PC
Network
USB1
USB2
USB3
USB4
E-Stop Solenoid Relay
Coil +
Coil -
E-Stop Circuit
E-Stop Coil +
E-Stop Coil -
E-Stop Button
1
2
E-Stop PB1
E-Stop PB2
cRIO E-Stop +
cRIO E-Stop -
IRC5 E-Stop Enable +
IRC5 E-Stop Enable -
IRC5 E-Stop State +
IRC5 E-Stop State -
DIO Breakout
Sabertooth
LW Enc
LM Enc
RW Enc
RM Enc
RC1
RC2
RC3
E-Stop +
E-Stop -
Sabertooth
S1
S2
RW Encoder
RM Encoder
LW Encoder
LM Encoder
Router
1
2
3
4
Internet
cRIO
Net1
Net2
DIO
Fast DIO
Analog Out
DIO
Fast DIO
Analog
IRC5
Network
E-Stop In +
E-Stop In -
E-Stop Out +
E-Stop Out -
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ABBY Data Block Diagram
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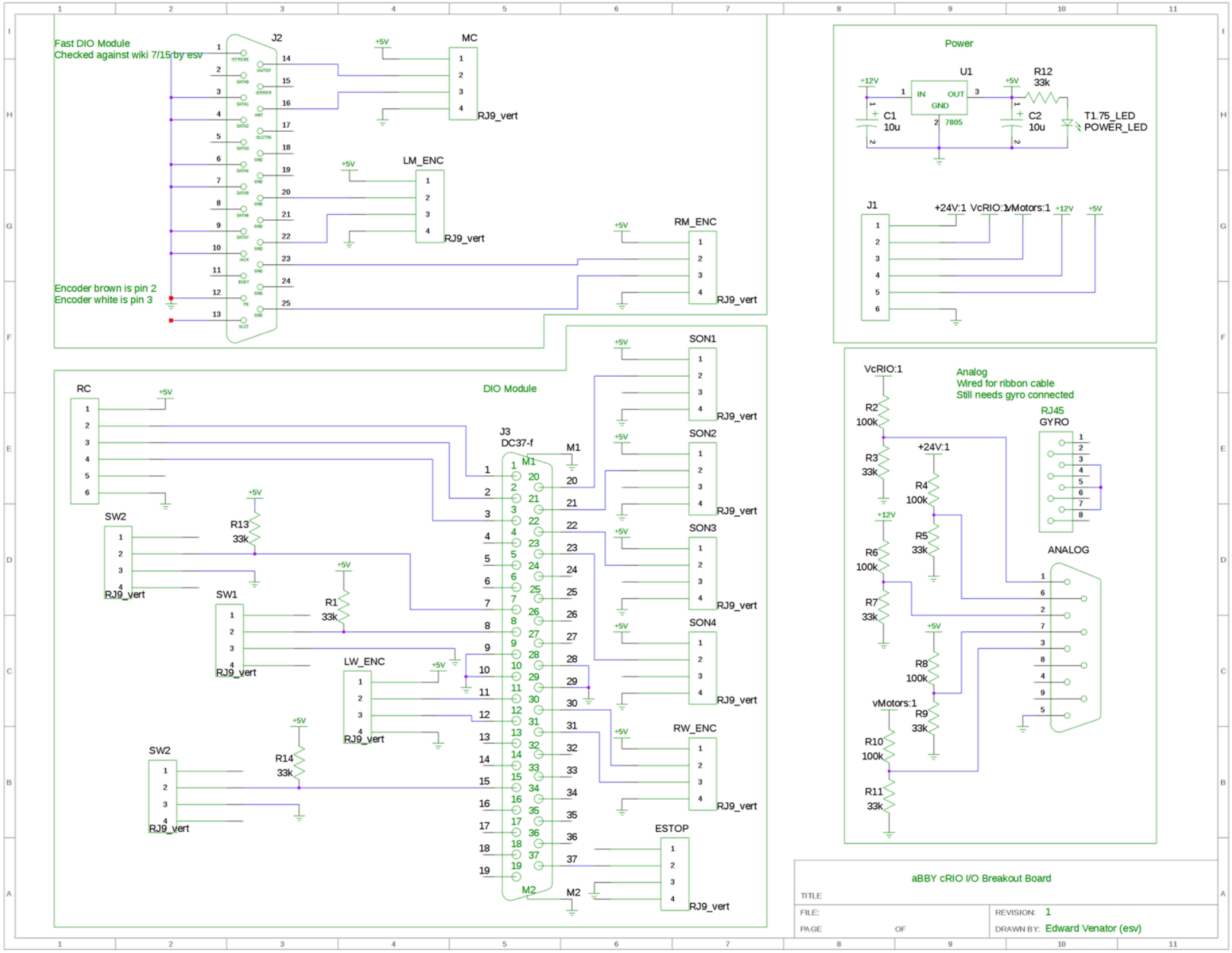
Fast DIO Module
Checked against wiki 7/15 by esv
J2
MC
RJ9_vert
LM_ENC
RM_ENC
Encoder brown is pin 2
Encoder white is pin 3
Power
U1
R12
33k
C1
10u
C2
10u
T1.75_LED
POWER_LED
J1
+24V:1
VcRIO:1
vMotors:1
DIO Module
RC
SW2
SW1
R13
R1
R14
LW_ENC
RW_ENC
J3
DC37-f
M1
M2
SON1
SON2
SON3
SON4
ESTOP
VcRIO:1
Analog
Wired for ribbon cable
Still needs gyro connected
RJ45
GYRO
ANALOG
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
100k
33k
aBBY cRIO I/O Breakout Board
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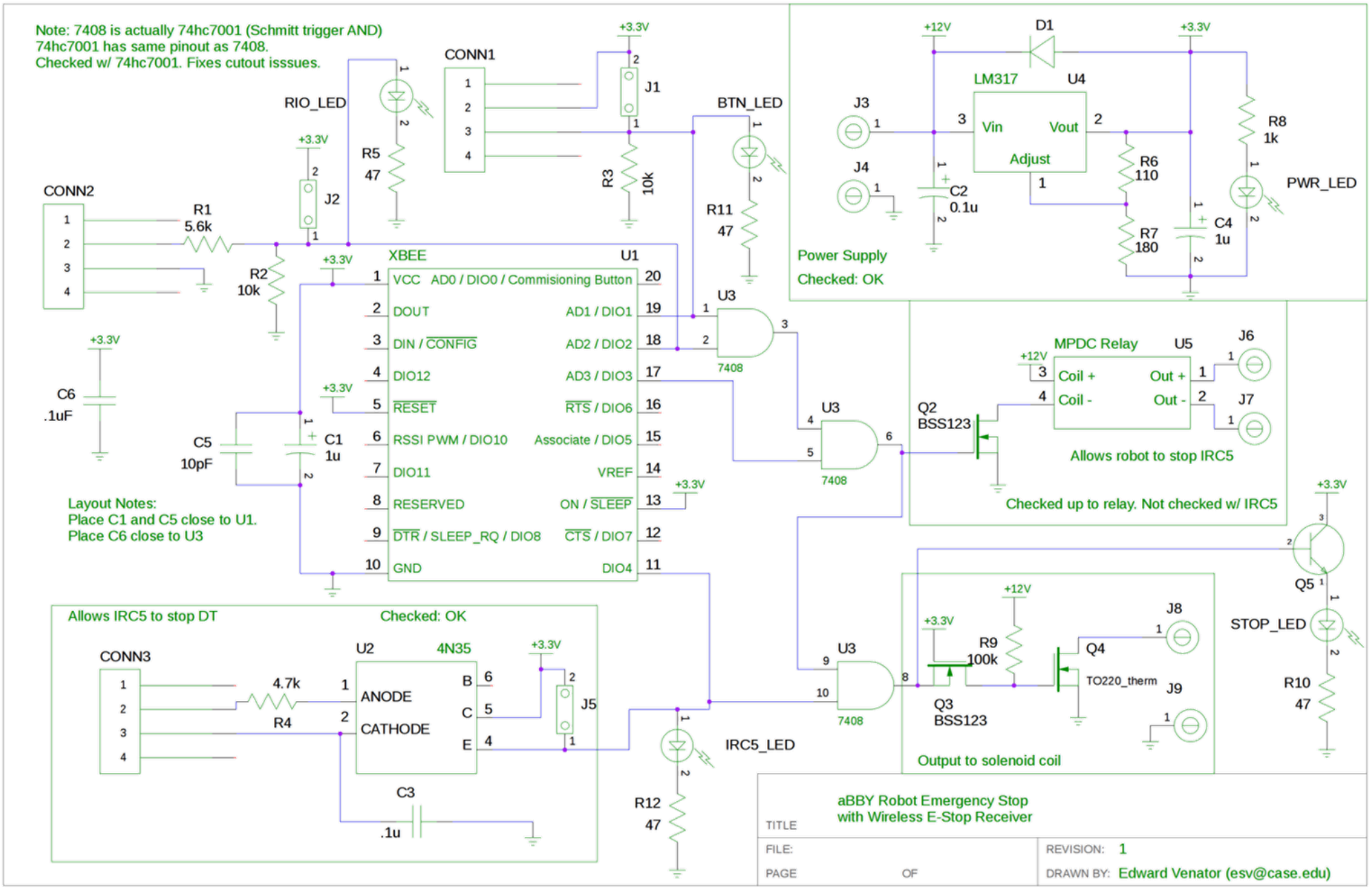
Note: 7408 is actually 74hc7001 (Schmitt trigger AND)
74hc7001 has same pinout as 7408.
Checked w/ 74hc7001. Fixes cutout isssues.
CONN1
J1
+3.3V
RIO_LED
R5
47
R3
10k
BTN_LED
R11
47
CONN2
R1
5.6k
J2
R2
10k
XBEE
U1
VCC
AD0 / DIO0 / Commisioning Button
DOUT
AD1 / DIO1
DIN / CONFIG
AD2 / DIO2
DIO12
AD3 / DIO3
RESET
RTS / DIO6
RSSI PWM / DIO10
Associate / DIO5
DIO11
VREF
RESERVED
ON / SLEEP
DTR / SLEEP_RQ / DIO8
CTS / DIO7
GND
DIO4
C6
.1uF
C5
10pF
C1
1u
Layout Notes:
Place C1 and C5 close to U1.
Place C6 close to U3
U3
7408
+12V
D1
LM317
U4
Vin
Vout
Adjust
J3
J4
C2
0.1u
R6
110
R7
180
R8
1k
C4
1u
PWR_LED
Power Supply
Checked: OK
MPDC Relay
U5
Coil +
Coil -
Out +
Out -
J6
J7
Q2
BSS123
Allows robot to stop IRC5
Checked up to relay. Not checked w/ IRC5
Allows IRC5 to stop DT
Checked: OK
CONN3
4.7k
R4
U2
4N35
ANODE
CATHODE
B
C
E
J5
C3
.1u
IRC5_LED
R12
47
R9
100k
Q3
BSS123
Q4
TO220_therm
J8
J9
Output to solenoid coil
Q5
STOP_LED
R10
47
aBBY Robot Emergency Stop
with Wireless E-Stop Receiver
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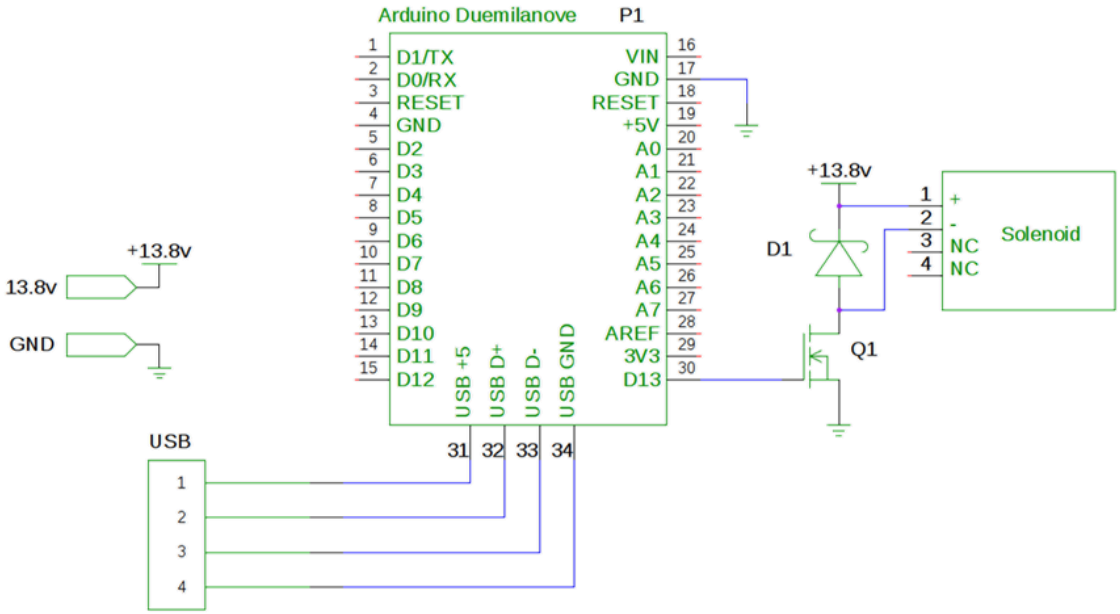

TITLE	Gripper Control (Arduino/Solenoid Valve)
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