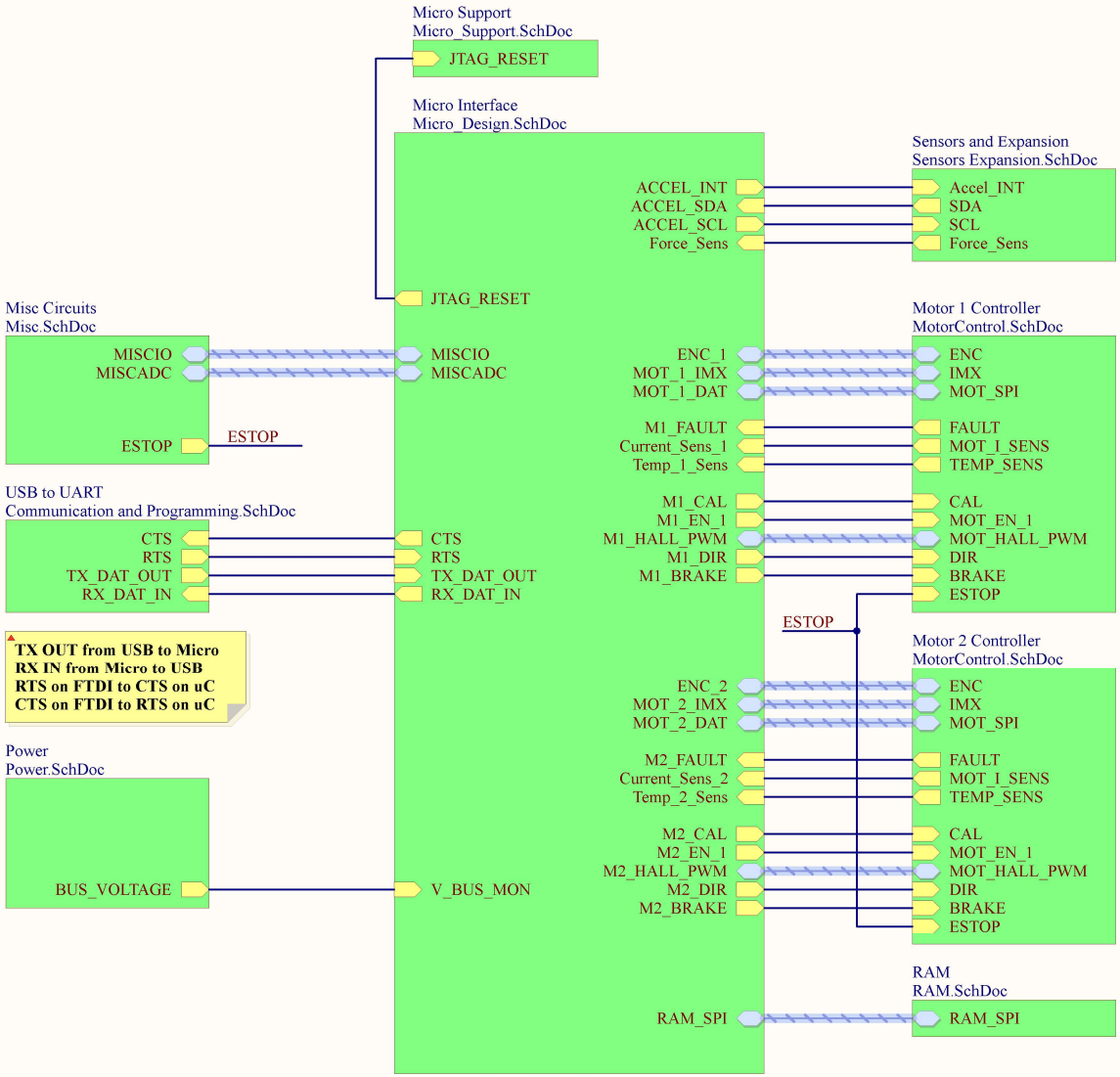
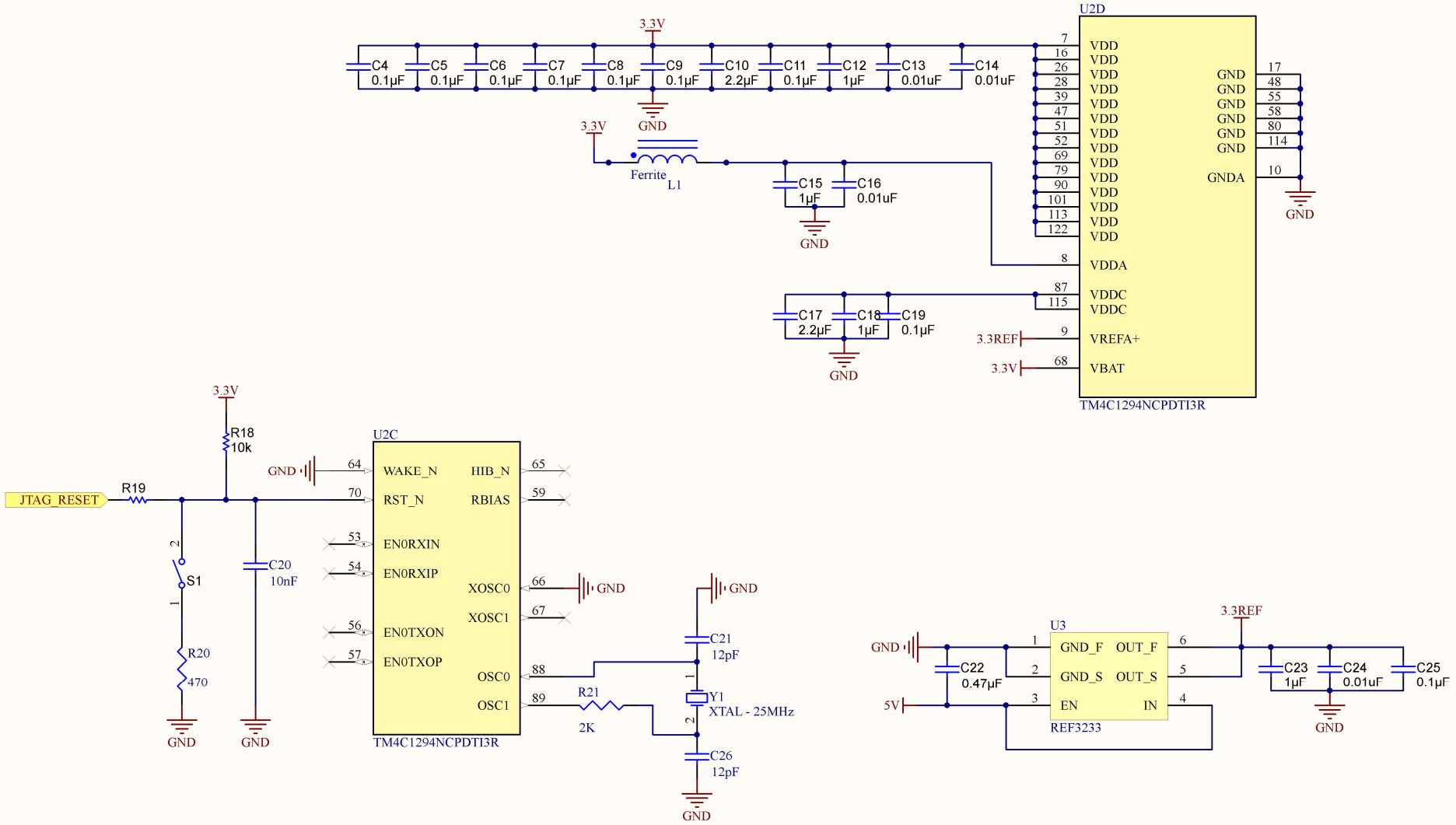


Title	**2R Robot Top Level Electrical Design**		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 6	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:54 PM	Sheet 1 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Top Level.SchDoc			*ME495 - Winter 2018*
			By: C. Miller



Title	***Microcontroller Support Circuitry***		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 4	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:54 PM	Sheet 2 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Micro_Support.SchDoc			*ME495 - Winter 2018*
			By: C. Miller

TX OUT from USB to Micro
RX IN from Micro to USB
RTS on FTDI to CTS on uC
CTS on FTDI to RTS on uC

U2A

TM4C1294NCPDTI3R

P2
7-JST-PA
3.3V
JTAG_RESET
TDI
TDO/SWO
TCK/SWCLK
TMS/SWDIO
R12
10K
3.3V
GND

U2B

TM4C1294NCPDTI3R

10K

BREAKOUT MORE PINS IF POSSIBLE

MISCIO

MISCADC

IMX

RAM_SPI

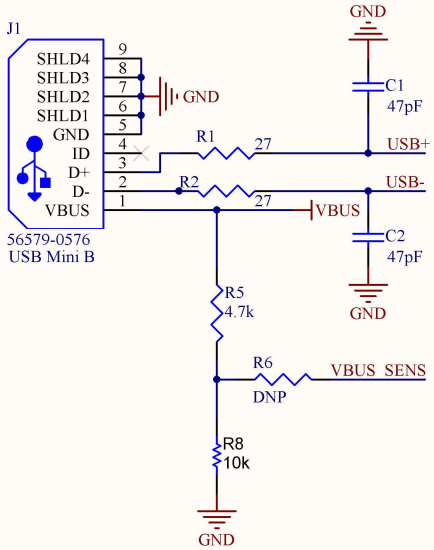
EncSPI

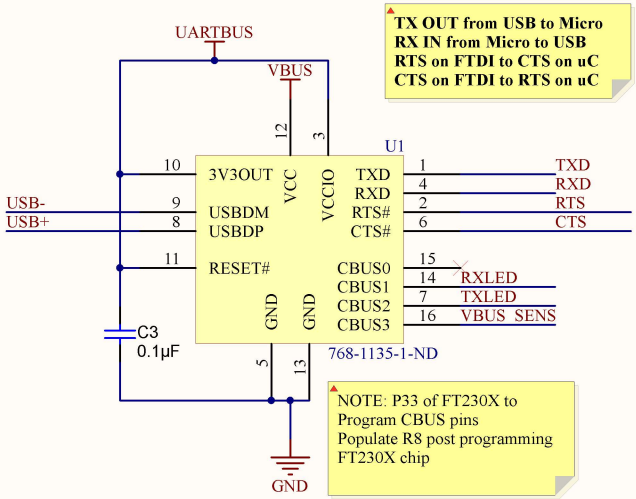
MOT_SPI

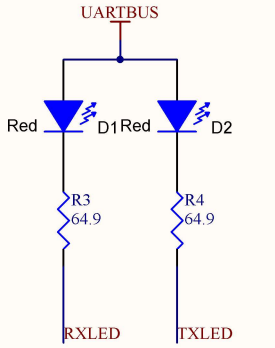
MOT_PWM_HALL

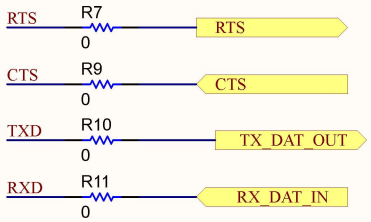
Title	Microcontroller Interface
Size: A	Author C. Miller
Revision:	6
Date: 5/30/2018	Time: 11:43:54 PM
Sheet	3 of 8
File:	C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Micro_Design.SchDoc

Wildcat Robot Design Studio
R2R Robotics
Northwestern University
ME495 - Winter 2018
By: C. Miller

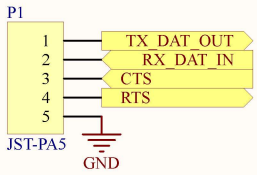




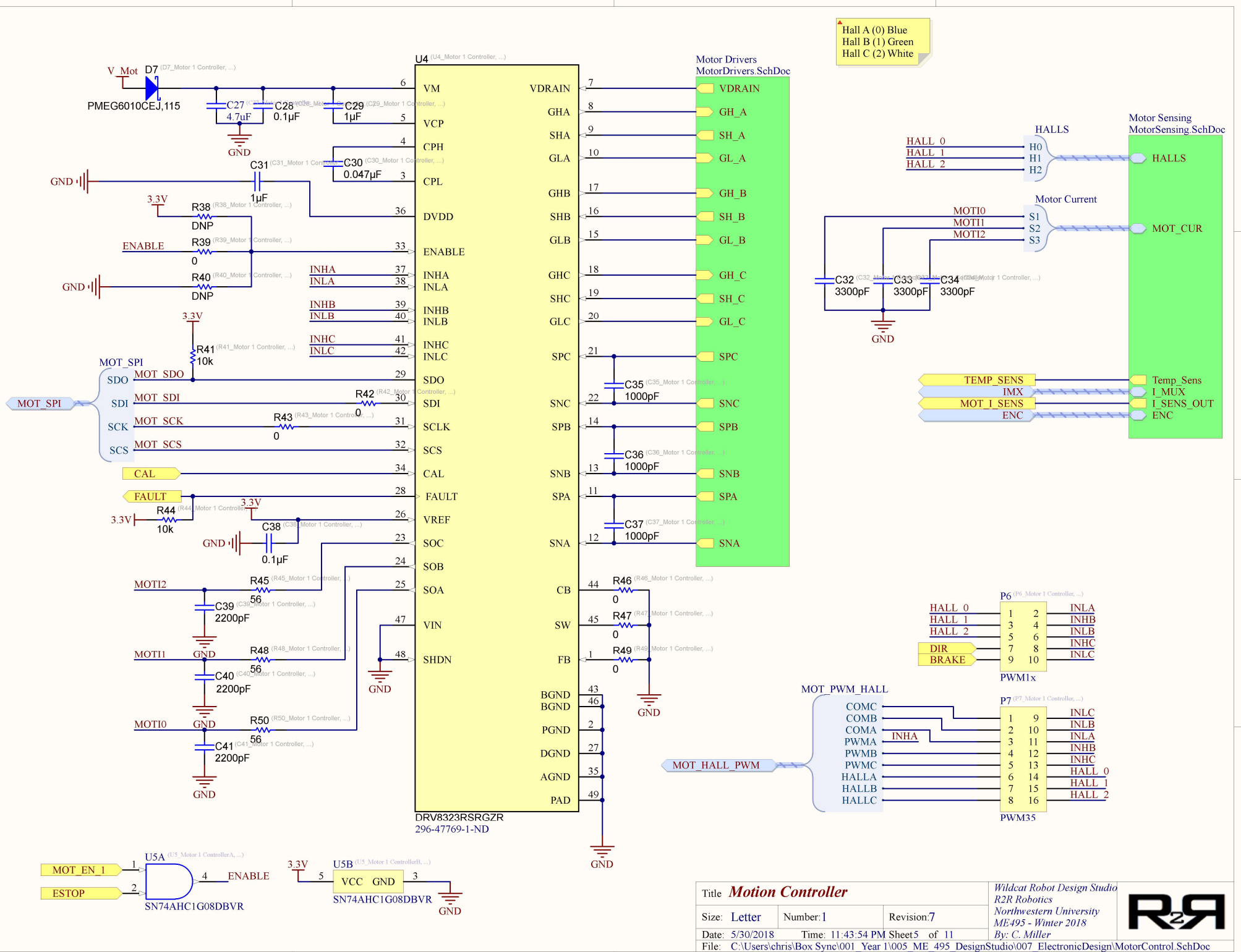




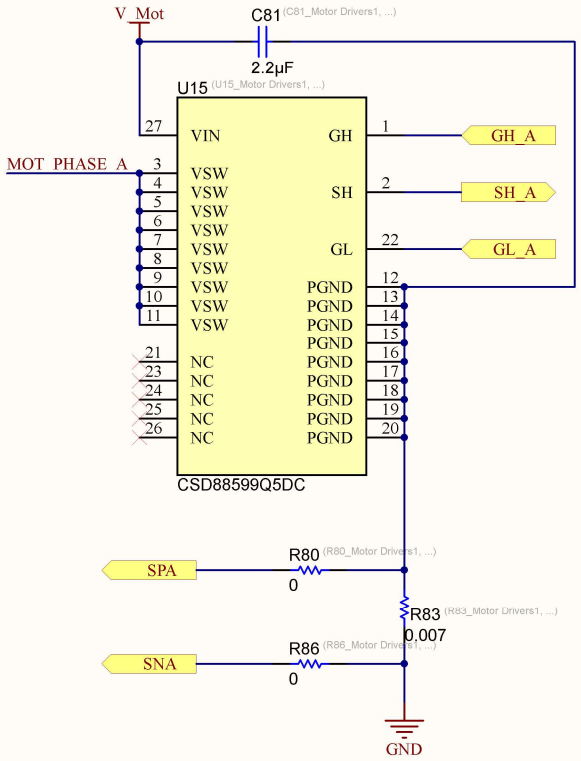
NOTE: To use UART breakout header
Remove 0Ohm Resistors on
RX TX RTS CTS lines



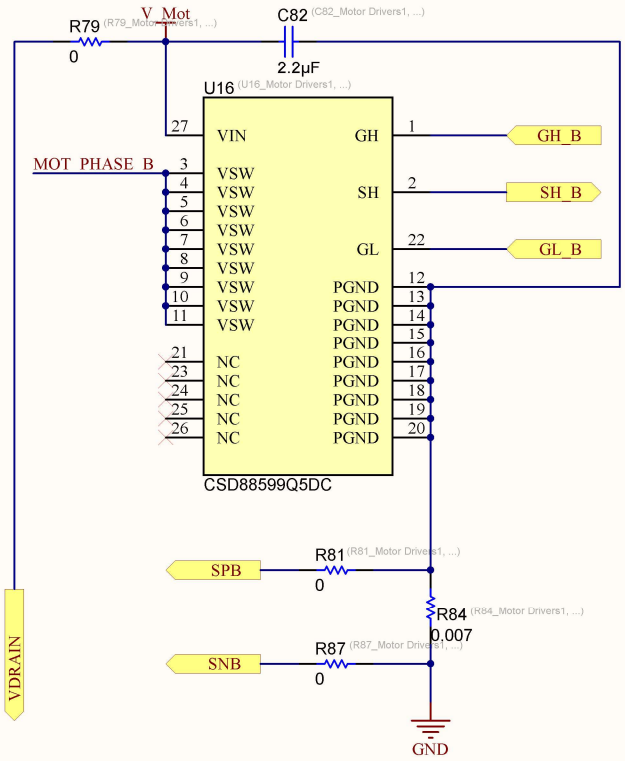
Title	**USB-to-UART**		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 5	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:54 PM	Sheet 4 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Communication and Programming.S			*ME495 - Winter 2018*
			By: C. Miller


Hall A (0) Blue
Hall B (1) Green
Hall C (2) White
U4
DRV8323RSRGZR
296-47769-1-ND
Motor Drivers
MotorDrivers.SchDoc
Motor Sensing
MotorSensing.SchDoc
HALLS
Motor Current
MOT_SPI
MOT_HALL_PWM
PWM1x
PWM35
U5A
SN74AHC1G08DBVR
U5B
SN74AHC1G08DBVR
Title Motion Controller
Size: Letter
Number:1
Revision:7
Date: 5/30/2018
Time: 11:43:54 PM
Sheet5 of 11
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\MotorControl.SchDoc
Wildcat Robot Design Studio
R2R Robotics
Northwestern University
ME495 - Winter 2018
By: C. Miller

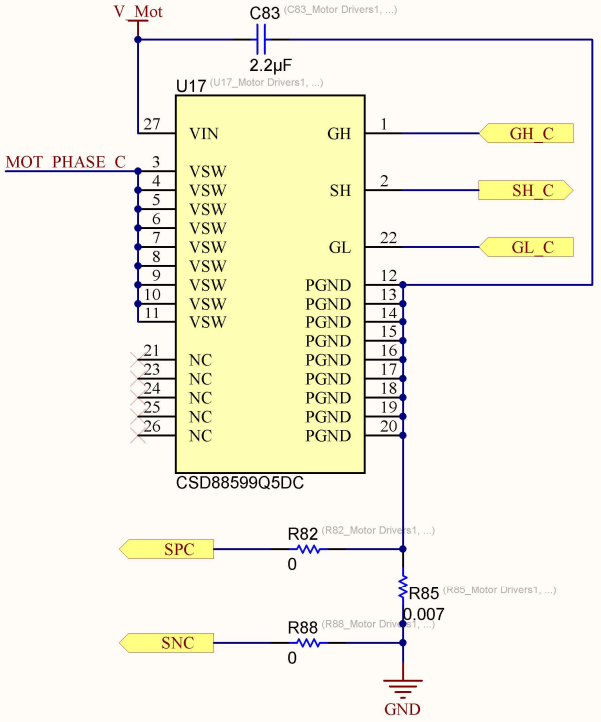
PHASE A



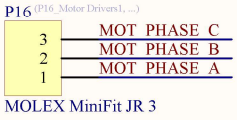
PHASE B



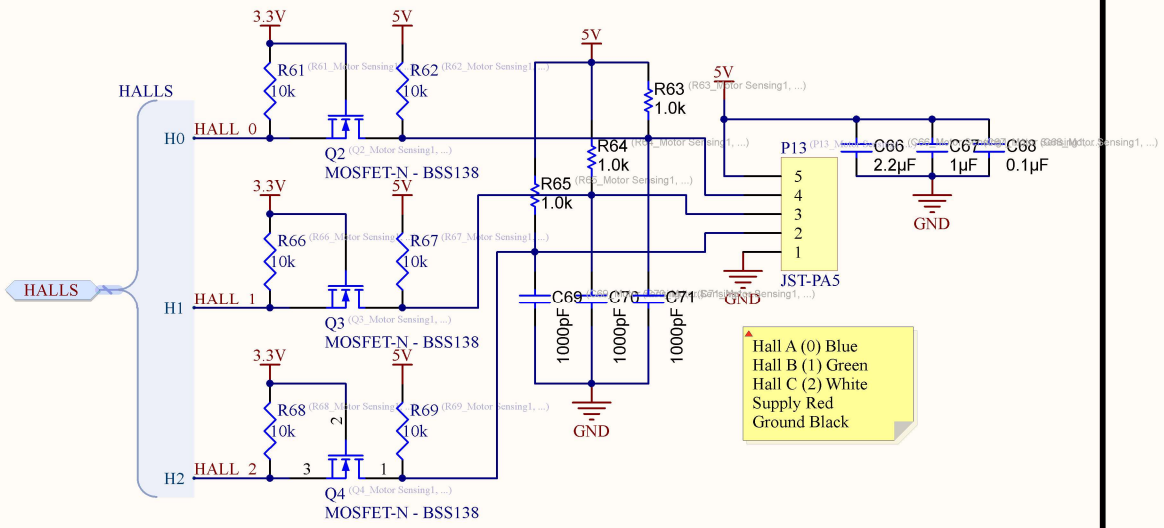
PHASE C



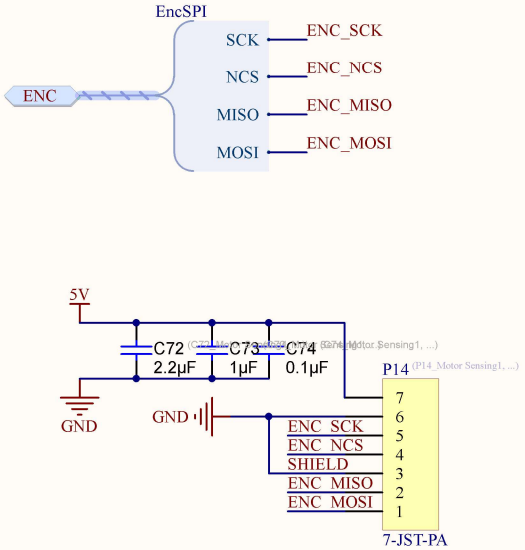
MOTOR OUTPUT



Title	***Motor Drivers and Output***		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 2	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:54 PM	Sheet 6 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\MotorDrivers.SchDoc			*ME495 - Winter 2018*
			By: C. Miller

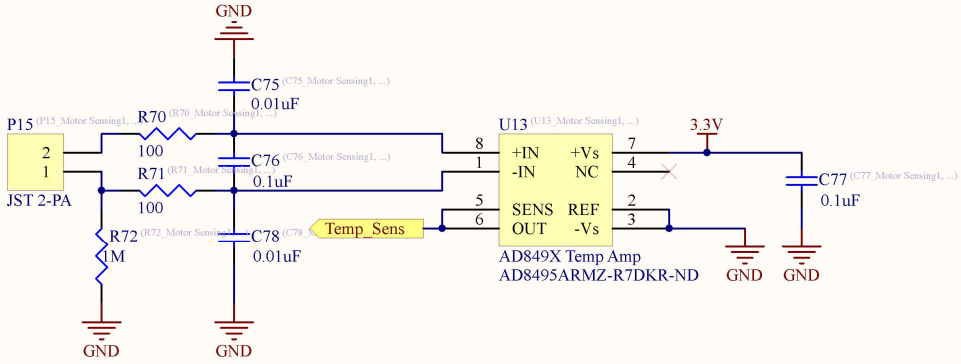


HALLS INTERFACE

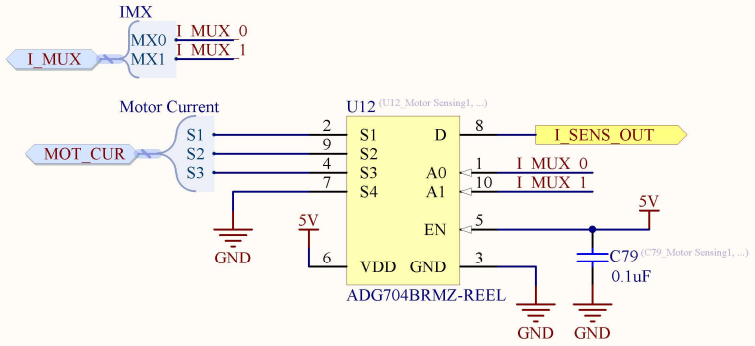


ENCODER INTERFACE

MOTOR TEMPERATURE MONITOR



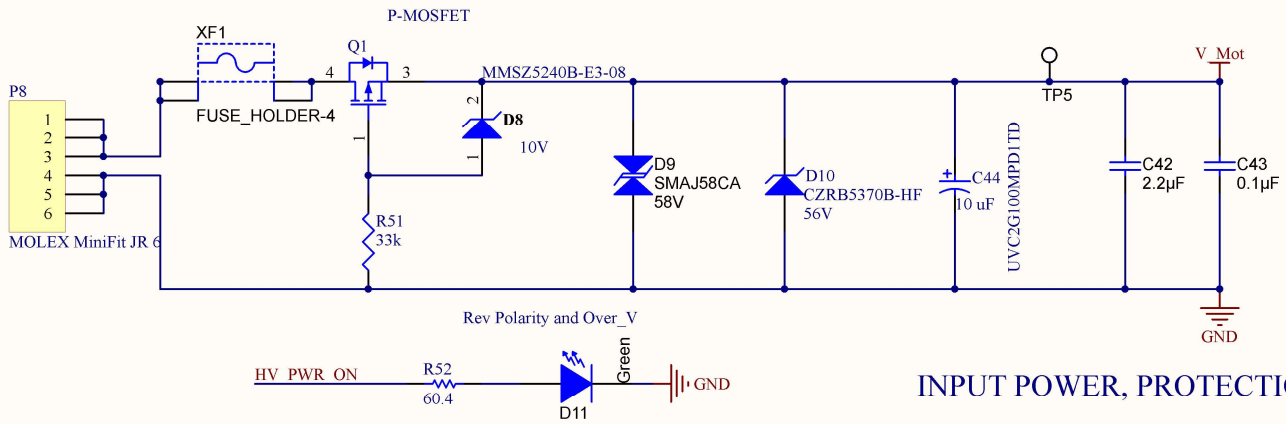
MOTOR CURRENT MONITOR AND ANALOG MUX

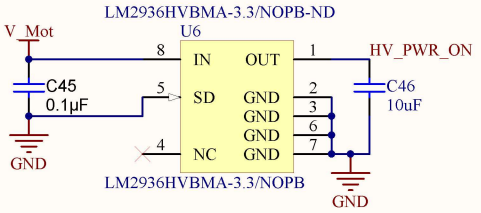


Title	***Motor Sensors***		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 5	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:55 PM	Sheet 7 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\MotorSensing.SchDoc			*ME495 - Winter 2018*
			By: C. Miller

CIRCUIT RATED TO PROTECT AGAINST REVERSE POLARITY AND VOLTAGES <=56V ONLY. V> 56V WILL CAUSE DAMAGE

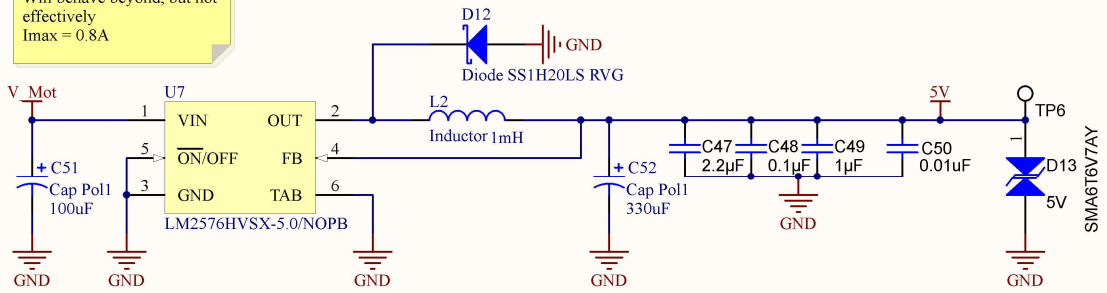
NOTES:
Does not protect motors for improper V sizing
If motor is undersized, and over_v, motor WILL
be damaged
--- Misc ---
Partially ESD Rated on all voltage rails via TVS





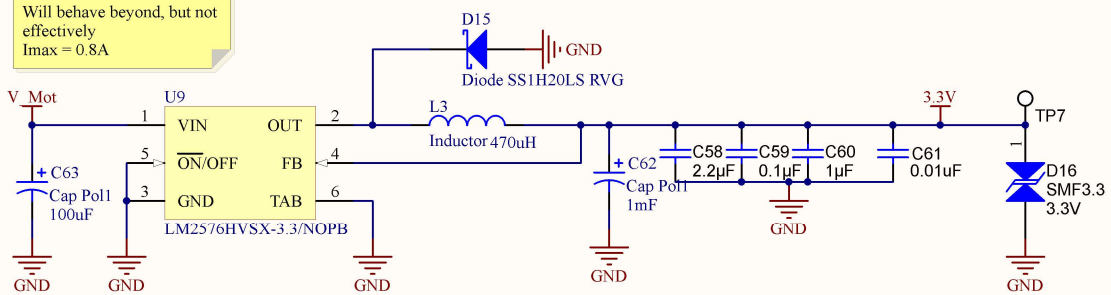
INPUT POWER, PROTECTION, AND MOTOR VOLTAGE (60V peak input)

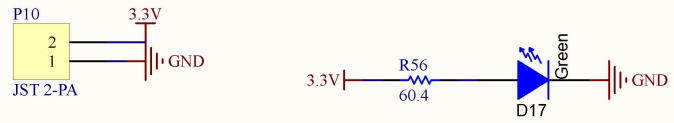
Rated for .2A to 0.35A
Will behave beyond, but not effectively
Imax = 0.8A



+5V REGULATION

Rated for .3A to 0.5A
Will behave beyond, but not effectively
Imax = 0.8A

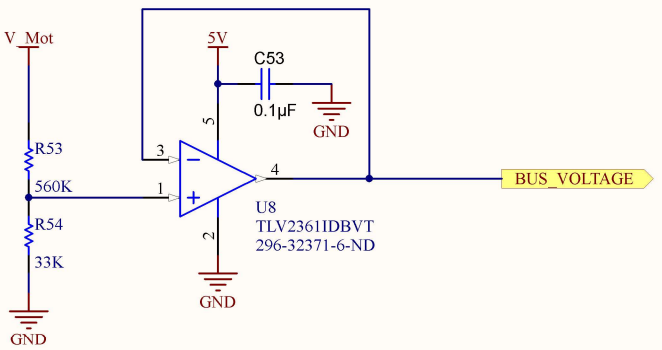




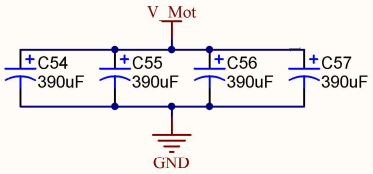
+3.3V REGULATION

REGEN CKT V MON: 60V RATING

V_Mot Monitor for Shunt Resp



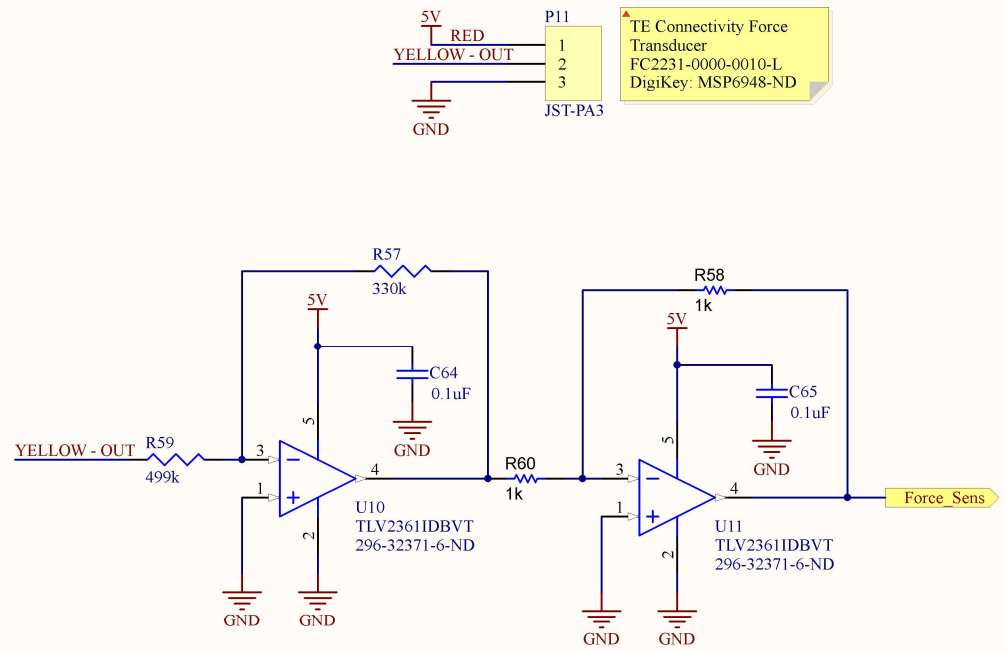
BULK CAPS RATED FOR VOLTAGES <80V



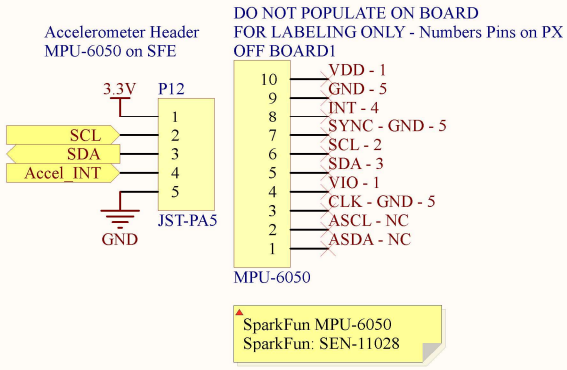
MOTOR PROTECTIONS

Title	**Power Circuitry**		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 5	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:55 PM	Sheet 8 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Power.SchDoc			*ME495 - Winter 2018*
			By: C. Miller

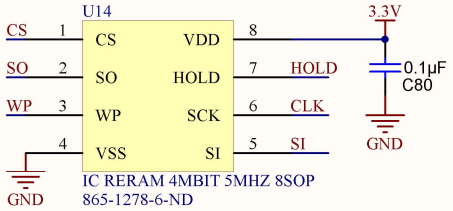
FORCE SENSOR

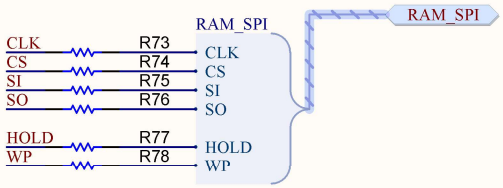


ACCELEROMETER

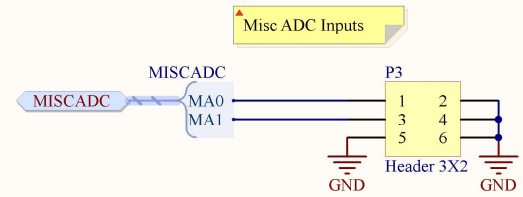


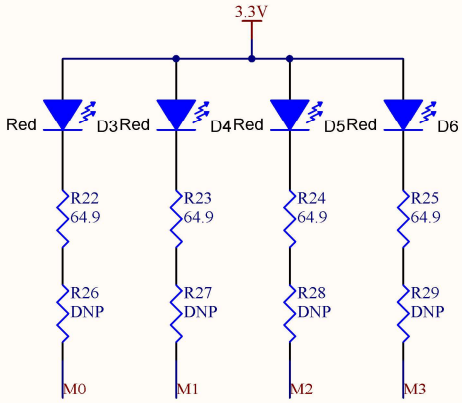
Title	***End Effector Sensors***		*Wildcat Robot Design Studio*
Size: Letter	Number: 1	Revision: 3	*R2R Robotics*
Date: 5/30/2018	Time: 11:43:55 PM	Sheet 9 of 11	*Northwestern University*
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Sensors Expansion.SchDoc			*ME495 - Winter 2018*
			By: C. Miller

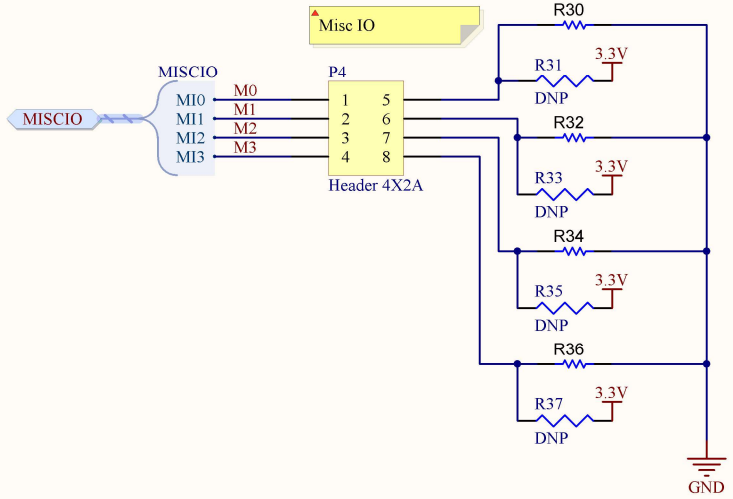


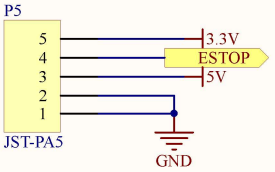


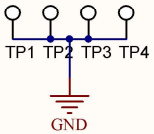
Title	***RAM Expansion***		*Wildcat Robot Design Studio* *R2R Robotics* *Northwestern University* *ME495 - Winter 2018* *By: C. Miller*
Size: Letter	Number: 1	Revision: 4	
Date: 5/30/2018	Time: 11:43:55 PM	Sheet 10 of 11	
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\RAM.SchDoc			











H4
NY PMS 256 0025 PH

H1
NY PMS 256 0025 PH

H2
NY PMS 256 0025 PH

H3
NY PMS 256 0025 PH

H8
NY PMS 256 0025 PH

H5
NY PMS 256 0025 PH

H6
NY PMS 256 0025 PH

H7
NY PMS 256 0025 PH

Title	***Miscellaneous and SD Card***		*Wildcat Robot Design Studio* *R2R Robotics* *Northwestern University* *ME495 - Winter 2018* *By: C. Miller*
Size: Letter	Number: 1	Revision: 4	
Date: 5/30/2018	Time: 11:43:55 PM	Sheet 11 of 11	
File: C:\Users\chris\Box Sync\001_Year 1\005_ME_495_DesignStudio\007_ElectronicDesign\Misc.SchDoc			