Tracks

Sheet: Tracks

BOOST-EN, BOOST-A, BOOST-B, MAIN-CTRL1, MAIN-CTRL2, PROG-CTRL1, PROG-CTRL2, MAIN-CUTOUT, PROG-CUTOUT, LIMIT-PROG

RCOM-MAIN-RX, RCOM-PROG-RX, RCOM-DAC, RCOM-MAIN-ERR, RCOM-PROG-ERR, MAIN-DISABLE, MAIN-SLEEP, MAIN-FAULT, MAIN-CURRENT, PROG-DISABLE, PROG-SLEEP, PROG-FAULT, PROG-CURRENT

File: Tracks.sch

Expansion Headers

Depending on the value of resistor on the shield from SHIELD-ID to 3.3V, we can detect the board type

J1 EXP-LOGIC

+3.3V, PB12, PB13, PB14, PB15, SHIELD-ID, PA17, GND, SDA, SCL, PB04, PB05, PB06, PB09, RCOM-MAIN-RX, RCOM-PROG-RX, CAN0-TX, CAN0-RX, BOOST-A, BOOST-B

R1 10k

Status LEDs

R2 330r D1 BLUE, R3 330r D2 BLU, R4 330r D3 GRN

LED-0, LED-1

SAMC21 MCU

U1 ATSAMC21J18A

C7 1uF, C10 0.1uF, C4 10uF, C5 0.1uF, C8 0.1uF, C11 0.1uF, C12 0.1uF, C13 10uF, C6 10uF, C9 0.1uF

470r FB1

C2 15pF, C3 15pF, Y1 32.768kHz

VDDANA, VDDIO, VDDCORE, VDDIN

PA00–PA31, PB00–PB31

VERSION, LIMIT-PROG, MAIN-DISABLE, BOOST-EN, PROG-CURRENT, MAIN-CURRENT, RCOM-MAIN-ERR, RCOM-PROG-ERR, PROG-SLEEP, PROG-FAULT, CAN0-TX, CAN0-RX, ESP-BOOT, ESP-RESET

SHIELD-ID, MAIN-CTRL1, MAIN-CTRL2, PROG-CTRL1, PROG-CTRL2, RCOM-MAIN-RX, PROG-CUTOUT, ESP-RTS, ESP-CTS, ESP-TXD, ESP-RXD, MAIN-CUTOUT, MAIN-SLEEP, RCOM-PROG-RX, PA17, MAIN-FAULT, PROG-DISABLE, BOOST-A, BOOST-B, SDA, SCL, USB-TX, USB-RX, LED-0, LED-1, JTAG-SWCLK, JTAG-SWDIO, SAM-RESET

R7 1k, R6 10k, C1 100pF, R5 330r, SW1 RESET

H1 MountingHole, H2 MountingHole, H3 MountingHole, H4 MountingHole

FID1 Fiducial, FID2 Fiducial

ESP32 WiFi

Sheet: ESP32

ESP-RXD, ESP-TXD, ESP-RTS, ESP-CTS, ESP-BOOT, ESP-RESET, SAM-RESET

File: ESP32.sch

Extra Decoupling Caps

C14 0.01uF, C16 0.01uF, C18 0.01uF, C20 0.01uF, C22 0.01uF

C15 0.01uF, C17 0.01uF, C19 0.01uF, C21 0.01uF, C23 0.01uF

+3.3V, +12V, GND

JTAG SWD Header

J2 JTAG_SWD

VTref, RESET, SWDCLK/TCK, SWDIO/TMS, SWO/TDO, NC/TDI, GNDDetect, GND

SAM-RESET, JTAG-SWCLK, JTAG-SWDIO

Sheet: Regulator

File: Regulator.sch

Sheet: I2C

File: I2C.sch

Isolated USB

Sheet: USB

USB-TX, USB-RX, UART-IN, UART-OUT

File: USB.sch

VERSION DETECTION

	MK1S	MK1T
PB00	Low	High

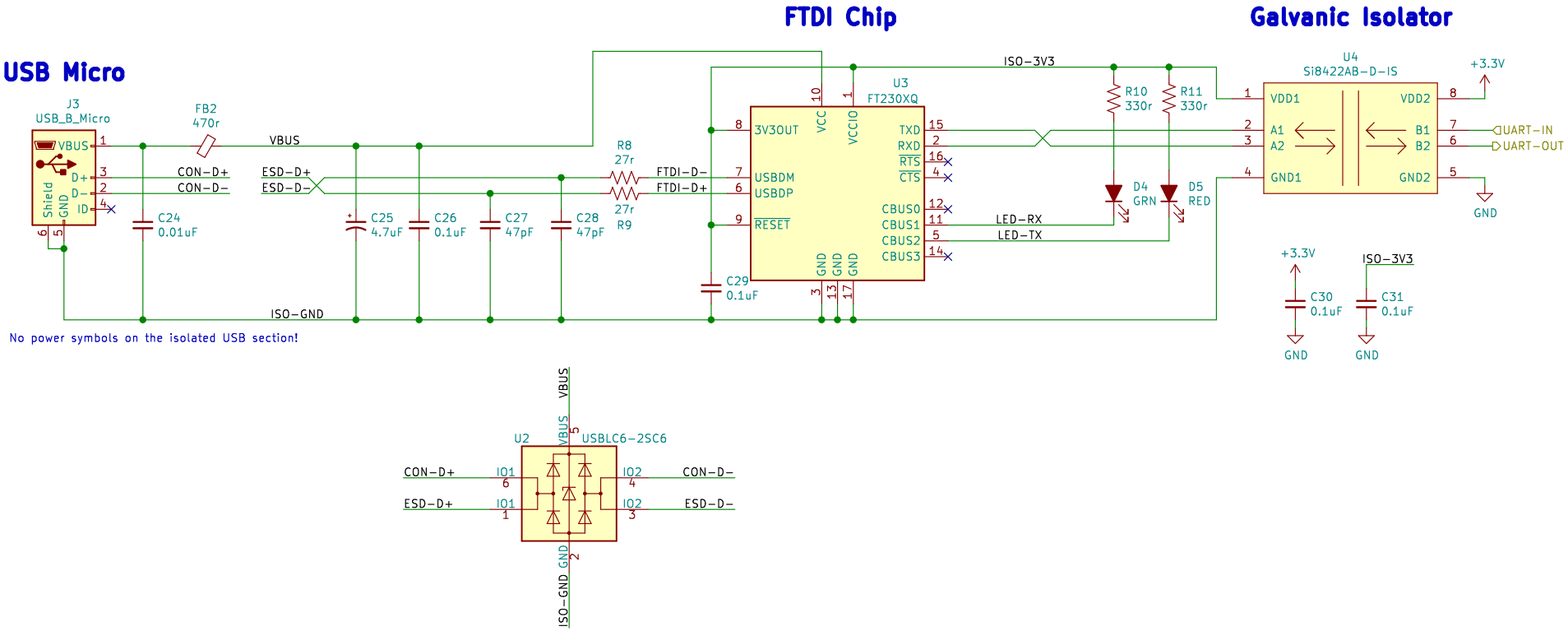
Wasatch Scale Models

Sheet: /

File: FireBox.sch

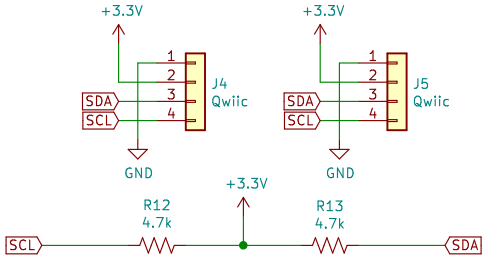
Title: Main

Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 1/8

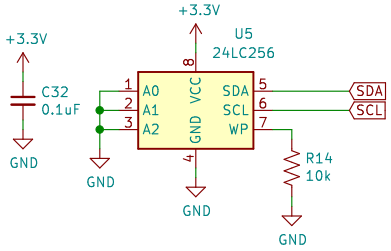


Wasatch Scale Models		
Sheet: /USB/		
File: USB.sch		
Title: Isolated USB to UART Interface		
Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 2/8

I2C Expansion Headers

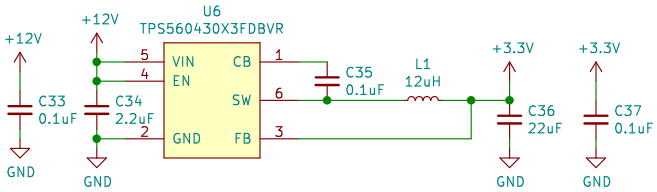


I2C EEPROM

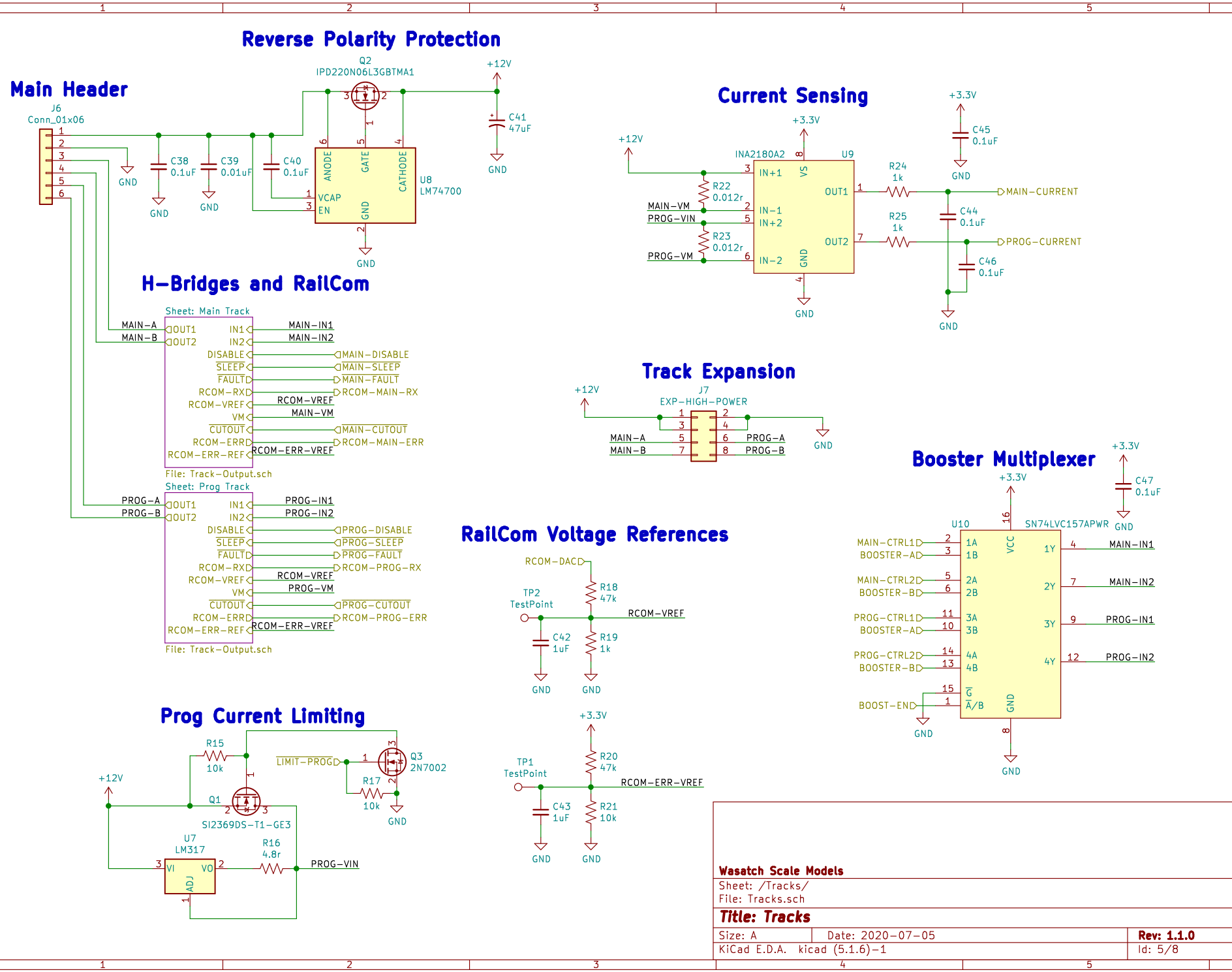


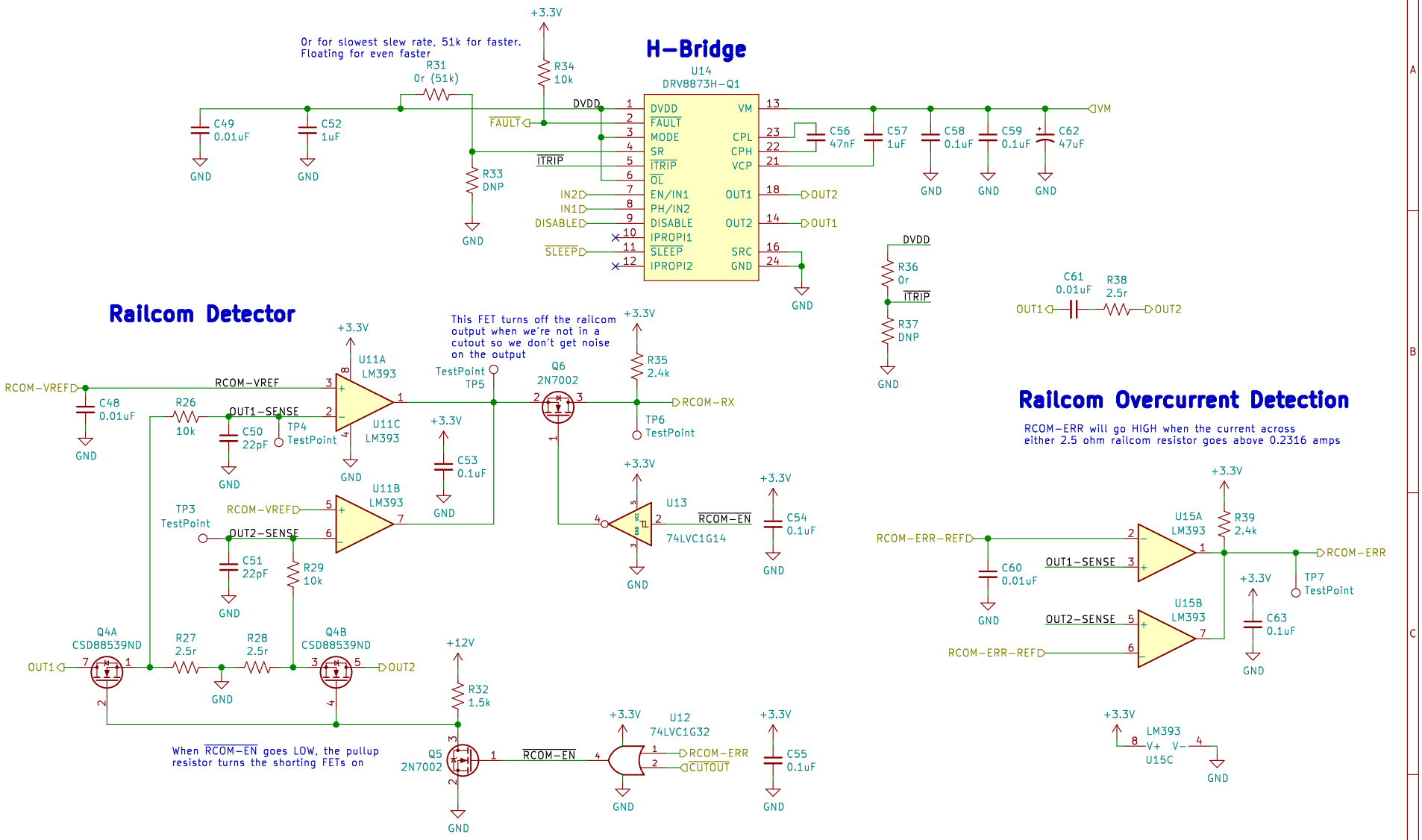
Wasatch Scale Models		
Sheet: /I2C/		
File: I2C.sch		
Title: I2C Devices		
Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 3/8

3.3V Switching Regulator

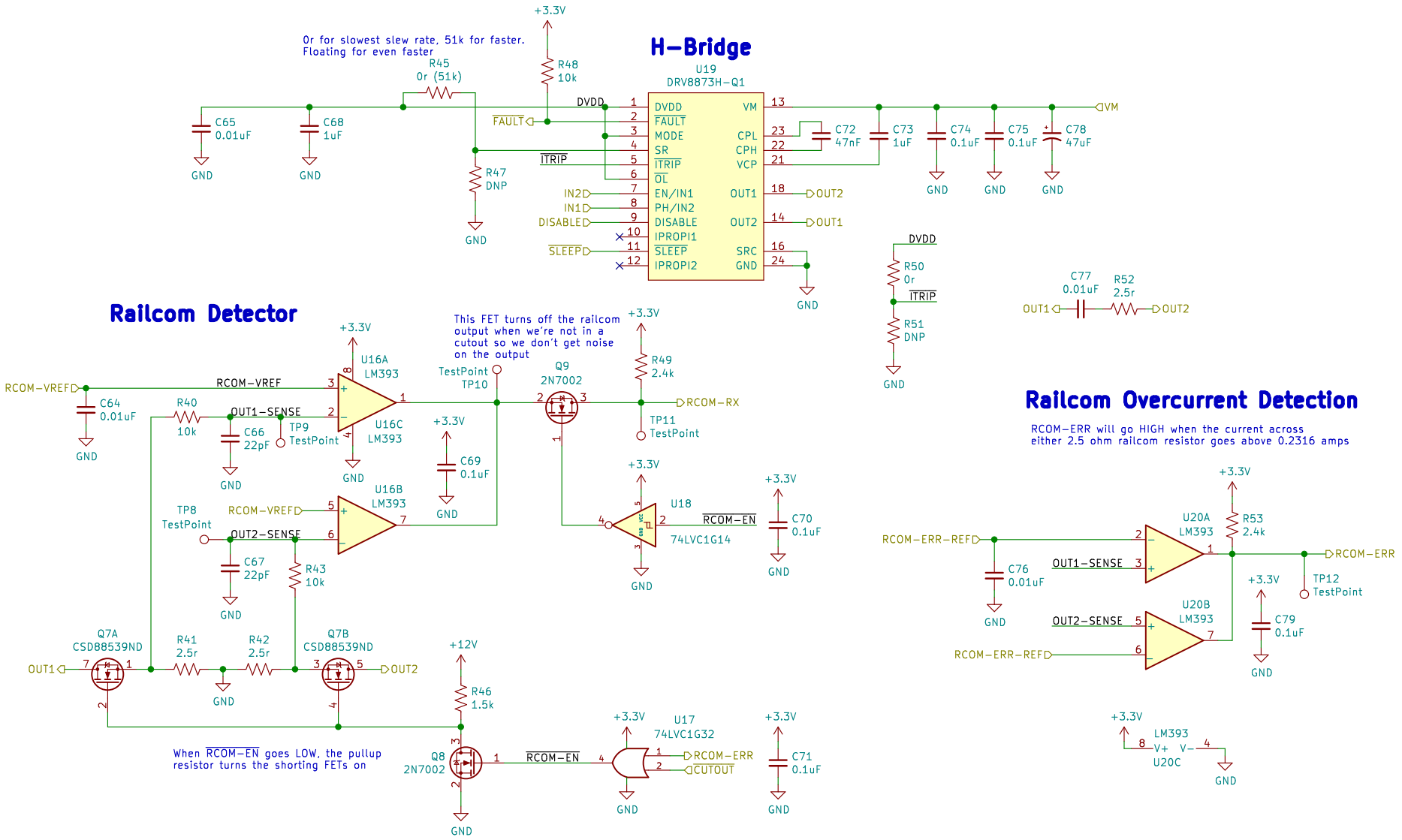


Wasatch Scale Models		
Sheet: /Regulator/		
File: Regulator.sch		
Title: 3.3V Regulator		
Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 4/8

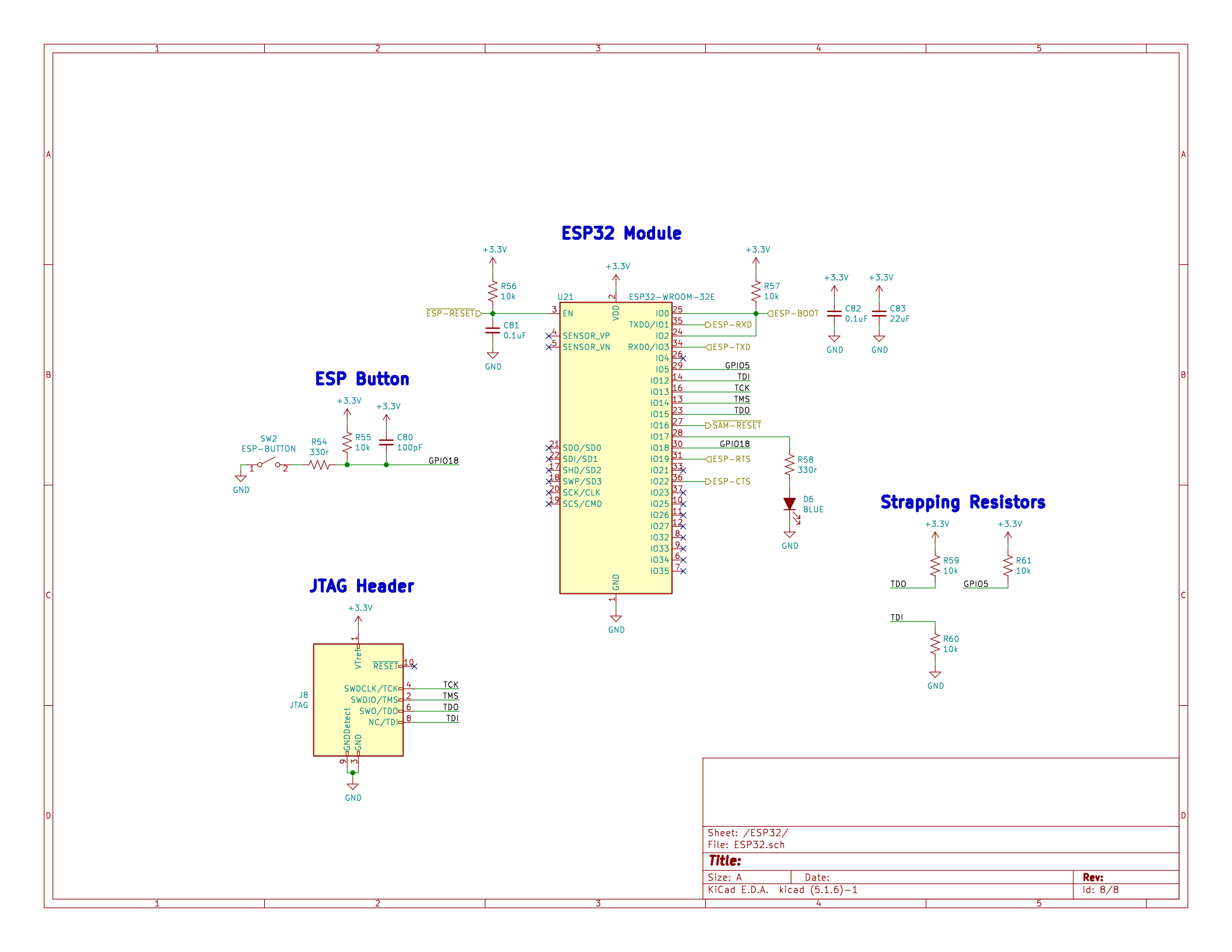

Reverse Polarity Protection
Main Header
J6
Conn_01x06
Q2
IPD220N06L3GBTMA1
+12V
C41
47uF
GND
C38
0.1uF
C39
0.01uF
C40
0.1uF
ANODE
GATE
CATHODE
VCAP
EN
GND
U8
LM74700
Current Sensing
+3.3V
+12V
INA2180A2
U9
IN+1
IN-1
IN+2
IN-2
VS
OUT1
OUT2
GND
R22
0.012r
R23
0.012r
MAIN-VM
PROG-VIN
PROG-VM
R24
1k
R25
1k
C45
0.1uF
C44
0.1uF
C46
0.1uF
MAIN-CURRENT
PROG-CURRENT
H-Bridges and RailCom
Sheet: Main Track
MAIN-A
MAIN-B
OUT1
OUT2
IN1
IN2
DISABLE
SLEEP
FAULT
RCOM-RX
RCOM-VREF
VM
CUTOUT
RCOM-ERR
RCOM-ERR-REF
MAIN-IN1
MAIN-IN2
MAIN-DISABLE
MAIN-SLEEP
MAIN-FAULT
RCOM-MAIN-RX
RCOM-VREF
MAIN-VM
MAIN-CUTOUT
RCOM-MAIN-ERR
RCOM-ERR-VREF
File: Track-Output.sch
Sheet: Prog Track
PROG-A
PROG-B
PROG-IN1
PROG-IN2
PROG-DISABLE
PROG-SLEEP
PROG-FAULT
RCOM-PROG-RX
RCOM-VREF
PROG-VM
PROG-CUTOUT
RCOM-PROG-ERR
RCOM-ERR-VREF
File: Track-Output.sch
Track Expansion
+12V
J7
EXP-HIGH-POWER
MAIN-A
MAIN-B
PROG-A
PROG-B
GND
Booster Multiplexer
+3.3V
C47
0.1uF
U10
SN74LVC157APWR
VCC
GND
MAIN-CTRL1
BOOSTER-AD
MAIN-CTRL2
BOOSTER-BD
PROG-CTRL1
BOOSTER-AD
PROG-CTRL2
BOOSTER-BD
BOOST-END
1A
1B
2A
2B
3A
3B
4A
4B
G
A/B
1Y
2Y
3Y
4Y
MAIN-IN1
MAIN-IN2
PROG-IN1
PROG-IN2
RailCom Voltage References
RCOM-DAC
TP2
TestPoint
R18
47k
RCOM-VREF
C42
1uF
R19
1k
TP1
TestPoint
R20
47k
RCOM-ERR-VREF
C43
1uF
R21
10k
Prog Current Limiting
+12V
R15
10k
Q1
SI2369DS-T1-GE3
LIMIT-PROG
Q3
2N7002
R17
10k
U7
LM317
VI
VO
ADJ
R16
4.8r
PROG-VIN
Wasatch Scale Models
Sheet: /Tracks/
File: Tracks.sch
Title: Tracks
Size: A
Date: 2020-07-05
Rev: 1.1.0
KiCad E.D.A. kicad (5.1.6)-1
Id: 5/8



Wasatch Scale Models		
Sheet: /Tracks/Main Track/		
File: Track-Output.sch		
Title: H-Bridge		
Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 6/8



Wasatch Scale Models		
Sheet: /Tracks/Prog Track/		
File: Track-Output.sch		
Title: H-Bridge		
Size: A	Date: 2020-07-05	**Rev: 1.1.0**
KiCad E.D.A. kicad (5.1.6)-1		Id: 7/8



Sheet: /ESP32/	
File: ESP32.sch	
Title:	
Size: A	Date:
KiCad E.D.A. kicad (5.1.6)-1	Id: 8/8