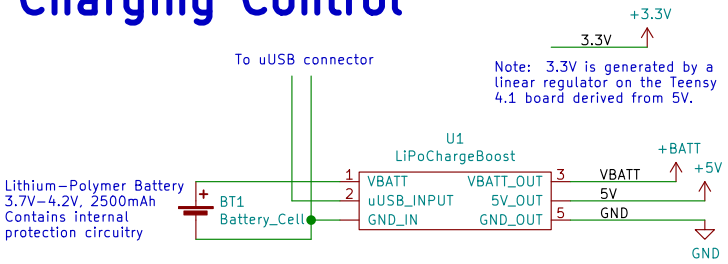
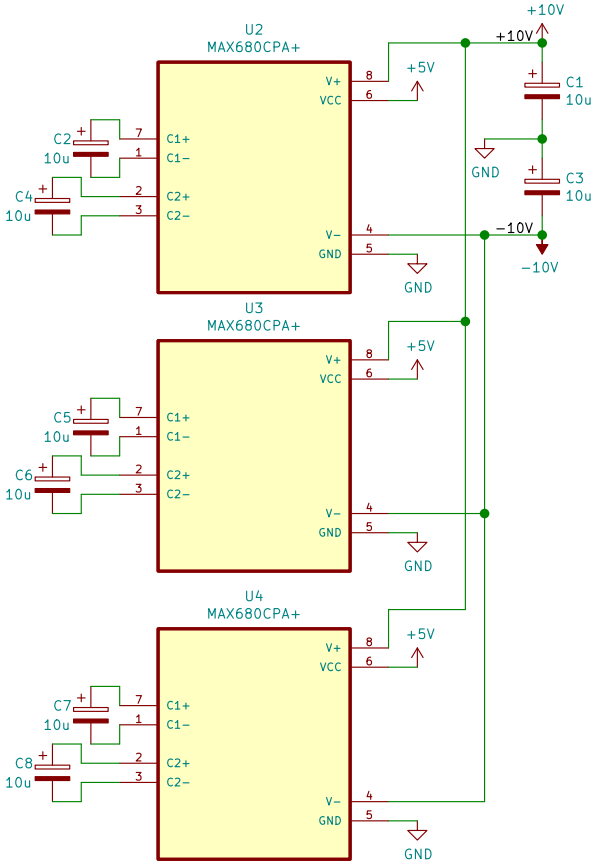
Voltage Regulation, Conversion, and Charging Control





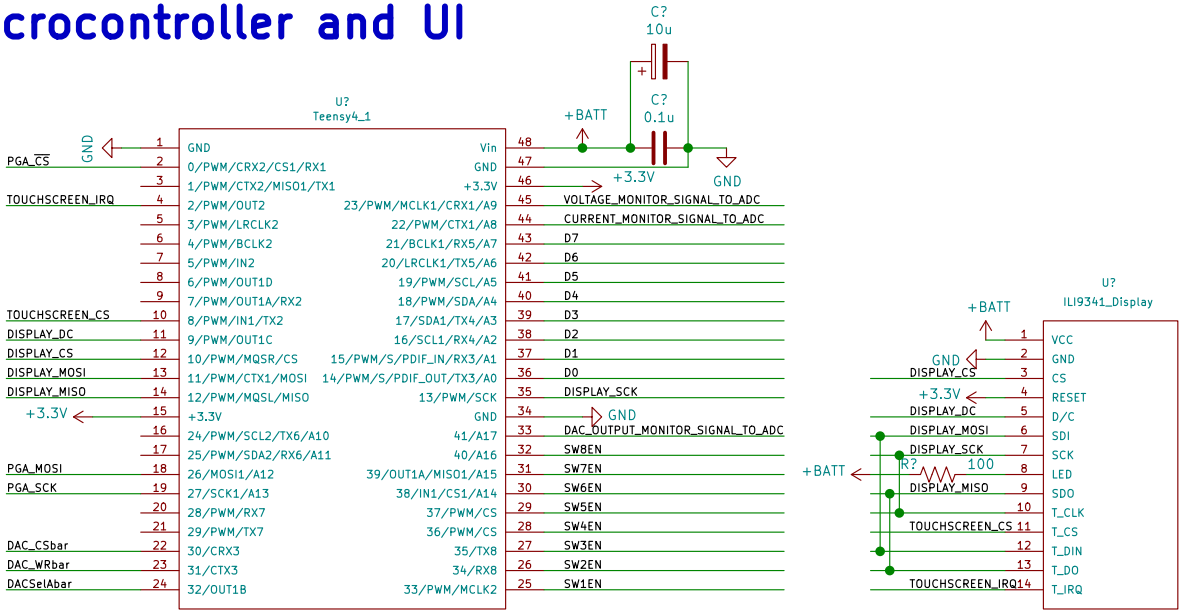
The MAX680 is a switched capacitor charge pump DC/DC converter.
It produces 2Vcc and -2Vcc. I use three in parallel to reduce voltage droop under load.

Measurement Circuit

Sheet: Measurement Circuit

File: MeasurementCircuit.sch

Microcontroller and UI



Drafted by Ryan Brandt
BrandtTech
Sheet: /
File: OpenLCRSchematic_v1_04_08_2022.sch

Title: OpenLCR Measurement Circuitry

Size: A4	Date:	**Rev: Rev 1**
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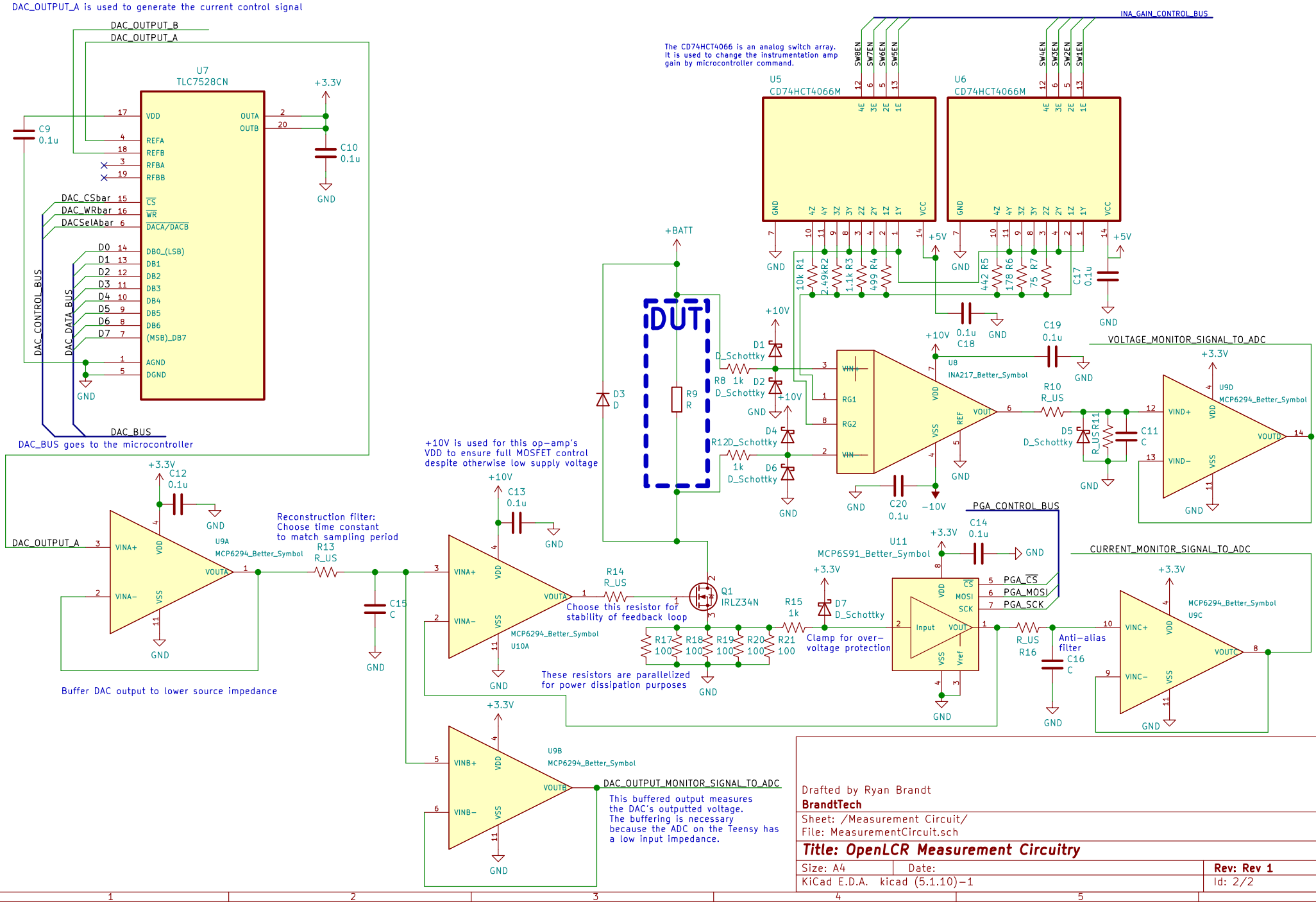
DAC_OUTPUT_A is used to generate the current control signal
DAC_OUTPUT_B
DAC_OUTPUT_A
U7
TLC7528CN
+3.3V
C9
0.1u
C10
0.1u
GND
DAC_CSbar
DAC_WRbar
DACSelAbar
DAC_CONTROL_BUS
DAC_DATA_BUS
D0
D1
D2
D3
D4
D5
D6
D7
DAC_BUS
DAC_BUS goes to the microcontroller
The CD74HCT4066 is an analog switch array.
It is used to change the instrumentation amp
gain by microcontroller command.
INA_GAIN_CONTROL_BUS
U5
CD74HCT4066M
U6
CD74HCT4066M
+BATT
DUT
R9
R
D3
D
+10V
D1
D_Schottky
R8 1k
D2
D4
R12
1k
D6
+5V
C17
0.1u
C18
0.1u
C19
0.1u
C20
0.1u
−10V
U8
INA217_Better_Symbol
R10
R_US
D5
R11
C11
C
VOLTAGE_MONITOR_SIGNAL_TO_ADC
U9D
MCP6294_Better_Symbol
PGA_CONTROL_BUS
U11
MCP6S91_Better_Symbol
PGA_CS
PGA_MOSI
PGA_SCK
C14
0.1u
CURRENT_MONITOR_SIGNAL_TO_ADC
U9C
MCP6294_Better_Symbol
R_US
R16
Anti−alias
filter
C16
C
+10V is used for this op−amp's
VDD to ensure full MOSFET control
despite otherwise low supply voltage
C12
0.1u
U9A
MCP6294_Better_Symbol
DAC_OUTPUT_A
Reconstruction filter:
Choose time constant
to match sampling period
R13
R_US
C15
C
C13
0.1u
U10A
MCP6294_Better_Symbol
R14
R_US
Choose this resistor for
stability of feedback loop
Q1
IRLZ34N
R15
1k
D7
D_Schottky
Clamp for over−
voltage protection
R17
100
R18
100
R19
100
R20
100
R21
100
These resistors are parallelized
for power dissipation purposes
Buffer DAC output to lower source impedance
U9B
MCP6294_Better_Symbol
DAC_OUTPUT_MONITOR_SIGNAL_TO_ADC
This buffered output measures
the DAC's outputted voltage.
The buffering is necessary
because the ADC on the Teensy has
a low input impedance.
Drafted by Ryan Brandt
BrandtTech
Sheet: /Measurement Circuit/
File: MeasurementCircuit.sch
Title: OpenLCR Measurement Circuitry
Size: A4
Date:
Rev: Rev 1
KiCad E.D.A. kicad (5.1.10)−1
Id: 2/2