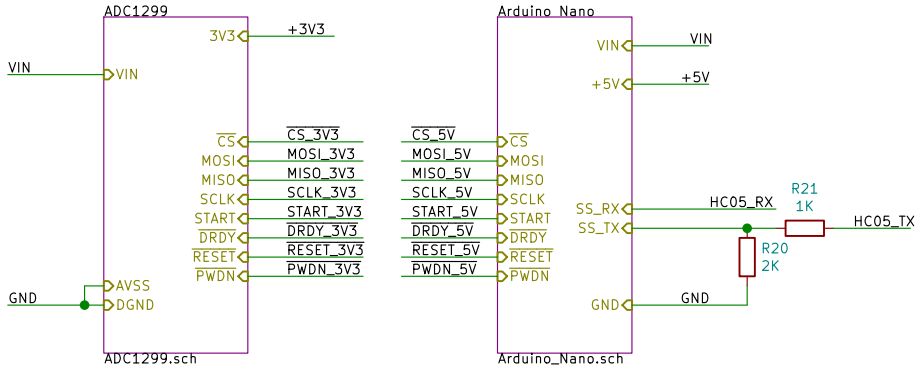
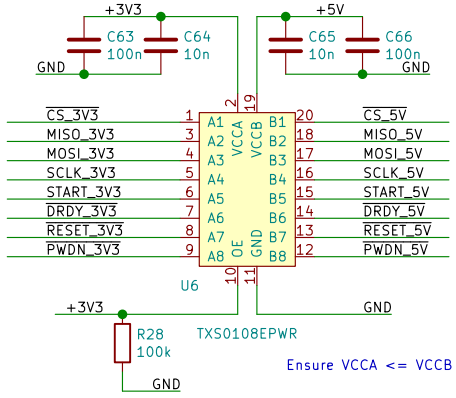
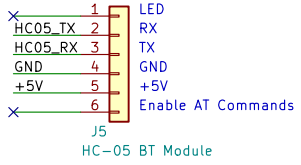
Data Acquisition System



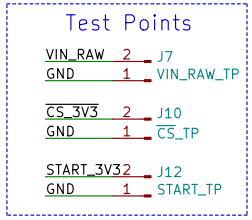
3V3 <-> 5V Bidirectional Level Shifter



HC-05 Bluetooth Module



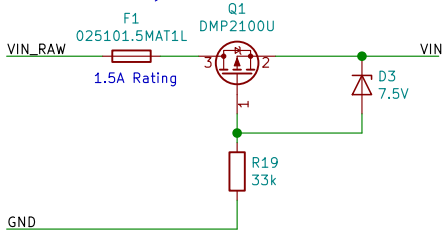
Test Points



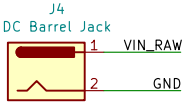
Mounting Holes & Logos

MH1 MountingHole
MH2 MountingHole
MH3 MountingHole
MH4 MountingHole
LOGO3 VersionLogo
LOGO1 UoNLogo
LOGO2 SparkerLogo

Reverse Polarity and Overcurrent Protection



Power Connections



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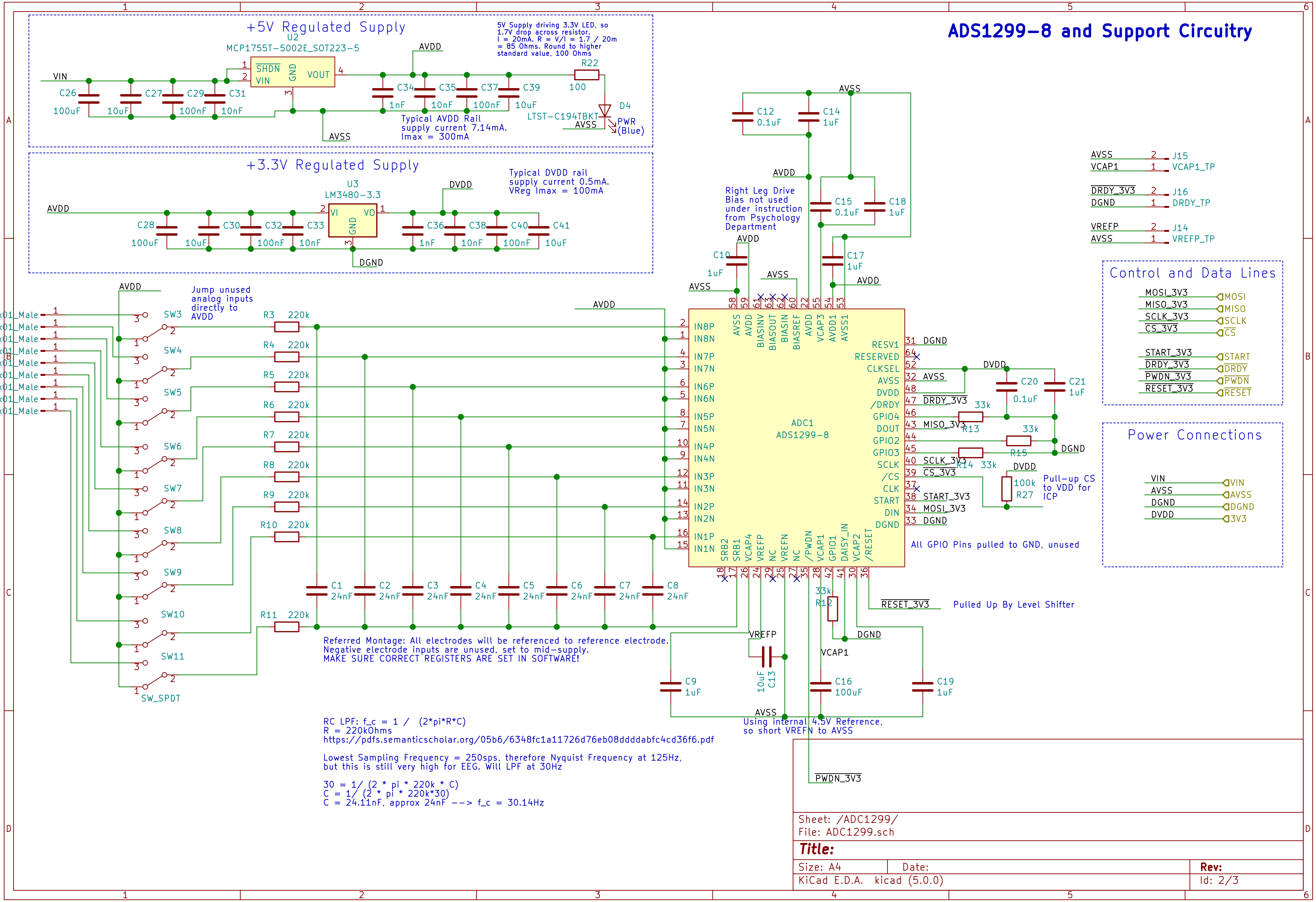

ADS1299-8 and Support Circuitry
+5V Regulated Supply
U2
MCP1755T-5002E_SOT223-5
SHDN
VIN
GND
VOUT
AVDD
VIN
C26 100uF
C27 10uF
C29 100nF
C31 10nF
C34 1nF
C35 10nF
C37 100nF
C39 10uF
5V Supply driving 3.3V LED, so
1.7V drop across resistor.
I = 20mA. R = V/I = 1.7 / 20m
= 85 Ohms. Round to higher
standard value, 100 Ohms
R22
100
D4
LTST-C194TBKT
PWR
(Blue)
Typical AVDD Rail
supply current 7.14mA.
Imax = 300mA
AVSS
+3.3V Regulated Supply
U3
LM3480-3.3
VI
VO
GND
DVDD
AVDD
Typical DVDD rail
supply current 0.5mA.
VReg Imax = 100mA
C28 100uF
C30 10uF
C32 100nF
C33 10nF
C36 1nF
C38 10nF
C40 100nF
C41 10uF
DGND
AVSS
C12 0.1uF
C14 1uF
AVDD
Right Leg Drive
Bias not used
under instruction
from Psychology
Department
C15 0.1uF
C18 1uF
C10 1uF
C17 1uF
AVDD
AVSS
AVSS
AVDD
Jump unused
analog inputs
directly to
AVDD
Conn_01x01_Male
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW_SPDT
R3 220k
R4 220k
R5 220k
R6 220k
R7 220k
R8 220k
R9 220k
R10 220k
R11 220k
IN8P
IN8N
IN7P
IN7N
IN6P
IN6N
IN5P
IN5N
IN4P
IN4N
IN3P
IN3N
IN2P
IN2N
IN1P
IN1N
AVSS
AVDD
BIASINV
BIASOUT
BIASIN
BIASREF
AVDD
VCAP3
AVDD1
AVSS1
ADC1
ADS1299-8
RESV1
RESERVED
CLKSEL
AVSS
DVDD
/DRDY
GPIO4
DOUT
GPIO2
GPIO3
SCLK
/CS
CLK
START
DIN
DGND
SRB2
SRB1
VCAP4
VREFP
NC
VREFN
NC
/PWDN
VCAP1
GPIO1
DAISY_IN
VCAP2
/RESET
DGND
DVDD
AVSS
DRDY_3V3
MISO_3V3
SCLK_3V3
CS_3V3
START_3V3
MOSI_3V3
DGND
C20 0.1uF
C21 1uF
R13 33k
R15 33k
R14 33k
DGND
DVDD
R27 100k
Pull-up CS
to VDD for
ICP
All GPIO Pins pulled to GND, unused
C1 24nF
C2 24nF
C3 24nF
C4 24nF
C5 24nF
C6 24nF
C7 24nF
C8 24nF
R12 33k
RESET_3V3
Pulled Up By Level Shifter
DGND
VREFP
VCAP1
C9 1uF
C13 10uF
C16 100uF
C19 1uF
AVSS
Using internal 4.5V Reference,
so short VREFN to AVSS
PWDN_3V3
Referred Montage: All electrodes will be referenced to reference electrode.
Negative electrode inputs are unused, set to mid-supply.
MAKE SURE CORRECT REGISTERS ARE SET IN SOFTWARE!
RC LPF: f_c = 1 / (2*pi*R*C)
R = 220kOhms
https://pdfs.semanticscholar.org/05b6/6348fc1a11726d76eb08ddddabfc4cd36f6.pdf
Lowest Sampling Frequency = 250sps, therefore Nyquist Frequency at 125Hz,
but this is still very high for EEG. Will LPF at 30Hz
30 = 1/ (2 * pi * 220k * C)
C = 1/ (2 * pi * 220k*30)
C = 24.11nF, approx 24nF --> f_c = 30.14Hz
AVSS J15
VCAP1 VCAP1_TP
DRDY_3V3 J16
DGND DRDY_TP
VREFP J14
AVSS VREFP_TP
Control and Data Lines
MOSI_3V3 MOSI
MISO_3V3 MISO
SCLK_3V3 SCLK
CS_3V3 CS
START_3V3 START
DRDY_3V3 DRDY
PWDN_3V3 PWDN
RESET_3V3 RESET
Power Connections
VIN VIN
AVSS AVSS
DGND DGND
DVDD 3V3
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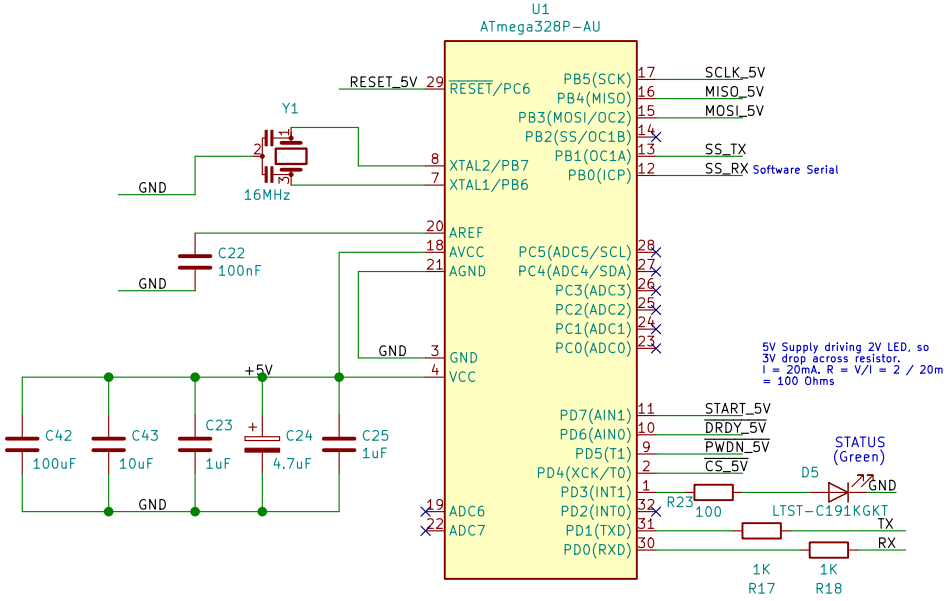
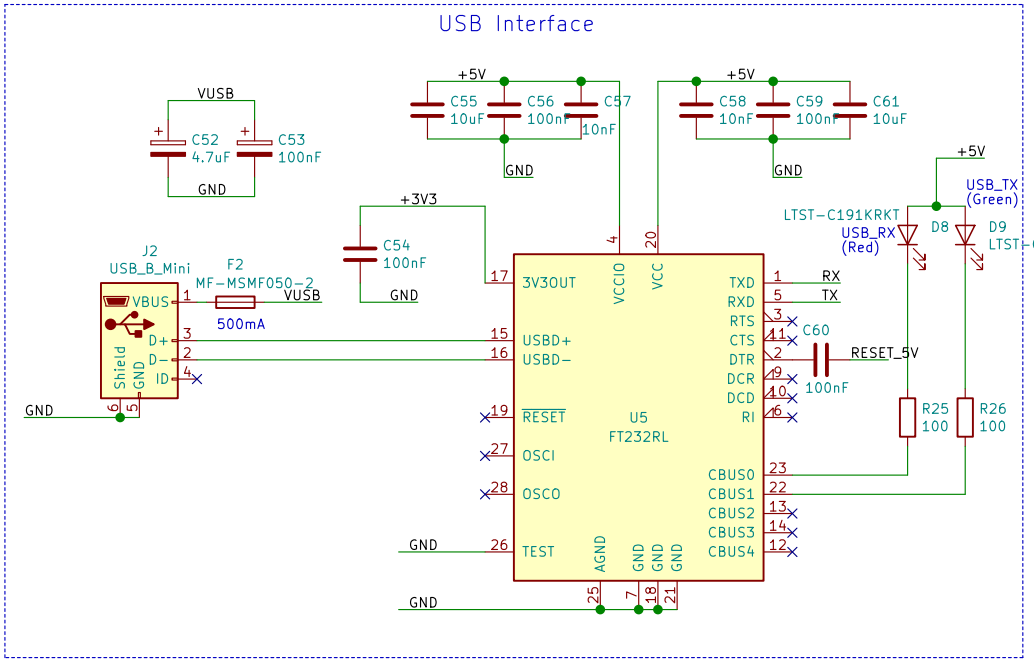
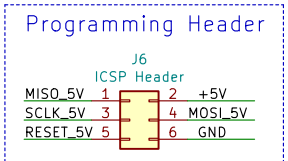
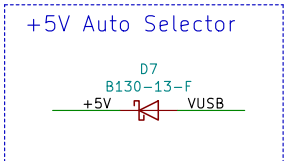
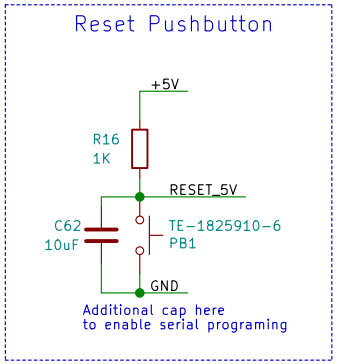
ATMega328P

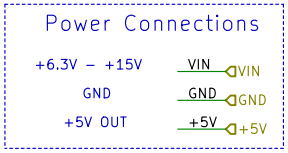


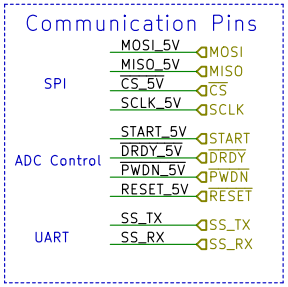


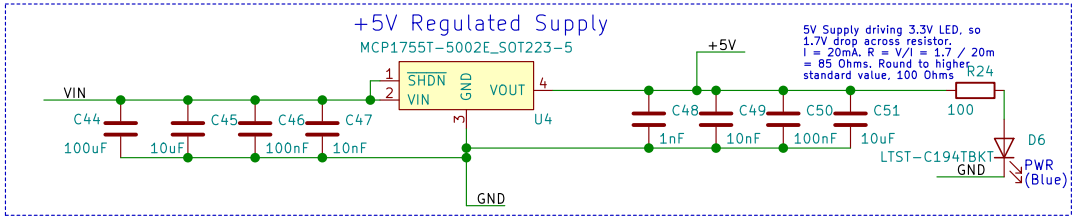












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