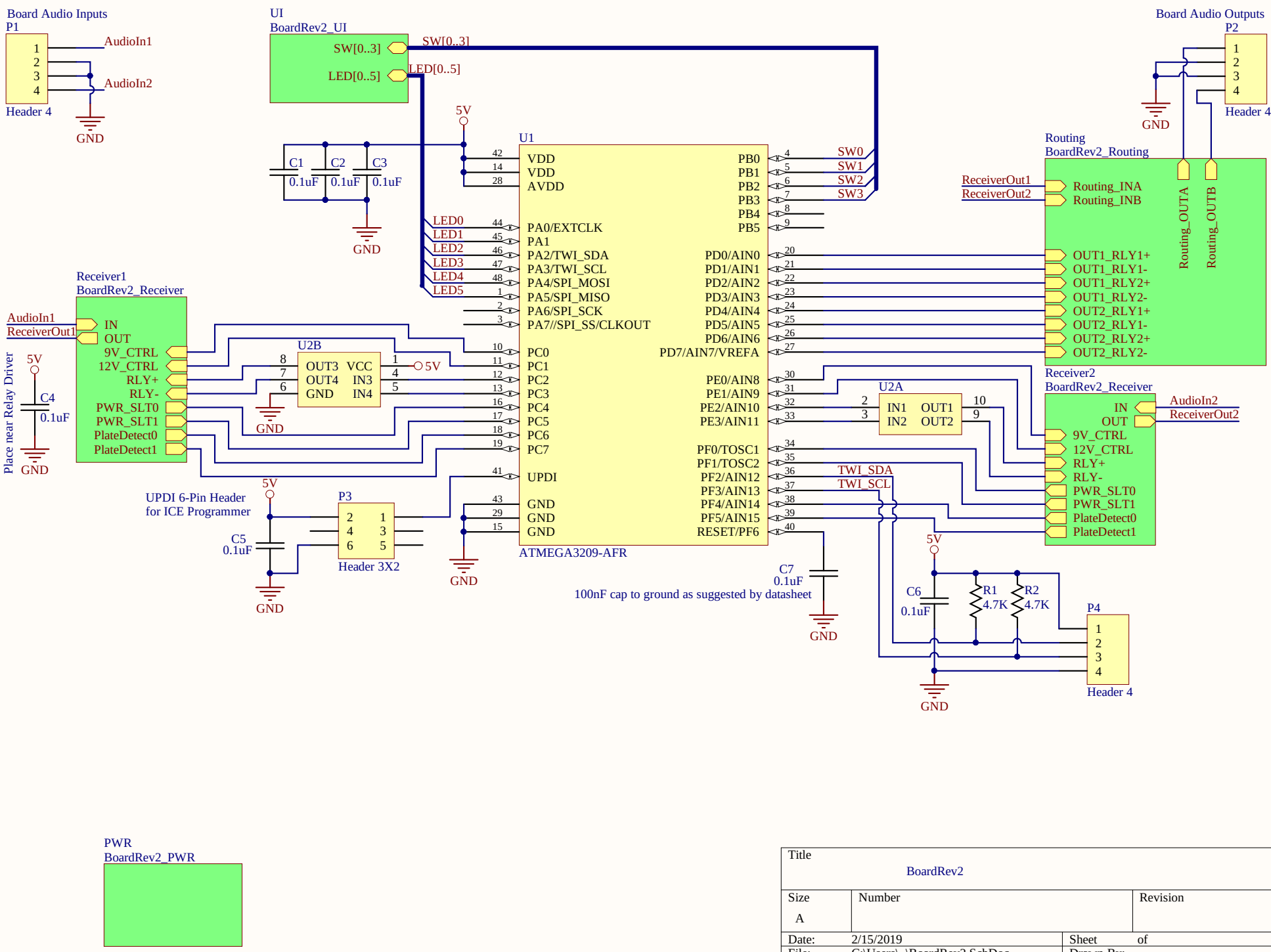
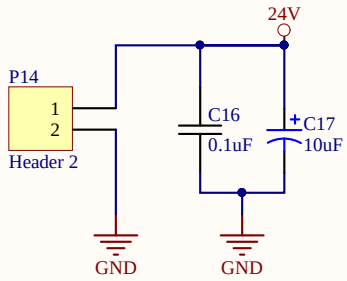
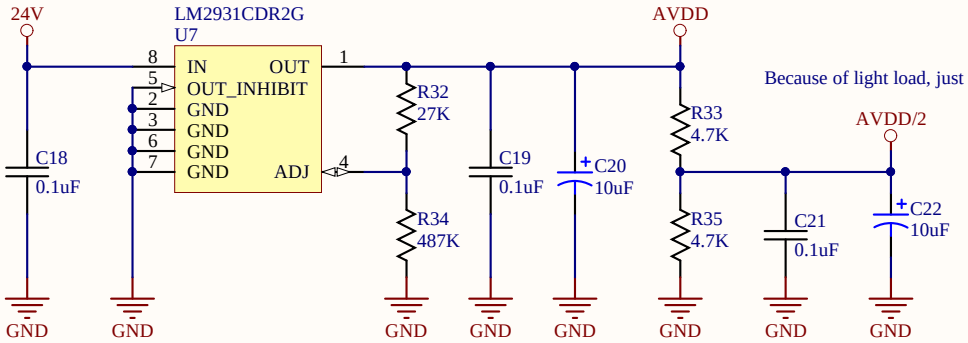
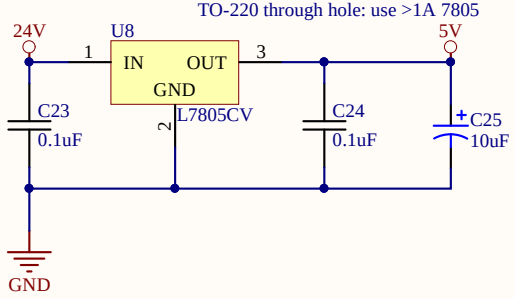

Board Audio Inputs
P1
AudioIn1
AudioIn2
Header 4
GND
UI
BoardRev2_UI
SW[0..3]
LED[0..5]
SW[0..3]
LED[0..5]
5V
U1
VDD
VDD
AVDD
PA0/EXTCLK
PA1
PA2/TWI_SDA
PA3/TWI_SCL
PA4/SPI_MOSI
PA5/SPI_MISO
PA6/SPI_SCK
PA7//SPI_SS/CLKOUT
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
UPDI
GND
GND
GND
PB0
PB1
PB2
PB3
PB4
PB5
PD0/AIN0
PD1/AIN1
PD2/AIN2
PD3/AIN3
PD4/AIN4
PD5/AIN5
PD6/AIN6
PD7/AIN7/VREFA
PE0/AIN8
PE1/AIN9
PE2/AIN10
PE3/AIN11
PF0/TOSC1
PF1/TOSC2
PF2/AIN12
PF3/AIN13
PF4/AIN14
PF5/AIN15
RESET/PF6
ATMEGA3209-AFR
SW0
SW1
SW2
SW3
LED0
LED1
LED2
LED3
LED4
LED5
TWI_SDA
TWI_SCL
C1
C2
C3
0.1uF
0.1uF
0.1uF
GND
Board Audio Outputs
P2
Header 4
GND
Routing
BoardRev2_Routing
ReceiverOut1
ReceiverOut2
Routing_INA
Routing_INB
Routing_OUTA
Routing_OUTB
OUT1_RLY1+
OUT1_RLY1-
OUT1_RLY2+
OUT1_RLY2-
OUT2_RLY1+
OUT2_RLY1-
OUT2_RLY2+
OUT2_RLY2-
Receiver1
BoardRev2_Receiver
AudioIn1
ReceiverOut1
IN
OUT
9V_CTRL
12V_CTRL
RLY+
RLY-
PWR_SLT0
PWR_SLT1
PlateDetect0
PlateDetect1
Place near Relay Driver
5V
C4
0.1uF
GND
U2B
OUT3
OUT4
GND
VCC
IN3
IN4
5V
GND
U2A
IN1
IN2
OUT1
OUT2
Receiver2
BoardRev2_Receiver
AudioIn2
ReceiverOut2
IN
OUT
9V_CTRL
12V_CTRL
RLY+
RLY-
PWR_SLT0
PWR_SLT1
PlateDetect0
PlateDetect1
UPDI 6-Pin Header
for ICE Programmer
P3
Header 3X2
5V
C5
0.1uF
GND
C7
0.1uF
GND
100nF cap to ground as suggested by datasheet
5V
C6
0.1uF
R1
4.7K
R2
4.7K
P4
Header 4
GND
PWR
BoardRev2_PWR
Title
BoardRev2
Size
A
Number
Revision
Date:
2/15/2019
Sheet
of
File:
C:\Users\..\BoardRev2.SchDoc
Drawn By:

Global 24V input
Place Common Mode Choke on 24V input to take care of switching noise from power supply





Local 5V supply for receiver and routing relays, uC, LEDs
TO-220 through hole: use >1A 7805



Title: BoardRev2_PWR		
Size: A	Number:	Revision:
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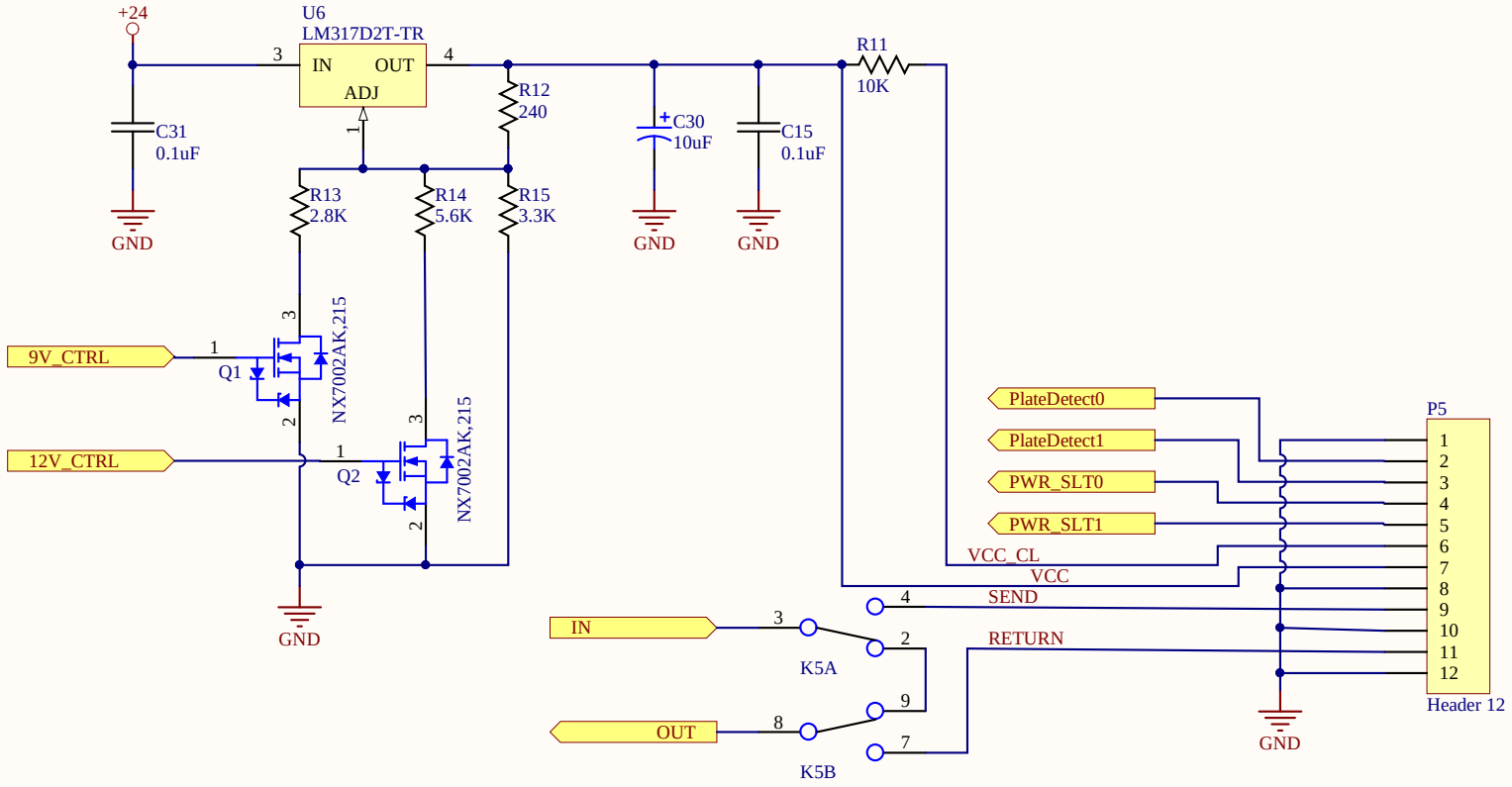
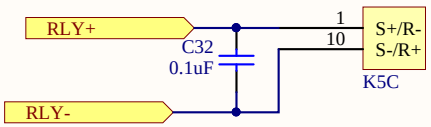
File: C:\Users\..\BoardRev2_PWR.SchDoc		Drawn By:

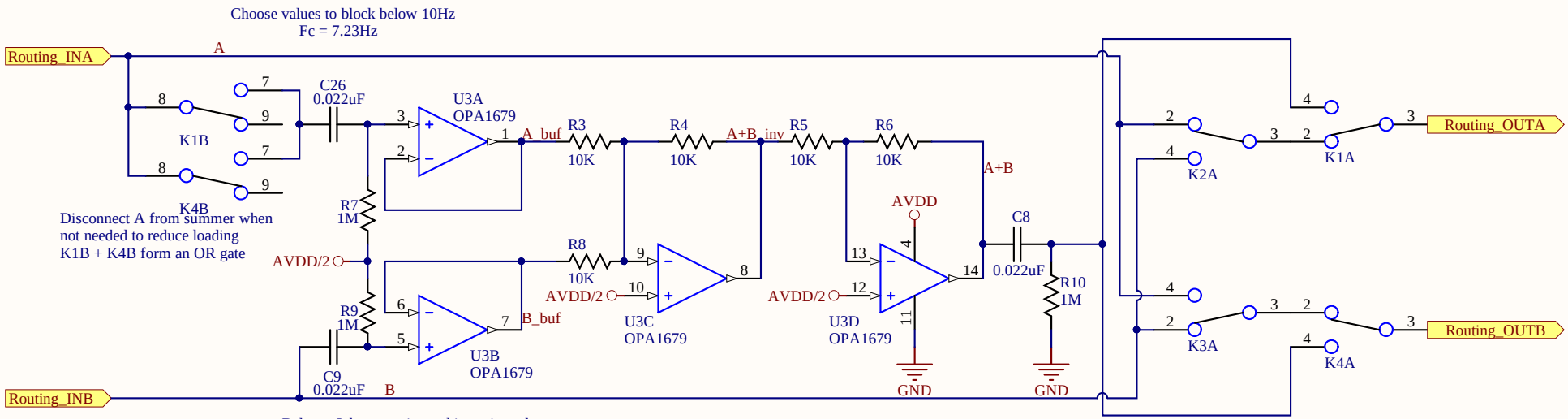
Adjustable Voltage Regulator



Relay driver on main page
to take advantage of dual driver

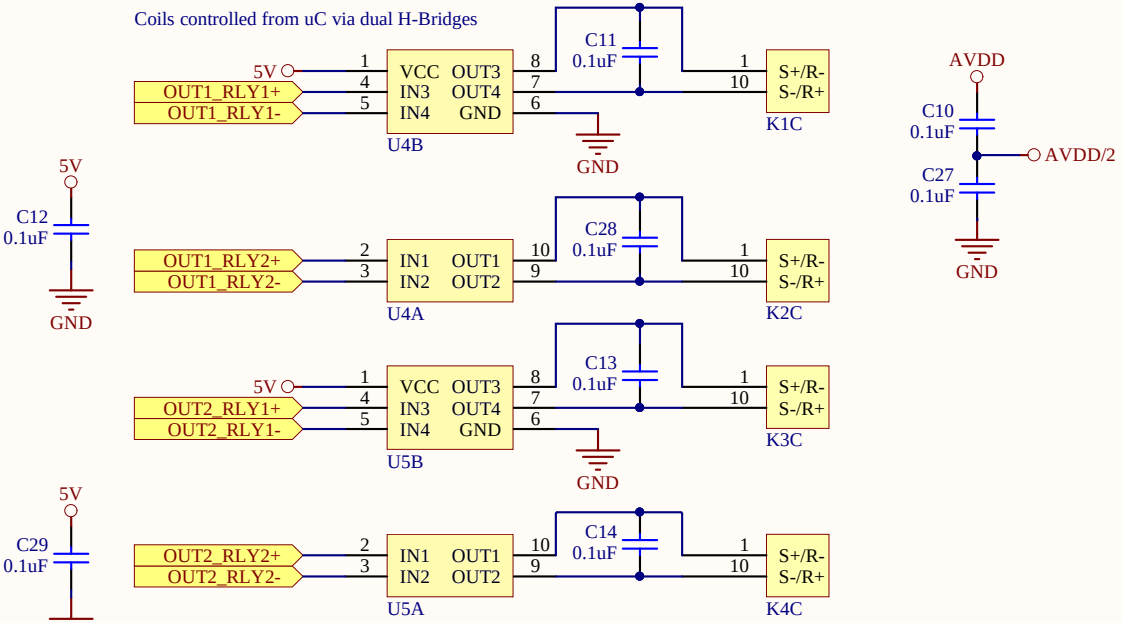


Title: BoardRev2_Receiver		
Size: A	Number:	Revision:
Date: 2/15/2019		Sheet of
File: C:\Users\..\BoardRev2_Receiver.SchDoc		Drawn By:

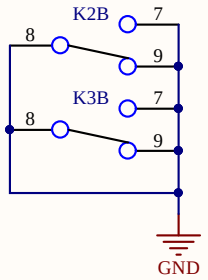


Balance Johnson noise and input impedance
Audio Capacitors must be plastic film (through hole 0.2" pitch)

OUTA	OUTB	K1	K2	K3	K4	Disconnect sum
A	A	0	0	1	0	1
A	B	0	0	0	0	1
A	A+B	0	0	X	1	0
B	A	0	1	1	0	1
B	B	0	1	0	0	1
B	A+B	0	1	X	1	0
A+B	A	1	X	1	0	0
A+B	B	1	X	0	0	0
A+B	A+B	1	X	X	1	0



Ground unused relay contacts



Put footprint for capacitor in parallel to relay switching signal
to provide path for current to discharge (may introduce oscillations)
depop at first

Title: BoardRev2_Routing		
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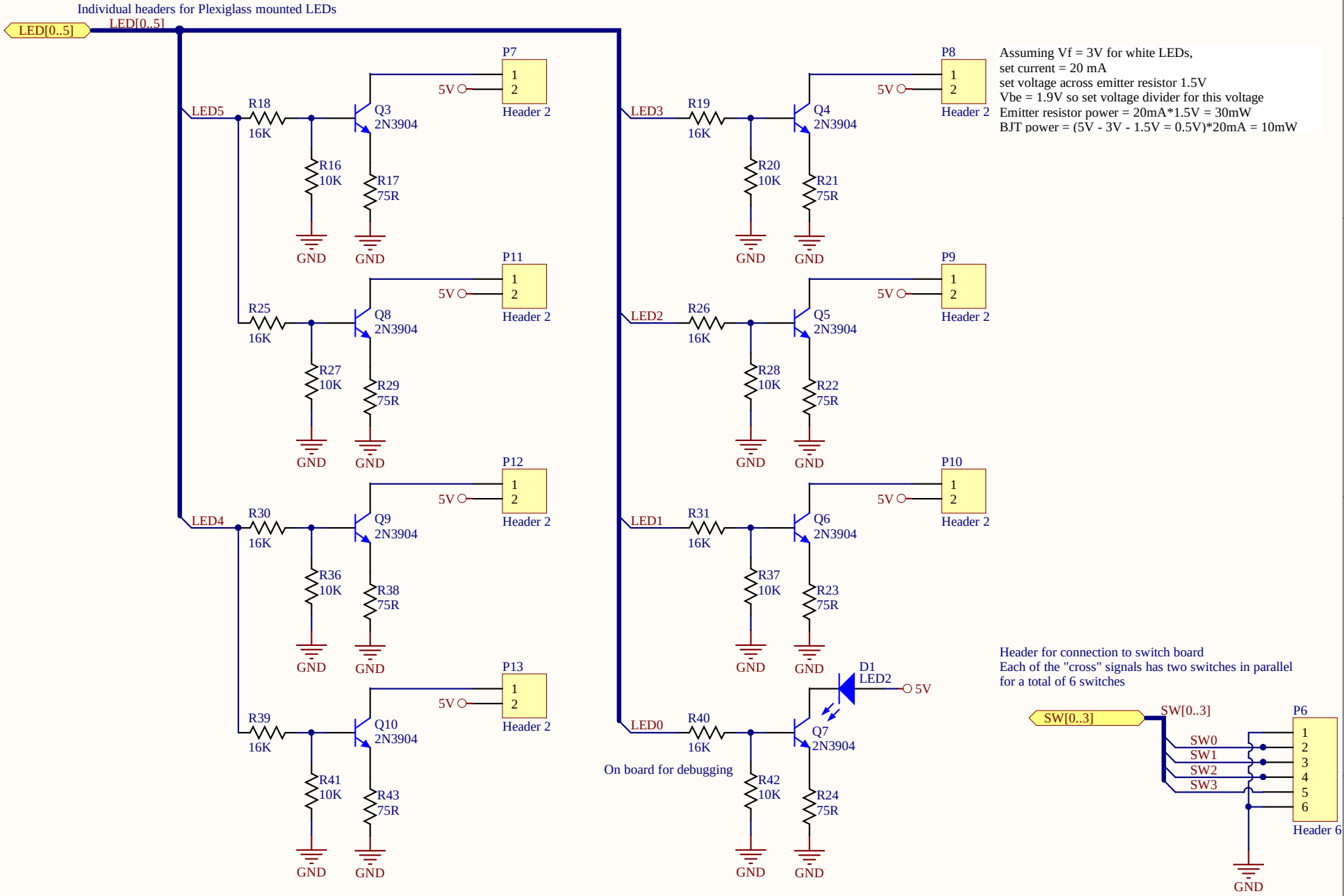
Individual headers for Plexiglass mounted LEDs
LED[0..5]
LED[0..5]
LED5
LED4
LED3
LED2
LED1
LED0
R18
16K
R25
16K
R30
16K
R39
16K
R19
16K
R26
16K
R31
16K
R40
16K
R16
10K
R17
75R
R27
10K
R29
75R
R36
10K
R38
75R
R41
10K
R43
75R
R20
10K
R21
75R
R28
10K
R22
75R
R37
10K
R23
75R
R42
10K
R24
75R
Q3
2N3904
Q8
2N3904
Q9
2N3904
Q10
2N3904
Q4
2N3904
Q5
2N3904
Q6
2N3904
Q7
2N3904
P7
P11
P12
P13
P8
P9
P10
Header 2
5V
GND
D1
LED2
On board for debugging
Assuming Vf = 3V for white LEDs,
set current = 20 mA
set voltage across emitter resistor 1.5V
Vbe = 1.9V so set voltage divider for this voltage
Emitter resistor power = 20mA*1.5V = 30mW
BJT power = (5V - 3V - 1.5V = 0.5V)*20mA = 10mW
Header for connection to switch board
Each of the "cross" signals has two switches in parallel
for a total of 6 switches
SW[0..3]
SW0
SW1
SW2
SW3
P6
Header 6
Title
BoardRev2_UI
Size
A
Number
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File:
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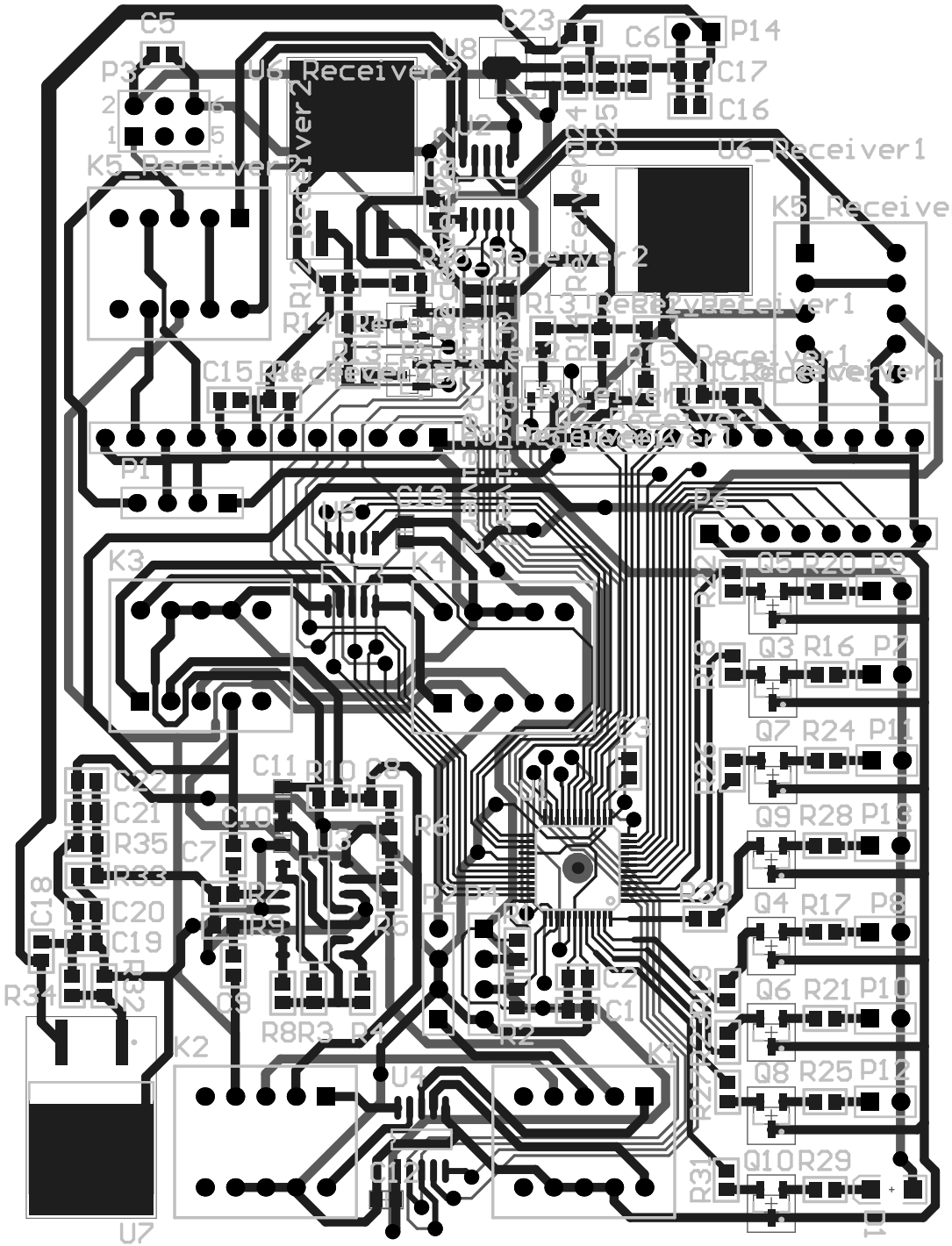
Drawn By:


C5
C23
C6
P14
C17
C16
U6_Receiver2
U8
U2
U6_Receiver1
K5_Receiver2
K5_Receiver1
P1
P6
K3
K4
Q5 R20 P9
Q3 R16 P7
Q7 R24 P11
Q9 R28 P13
Q4 R17 P8
Q6 R21 P10
Q8 R25 P12
Q10 R29
C11 R10 C8
C22
C21
R35
C7
C18
C20
C19
R34
C9
R8 R3
K2
U4
U7