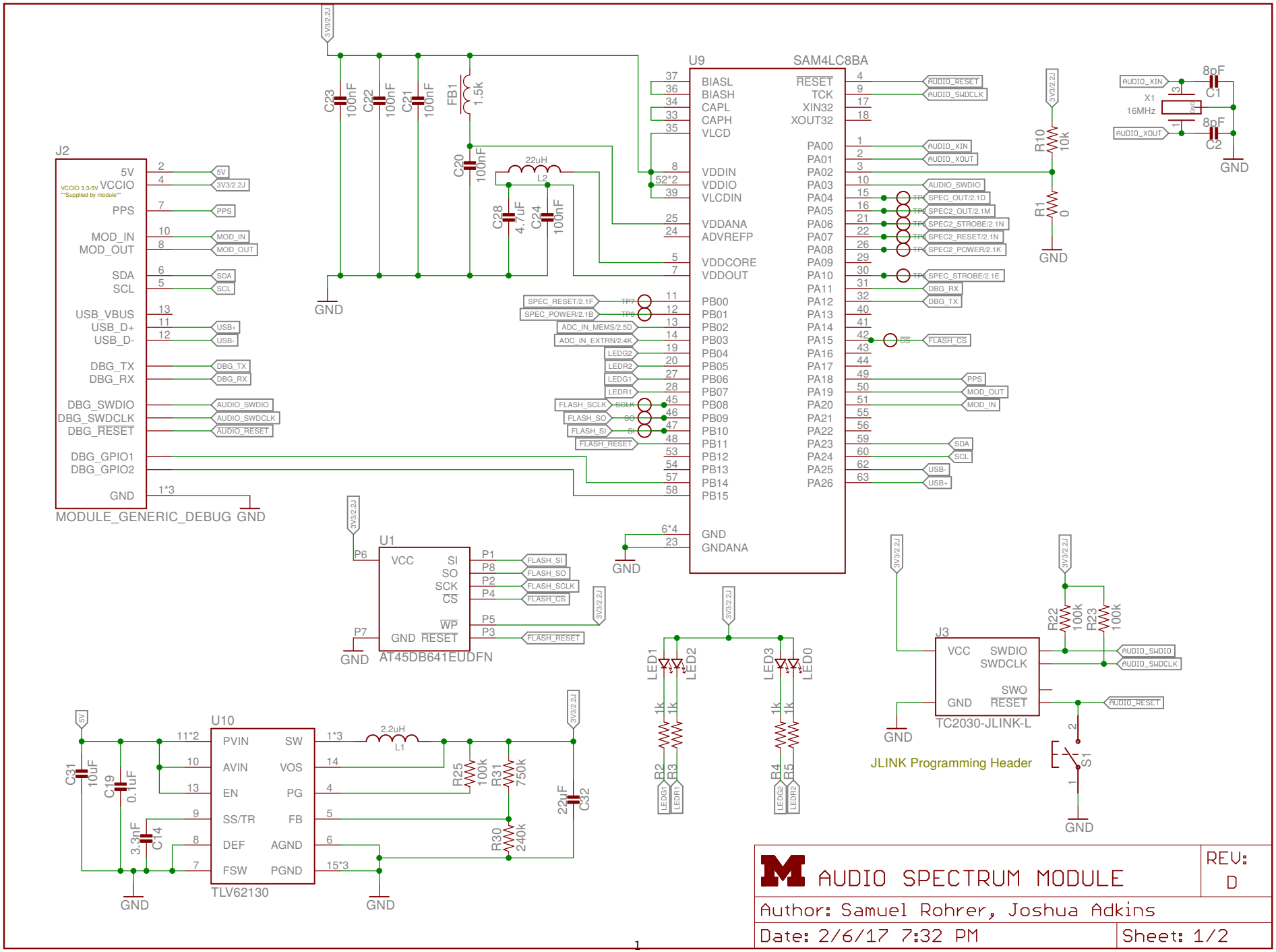
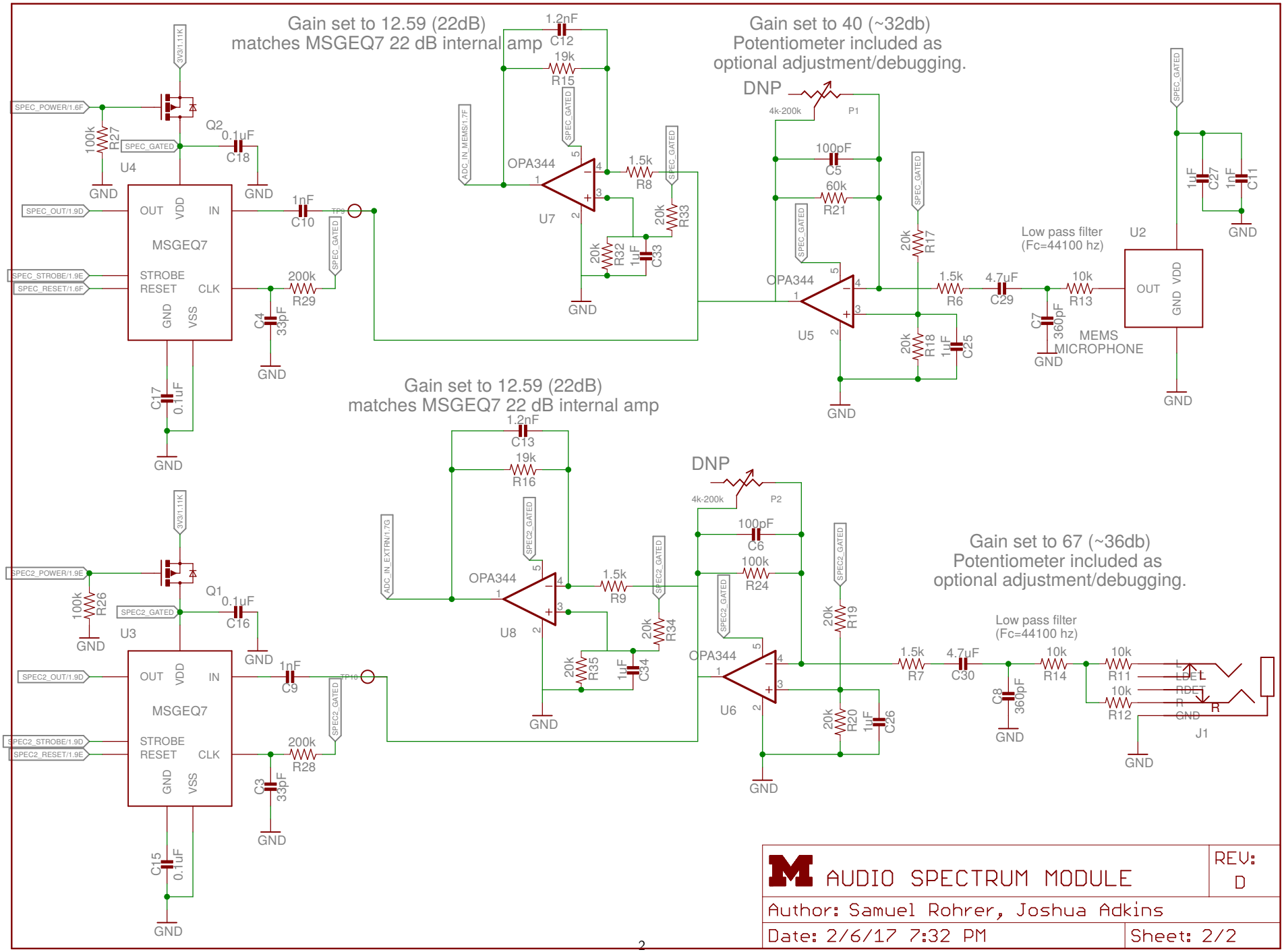
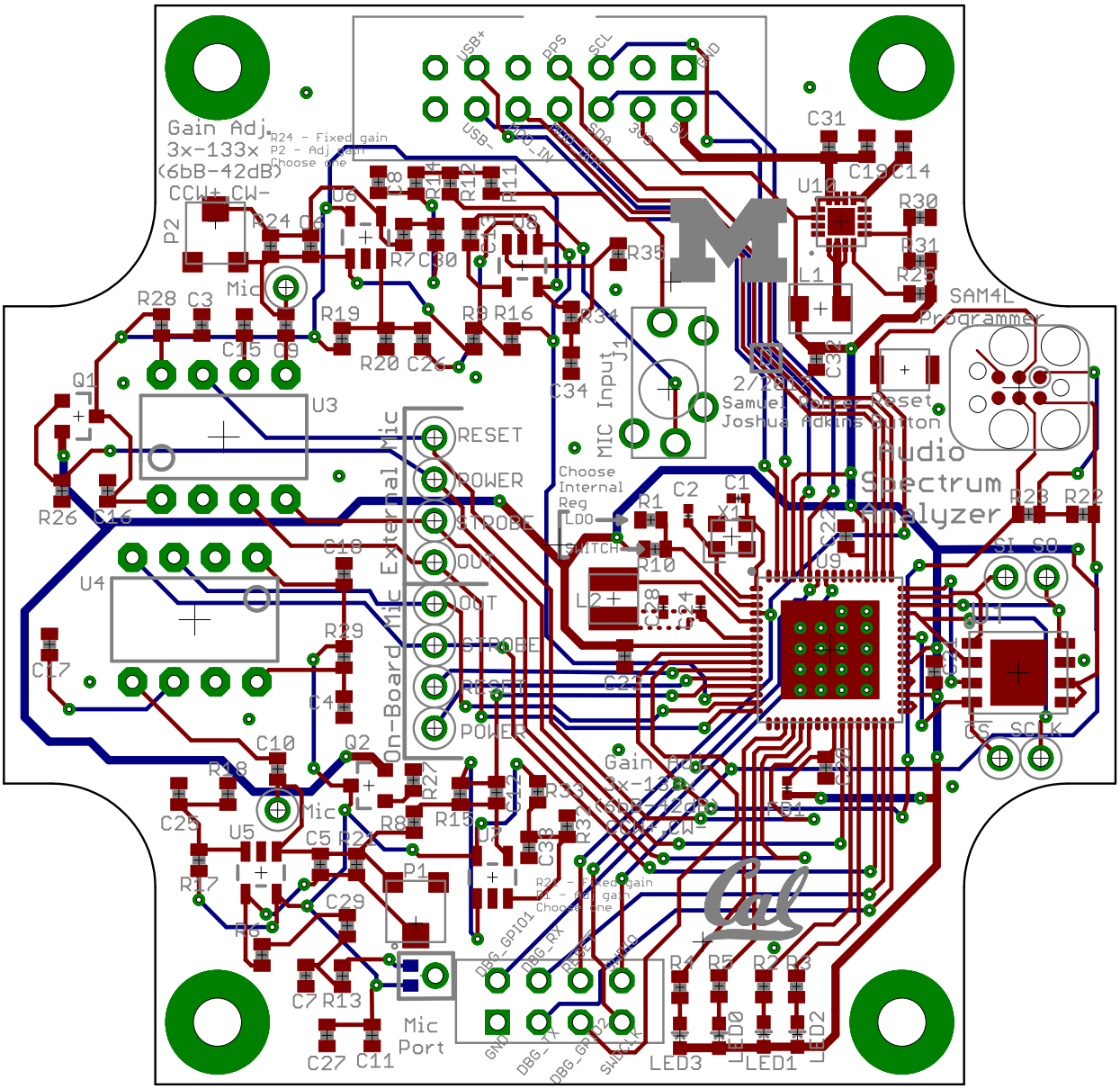
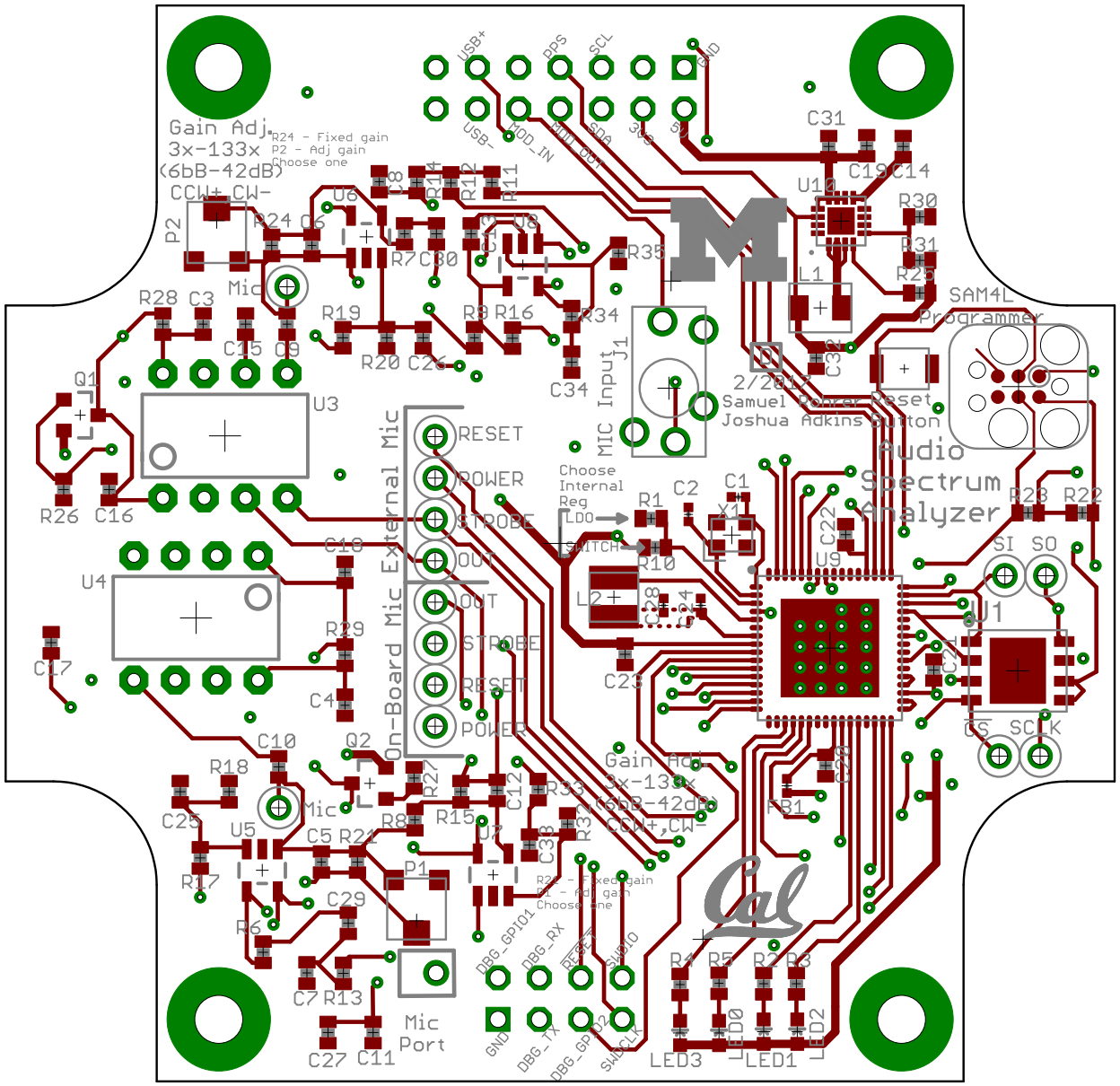

U9
SAM4LC8BA
J2
MODULE_GENERIC_DEBUG
U1
AT45DB641EUDFN
U10
TLV62130
J3
TC2030-JLINK-L
JLINK Programming Header
AUDIO SPECTRUM MODULE
REV: D
Author: Samuel Rohrer, Joshua Adkins
Date: 2/6/17 7:32 PM
Sheet: 1/2

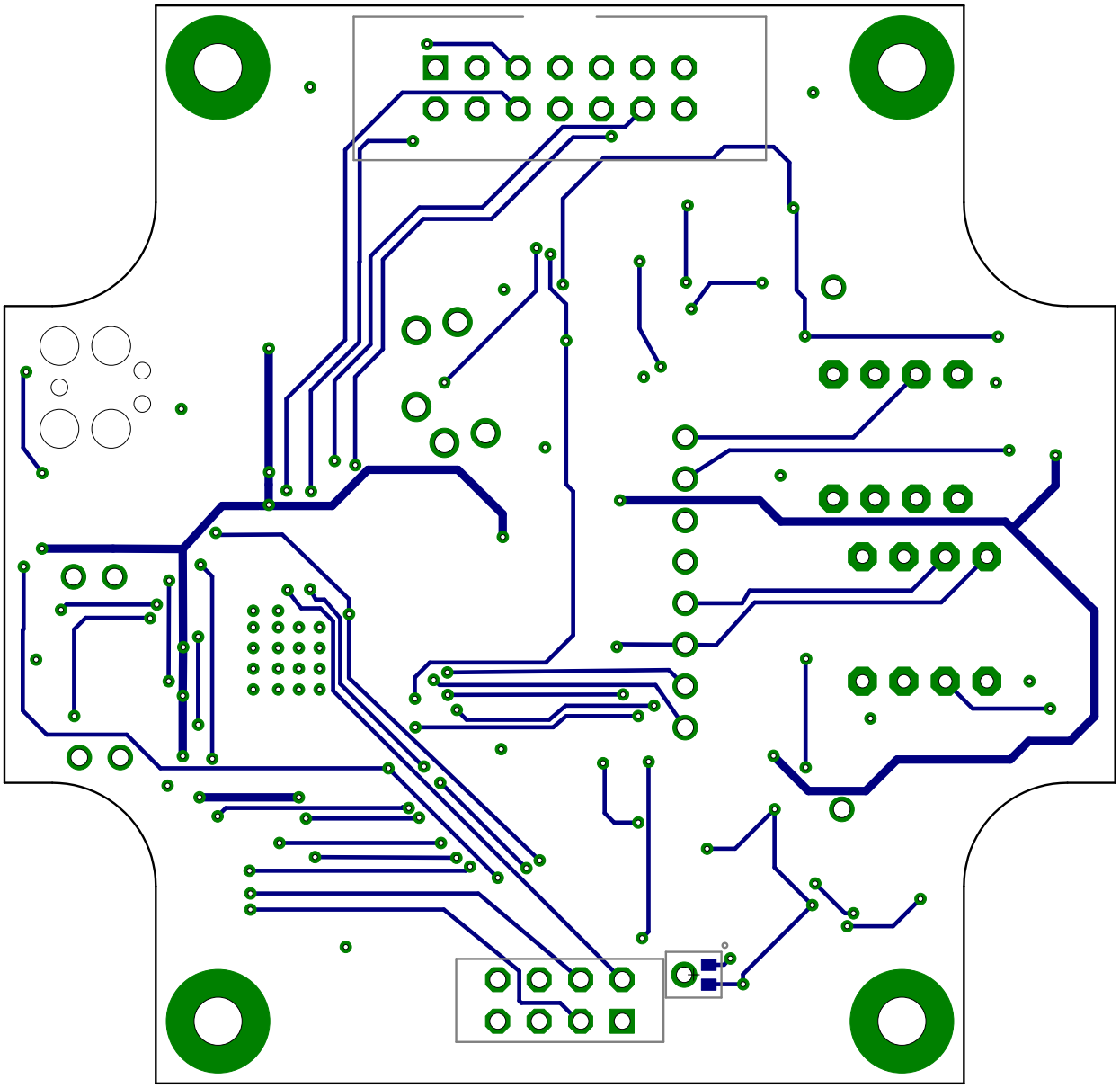

Gain set to 12.59 (22dB)
matches MSGEQ7 22 dB internal amp
Gain set to 40 (~32db)
Potentiometer included as
optional adjustment/debugging.
DNP
Gain set to 12.59 (22dB)
matches MSGEQ7 22 dB internal amp
DNP
Gain set to 67 (~36db)
Potentiometer included as
optional adjustment/debugging.
Low pass filter
(Fc=44100 hz)
Low pass filter
(Fc=44100 hz)
MEMS
MICROPHONE
MSGEQ7
OPA344
AUDIO SPECTRUM MODULE
REV:
D
Author: Samuel Rohrer, Joshua Adkins
Date: 2/6/17 7:32 PM
Sheet: 2/2

Top and Bottom Layers

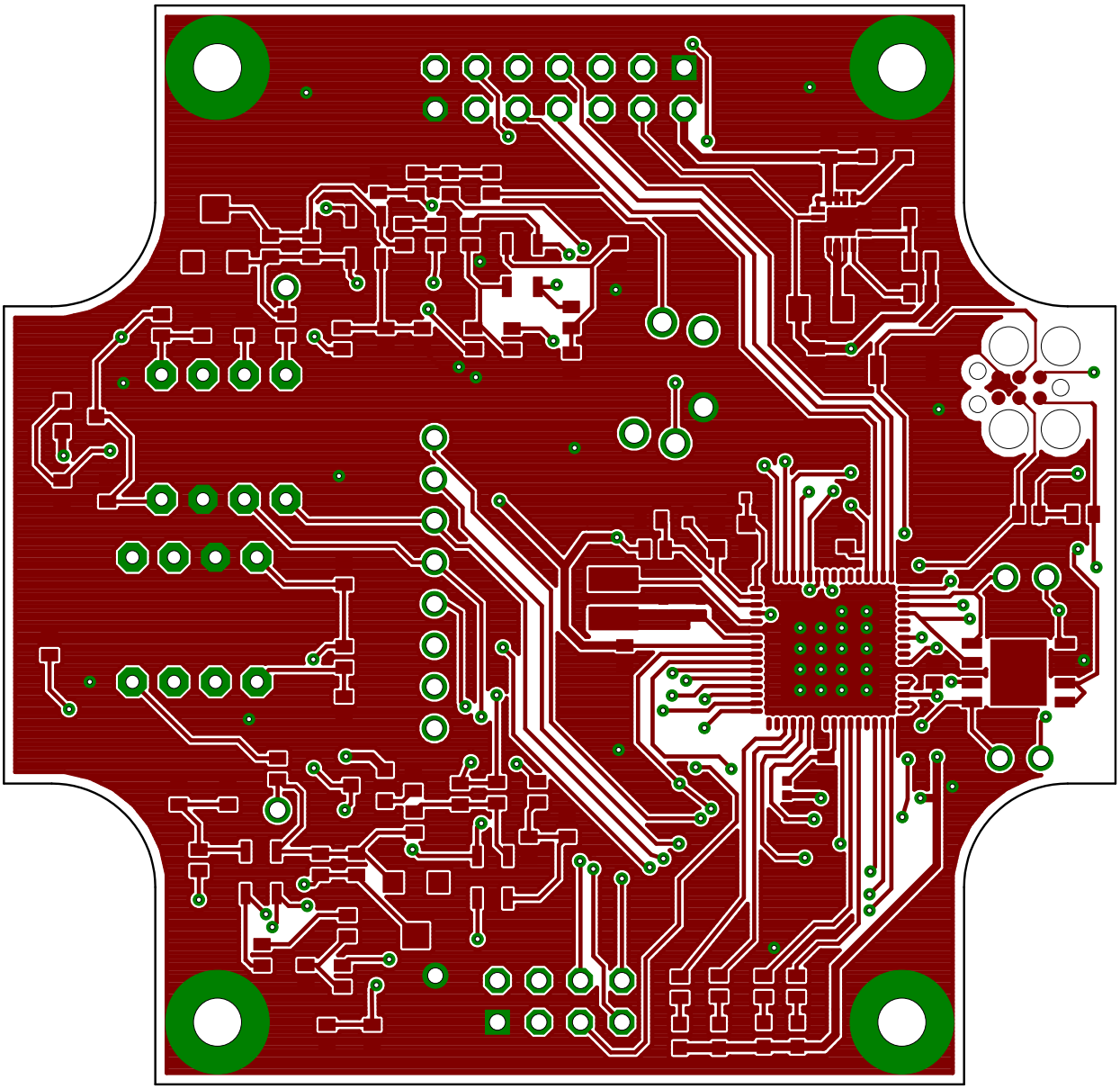



Gain Adj.
3x-133x
(6bB-42dB)
CCW+ CW-
R24 - Fixed gain
P2 - Adj gain
Choose one
On-Board Mic
External Mic
RESET
POWER
STROBE
OUT
OUT
STROBE
RESET
POWER
MIC Input
J1
Choose
Internal
Reg
LDO
SWITCH
2/2017
Samuel Bowyer
Joshua Adkins
Dalton
Audio
Spectrum
Analyzer
SAM4L
Programmer
Reset
Mic
Port
LED0
LED1
LED2
LED3
SI
SO
SCLK
CS
USB+
USB-
PPS
SCL
SDA
3V3
GND
MOD_IN
MOD_OUT
DBG_GPIO1
DBG_RX
DBG_TX
DBG_GPIO2
SWDIO
SWCLK

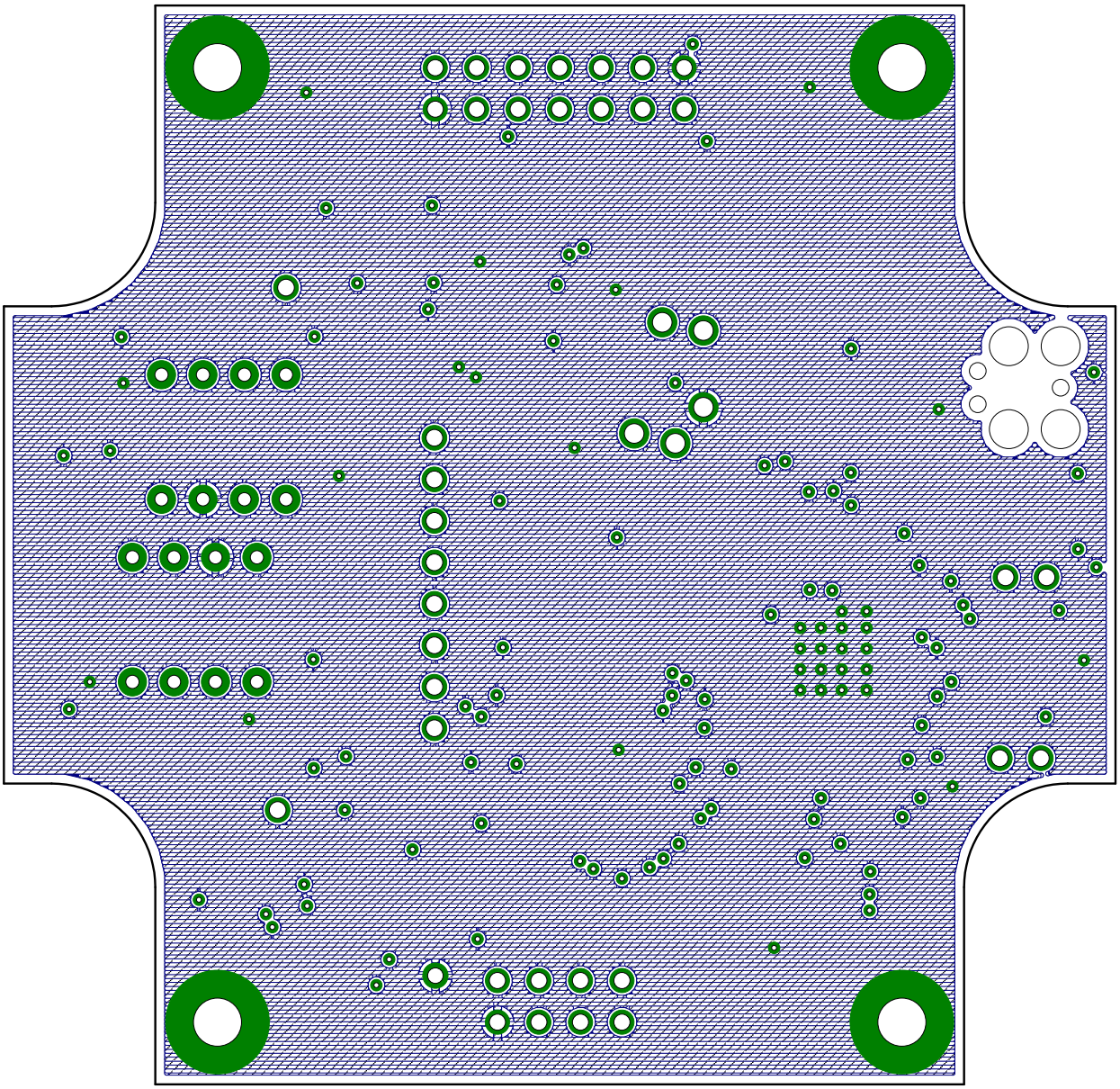
Bottom Layer



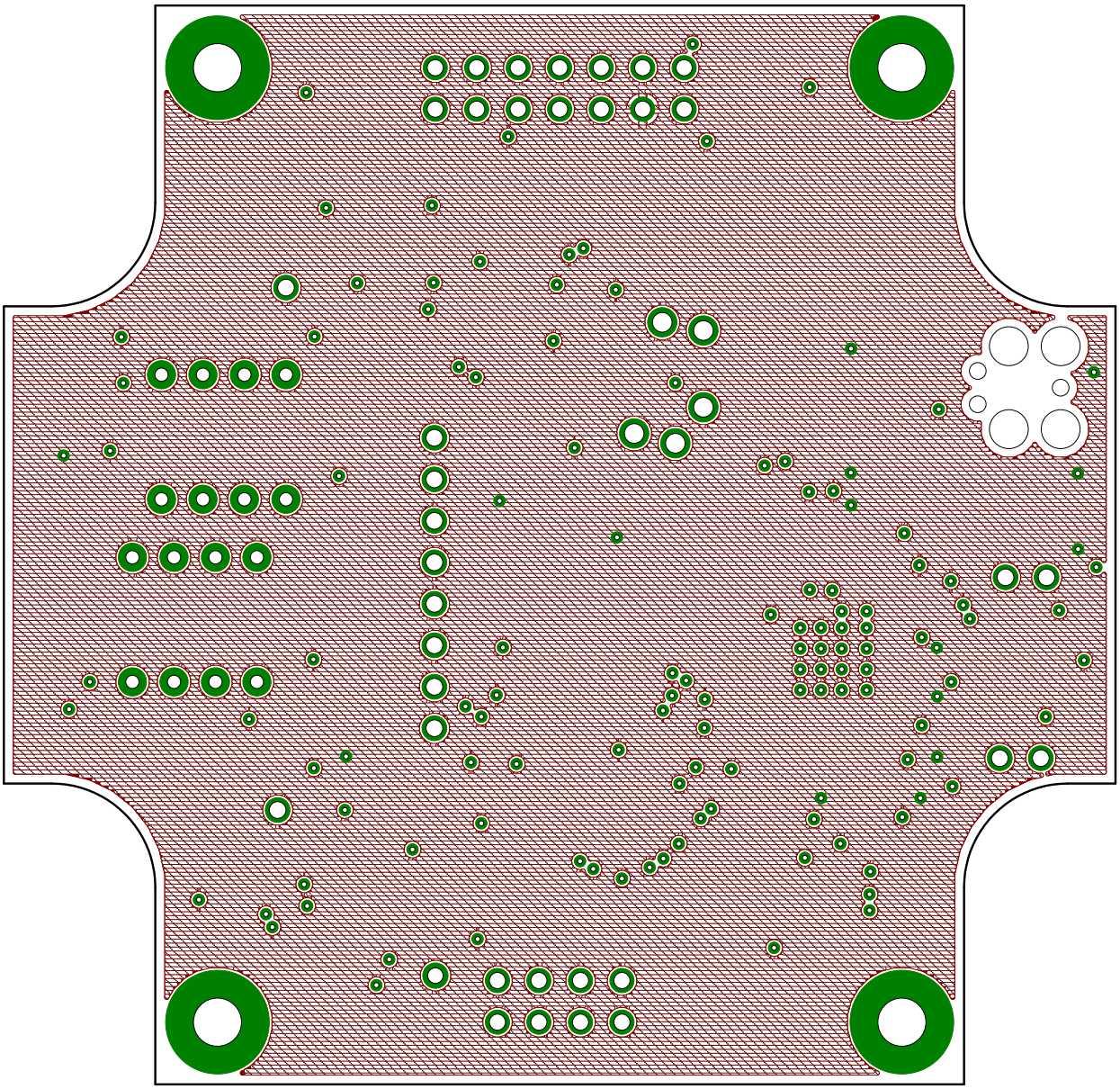
Top Copper Layer



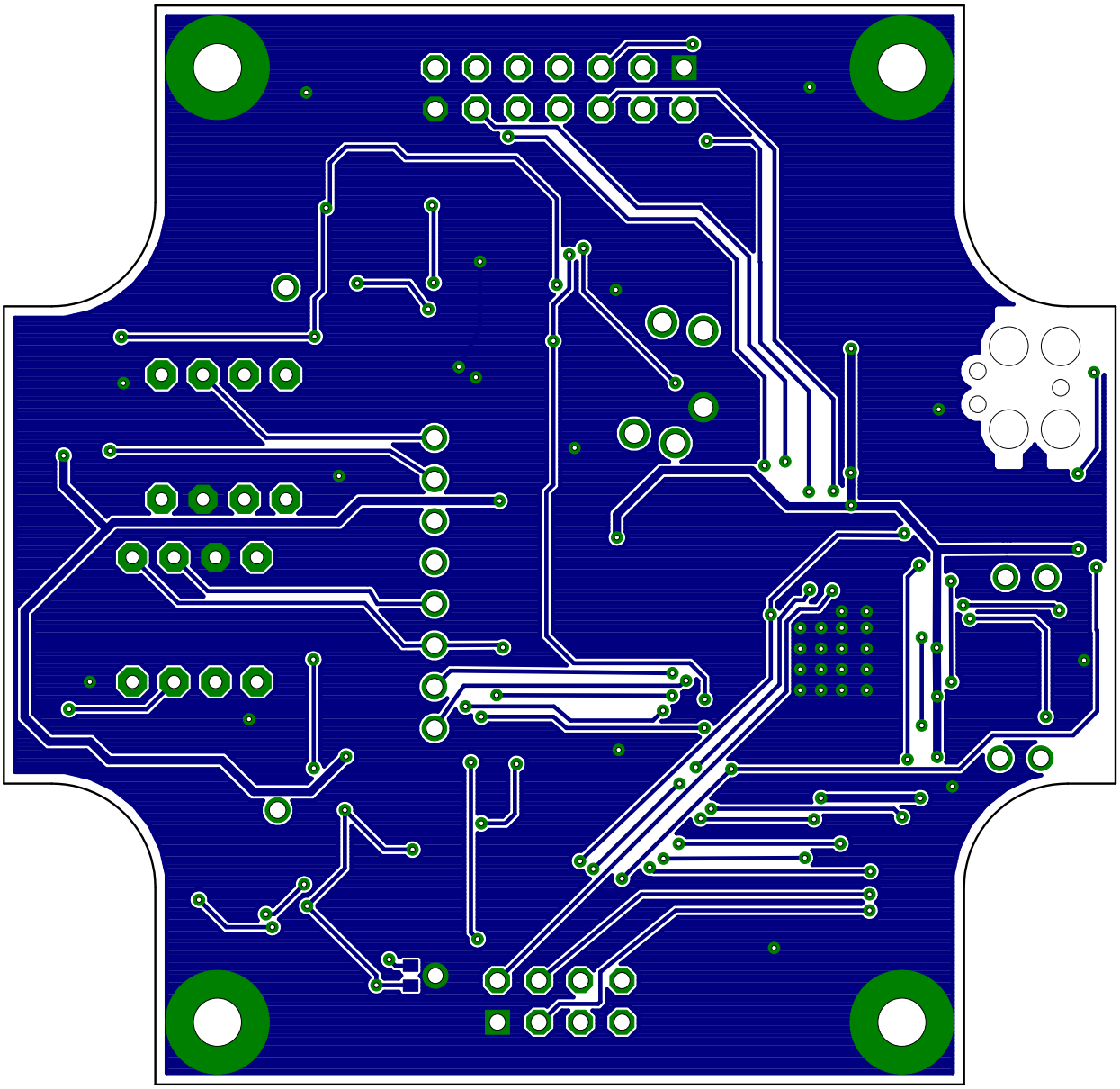
Layer 2 Copper

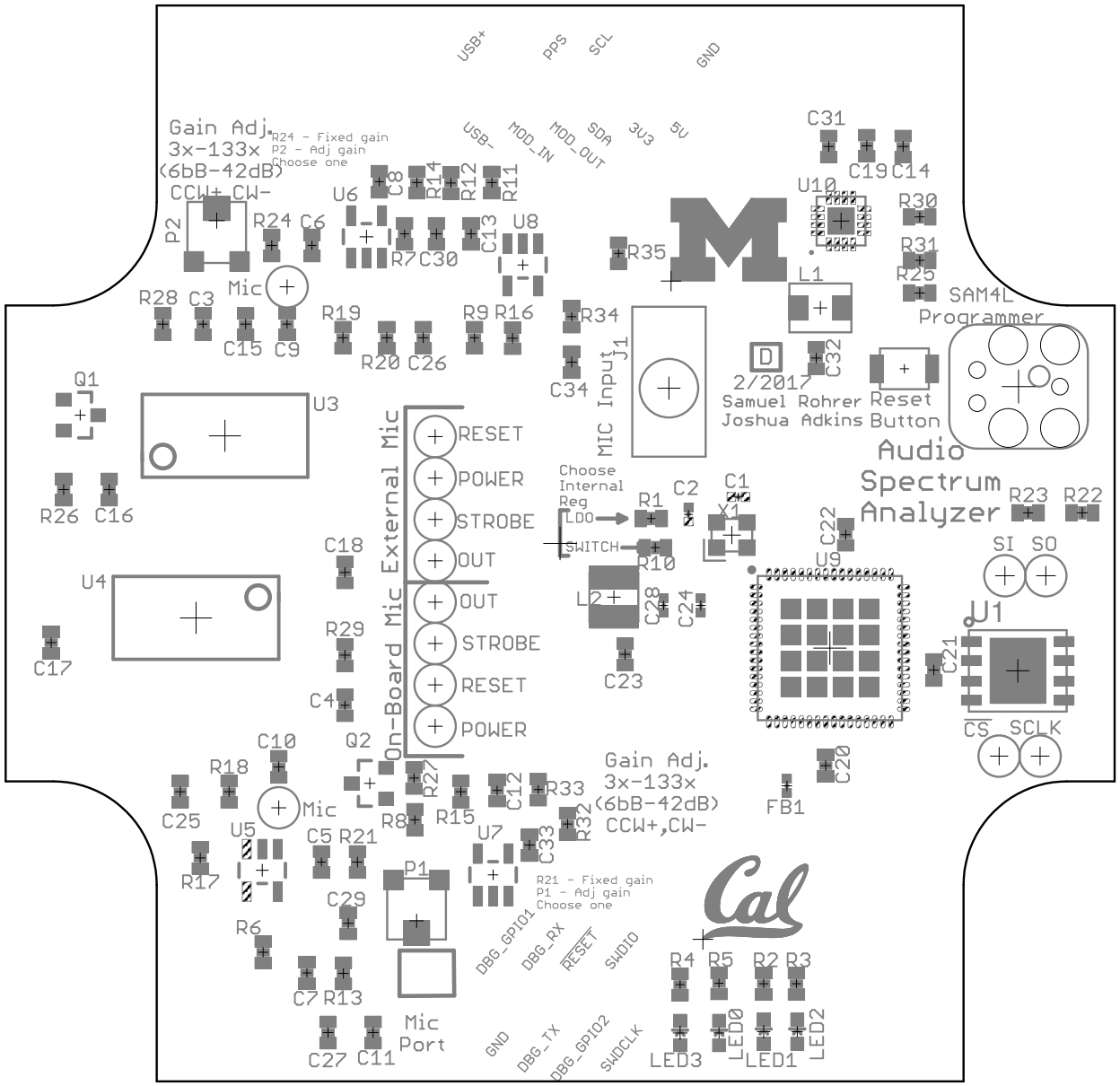


Layer 3 Copper

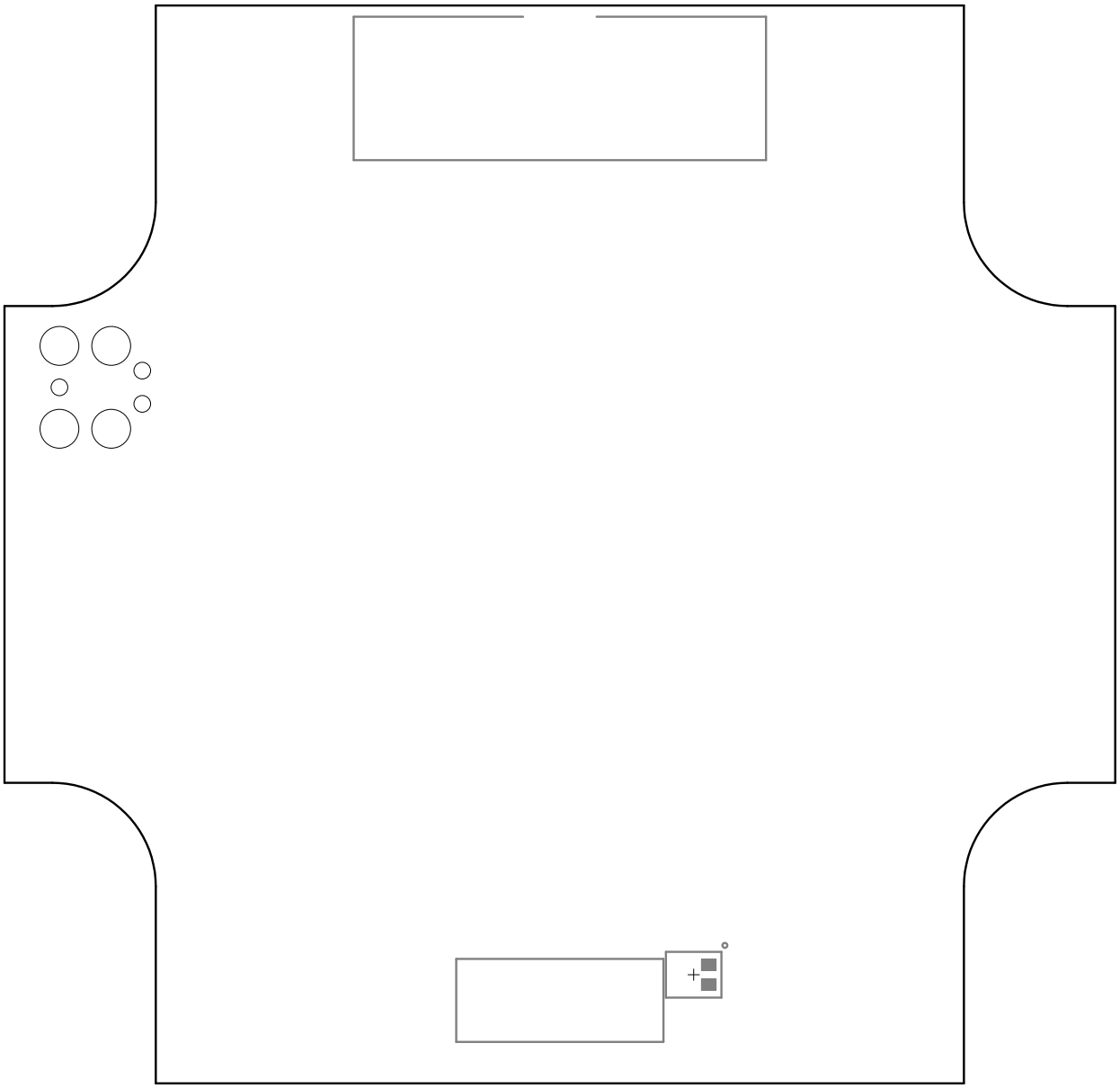


Bottom Copper Layer

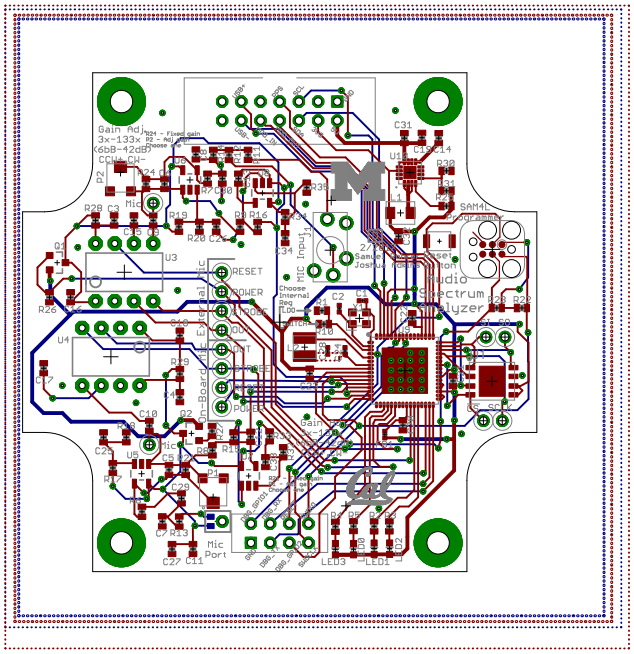



USB+
PPS
SCL
GND
USB-
MOD_IN
MOD_OUT
SDA
3V3
5V
Gain Adj.
3x-133x
(6bB-42dB)
CCW+ CW-
R24 - Fixed gain
P2 - Adj gain
Choose one
P2
R24
C6
U6
C8
R14
R12
R11
R7
C30
C13
U8
R35
C31
C19
C14
U10
R30
R31
R25
L1
SAM4L
Programmer
Mic
R28
C3
C15
C9
R19
R20
C26
R9
R16
R34
C34
J1
MIC Input
D
2/2017
Samuel Rohrer
Joshua Adkins
C32
Reset
Button
Audio
Spectrum
Analyzer
Q1
U3
R26
C16
U4
C17
C18
R29
C4
Choose
Internal
Reg
LDO
SWITCH
R1
C2
C1
X1
R10
L2
C28
C24
C23
U9
C22
R23
R22
SI
SO
U1
C21
CS
SCLK
C20
FB1
On-Board Mic
External Mic
RESET
POWER
STROBE
OUT
OUT
STROBE
RESET
POWER
C10
R18
Mic
C25
Q2
R27
R8
R15
C12
R33
R32
C33
U7
Gain Adj.
3x-133x
(6bB-42dB)
CCW+,CW-
U5
R17
C5
R21
P1
C29
R6
C7
R13
C27
C11
Mic
Port
R21 - Fixed gain
P1 - Adj gain
Choose one
DBG_GPIO1
DBG_RX
RESET
SWDIO
GND
DBG_TX
DBG_GPIO2
SWDCLK
R4
R5
R2
R3
LED3
LED0
LED1
LED2

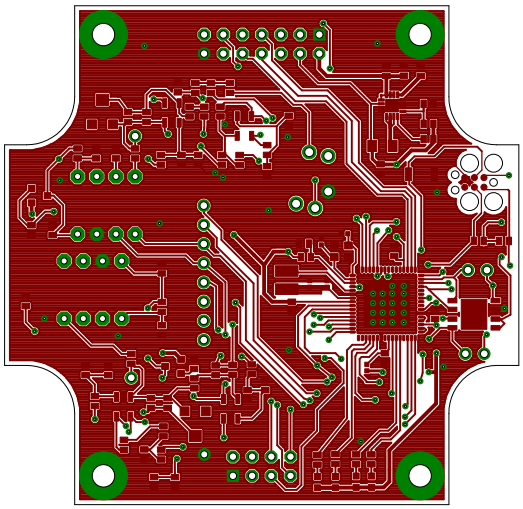
Bottom Paste Layer with Silkscreen



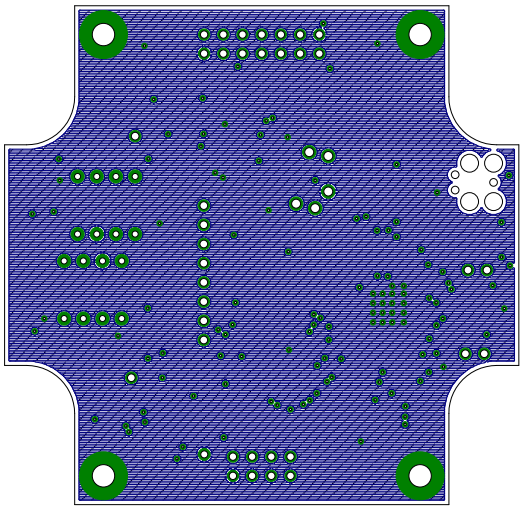
Top and Bottom Layers 1:1 Scale



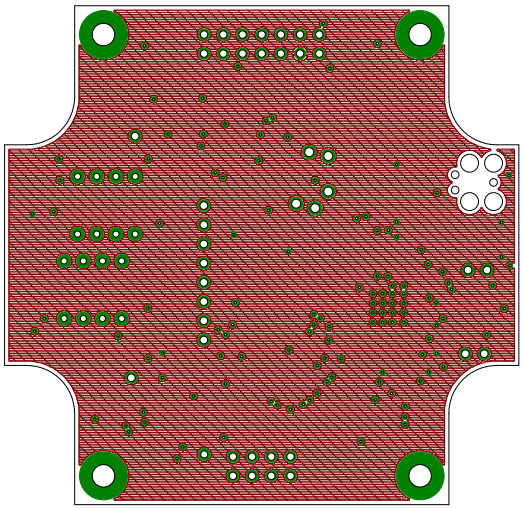
Top Layer 1:1 Scale



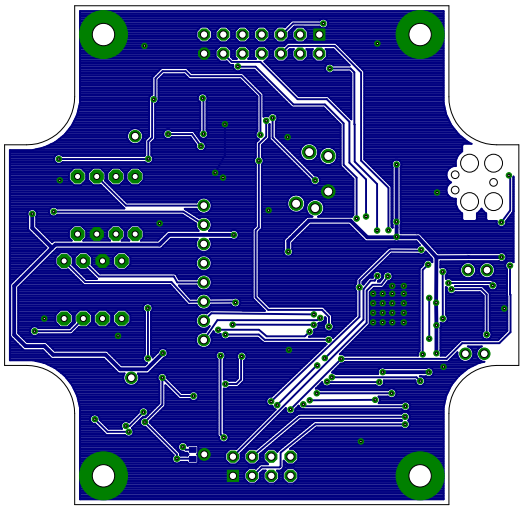
Layer 2 Copper 1:1 Scale



Layer 3 Copper 1:1 Scale



Bottom Copper Layer 1:1 Scale



# audio_spectrum_bom

| Qty | Value | Device | Package | |
|---|---|---|---|---|
| 2 | 8pF | CAPACITOR0402_CAP | 0402_CAP | |
| 2 | 1.2nF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 3.3nF | CAPACITOR0603_CAP | 0603_CAP | |
| 5 | 0.1uF | CAPACITOR0603_CAP | 0603_CAP | |
| 4 | 100nF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 100nF | CAPACITOR0402_CAP | 0402_CAP | |
| 5 | 1uF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 4.7uF | CAPACITOR0402_CAP | 0402_CAP | |
| 2 | 4.7uF | CAPACITOR0603_CAP | 0603_CAP | |
| 2 | 33pF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 10uF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 22uF | CAPACITOR0603_CAP | 0603_CAP | |
| 2 | 100pF | CAPACITOR0603_CAP | 0603_CAP | |
| 2 | 360pF | CAPACITOR0603_CAP | 0603_CAP | |
| 3 | 1nF | CAPACITOR0603_CAP | 0603_CAP | |
| 1 | 1.5k | FERRITE_BEAD0402 | 0402_CAP | |
| 1 | AUDIO-JACK-VERTICAL | AUDIO-JACK-VERTICAL | AUDIO-JACK-VERTICAL | |
| 1 | MODULE_GENERIC_DEBUG | MODULE_GENERIC_DEBUG | MODULE_GENERIC_DEBUG | |
| 1 | TC2030-JLINK-L | TC2030-JLINK-L | TC2030-IDC | |
| 1 | 2.2uH | INDUCTORIHL | IHL-1212BZ-11 | |
| 1 | 22uH | LHQ3NP | | 1212 |
| 2 | LED0603 | LED0603 | LED-0603 | |
| 2 | LED0603 | LED0603 | LED-0603 | |
| 2 | 4k-200k | POTTC33X | TC33X-2 | |
| 2 | NX3008PBK | NX3008PBK | SOT23-3 | |
| 1 | 0 | RESISTOR0603_RES | 0603-RES | |
| 4 | 10k | RESISTOR0603_RES | 0603-RES | |
| 1 | 10k | RESISTOR0603_RES | 0603-RES | |
| 2 | 19k | RESISTOR0603_RES | 0603-RES | |
| 8 | 20k | RESISTOR0603_RES | 0603-RES | |
| 1 | 1k | RESISTOR0603_RES | 0603-RES | |
| 1 | 60k | RESISTOR0603_RES | 0603-RES | |
| 6 | 100k | RESISTOR0603_RES | 0603-RES | |
| 2 | 200k | RESISTOR0603_RES | 0603-RES | |
| 3 | 1k | RESISTOR0603_RES | 0603-RES | |
| 1 | 240k | RESISTOR0603_RES | 0603-RES | |
| 1 | 750k | RESISTOR0603_RES | 0603-RES | |
| 4 | 1.5k | RESISTOR0603_RES | 0603-RES | |
| 1 | B3U-1000P | B3U-1000P | B3U-1000P | |
| 1 | AT45DB641EUDFN | AT45DB641EUDFN | UDFN-8-5MMX6MM | |
| 1 | TLV62130 | TLV62130 | TQFN-16/3MM | |
| 1 | MP23AB02B | MP23AB02B | MP23AB02B | |
| 2 | MSGEQ7 | MSGEQ7 | DIP-8 | |
| 4 | OPA344 | OPA344 | SOT23-5 | |
| 1 | SAM4LC8BA | SAM4LC8BA | QFN-64-9MM | |
| 1 | 16MHz | FH1600015 | FHXXX | |

Parts
C1, C2
C12, C13
C14
C15, C16, C17, C18, C19
C20, C21, C22, C23
C24
C25, C26, C27, C33, C34
C28
C29, C30
C3, C4
C31
C32
C5, C6
C7, C8
C9, C10, C11
FB1
J1
J2
J3
L1
L2
LED0, LED2
LED1, LED3
P1, P2
Q1, Q2
R1
R10, R11, R13, R14
R12
R15, R16
R17, R18, R19, R20, R32, R33, R34, R35
R2
R21
R22, R23, R24, R25, R26, R27
R28, R29
R3, R4, R5
R30
R31
R6, R7, R8, R9
S1
U1
U10
U2
U3, U4
U5, U6, U7, U8
U9
X1

| Description | DIGIKEY |
|---|---|
| 0402 Capacitor | 490-8230-1-ND |
| 0402 Capacitor | 490-13298-1-ND |
| 0402 Capacitor | 490-1503-1-ND |
| 0402 Capacitor | 490-1532-1-ND |
| 0402 Capacitor | 490-1532-1-ND |
| 0402 Capacitor | 490-10777-1-ND |
| 0402 Capacitor | 490-1536-1-ND |
| 0402 Capacitor | 490-13252-1-ND |
| 0402 Capacitor | 490-3297-1-ND |
| 0402 Capacitor | 490-1415-1-ND |
| 0402 Capacitor | 490-6405-1-ND |
| 0402 Capacitor | 490-13241-1-ND |
| 0402 Capacitor | 490-1427-1-ND |
| 0402 Capacitor | 490-1440-1-ND |
| 0402 Capacitor | 490-1494-1-ND |
| | 490-5216-1-ND |
| A vertical audio jack | |
| The debug version of the signpost module header | S9170-ND |
| | |
| A very specific inductor | 541-1322-1-ND |
| LHQ3NP Inductor | 490-5350-1-ND |
| LED | 160-1447-1-ND |
| LED | 160-1446-1-ND |
| Potentiometer | TC33X-2-204ECT-ND |
| MOSFET - P Channel | 568-10499-1-ND |
| Resistor | 1276-3431-1-ND |
| Resistor | RHM10.0KHCT-ND |
| Resistor | RHM10.0KHCT-ND |
| Resistor | RHM19.1KCFCT-ND |
| Resistor | RHM20KCGCT-ND |
| Resistor | RHM1.0KDCT-N |
| Resistor | RHM60.4KCLCT-ND |
| Resistor | RHM100KCGCT-ND |
| Resistor | RHM200KCFCT-ND |
| Resistor | RHM1.0KDCT-ND |
| Resistor | RHM240KCFCT-ND |
| Resistor | RHM750KCFCT-ND |
| Resistor | RHM1.5KCGCT-ND |
| Switch | SW1020CT-ND |
| 64 Mbit flash memory | AT45DB641E-MHN-TCT-ND |
| High Efficient 3A switching step-down regulator. 1V-5V out, 4V-17V in. | 296-35978-1-ND |
| A pretty normal mems microphone | 497-14947-1-ND |
| A CMOS spectrum analyzer | 1568-1335-ND |
| Single gate rail-to-rail output op-amp. Inputs extend 300mV past rails. | OPA344NACT-ND |
| SAM4L Microcontroller. 64QFN Package. 512 Flash. | ATSAM4LC8BA-MURCT-ND |
| Pericom Type FH 16 MHz 2.5 x 2.0 mm | FH1600015CT-ND |

| MOUSER | NEWARK |
| --- | --- |
| 806-STX-3790-5N | |
| 771-NX3008PBK,215 | 74T4665 |