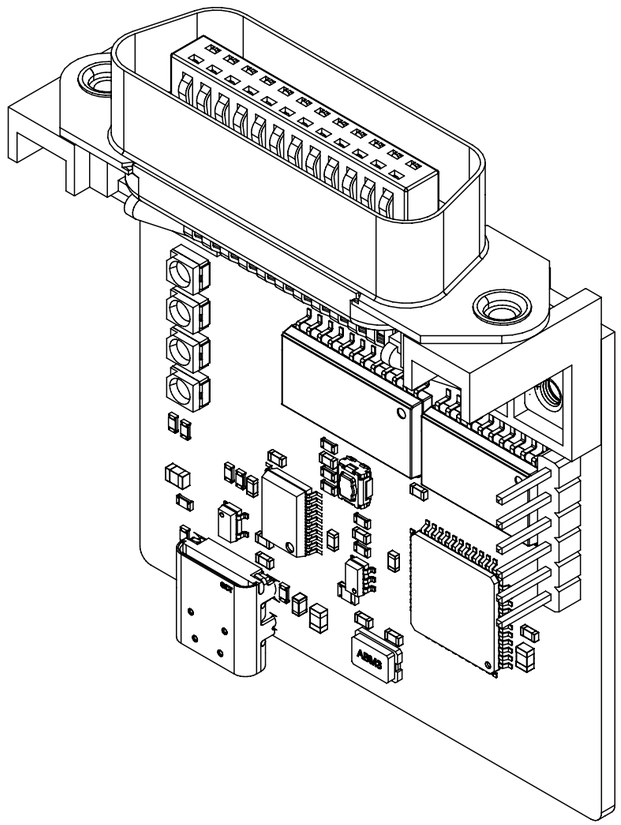
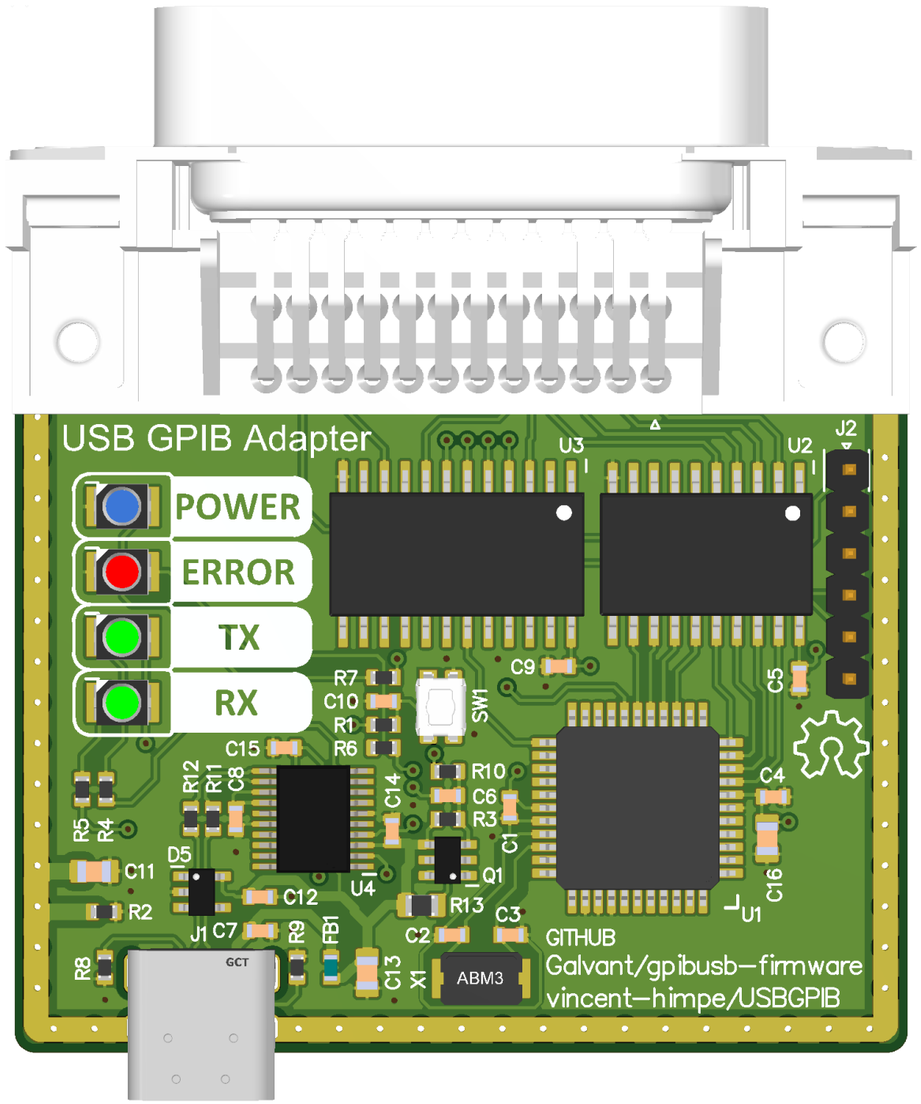
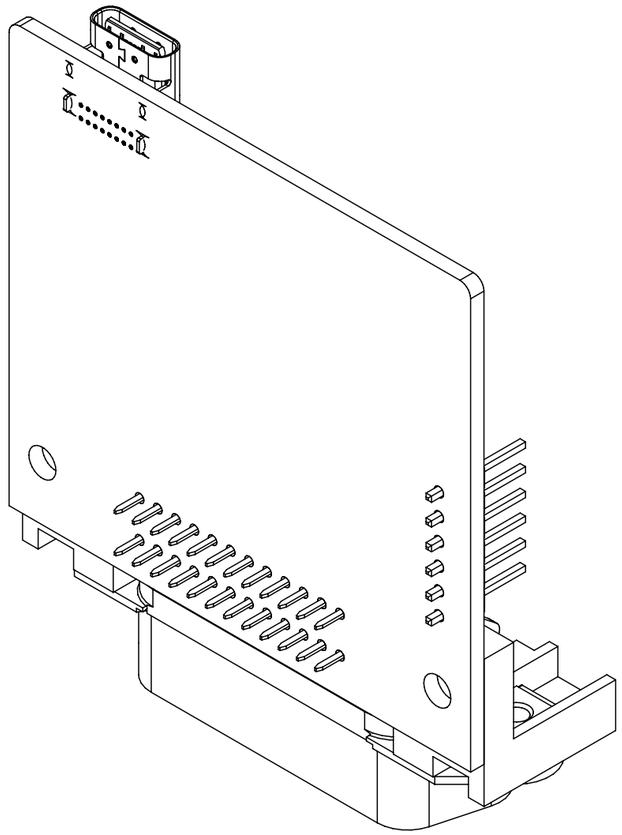
USB-GPIB.PrjPcb







Document Creation Date: 7/2/2025

Design : Vincent Himpe

Fullyrouted

LEGEND

- SUPPLY
- GROUND (RETURN)
- NET ON SAME PAGE

J2 1 2 3 4 5 6 GND VCC

U1 PIC18F4520-I/PT

VCC 28 7
MCLR 18
OSC1 30
OSC2 31
GND 6 29

RA0 19 SRQ
RA1 20 ATN
RA2 21 EOI
RA3 22 DAV
RA4 23 NRFD
RA5 24 NDAC

RB0 8 DIO1
RB1 9 DIO2
RB2 10 DIO3
RB3 11 DIO4
RB4 14 DIO5
RB5 15 DIO6
RB6 16 DIO7
RB7 17 DIO8

RC0 32 GND
RC1 35
RC2 36
RC3 37
RC4 42 FT_RTS
RC5 43 ERROR
RC6/TX 44 FT_RXD
RC7/RX 1 FT_TXD

RD0 38
RD1 39
RD2 40
RD3 41 FT_CTS
RD4 2 DC
RD5 3 PE
RD6 4 TE
RD7 5 SC

RE0 25 IFC
RE1 26 REN
RE2 27

R1 0603 10K 1/10W 1%
C16 0805 X7R 25V 10uF
C1 0603 X7R 50V 100nF
C4 0603 X7R 50V 100nF
SW1 3 2 4 1
C10 0603 X7R 50V 100nF
X1 18.432MHz
C2 0603 C0G 50V 18pF
C3 0603 C0G 50V 18pF

R13 0805 0R 1/8W 5%
Q1 SI3443CDV-T1-E3
C6 0603 X7R 50V 100nF
R3 0603 10K 1/10W 1%
R10 0603 1K 1/10W 1%

VBUS FB1 0603 1KZ
C7 0603 X7R 50V 100nF
C12 0603 X7R 50V 100nF
D5
C13 0805 X7R 25V 10uF
C15 0603 X7R 50V 100nF
C14 0603 X7R 50V 100nF

U4

VCCIO 3
VCC 15
USBDM 12
USBDP 11
RESET 14
3V3OUT 13
GND 16
GND 6

TXD 20
RXD 4
RTS 2
CTS 9
DTR 1
DSR 7
DCD 8
RI 5

CBUS0 18 RXLED
CBUS1 17
CBUS2 10 TXLED
CBUS3 19

R11 0603 27R 1/10W 1%
R12 0603 27R 1/10W 1%
C8 0603 X7R 50V 100nF

R8 0603 5K1 1/10W 1%
R9 0603 5K1 1/10W 1%

J1 USB_N USB_P SHIELD GND VBUS

R4 0603 1K 1/10W 1%
R5 0603 1K 1/10W 1%
R6 0603 1K 1/10W 1%
R7 0603 1K 1/10W 1%
D1 D2 D3 D4

CONTROL BUS

C9 0603 X7R 50V 100nF
C5 0603 X7R 50V 100nF

U2 U3

VCC 20
GND 10
PE 11
TE 1
D1 D2 D3 D4 D5 D6 D7 D8
B1 B2 B3 B4 B5 B6 B7 B8

G_DIO1 G_DIO2 G_DIO3 G_DIO4 G_DIO5 G_DIO6 G_DIO7 G_DIO8

VCC 24
GND 12
REN 22
IFC 21
NDAC 20
NRFD 19
DAV 18
EOI 17
ATN 16
SRQ 15
SC 1
TE 2
DC 13

G_REN G_IFC G_NDAC G_NRFD G_DAV G_EOI G_ATN G_SRQ

P1 ME1 ME2 SHIELD

R2 0603 4K7 1/10W 1%
C11 0805 X7R 200V 10nF

BASED ON THE WORK OF :

https://github.com/Galvant/gpibusb-pcb
https://github.com/Galvant/gpibusb-firmware

Modifications by Vincent Himpe

- SWITCHED TO VERTICAL GPIB CONNECTOR
- Board is sized to fit behind connector
- Component footprint changes (QFN,0402)
- Added Ferrite bead
- Reset button added
- Changed TVS diode
- BOM optimized for JLCPCB assembly service (LCSC parts)

GENERAL

GENERAL

1. DO NOT ALTER SUPPLIED COPPER OR DRILL DATA
2. NO COPPER BALANCING OR REMOVAL OF UNUSED PADS ALLOWED.
3. SILKSCREEN MAY BE CLIPPED / TRIMMED TO EXPOSE COPPER
4. PCB DESIGN AND ACCEPTANCE CRITERIA SHALL FOLLOW THE REQUIREMENTS OF IPC-2221, IPC-2222, AND IPC-6012 CLASS 2
5. ALL SPECIFICATIONS SHALL BE THE LATEST STANDARDS, UNLESS OTHERWISE NOTED
6. ALL MODIFICATIONS MUST BE COMMUNICATED AND APPROVED IN WRITING.

MATERIALS

7. MATERIALS SHALL BE ACCORDING TO THE STACKUP DRAWING IN THIS DOCUMENT.
8. MATERIAL SHALL HAVE A FLAMABILITY RATING OF UL 94V-0 OR BETTER
9. SURFACE FINISH : HASL
10. SOLDER MASK COLOR : BLACK
11. SOLDERMASK MAX REGISTRATION ERROR : 0.05mm
12. SILKSCREEN COLOR : WHITE

STACKUP / IMPEDANCE CONTROL

13. THICKNESS LISTED IN LAYER STACK LEGEND REPRESENT FINAL PRESSED VALUES FOR THE PREPREG
14. IMPEDANCE CONTROL, IF ANY, SHALL BE PER LISTED TABLE WITH A MAX TOLERANCE OF +/-10%

QA, ELECTRICAL TEST AND MARKINGS

15. PCB SHALL BE 100% ELECTRICALLY TESTED FOR SHORTS AND CONTINUITY

Fullyrouted

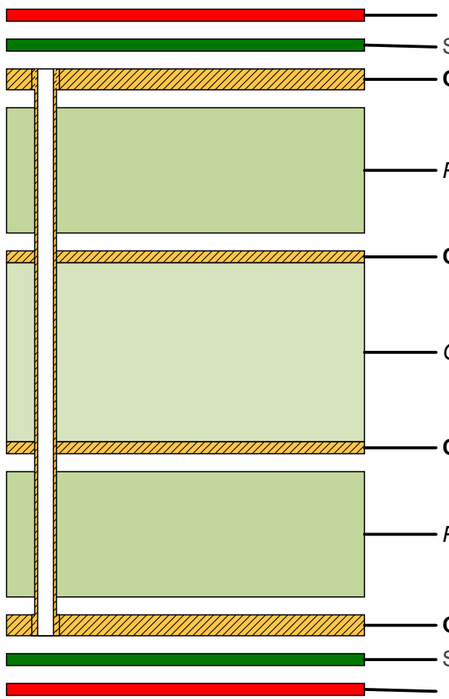
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER STACK

Layer Stack Legend



Material	Layer	Thickness	Dielectric Material	Type	Gerber	Dk	Weight	Constructions	Df	Resin
	Top Overlay			Legend	GTO					
Surface Material	Top Solder	0.010mm(0.394mil)	Solder Resist	Solder Mask	GTS	3.5				
Copper	**Top Layer**	**0.035mm(1.378mil)**		**Signal**	**GTL**		**1oz**			
Prepreg		*0.210mm(8.268mil)*	*7628 X 1*	*Dielectric*		*4.1*		*1080*	*0.02*	*62%*
CF-004	**Layer 1**	**0.015mm(0.591mil)**		**Signal**	**G1**		**0.5oz**			
Core		*1.065mm(41.929mil)*	*FR-4*	*Dielectric*		*4.8*				
CF-004	**Layer 2**	**0.015mm(0.591mil)**		**Signal**	**G2**		**0.5oz**			
Prepreg		*0.210mm(8.268mil)*	*7628 X 1*	*Dielectric*		*4.1*		*1080*	*0.02*	*62%*
Copper	**Bottom Layer**	**0.035mm(1.378mil)**		**Signal**	**GBL**		**1oz**			
Surface Material	Board Layer Stack Bottom Solder	0.010mm(0.394mil)	Solder Resist	Solder Mask	GBS	3.5				
	Board Layer Stack Bottom Overlay			Legend	GBO					

Total thickness: 1.605mm(63.189mil)

Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

CONTROLLED IMPEDANCE

Transmission Line Structure Table

Impedance Id	Transmission Line	Target Impedance	Calculated Impedance	Trace layer	Wide Trace Width	Narrow Trace Width	Reference layers	Substack	Clearance	Target Tolerance

Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

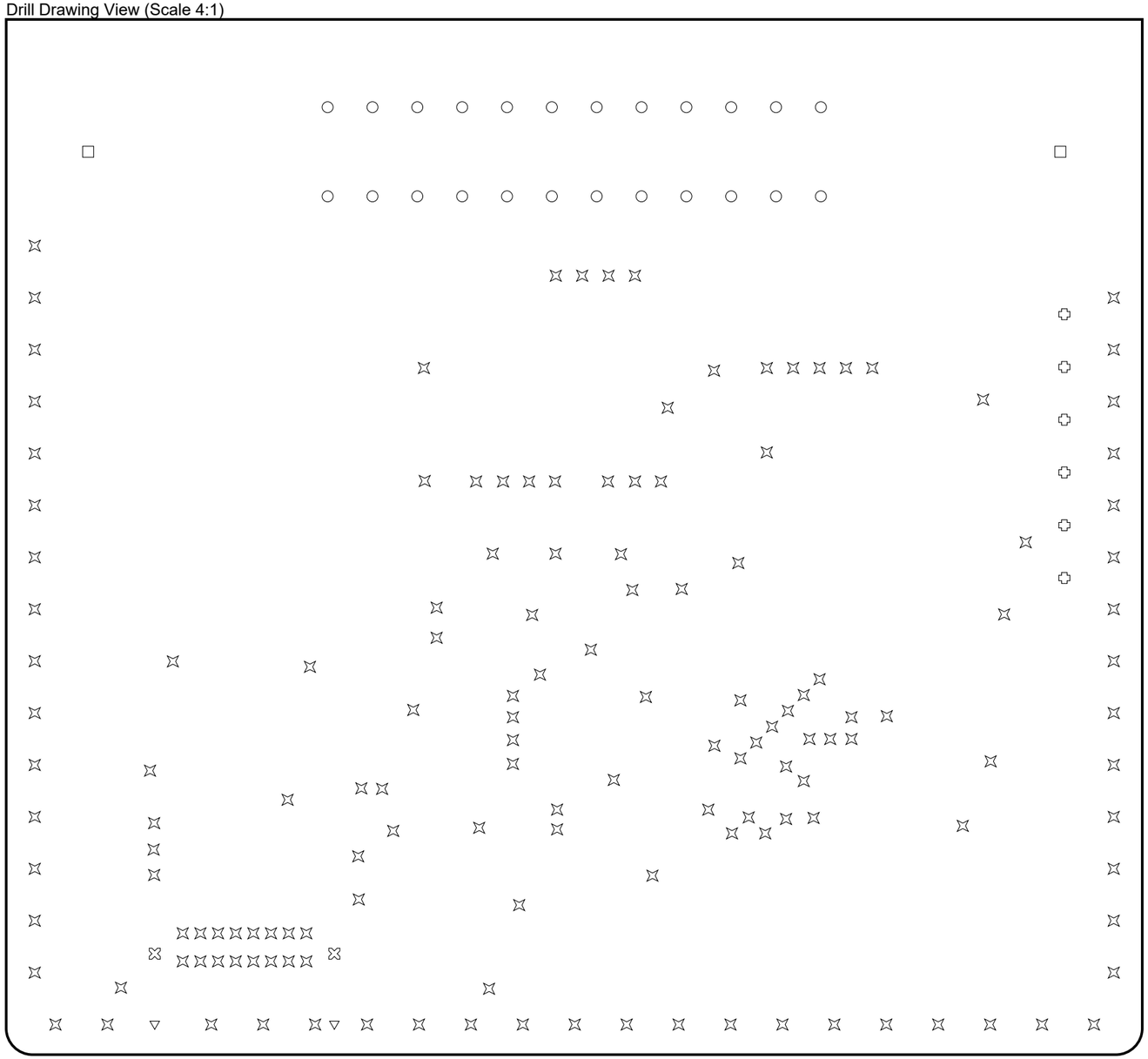
DRILL LEGEND

Drill Table

Symbol	Count	Hole Size	Plated	Hole Type	Drill Layer Pair	Via / Pad	Pad Shape	Description	Hole Tolerance	Via Type	Via Feature
⛌	149	0.400mm(15.748mil)	Plated	Round	Top Layer - Bottom Layer	(Mixed)	(Mixed)				
○	24	1.000mm(39.370mil)	Plated	Round	Top Layer - Bottom Layer	Pad	Rounded				
⯐	6	1.100mm(43.307mil)	Plated	Round	Top Layer - Bottom Layer	Pad	(Mixed)				
▽	2	1.400mm(55.118mil)	Plated	Slot	Top Layer - Bottom Layer	Pad	Rounded Rectangular				
⛝	2	2.100mm(82.677mil)	Plated	Slot	Top Layer - Bottom Layer	Pad	Rounded Rectangular				
□	2	3.200mm(125.984mil)	Plated	Round	Top Layer - Bottom Layer	Pad	Rounded				
	185 Total										

DRILL DRAWING

Drill Drawing View (Scale 4:1)



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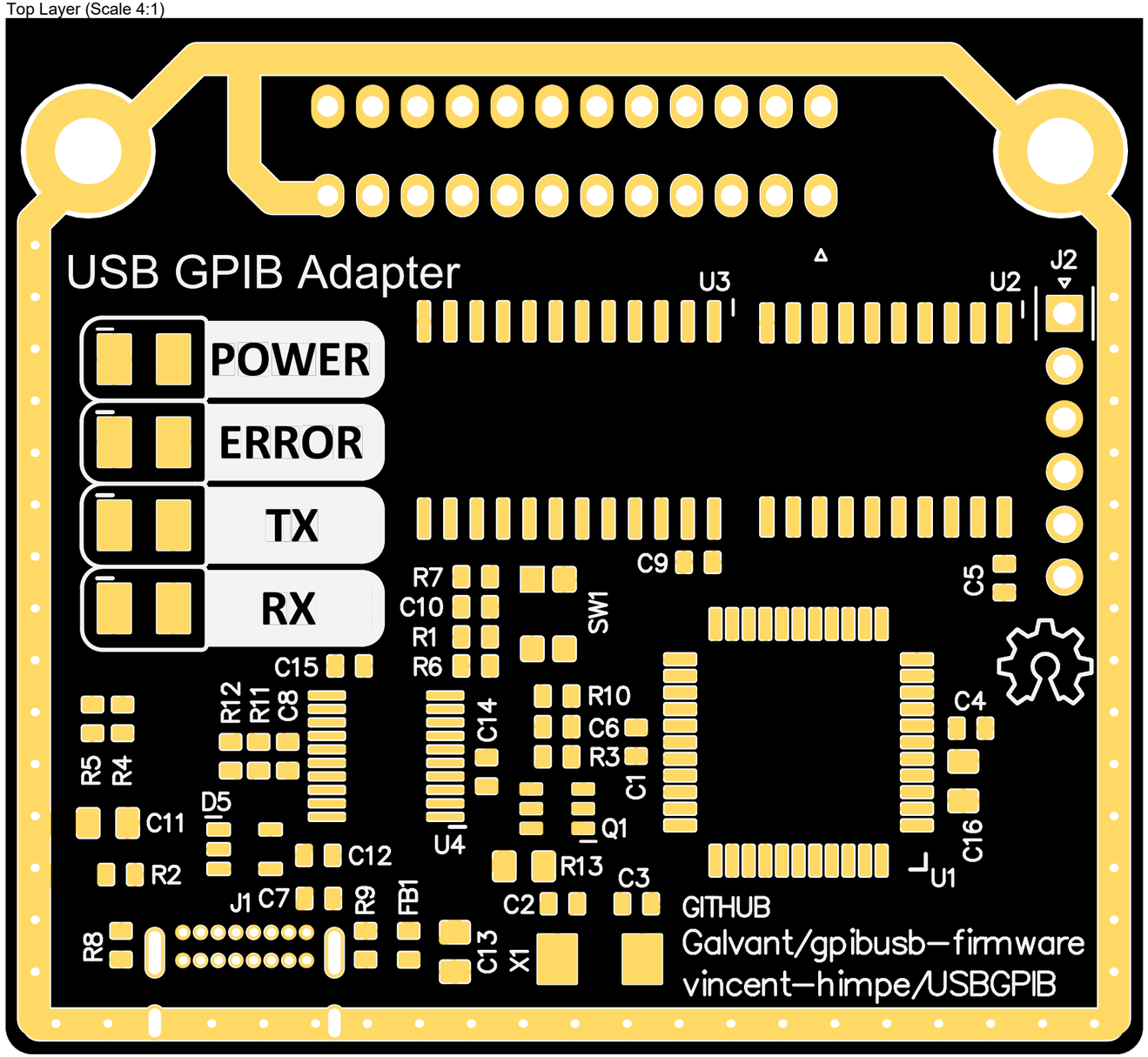
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

COMPOSITE VIEW FRONT

Top Layer (Scale 4:1)



Fullyrouted

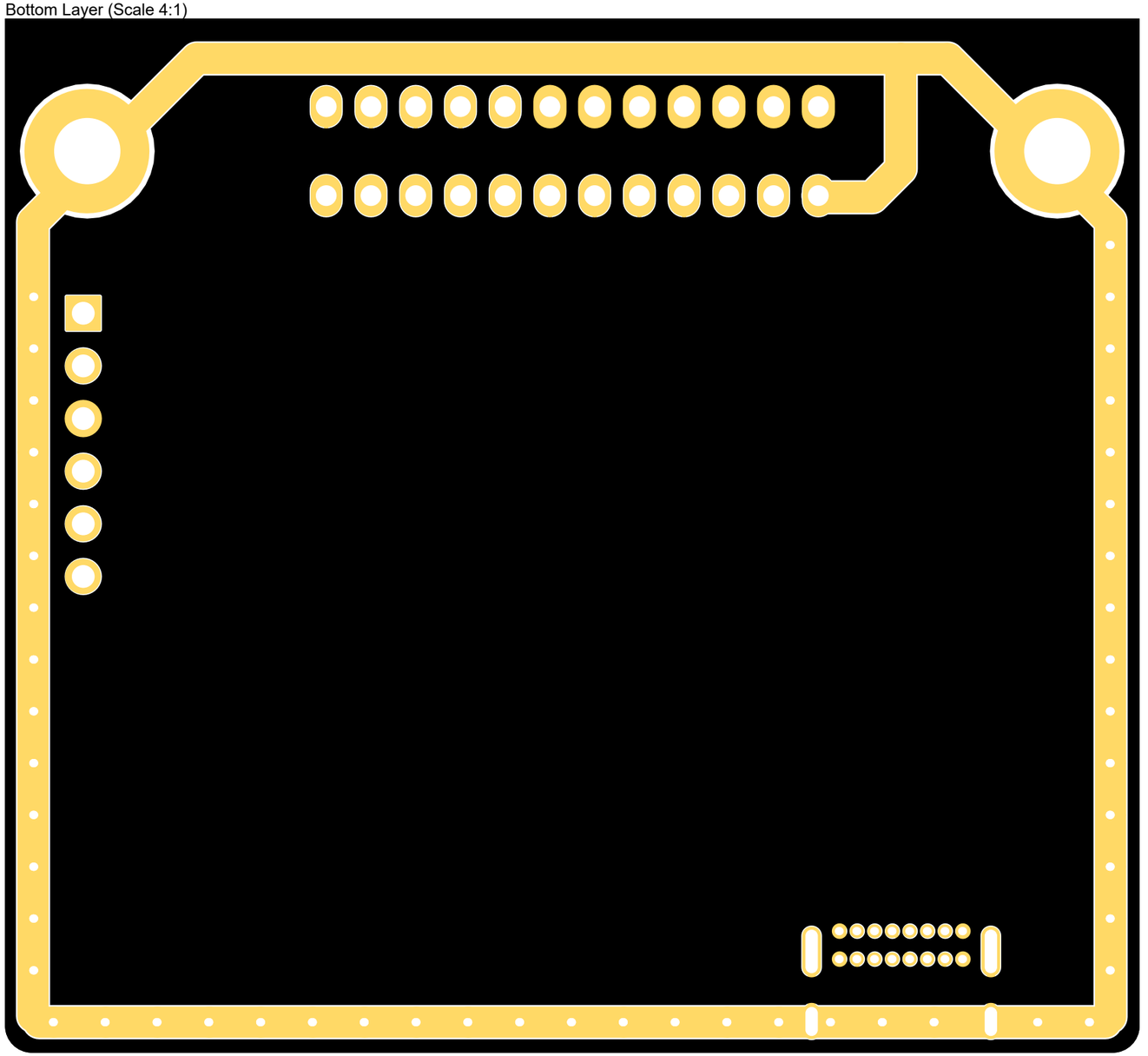
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

COMPOSITE VIEW BACK

Bottom Layer (Scale 4:1)



Fullyrouted

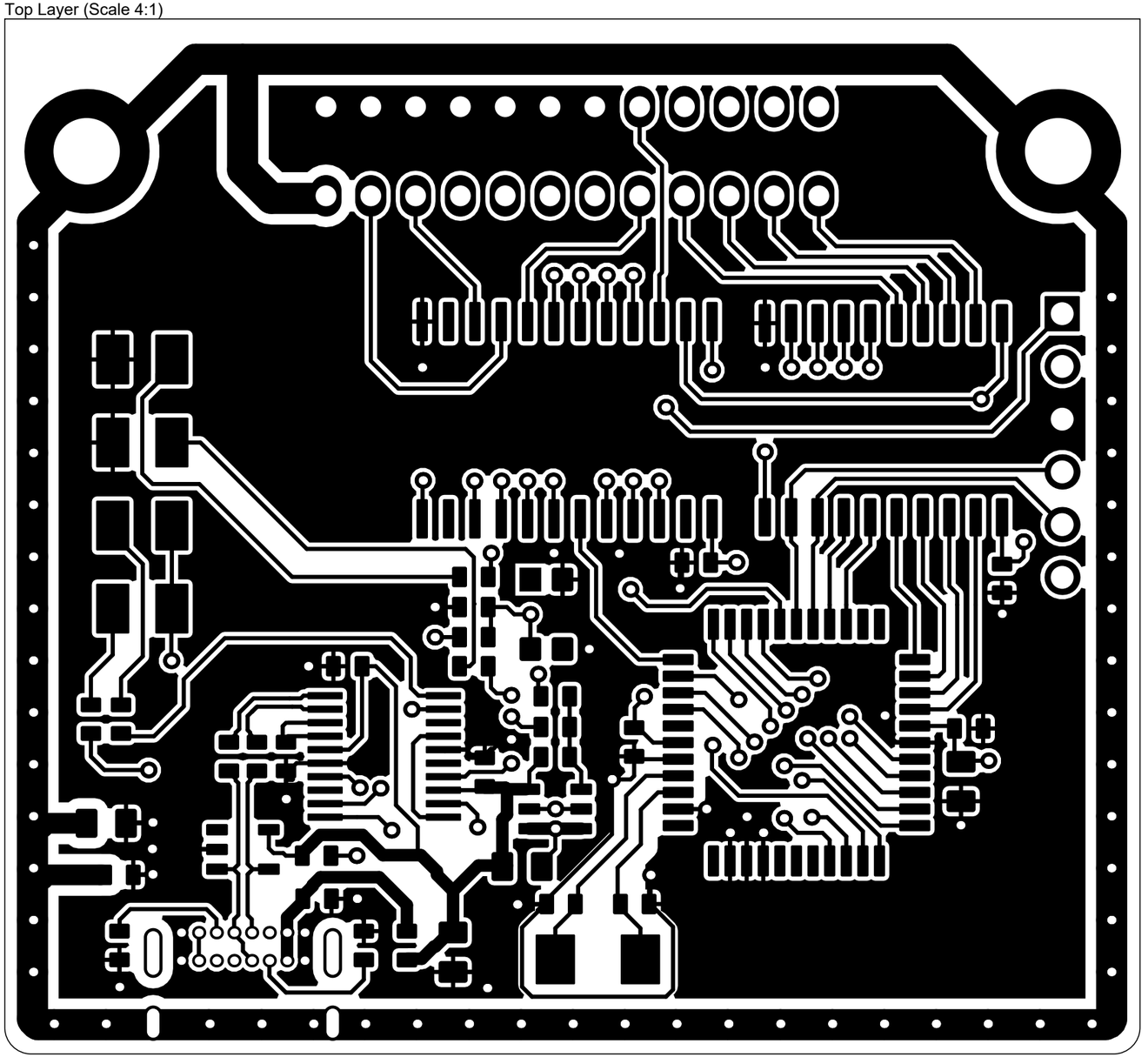
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : TOP LAYER

Top Layer (Scale 4:1)



Fullyrouted

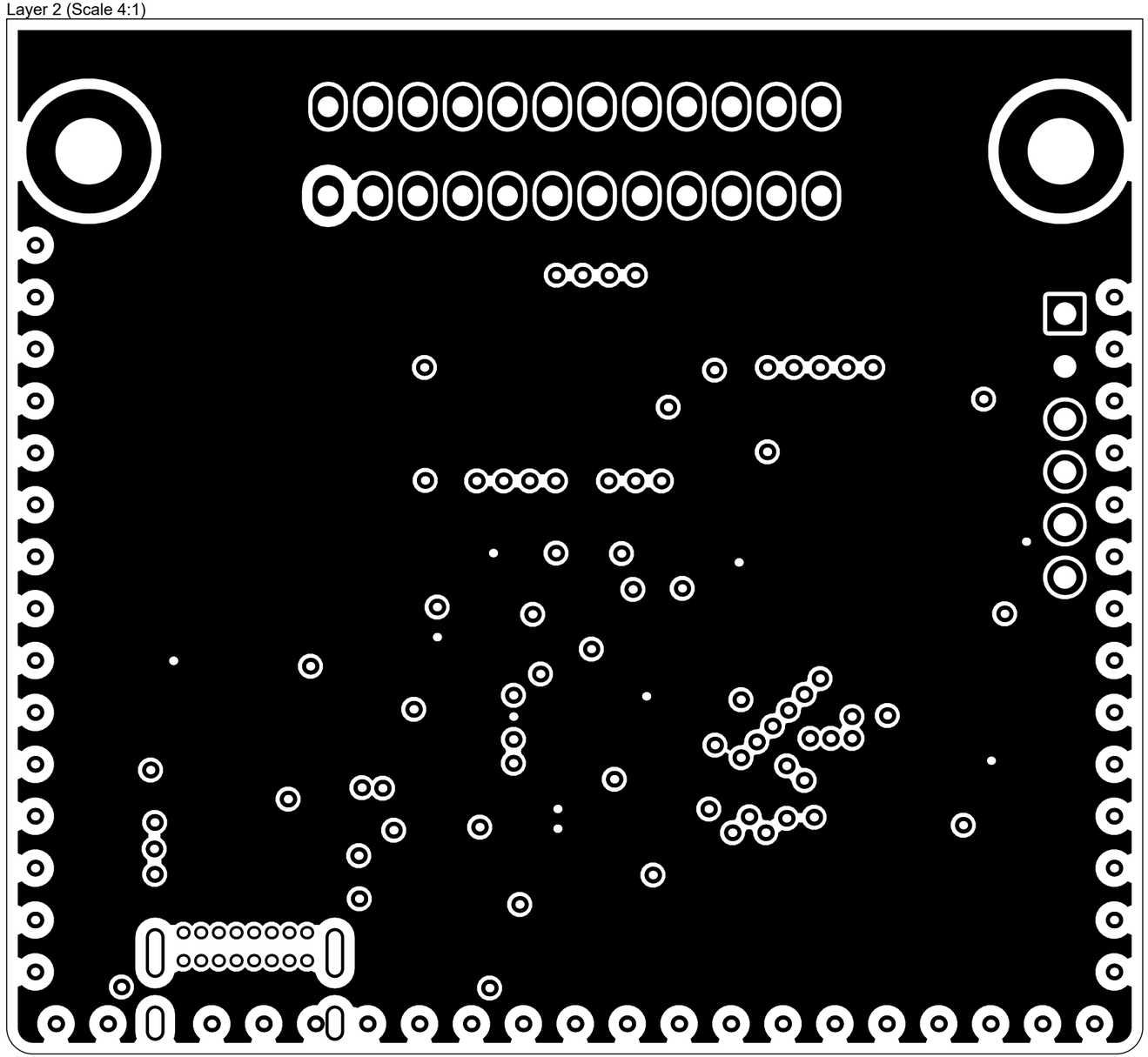
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : MID LAYER 1

Layer 2 (Scale 4:1)



Fullyrouted

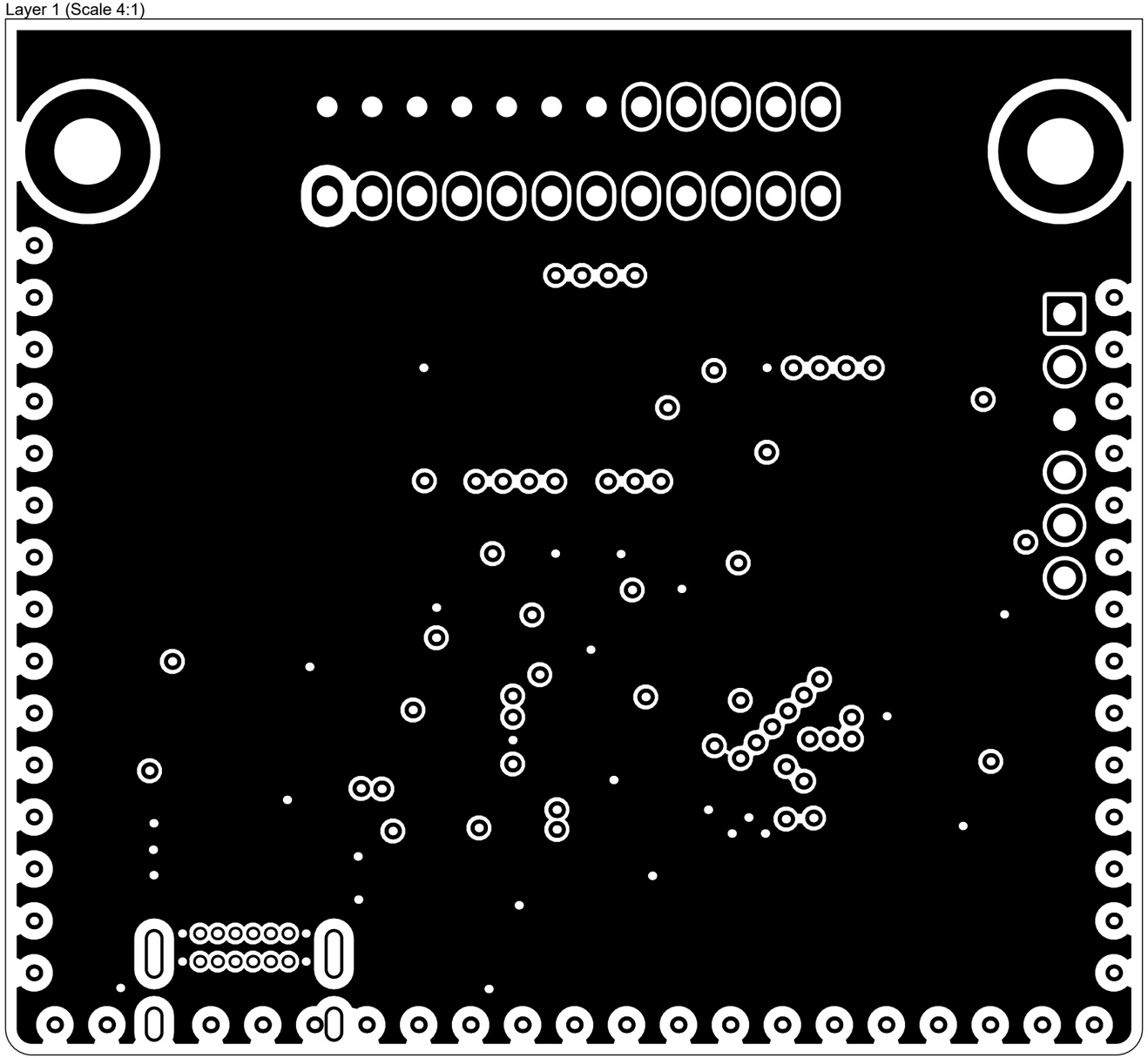
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : MID LAYER 2

Layer 1 (Scale 4:1)



Fullyrouted

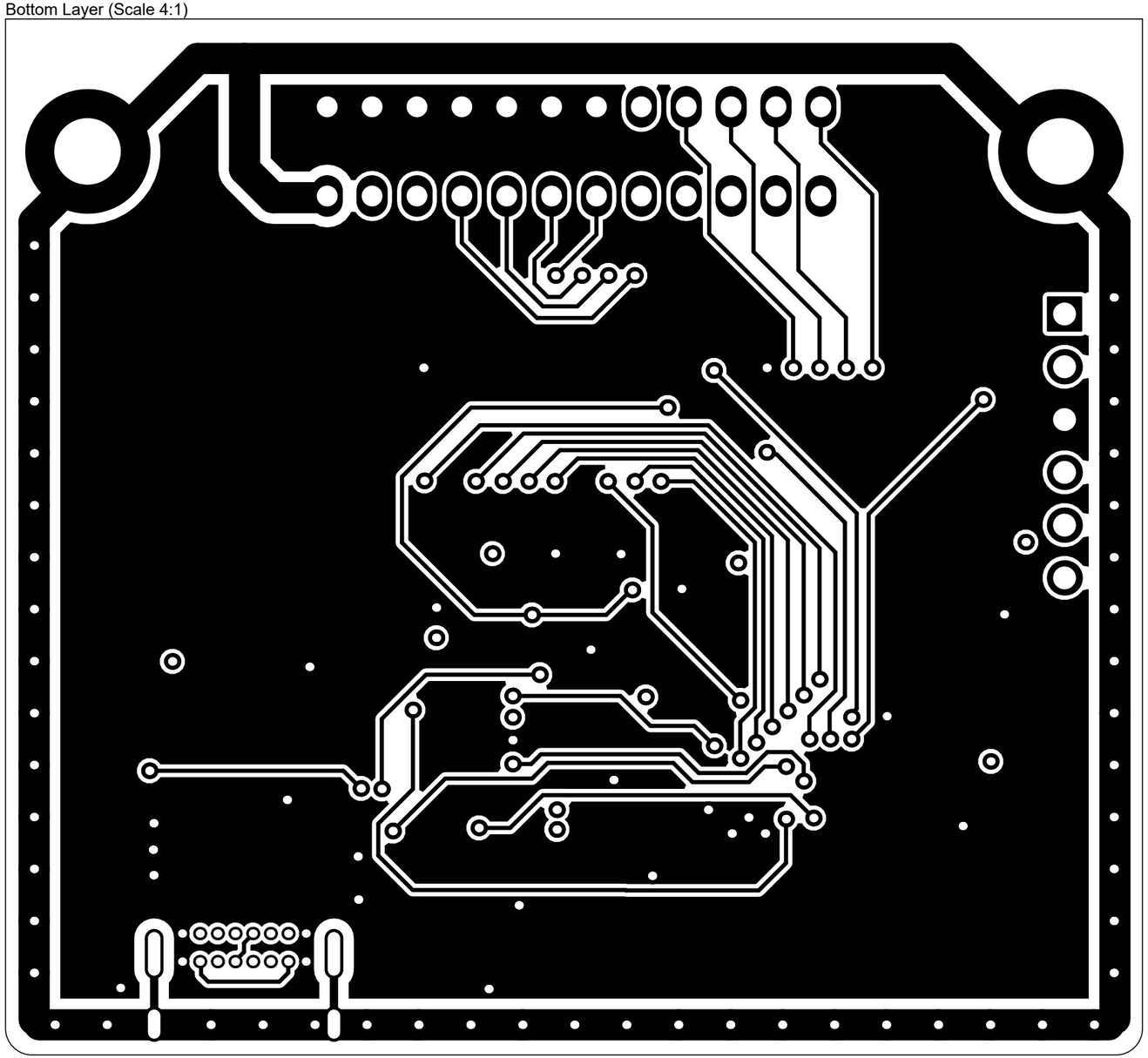
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : BOTTOM LAYER

Bottom Layer (Scale 4:1)



Fullyrouted

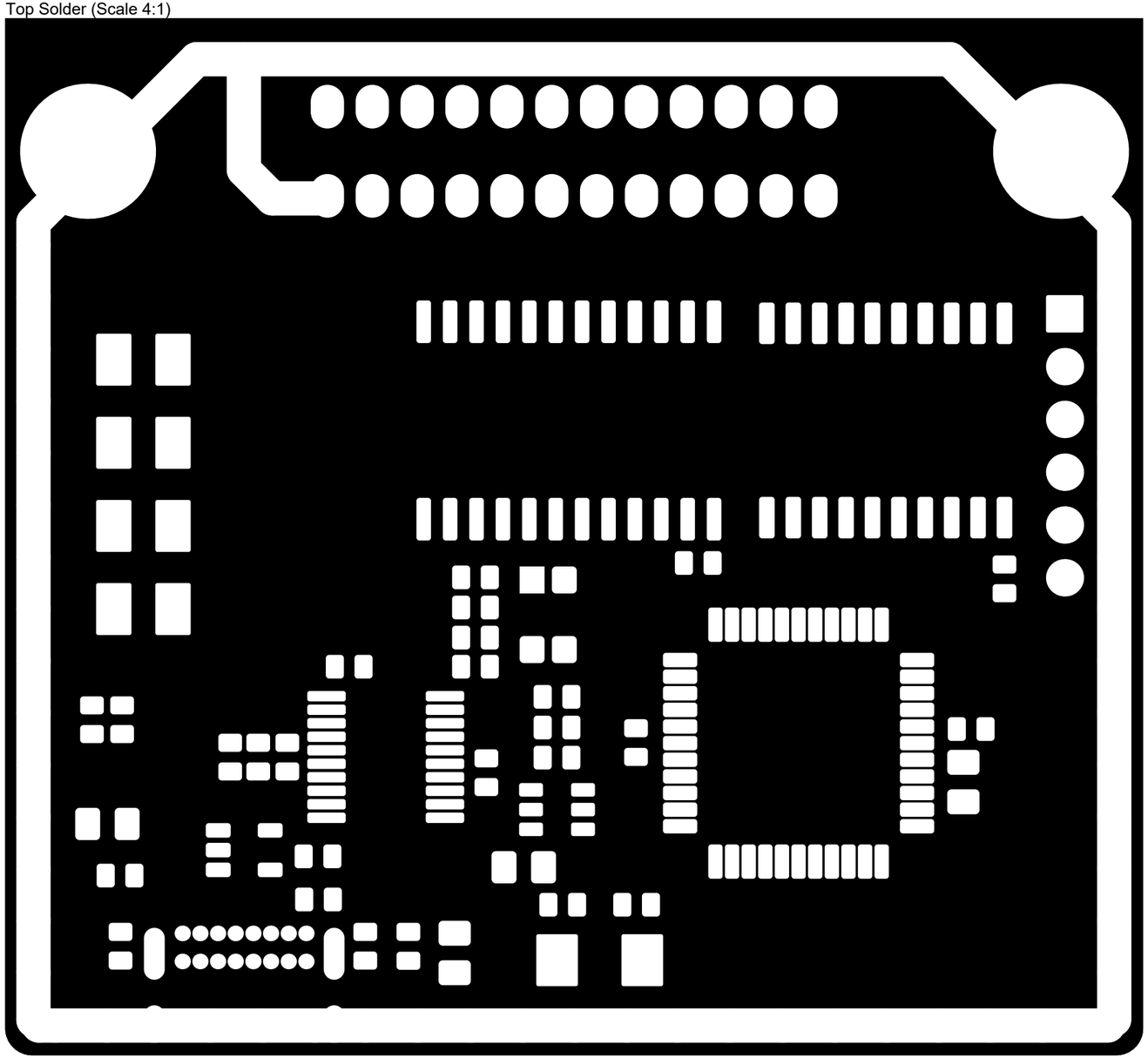
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : TOP SOLDER MASK

Top Solder (Scale 4:1)



Fullyrouted

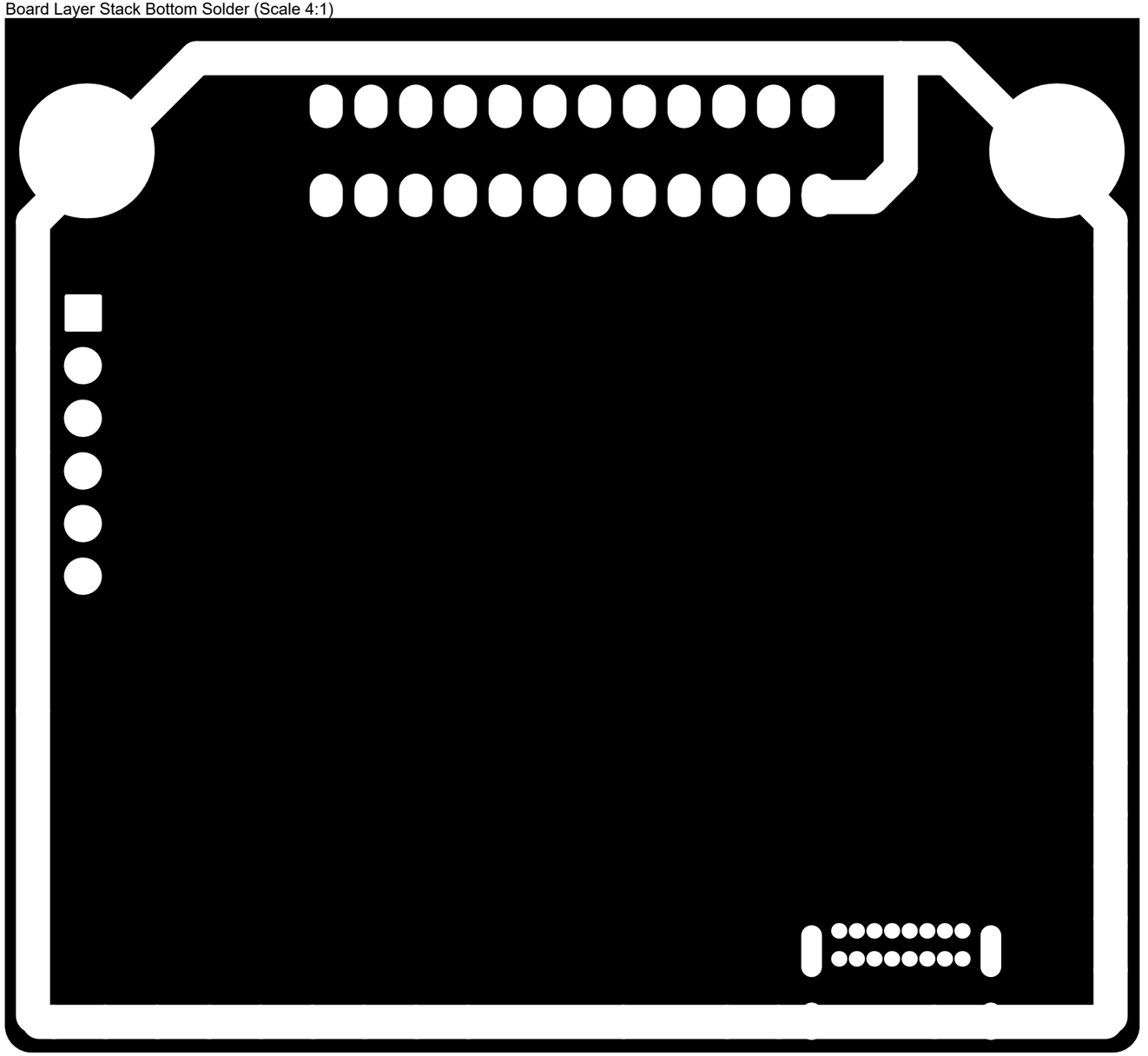
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : BOTTOM SOLDER MASK

Board Layer Stack Bottom Solder (Scale 4:1)



Fullyrouted

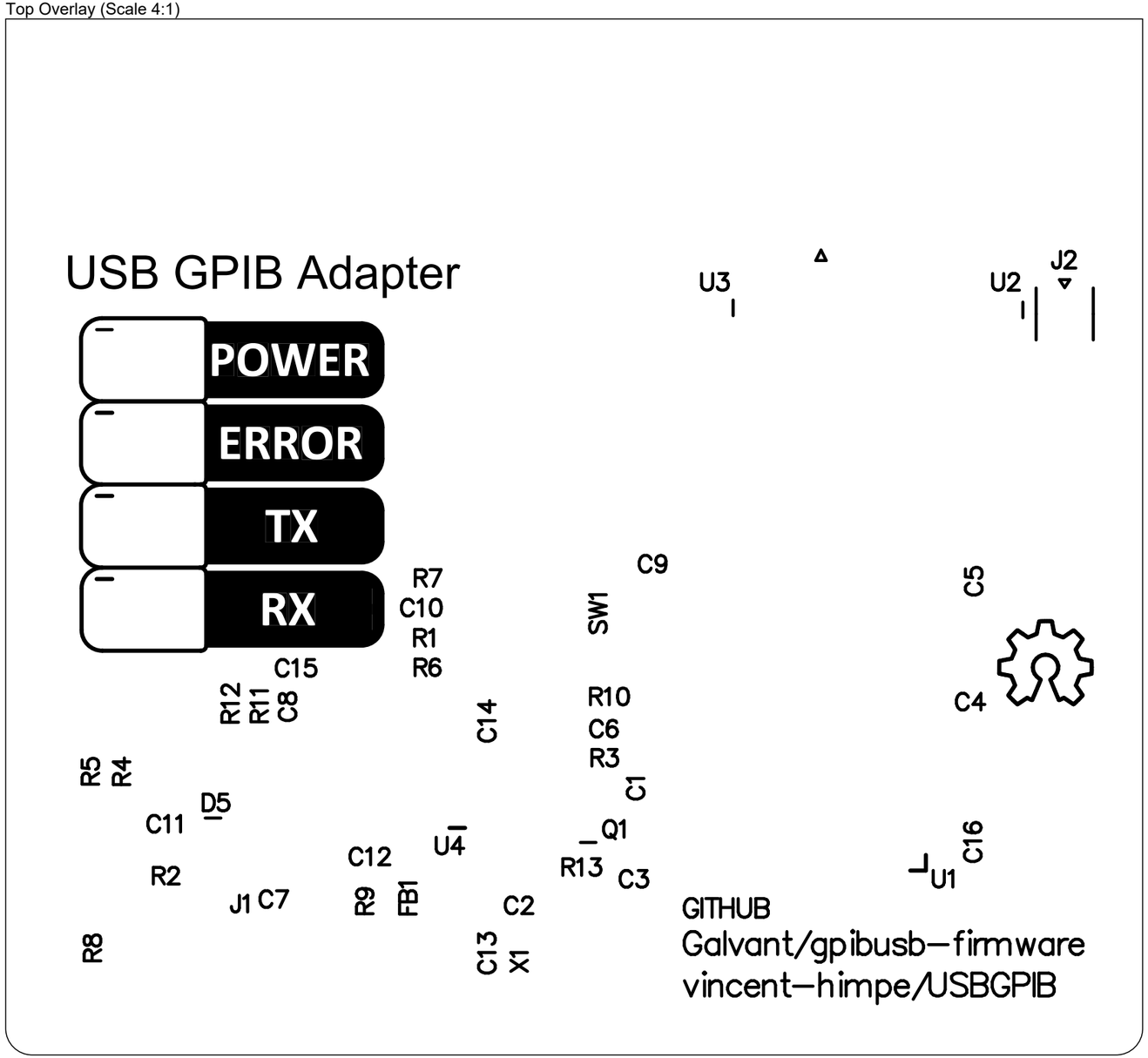
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : TOP SILKSCREEN (LEGEND)

Top Overlay (Scale 4:1)



Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

LAYER VIEW : BOTTOM SILKSCREEN (LEGEND)

Board Layer Stack Bottom Overlay (Scale 4:1)

Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

FABRICATION DRAWING

GENERAL

Unless otherwise specified the following rules apply:

1. DO NOT DEVIATE FROM ARTWORK OR BOM WITHOUT PRIOR AUTHORIZATION.
2. ASSEMBLE AND INSPECT PER IPC-610 CLASS 2

Bill of Materials and Material Handling

3. THE BOM CONTAINED IN THIS DOCUMENT IS AS-BUILT. NON-INSTALLED PARTS HAVE BEEN REMOVED. ADDITIONAL BOM FORMATS ARE AVAILABLE IN THE PROJECT FILES
4. ANY PART SUBSTITUTIONS MUST BE APPROVED IN WRITING BEFORE ASSEMBLY
5. ALL MATERIALS MUST BE PROCURED FROM MANUFACTURER AUTHORIZED DISTRIBUTORS OR THE ORIGINAL MANUFACTURER
6. ALL COMPONENTS AND BOARDS TO BE HANDLED AND STORED ACCORDING TO IPC GUIDELINES
7. ESD CONTROL PER IPC RULES

Soldering

8. SOLDERING TO BE DONE USING SN37PB63 ALLOY USING ALLOY MANUFACTURER RECOMMENDED NO-CLEAN FLUX
9. BGA COMPONENTS WITH LEAD-FREE CONNECTIONS NEED TO BE REBALLED WITH SN63PB37. MIXING OF ALLOYS IS NOT PERMITTED.
10. SOLDERING PREFERRABLY TO BE DONE USING NITROGEN ATMOSPHERE
11. SURPLUS COMPONENTS TO VACUUM SEALED WITH DESSICANT IN ANTISTATIC BAGS
12. INCOMING MATERIAL (BOARDS AND COMPONENTS) NEEDS TO BE INSPECTED FOR HUMIDITY AND BAKED IF NEEDED PRIOR TO USE.
13. MANUAL REWORK / TOUCHUP TO BE DONE USING SAME ALLOY AND APPROPRIATE FLUX. FLUX MUST BE REMOVED.

Fullyrouted

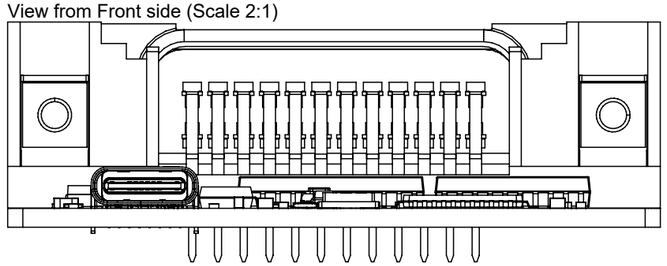
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

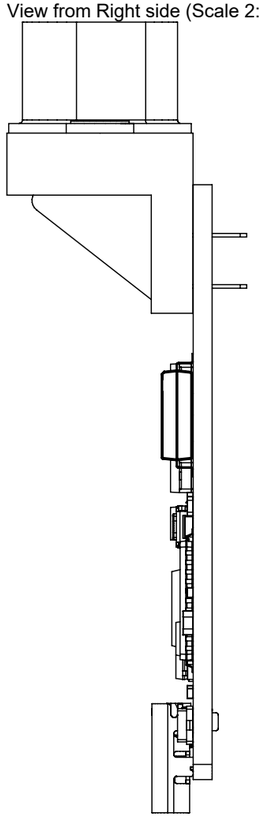
ASSEMBLY DRAWING

2D VIEW

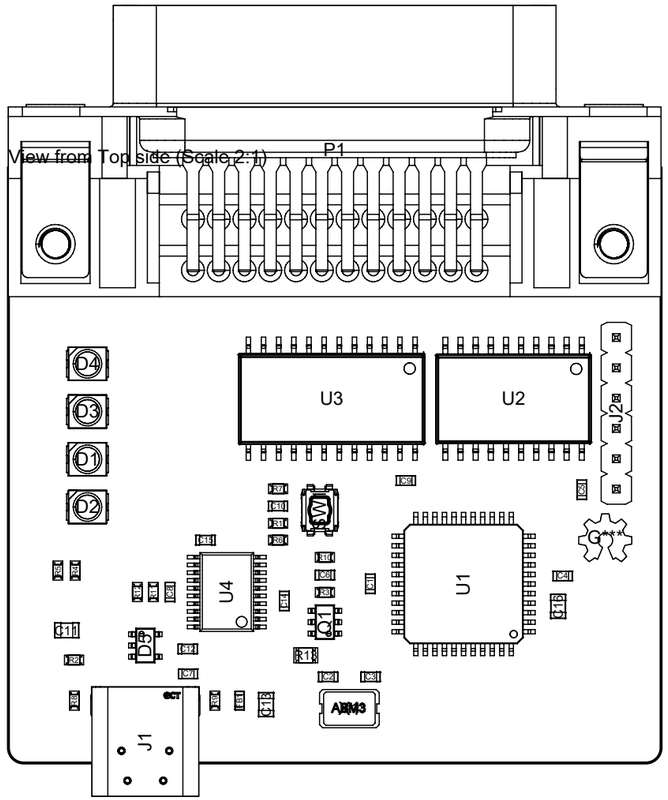
View from Front side (Scale 2:1)



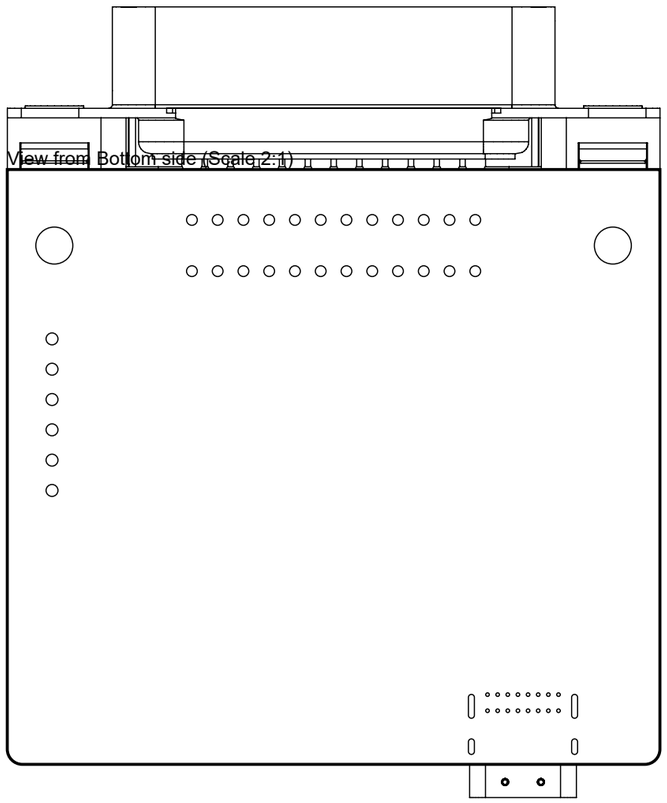
View from Right side (Scale 2:1)



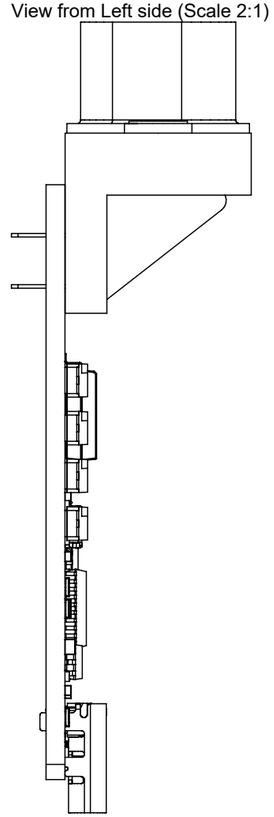
View from Top side (Scale 2:1)



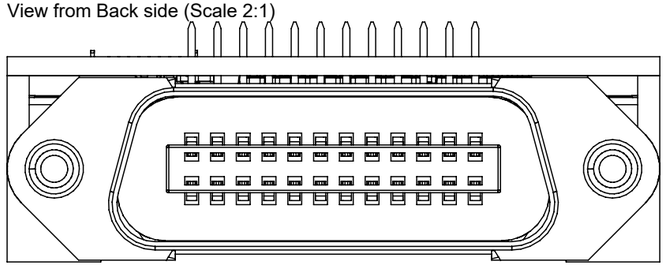
View from Bottom side (Scale 2:1)



View from Left side (Scale 2:1)



View from Back side (Scale 2:1)



Fullyrouted

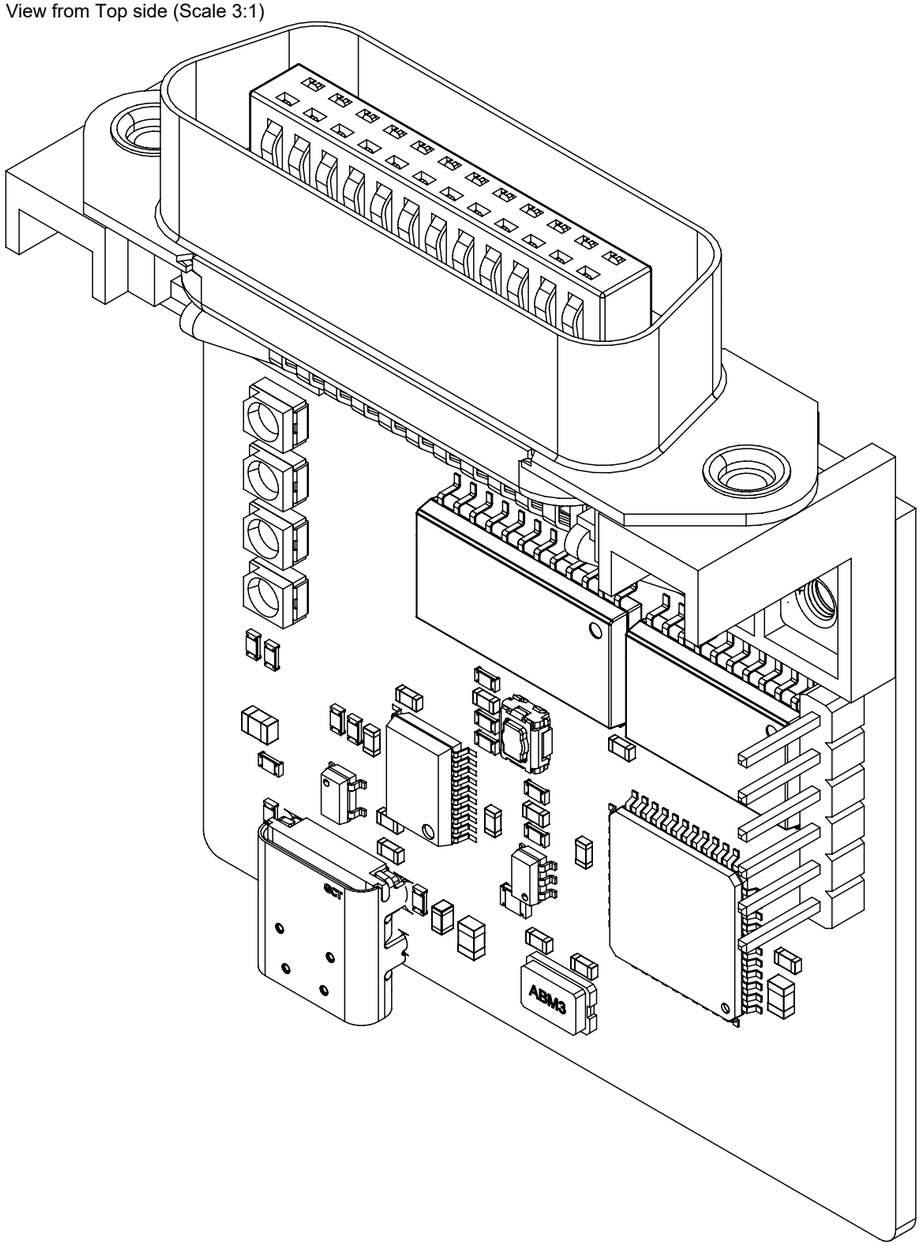
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

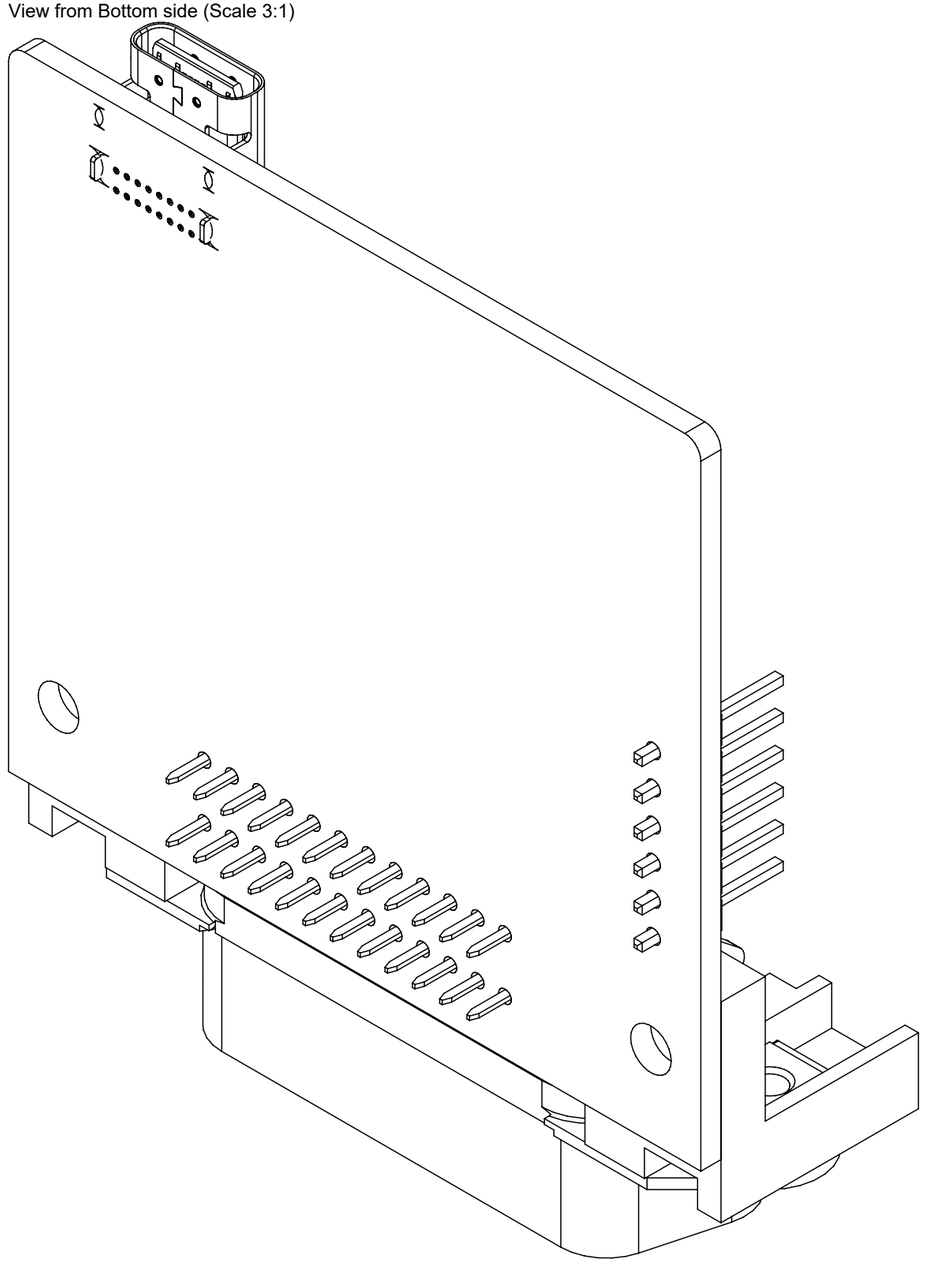
ASSEMBLY DRAWING

3D VIEW

View from Top side (Scale 3:1)



View from Bottom side (Scale 3:1)



Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

ASSEMBLY DRAWING

Bill Of Materials

Quantity	Designator	Description	LCSC	MOUSER
11	C1, C4, C5, C6, C7, C8, C9, C10, C12, C14, C15	CAPACITOR,CERAMIC,100nF,50V,X7R,0603	C127833	80-C0603C104K5R
2	C2, C3	CAPACITOR,CERAMIC,18pF,50V,C0G,0603	C2169518	80-C0603C180K5G
1	C11	CAPACITOR,CERAMIC,10nF,200V,X7R,0805,ESD	C36911368	80-C0805C103K2RECAUT
2	C13, C16	CAPACITOR,CERAMIC,10uF,25V,X5R,0805	C3039694	187-CL21B106KAYQNNE
2	D1, D2	LED,SMD,GREEN,42mCd,PLCC-2	C5248446	78-VLMPG33N1P2
1	D3	LED,SMD,RED,35.5mCd,PLCC-2	C6584989	78-VLMK3105
1	D4	LED,SMD,BLUE,90mCd,PLCC-2	C6323026	78-VLMB41P1Q2
1	D5	DIODE,TVS,DUAL,UNIDIRECTIONAL,USB	C22358704	710-824011
1	FB1	FERRITE,1KZ@100MHz,0R2DC,0603	C160982	81-BLM18KG102SN1D
1	J1	CONN,USB-C,16P,RA,TH,8.94X9.17	C7095263	640-USB4085-GF-A
1	J2			
1	P1	CONN,GPIB,24P,RIGHT ANGLE,TH		636-112-024-113R001
1	Q1	XSTR,PMOS,20V,5.97A,VISHAY,SI3443,SOT26	C727385	781-SI3443CDV-GE3
2	R1, R3	RESISTOR,10K,1%,100mW,0603 (1608)	C98220	603-RC0603FR-0710KL
1	R2	RESISTOR,4K7,1%,100mW,0603 (1608)	C99782	603-RC0603FR-074K7L
5	R4, R5, R6, R7, R10	RESISTOR,1K,1%,100mW,0603 (1608)	C22548	603-RC0603FR-071KL
2	R8, R9	RESISTOR,5K1,1%,100mW,0603 (1608)	C105580	603-RC0603FR-075K1
2	R11, R12	RESISTOR,27R,1%,100mW,0603 (1608)	C137753	603-RC0603FR-0727RL
1	R13	RESISTOR,0R,JUMPER	C96345	603-RC0805JR-070RL
1	SW1	SW,SMD,TACT,4PIN,2.9X3.5,4PIN	C483888	667-EVP-AA202K
1	U1	IC,CPU,MICROCHIP,PIC18F4520,TQFP44	C9734	579-PIC18F4520-I/PT
1	U2	IC,XCVR,GPIB,DATA.TI,SN75160DW,SO20W	C882412	595-SN75160BDW
1	U3	IC,XCVR,GPIB,CONTROL,TI,SN75162DW,SO24W	C2863933	595-SN75162BDWR
1	U4	IC,XCVR,USB UART,FTDI,FT231XS-R,TSSOP20	C132160	895-FT231XS-R
1	X1	XTAL,18.432MHz,ABRACON ABM3,SMD5032	C1985331	815-ABM3-18.43-D2Y-T

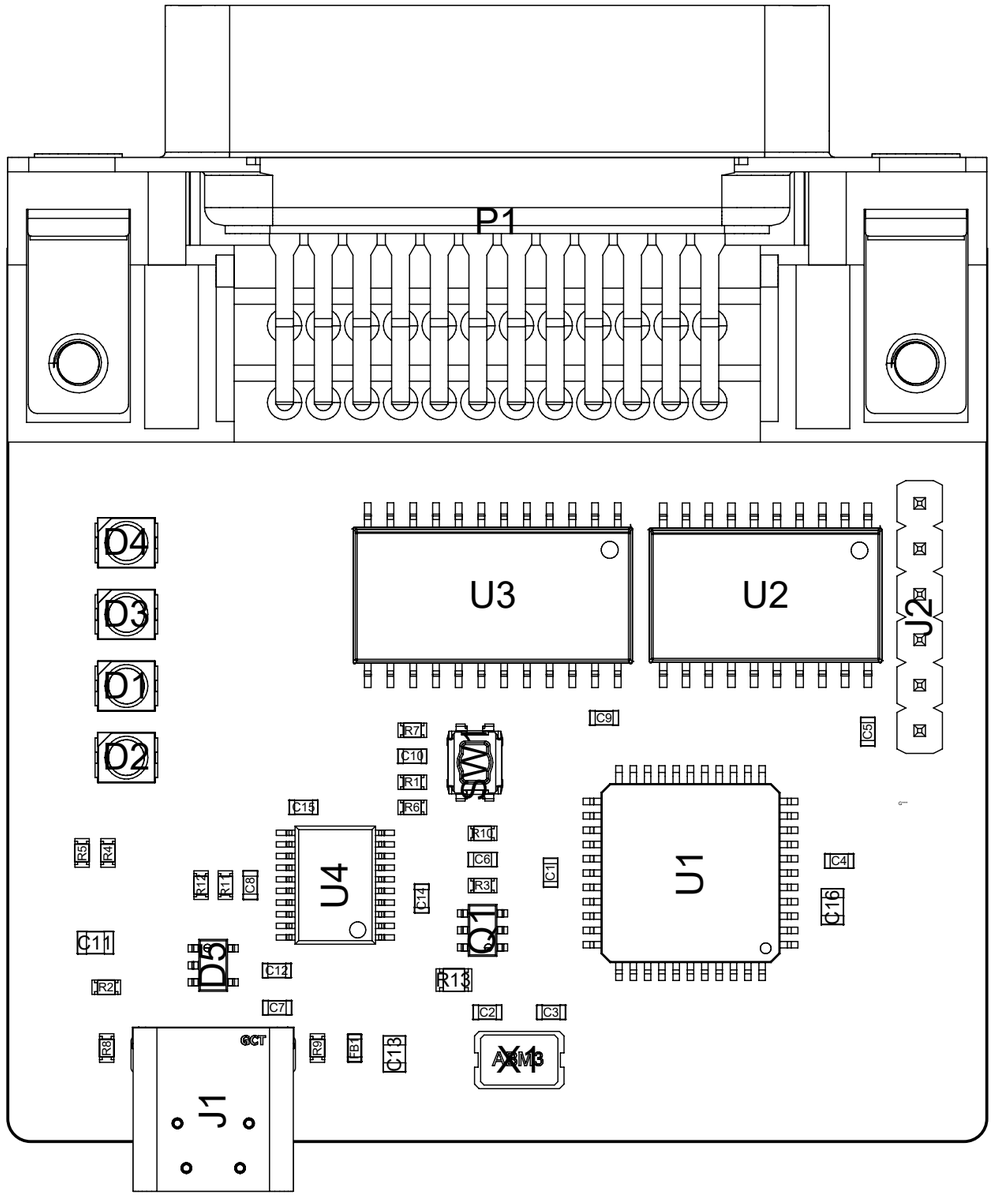
Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

ASSEMBLY DRAWING

DESIGNATORS FRONT



View from Top side (Scale 3:1)

Fullyrouted

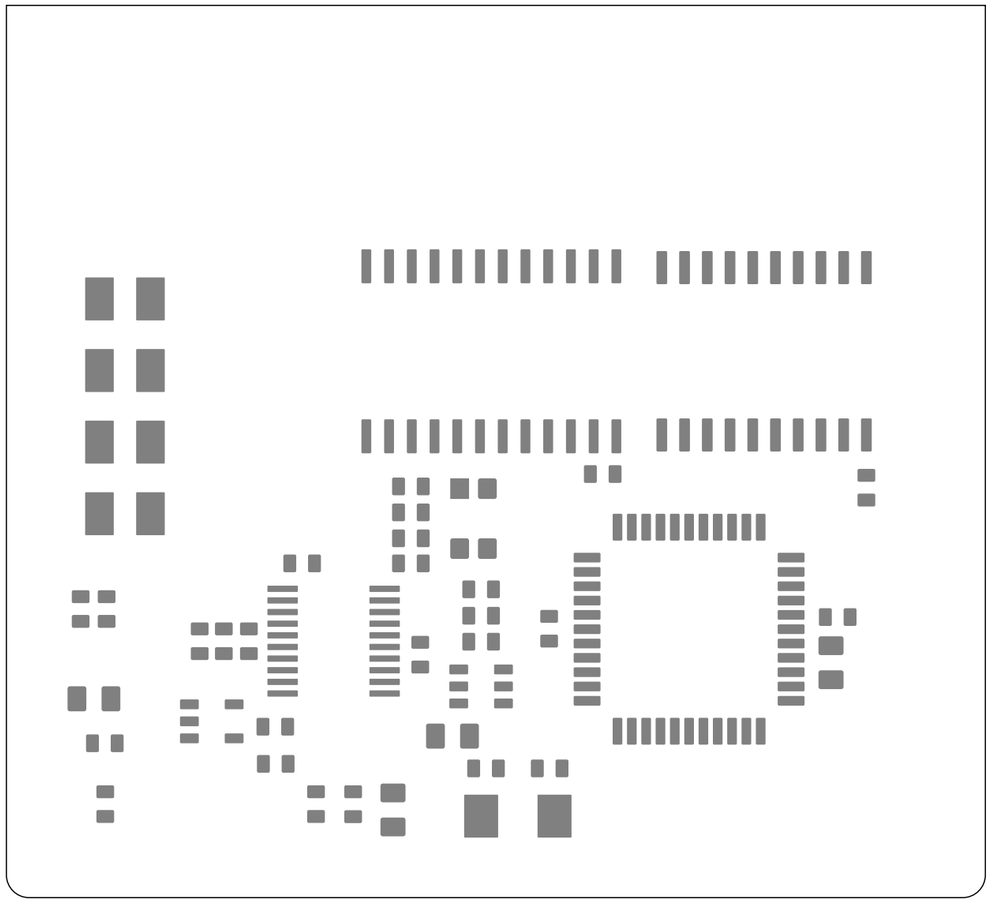
Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

ASSEMBLY DRAWING

PASTE MASK TOP

Top Paste (Scale 3:1)



Fullyrouted

Project USB-GPIB.PrjPcb

Version: | Variant [No Variations]

ASSEMBLY DRAWING