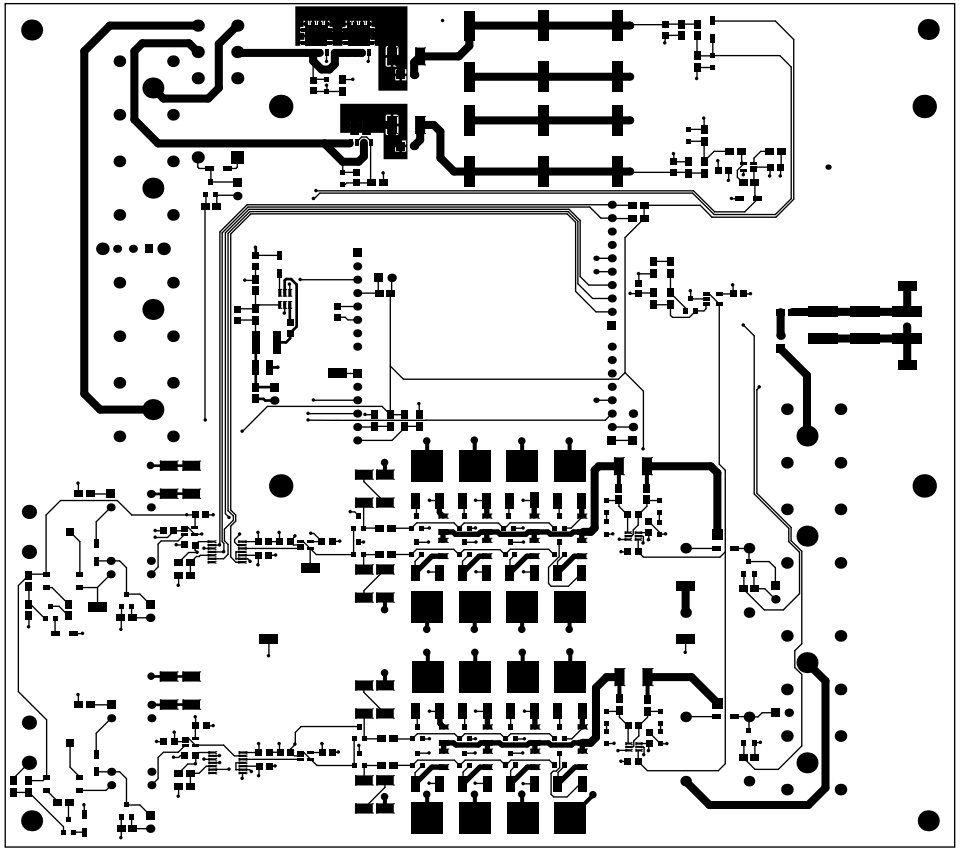
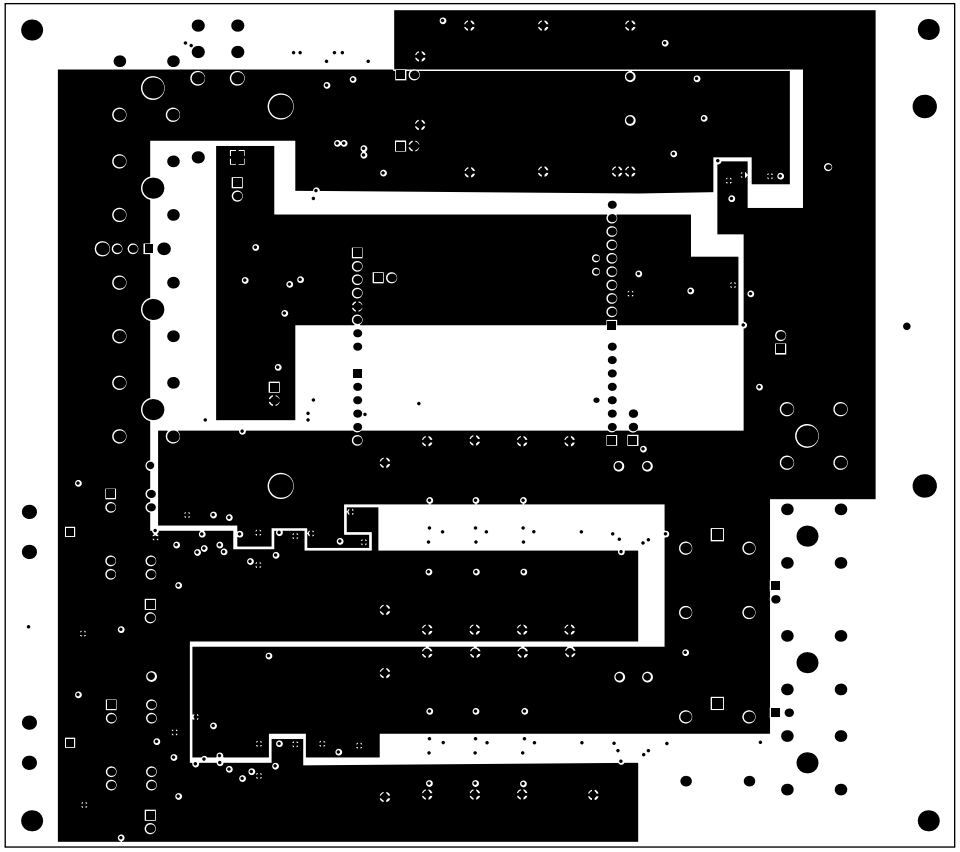
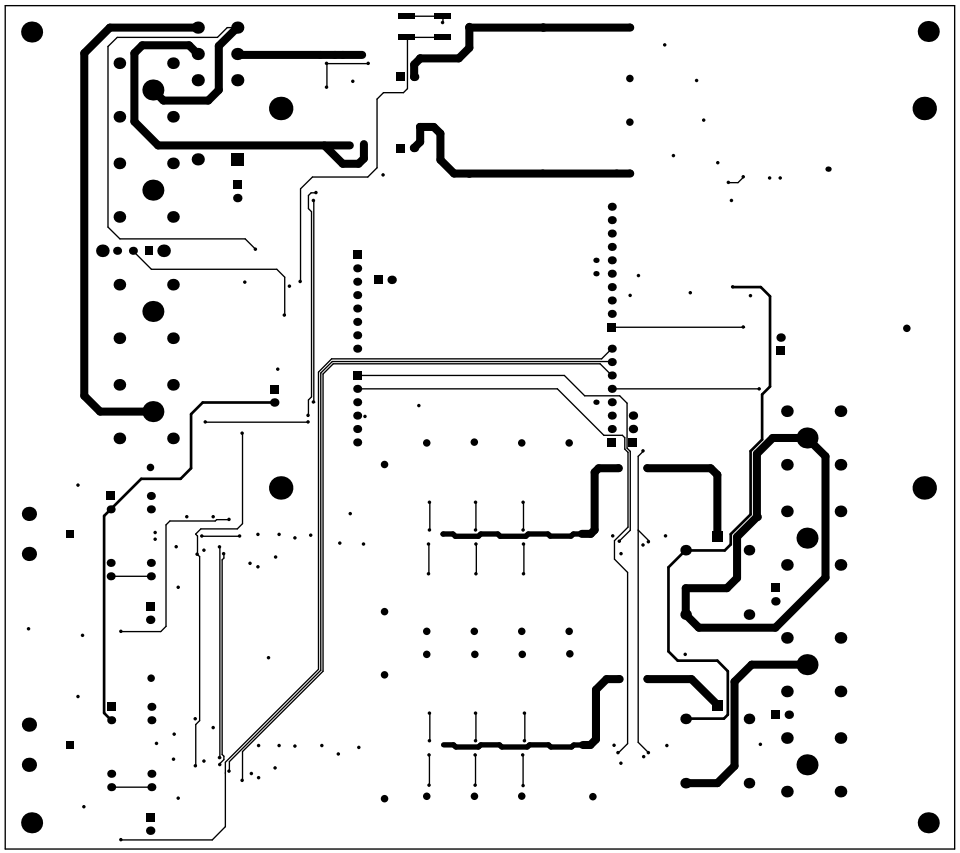


TOP

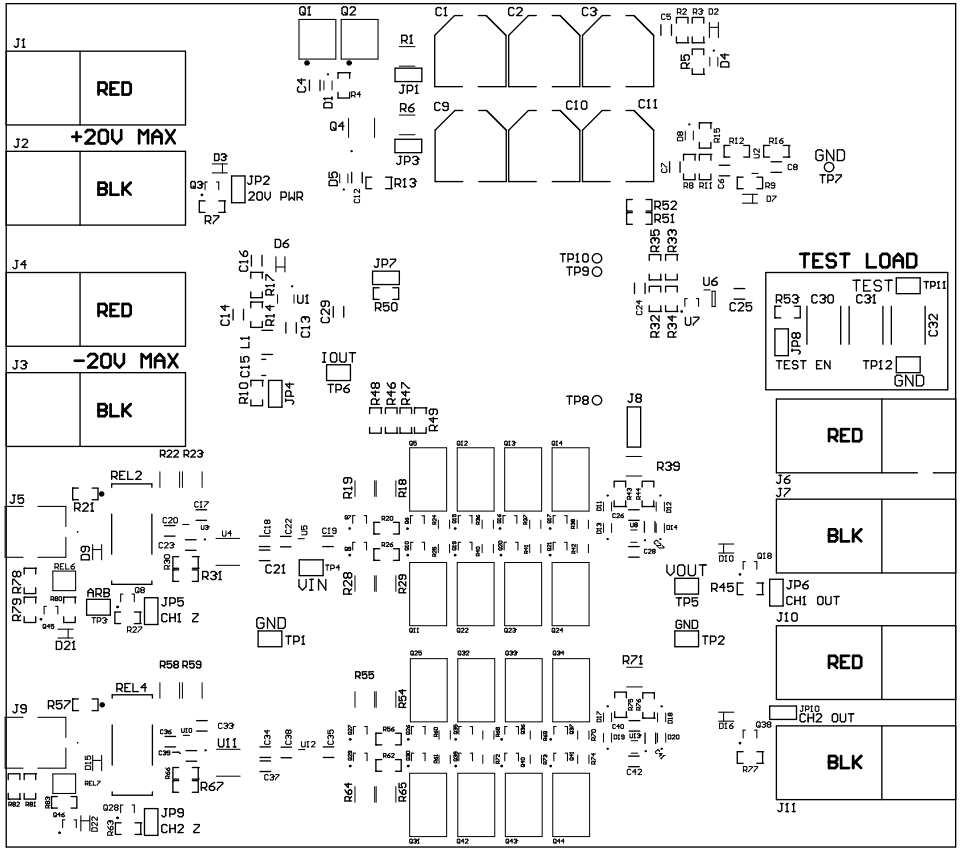
SIGNAL LAYER 1



SIGNAL LAYER 2

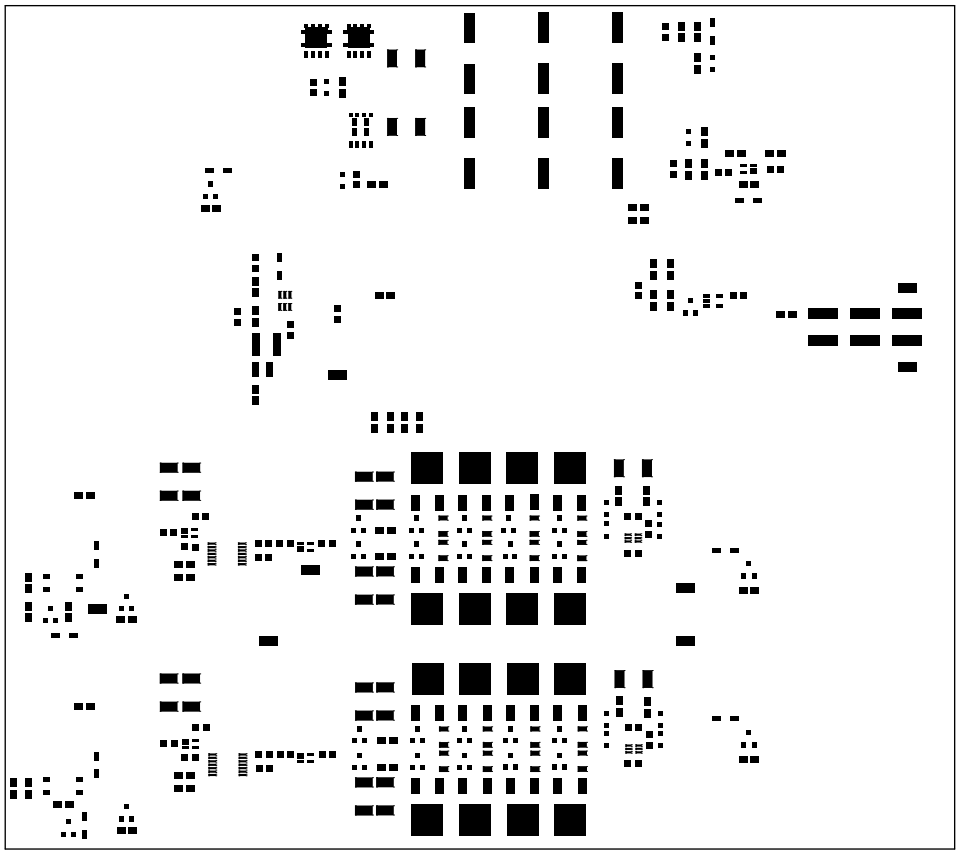


BOTTOM

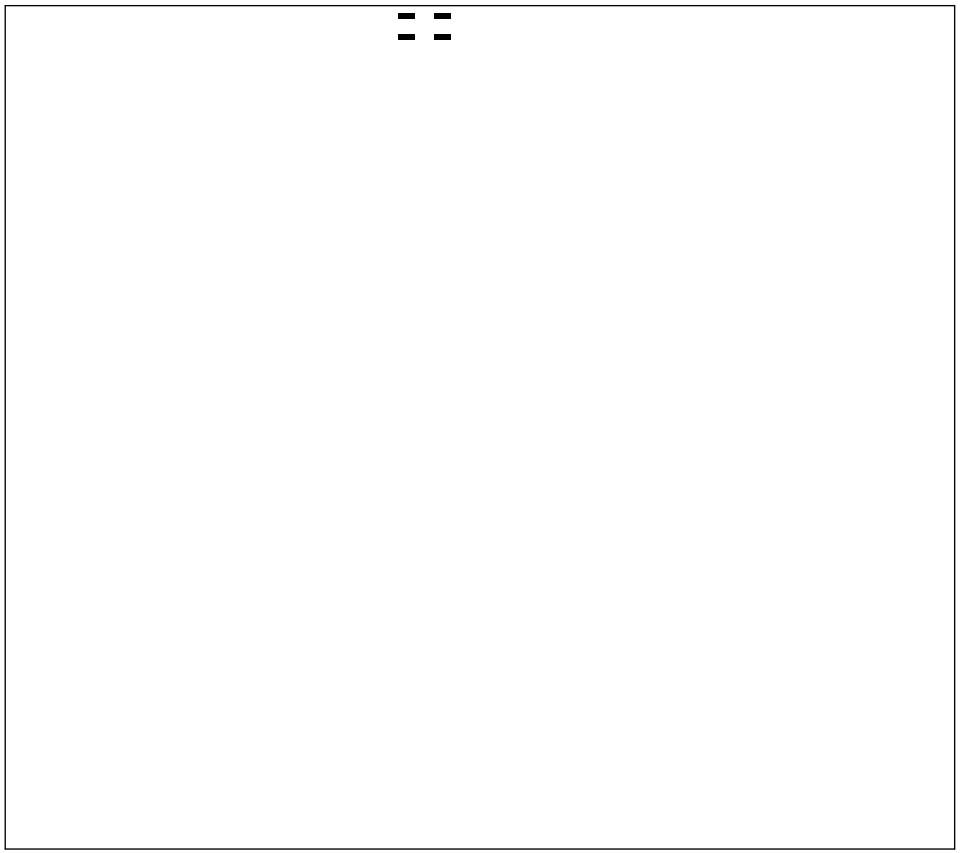

J1
RED
+20V MAX
J2
BLK
J4
RED
-20V MAX
J3
BLK
TEST LOAD
TEST
TEST EN
GND
J6
RED
J7
BLK
J10
RED
J11
BLK
J5
J9
VIN
VOUT
IOUT
GND
JP1
JP2
20V PWR
JP3
JP4
JP5
CH1 Z
JP6
CH1 OUT
JP7
JP8
JP9
CH2 Z
JP10
CH2 OUT
TP1
TP2
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
ARB
REL2
REL4
REL6
REL7

TOP SILK

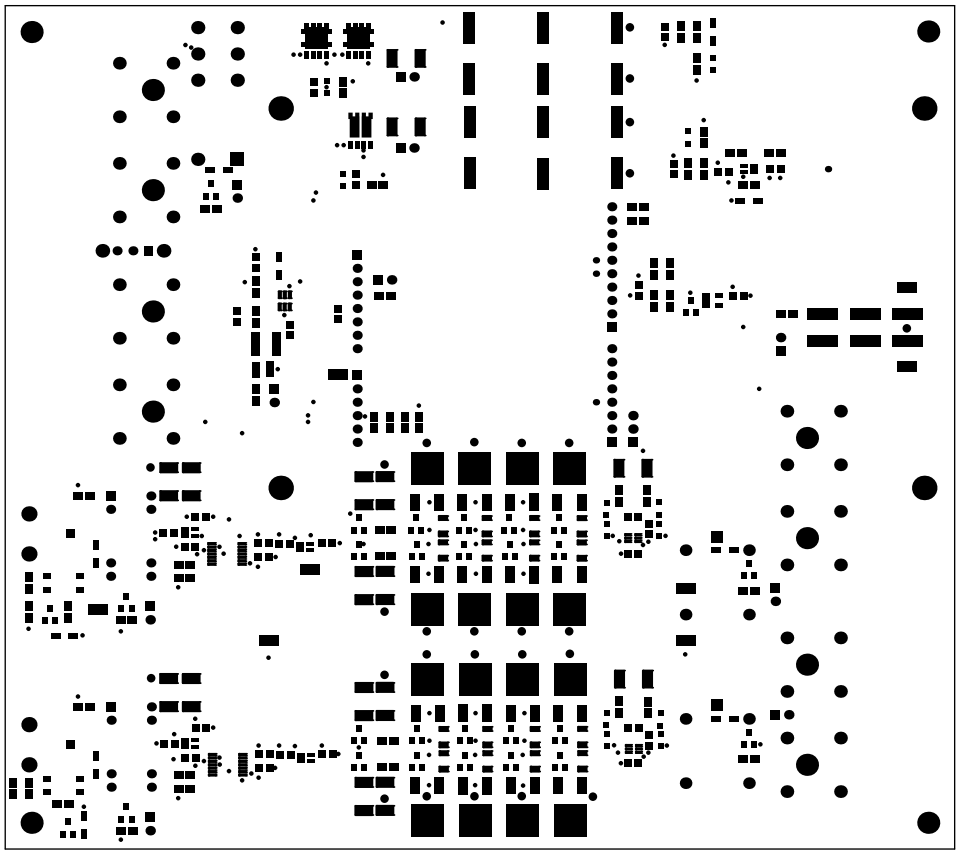
IWR Engineering
Ideas Made Real
ARBITRARY POWER BOOSTER
IWR-002-BCB REV I
[ ] PLATED 1oz PCB RATED 6.2A
[ ] PLATED 2oz PCB RATED 10.5A
LIMITS:
MAX INPUT VMB SUPPLY +\-15V
MAX INPUT VAB SIGNAL +\-15V
MAX CONTINEOUS CURRENT PER CHANNEL 10A rms
MIN DISCHARGE TIME ON LOAD CAP 8.8s
OUTPUT LOAD I = (NOMINAL DC LOAD + Vpk\xI<)A rms
CH1 INPUT
CH2 INPUT
CH1 OUTPUT
CH2 OUTPUT
-50V PWR INPUT
+50V PWR INPUT
OFF
ON
SW1
DISPLAY READS THIS ORIENTATION
480X272 RESOLUTION
CN1
CN2
CN3
CN4
RESET
SW2
BT1
BOTTOM SILK



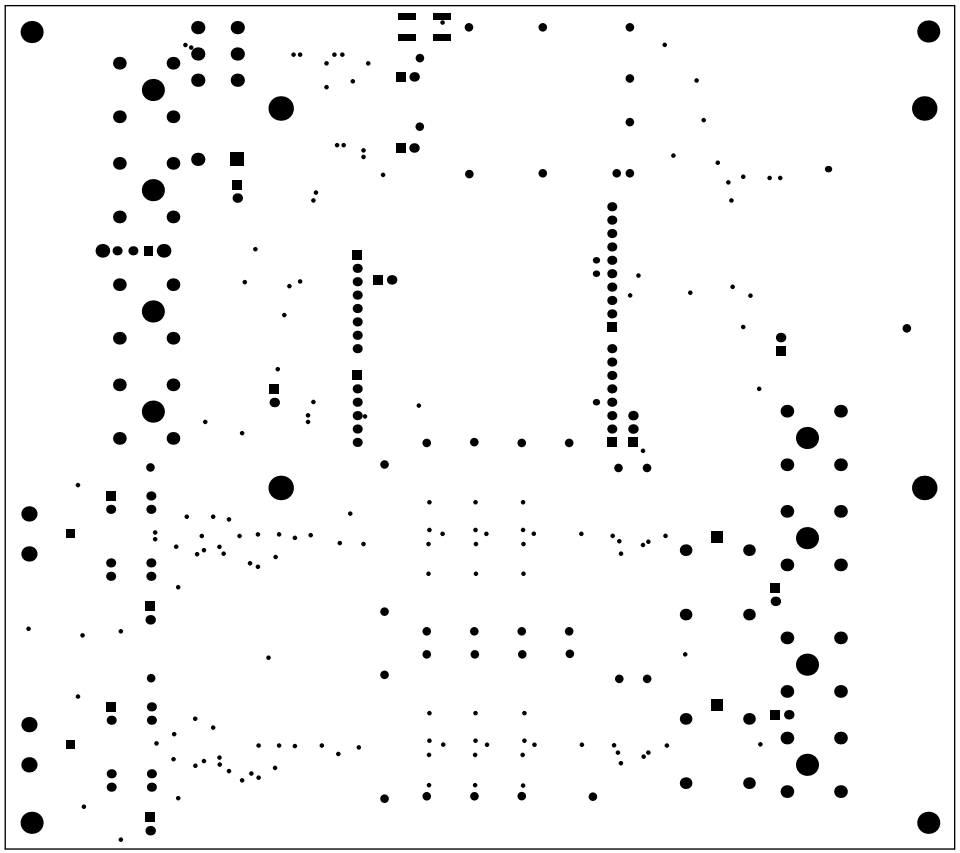
TOP PM



BOTTOM PM



TOP SM

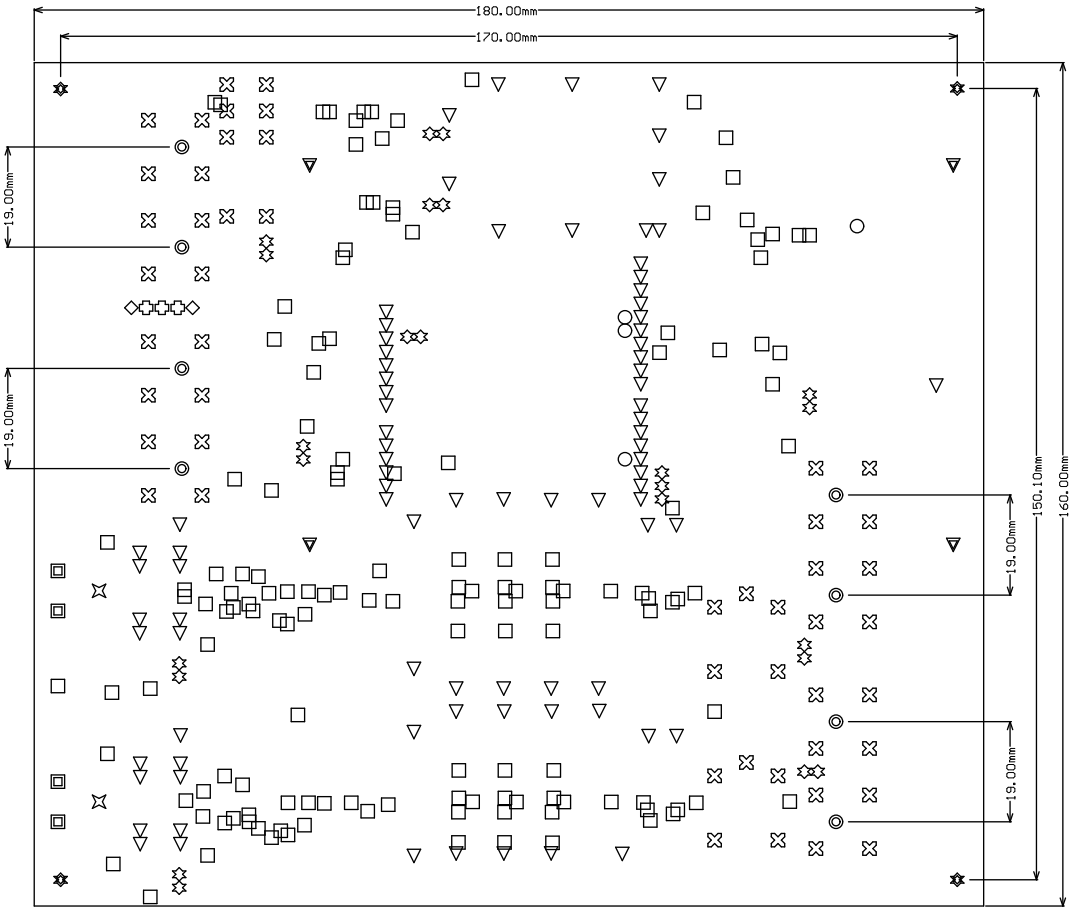


BOTTOM SM

Symbol	Hit Count	Finished Hole Size	Plated	Hole Type
⊠	2	0.920mm (36.22mil)	PTH	Round
◇	2	1.590mm (62.60mil)	PTH	Round
✿	3	1.010mm (39.76mil)	PTH	Round
○	4	0.508mm (20.00mil)	PTH	Round
◙	4	1.800mm (70.87mil)	PTH	Round
▽	4	3.175mm (125.00mil)	PTH	Round
✱	4	3.300mm (129.92mil)	PTH	Round
◎	8	2.200mm (86.61mil)	PTH	Round
✲	23	0.900mm (35.43mil)	PTH	Round
⊠	50	1.300mm (51.18mil)	PTH	Round
▽	86	0.762mm (30.00mil)	PTH	Round
□	147	0.381mm (15.00mil)	PTH	Round
	337 Total			

LAYER STACK:
Top Layer
Signal Layer 1
Signal Layer 2
Bottom Layer

+/- 20V TRACE:
MAX BOARD CURRENT 1oz PLATING: 6.50A RMS
MAX BOARD CURRENT 2oz PLATING: 10.70A RMS



DRILL & FAB

PCB FABRICATION NOTES:

MATERIAL:
FR4 (GF per MIL-P-13949) MIN UL 94V0

Cu WEIGHT:
OUTER LAYER: 1oz
INNER LAYER: NA

SOLDER MASK:
TYPE: LPI (LIQUID PHOTO-IMAGE)
COVER: SMOBC (SOLDER MASK OVER BARE Cu)
COLOR: RED (PROTOTYPE) OR GREEN (PRODUCTION) GLOSS

OVERALL PCB THICKNESS:
PCB: 1.6mm (63MIL)
TOLERANCE: 0.178mm (7MIL)

PCB ELECTRICAL TEST
TESTED TO GERBER DATA
PURCHASE ORDER TO OVERRIDE

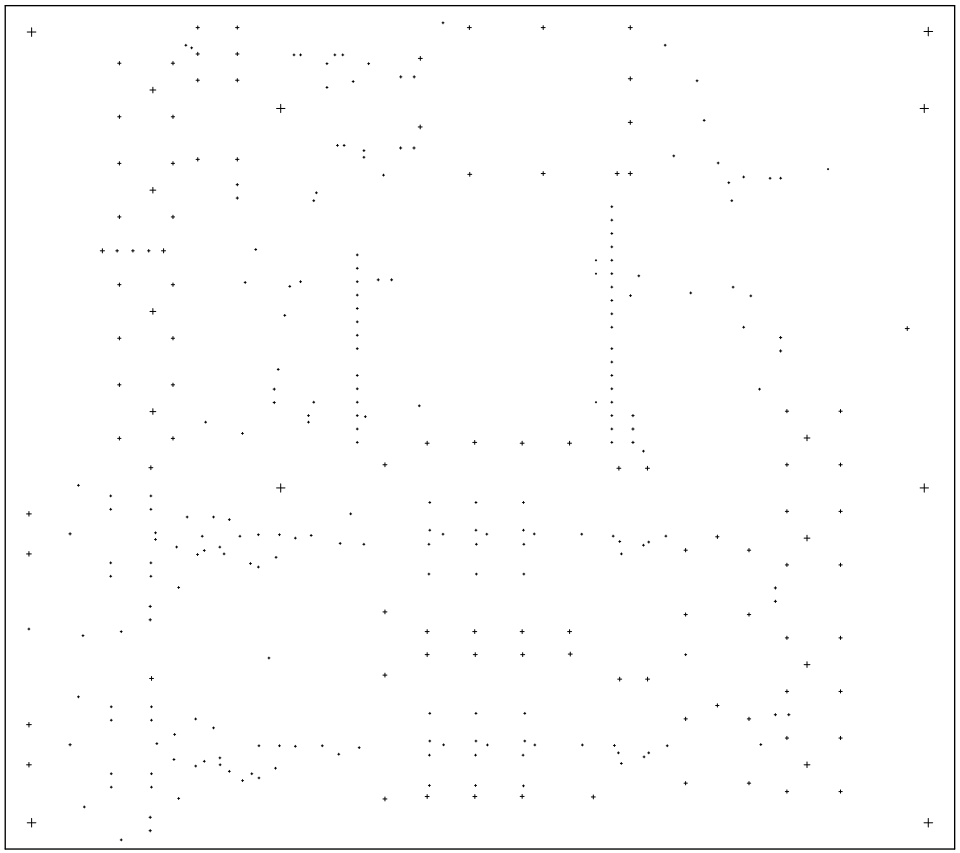
HOLE DIAMETER TOLERANCE:
PLATED HOLE TOLERANCE: 0.076mm (3MIL)
NON PLATED HOLE TOLERANCE: 0.076mm (3MIL)

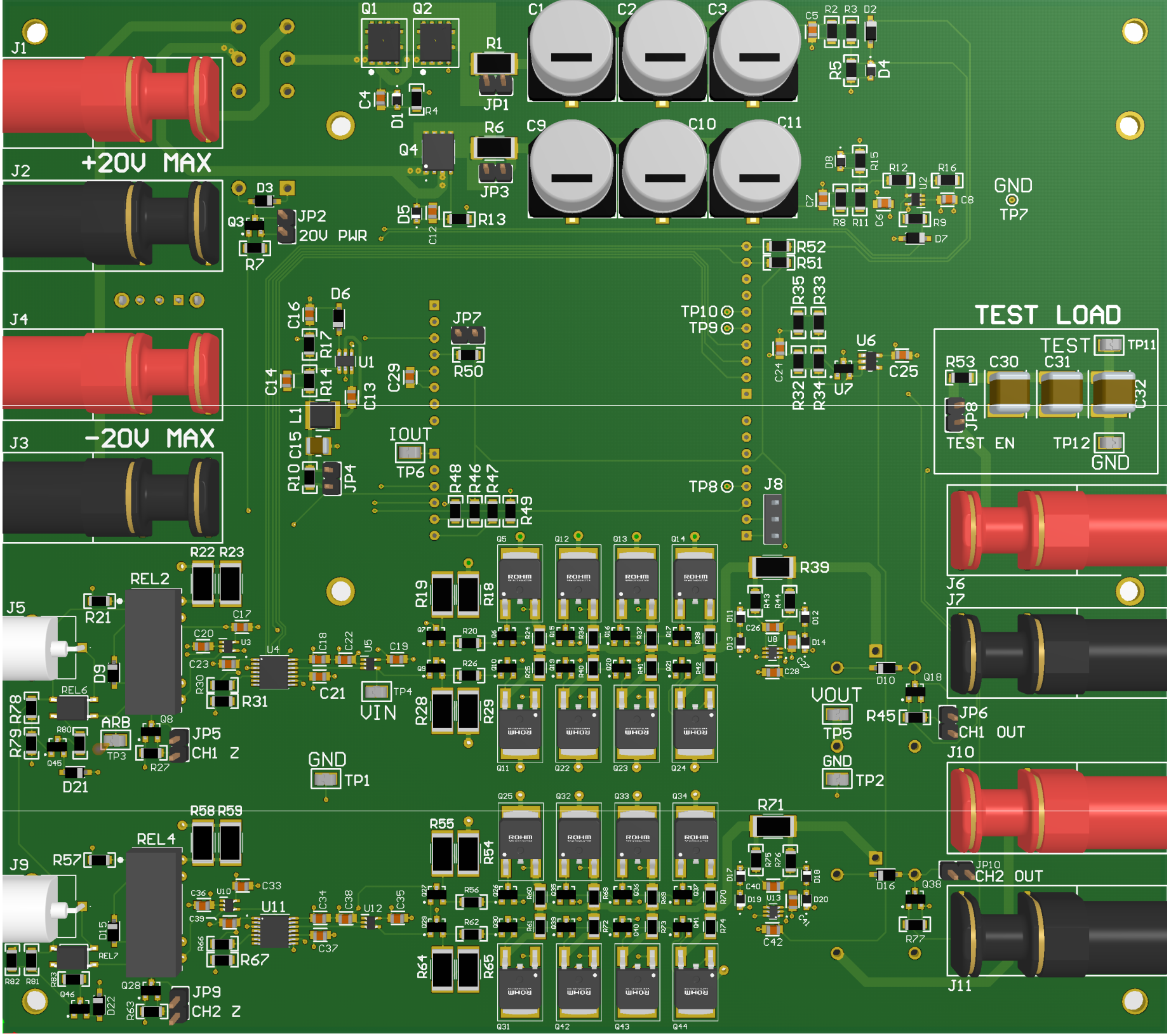
SILK SCREEN
SIDES: TOP
COLOR: WHITE
TYPE: LPI (PREFERRED)

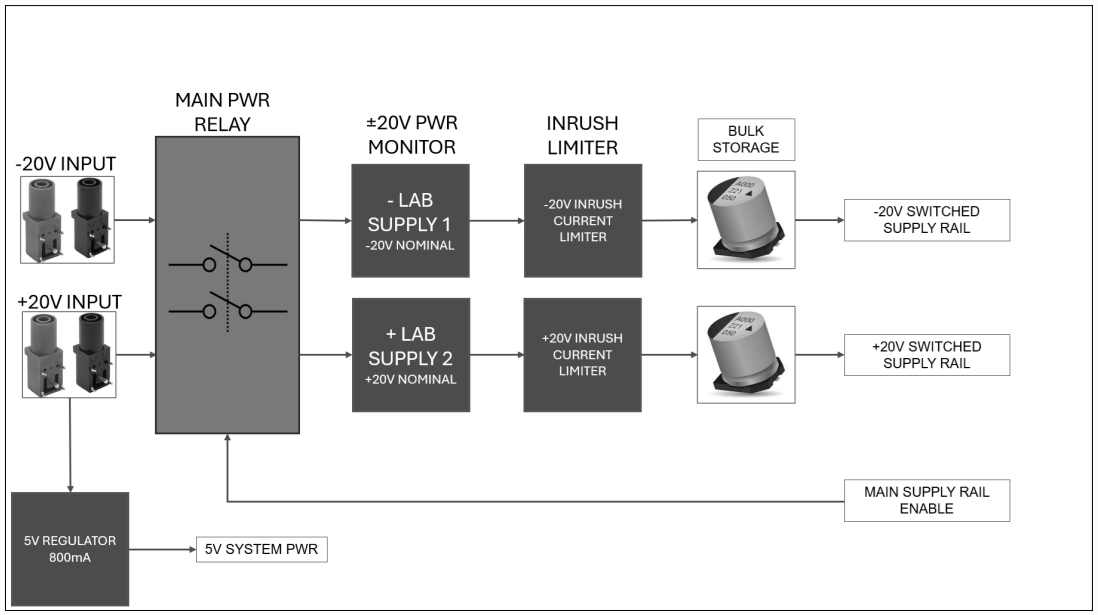
SURFACE FINSIH:
PROTOTYPE: HASL OR ENIG
PRODUCTION: ENIG (ONLY IF SPEC ON PURCHASE ORDER)

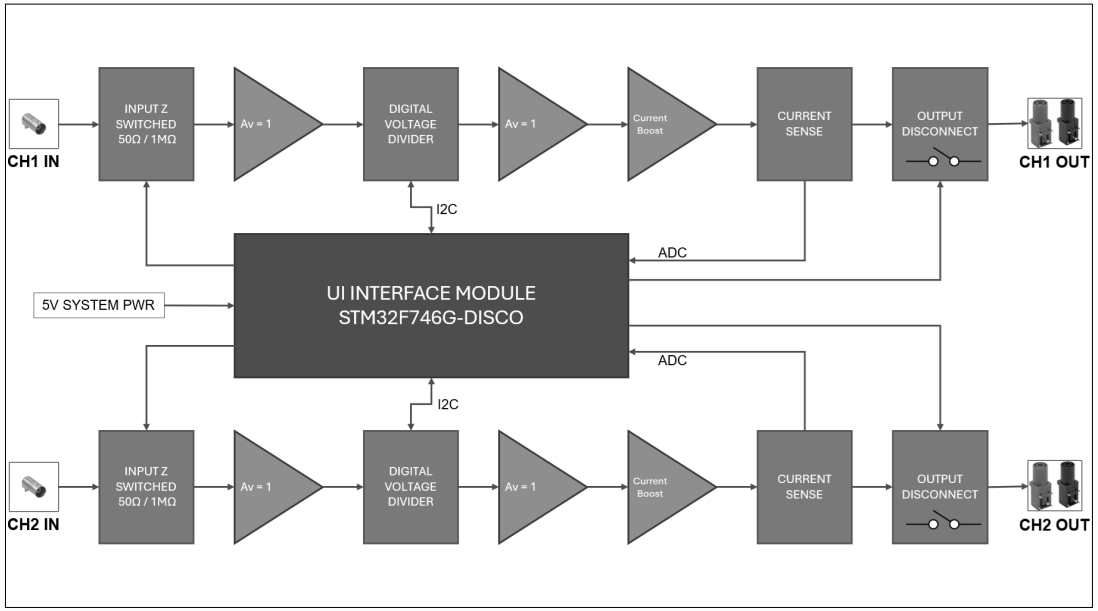
ACCEPTABILITY:
STANDARD: IPC-A-600 (LATEST REV)
MFG TO ADD: DATE CODE, UL FLAME CODE

IMR Engineering	REV 1	ENGG: IMR-005-PCB
Arb Power Booster	02/25/2025	Hab Collector




J1
+20V MAX
J2
J4
J3
-20V MAX
Q1
Q2
R1
JP1
C1
C2
C3
C5
R2
R3
D2
R5
D4
C4
D1
R4
Q4
R6
JP3
C9
C10
C11
D8
R15
R12
R16
U2
C7
R8
R11
C6
C8
R9
D7
GND
TP7
D3
Q3
JP2
20V PWR
R7
D5
C12
R13
D6
C16
R17
U1
C14
R14
C13
C29
L1
C15
R10
JP4
JP7
R50
IOUT
TP6
R48
R46
R47
R49
R52
R51
TP10
TP9
R35
R33
R32
R34
U7
C24
U6
C25
TEST LOAD
TEST
TP11
R53
C30
C31
C32
JP8
TEST EN
TP12
GND
TP8
J8
R39
J6
J7
R22
R23
REL2
R21
J5
C17
C20
U3
C23
R30
R31
U4
C18
C22
U5
C19
C21
TP4
VIN
D9
REL6
R78
R79
R80
Q45
D21
ARB
TP3
Q8
R27
JP5
CH1 Z
R19
R18
R20
R26
R28
R29
Q5
Q12
Q13
Q14
Q11
Q22
Q23
Q24
R43
R44
C26
U8
C28
D11
D12
D13
D14
D10
Q18
VOUT
TP5
R45
JP6
CH1 OUT
GND
TP1
GND
TP2
J10
R58
R59
REL4
R57
J9
C36
U10
C33
C39
U11
C34
C38
U12
C35
C37
R66
R67
REL7
R82
R81
R83
Q46
D22
R63
Q28
JP9
CH2 Z
R55
R54
R56
R62
R64
R65
Q25
Q32
Q33
Q34
Q31
Q42
Q43
Q44
R71
R75
R76
C40
D19
U13
C42
D17
D18
D16
D20
Q38
R77
JP10
CH2 OUT
J11

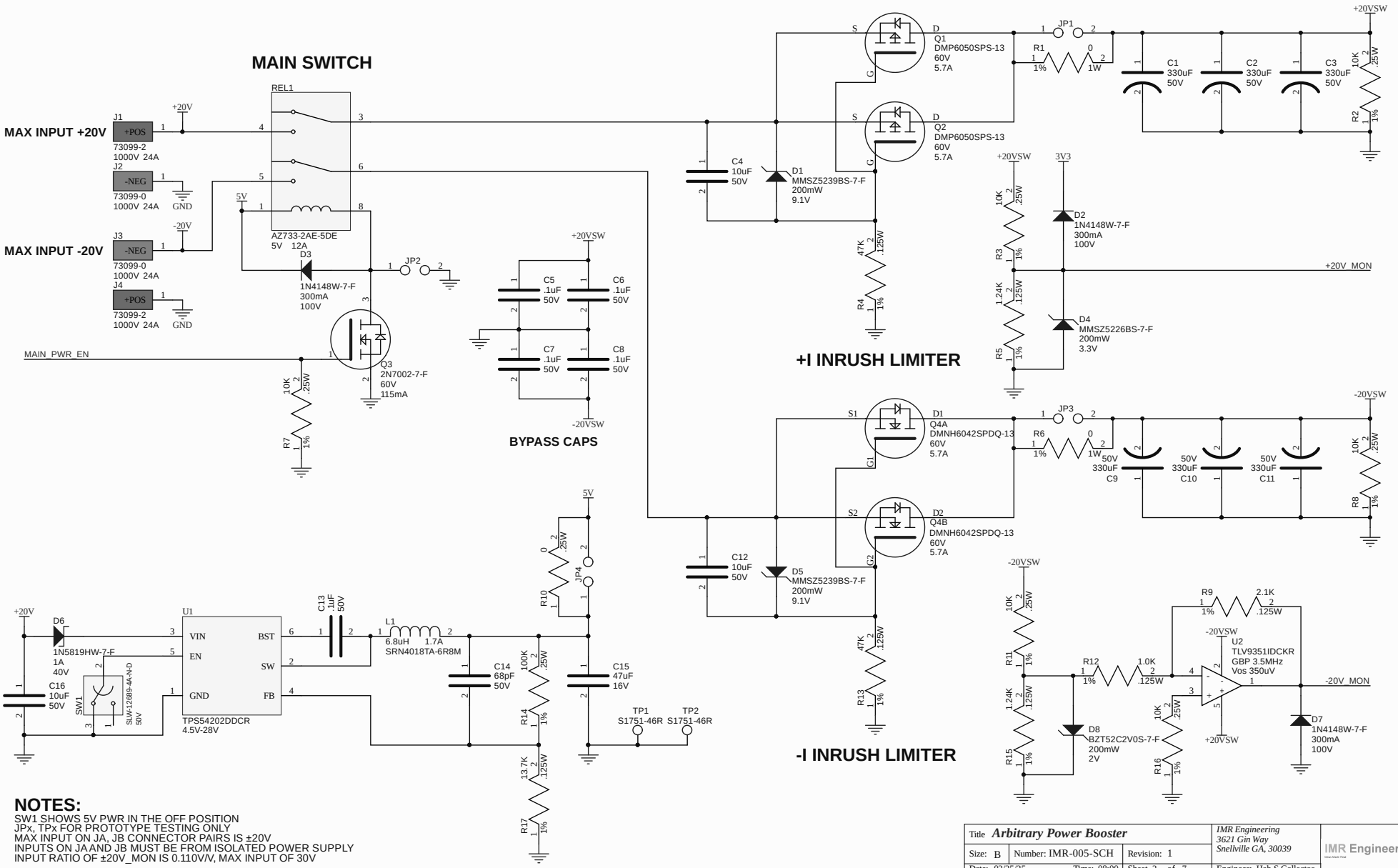




REVISION HISTORY:

REV	ECO	CHANGE DESCRIPTION
1	NA	Initial design

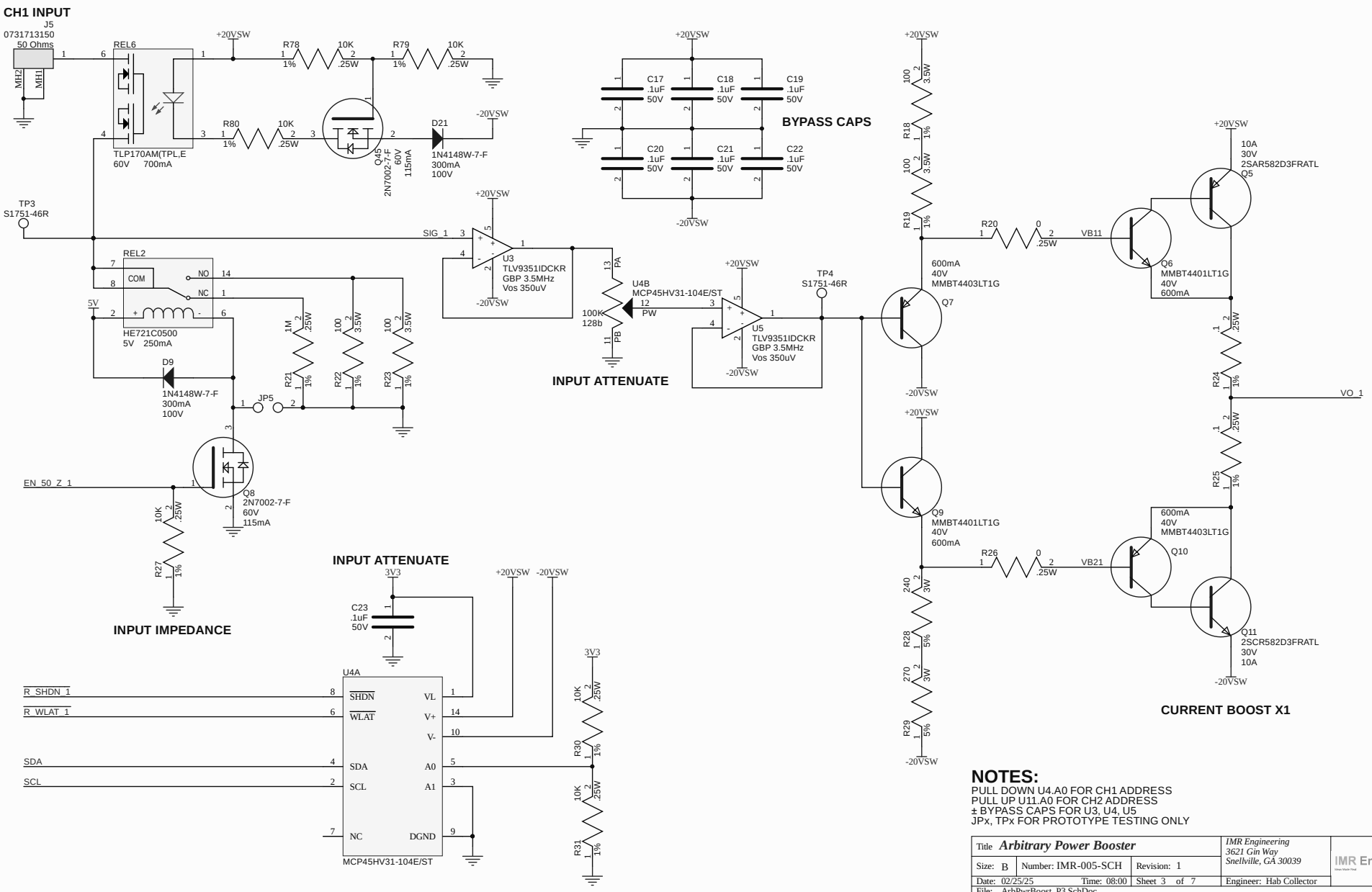
Title	***Arbitrary Power Booster***		*IMR Engineering* *3621 Gin Way* *Snellville GA, 30039*
Size: B	Number: IMR-005-SCH	Revision: 1	IMR Engineering
Date: 02/25/25	Time: 08:00	Sheet 1 of 7	Engineer: Hab S Collector
File: ArbPwrBoost_P1.SchDoc			

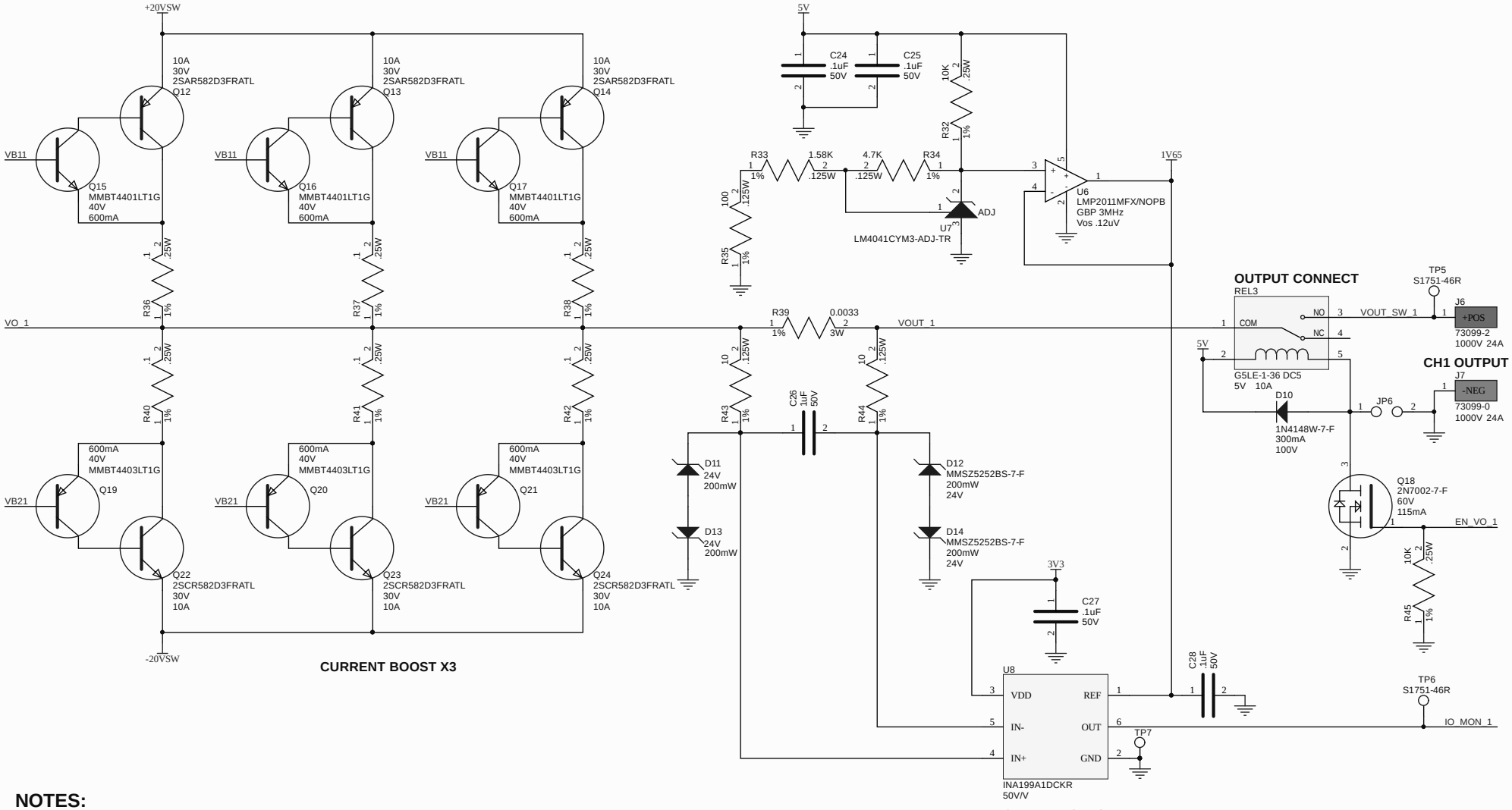


NOTES:

SW1 SHOWS 5V PWR IN THE OFF POSITION
JPx, TPx FOR PROTOTYPE TESTING ONLY
MAX INPUT ON JA, JB CONNECTOR PAIRS IS ±20V
INPUTS ON JA AND JB MUST BE FROM ISOLATED POWER SUPPLY
INPUT RATIO OF ±20V_MON IS 0.110V/V, MAX INPUT OF 30V

Title: *Arbitrary Power Booster*			*IMR Engineering* *3621 Gin Way* *Snellville GA, 30039*
Size: B	Number: IMR-005-SCH	Revision: 1	IMR Engineering
Date: 02/25/25	Time: 08:00	Sheet 2 of 7	Engineer: Hab S Collector
File: ArbPwrBoost_P2.SchDoc			

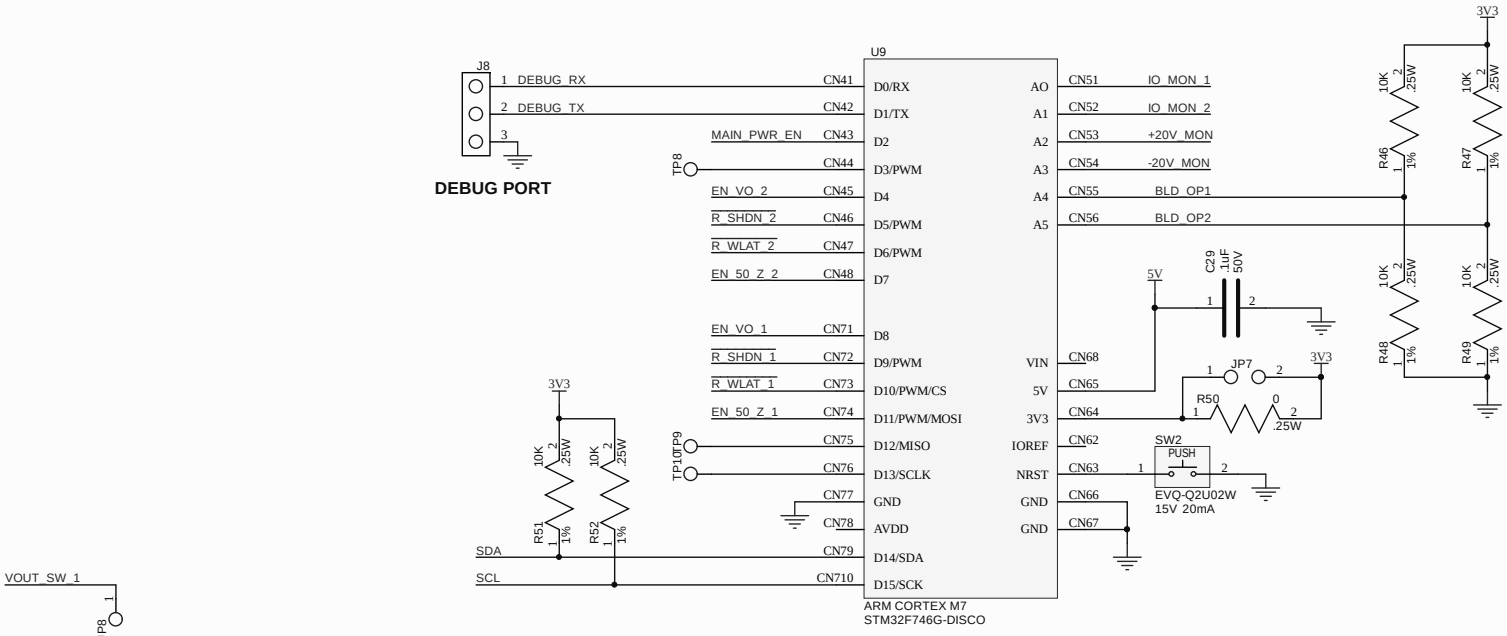

CH1 INPUT
J5
0731713150
50 Ohms
MH2
MH1
REL6
TLP170AM(TPL,E
60V 700mA
+20VSW
R78 10K 1% .25W
R79 10K 1% .25W
R80 10K 1% .25W
Q45
2N7002-7F
60V
115mA
D21
1N4148W-7-F
300mA
100V
-20VSW
BYPASS CAPS
C17 .1uF 50V
C18 .1uF 50V
C19 .1uF 50V
C20 .1uF 50V
C21 .1uF 50V
C22 .1uF 50V
TP3
S1751-46R
SIG_1
U3
TLV9351IDCKR
GBP 3.5MHz
Vos 350uV
REL2
COM
NO
NC
5V
HE721C0500
5V 250mA
D9
1N4148W-7-F
300mA
100V
JP5
R21 1M 1%
R22 100 1%
R23 100 1%
INPUT ATTENUATE
U4B
MCP45HV31-104E/ST
100K
128b
PA
PW
PB
U5
TLV9351IDCKR
GBP 3.5MHz
Vos 350uV
TP4
S1751-46R
EN_50_Z_1
Q8
2N7002-7F
60V
115mA
10K .25W
R27 1%
INPUT IMPEDANCE
INPUT ATTENUATE
3V3
C23 .1uF 50V
U4A
R_SHDN_1
R_WLAT_1
SDA
SCL
SHDN
WLAT
SDA
SCL
NC
VL
V+
V-
A0
A1
DGND
MCP45HV31-104E/ST
R30 10K 1%
R31 10K 1%
R18 100 3.5W 1%
R19 100 3.5W 1%
R20 0 .25W
VB11
600mA
40V
MMBT4403LT1G
Q7
MMBT4401LT1G
40V
600mA
Q6
10A
30V
2SAR582D3FRATL
Q5
R24 1%
R25 1%
VO_1
Q9
MMBT4401LT1G
40V
600mA
R26 0 .25W
VB21
600mA
40V
MMBT4403LT1G
Q10
R28 240 3W 5%
R29 270 3W 5%
Q11
2SCR582D3FRATL
30V
10A
CURRENT BOOST X1
NOTES:
PULL DOWN U4.A0 FOR CH1 ADDRESS
PULL UP U11.A0 FOR CH2 ADDRESS
± BYPASS CAPS FOR U3, U4, U5
JPx, TPx FOR PROTOTYPE TESTING ONLY
Title Arbitrary Power Booster
Size: B
Number: IMR-005-SCH
Revision: 1
Date: 02/25/25
Time: 08:00
Sheet 3 of 7
File: ArbPwrBoost_P3.SchDoc
IMR Engineering
3621 Gin Way
Snellville, GA 30039
Engineer: Hab Collector



NOTES:

3V3, 1V65 ARE BOTH AVAILABLE WITH 5V
3V3 IS OUTPUT FROM MODULE - DO NOT OPERATE WITHOUT MODULE INSTALLED OR DAMAGE TO CURRENT SENSE MAY OCCUR
JPx, TPx FOR PROTOTYPE TESTING ONLY

Title: *Arbitrary Power Booster*			*IMR Engineering*
Size: B	Number: IMR-005-SCH	Revision: 1	*3621 Gin Way*
Date: 02/25/25	Time: 08:00	Sheet 4 of 7	*Snellville, GA 30039*
File: ArbPwrBoost_P4.SchDoc		Engineer: Hab Collector	IMR Engineering

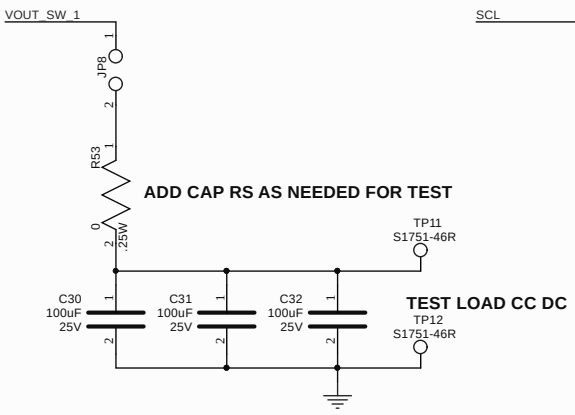


CONTROLLER MODULE WITH GUI INTERFACE

A0 TO A4 ADC INPUTS

MOUNTING HOLES

MTN1 MTN2 MTN3 MTN4
3.3mm 3.3mm 3.3mm 3.3mm

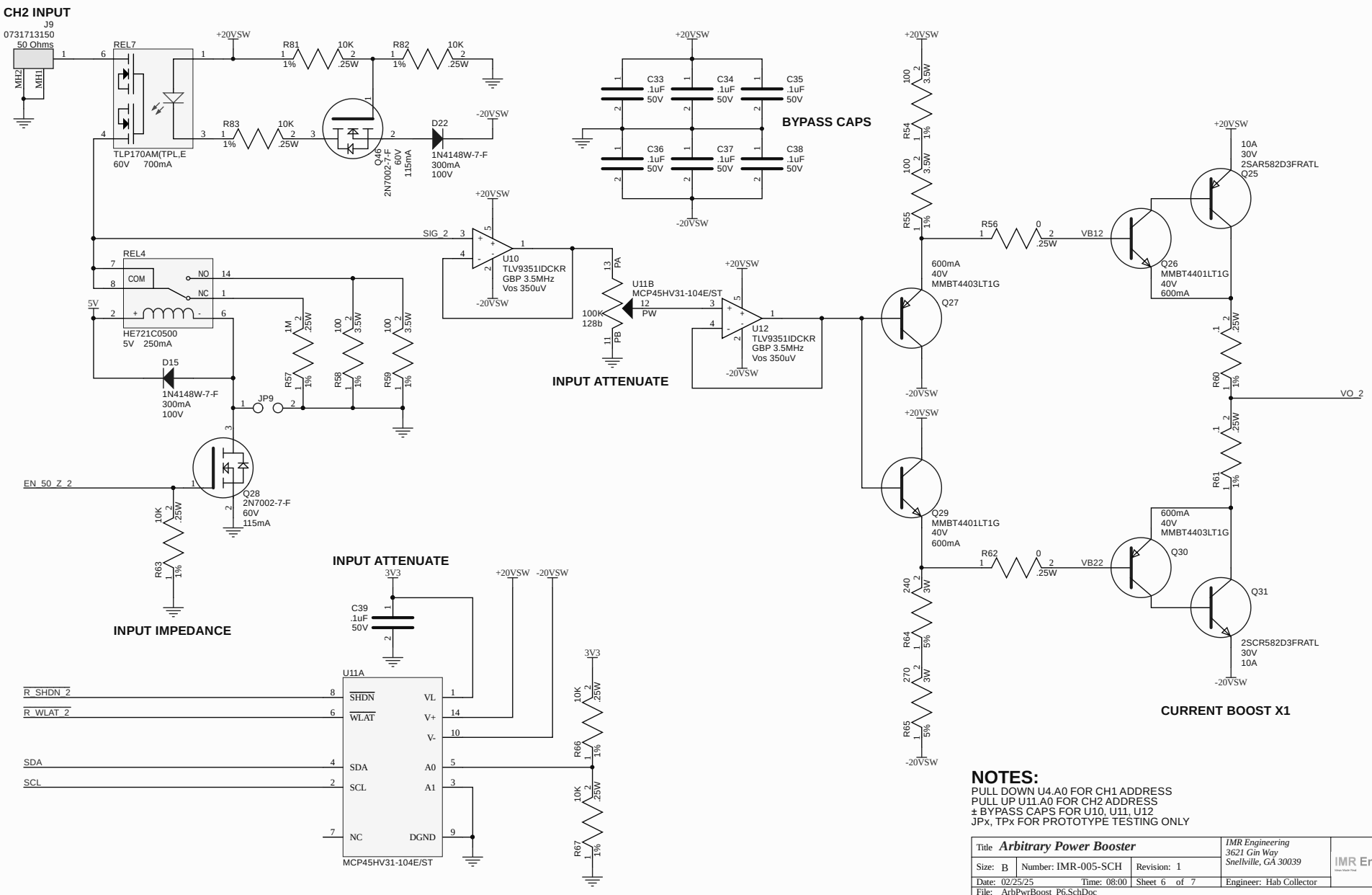


TEST CIRCUIT - FOR PROTOTYPE ONLY

NOTES:

I2C PULL UP ON MODULE - ADDED HERE JUST IN CASE - DNP
5V IS POWER INPUT TO MODULE
3V3 IS REGULATED POWER OUTPUT FROM MODULE
JPx, TPx FOR PROTOTYPE TESTING ONLY
CHANNEL 1 AND CHANNEL 2 OPERATE INDEPENDENTLY OF EACH OTHER
CHANNEL 1 IS MANDATORY, CHANNEL 2 IS A BUILD OPTION
BLD_OP1, 2 ARE HARDWARE FIRMWARE BUILD / CONFIG OPTIONS TBD

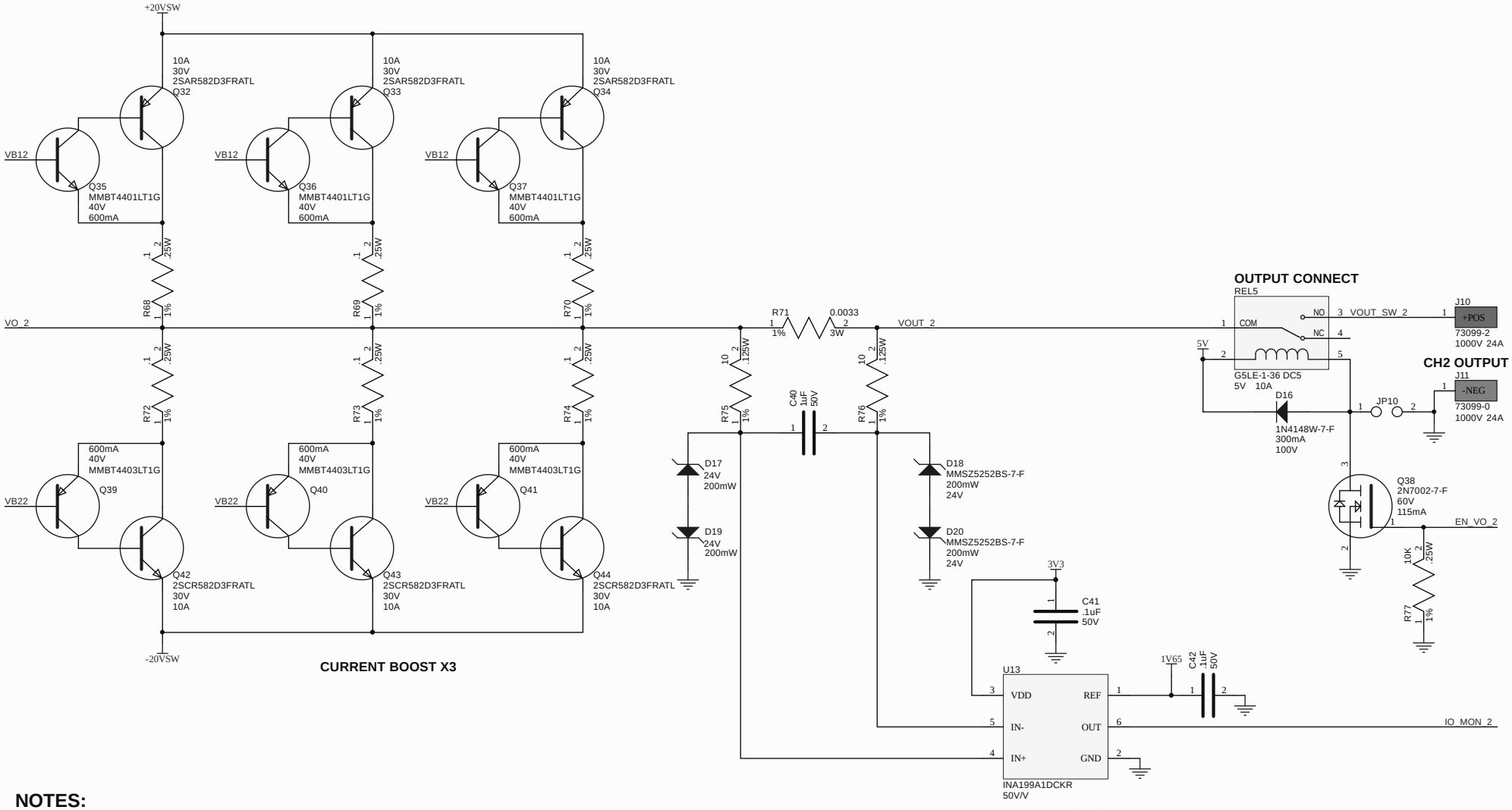
Title *Arbitrary Power Booster*			*IMR Engineering* *3621 Gin Way* *Snellville, GA 30039*
Size: B	Number: IMR-005-SCH	Revision: 1	IMR Engineering
Date: 02/25/25	Time: 08:00	Sheet 5 of 7	Engineer: Hab Collector
File: ArbPwrBoost_P5.SchDoc			



NOTES:

PULL DOWN U4.A0 FOR CH1 ADDRESS
PULL UP U11.A0 FOR CH2 ADDRESS
± BYPASS CAPS FOR U10, U11, U12
JPx, TPx FOR PROTOTYPE TESTING ONLY

Title: *Arbitrary Power Booster*			*IMR Engineering* *3621 Gin Way* *Snellville, GA 30039*
Size: B	Number: IMR-005-SCH	Revision: 1	IMR Engineering
Date: 02/25/25	Time: 08:00	Sheet 6 of 7	Engineer: Hab Collector
File: ArbPwrBoost_P6.SchDoc			



CURRENT BOOST X3

NOTES:

3V3, 1V65 ARE BOTH AVAILABLE WITH 5V
3V3 IS OUTPUT FROM MODULE - DO NOT OPERATE WITHOUT MODULE INSTALLED OR DAMAGE TO CURRENT SENSE MAY OCCUR
JPx, TPx FOR PROTOTYPE TESTING ONLY

Title	*Arbitrary Power Booster*		*IMR Engineering*
Size: B	Number: IMR-005-SCH	Revision: 1	*3621 Gin Way*
Date: 02/25/25	Time: 08:00	Sheet 7 of 7	*Snellville, GA 30039*
File: ArbPwrBoost_P7.SchDoc		Engineer: Hab Collector	IMR Engineering

PROTOTYPE BOM

Arbitrary Power Booster

Source Data From:	**Arb_Power_Booster.PrjPcb**	**Company Part Number:**	**IMR-005-SCH**
Project:	**Arb_Power_Booster.PrjPcb**	**PCB Revision:**	**1**
Variant:	**None**	**Engineer:**	**Hab S Collector**
Report Date:	2/25/2025 5:11:37 AM		
Print Date:	25-Feb-25 5:12:15 AM		

IMR Engineering
Ideas Made Real

#	Quantity	LibRef	Description	Designator	MFG	MFG_PN	Supplier 1	Supplier Part Number 1	Unit Price	TOTAL
1	6	CAP_330UF_50V_ALE	CAP ALE 330UF 20% 50V SMD	C1, C2, C3, C9, C10, C11	EEV-FK1H331Q	Panasonic Electronic	DigiKey	PCE3475CT-ND	1.41	$8.46
2	3	CAP_SMD_10UF_50V_0805	CAP CER 10UF 50V X5R 0805	C4, C12, C16	Murata Electronics	GRM21BR61H106KE43L	DigiKey	490-18663-1-ND	.28	$0.84
3	26	CAP_SMD_0.1UF_50V_0805	CAP CER 0.1UF 50V X7R 0805	C5, C6, C7, C8, C13, C17, C18, C19, C20, C21, C22, C23, C24, C25, C27, C28, C29, C33, C34, C35, C36, C37, C38, C39, C41, C42	KYOCERA AVX	KGM21NR71H104KT	DigiKey	478-KGM21NR71H104KTCT-ND	.1	$2.60
4	1	CAP_SMD_68PF_50V_0805	CAP CER 68PF 50V X7R 0805	C14	KEMET	C0805C680K5RACAUTO	DigiKey	399-C0805C680K5RACAUTOCT-ND	.24	$0.24
5	1	CAP_SMD_47UF_16V_1210	CAP CER 47UF 50V X5R 1210	C15	Murata Electronics	GRM32ER60J476ME20L	DigiKey	490-1887-1-ND	.28	$0.28
6	2	CAP_SMD_1UF_50V_0805	CAP CER 1UF 50V X7R 0805	C26, C40	KYOCERA AVX	08055C105K4T2A	DigiKey	478-KAM21KR71H105KUCT-ND	.27	$0.54
7	3	CAP_SMD_100UF_25V_SMD	CAP CER 100UF 25V X7S SMD	C30, C31, C32	Murata Electronics	KCM55WC71E107MH13L	DigiKey	490-KCM55WC71E107MH13LCT-ND	5.68	$17.04
8	2	DIODE_ZENER_MMSZ5239BS-7-F	DIODE ZENER 9.1V 200MW SOD323	D1, D5	Diodes Inc	MMSZ5239BS-7-F	DigiKey	MMSZ5239BS-FDICT-ND	.18	$0.36
9	9	DIODE_1N4148W-7-F	RELAY REED SPDT 250MA 5V	D2, D3, D7, D9, D10, D15, D16, D21, D22	Diodes Inc	1N4148W-7-F	DigiKey	1N4148W-FDICT-ND	.16	$1.44
10	1	DIODE_ZENER_MMSZ5226BS-7-F	DIODE ZENER 3.3V 200MW SOD323	D4	Diodes Inc	MMSZ5226BS-7-F	DigiKey	MMSZ5226BS-FDICT-ND	.15	$0.15
11	1	DIODE_SCHOTTKY_1N5819HW-7-F	DIODE SCHOTTKY 40V 1A SOD123	D6	Diodes Inc	1N5819HW-7-F	DigiKey	1N5819HW-FDICT-ND	.25	$0.25
12	1	DIODE_ZENER_BZT52C2V0S-7-F	DIODE ZENER 2V 200MW SOD323	D8	Diodes Inc	BZT52C2V0S-7-F	DigiKey	BZT52C2V0S-7FDICT-ND	.15	$0.15
13	8	DIODE_ZENER_MMSZ5252BS-7-F	DIODE ZENER 24V 200MW SOD323	D11, D12, D13, D14, D17, D18, D19, D20	Diodes Inc	MMSZ5252BS-7-F	DigiKey	MMSZ5252BS-FDICT-ND	.12	$0.96
14	4	CONN_PANOMA_73099-2	CONN 4mm Banana Socket Right Angle PCB RED	J1, J4, J6, J10	Pomona	73099-2	DigiKey	501-73099-2-ND	10.39	$41.56
15	4	CONN_PANOMA_73099-0	CONN 4mm Banana Socket Right Angle PCB BLK	J2, J3, J7, J11	Pomona	73099-0	DigiKey	501-73099-0-ND	10.39	$41.56
16	2	CONN_MOLEX_0731713150	CONN BNC RCPT R/A 50 OHM PCB	J5, J9	Molex	0731713150	DigiKey	WM20430-ND	1.40	$2.80
17	1	CONN_HEADER_3P_100MIL_VERT	CONN HEADER VERT 3POS 2.54MM	J8	Sullins Connector Solutions	PREC003SFAN-RC	Digi-Key	S1212EC-03-ND	.07	$0.07
18	10	CONN_JUMPER_2P_100MIL_VERT	CONN HEADER VERT 2POS 2.54MM	JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8, JP9, JP10	Sullins Connector Solutions	PREC002SFAN-RC	Digi-Key	S1212EC-02-ND	.07	$0.70
19	1	INDUCTOR_SRN4018TA-6R8M	FIXED IND 6.8UH 1.7A 98 MOHM SMD	L1	Bourns Inc.	SRN4018TA-6R8M	DigiKey	SRN4018TA-6R8MCT-ND	.48	$0.48
20	2	MOSFET_PCH_DMP6050SPS-13	MOSFET P-CH 60V 5.7A PWRDI5060-8	Q1, Q2	Diodes Inc	DMP6050SPS-13	DigiKey	DMP6050SPS-13DICT-ND	1.07	$2.14
21	7	MOSFET_NCH_2N7002-7-F	MOSFET N-CH 60V 115MA SOT23-3	Q3, Q8, Q18, Q28, Q38, Q45, Q46	Diodes Inc	2N7002-7-F	DigiKey	2N7002-FDICT-ND	.20	$1.40
22	1	MOSFET_NCH_DMNH6042SPDQ-13	MOSFET NCH 60V 5.7A POWERDI	Q4	Diodes Inc	DMNH6042SPDQ-13	DigiKey	DMNH6042SPDQ-13DICT-ND	1.36	$1.36
23	8	BJT_PNP_2SAR582D3FRATL	TRANS PNP 30V 5.7A TO-252	Q5, Q12, Q13, Q14, Q25, Q32, Q33, Q34	Rohm Semiconductor	2SAR582D3FRATL	DigiKey	846-2SAR582D3FRATLCT-ND	1.59	$12.72
24	10	BJT_NPN_MMBT4401LT1G	TRANS NPN 40V 0.6A SOT23-3	Q6, Q9, Q15, Q16, Q17, Q26, Q29, Q35, Q36, Q37	On Semiconductor	MMBT4401LT1G	DigiKey	MMBT4401LT1GOSCT-ND	.13	$1.30
25	10	BJT_PNP_MMBT4403LT1G	TRANS PNP 40V 0.6A SOT23-3	Q7, Q10, Q19, Q20, Q21, Q27, Q30, Q39, Q40, Q41	On Semiconductor	MMBT4403LT1G	DigiKey	MMBT4403LT1GOSCT-ND	.13	$1.30
26	8	BJT_NPN_2SCR582D3FRATL	TRANS NPN 30V 10A TO-252	Q11, Q22, Q23, Q24, Q31, Q42, Q43, Q44	Rohm Semiconductor	2SCR582D3FRATL	DigiKey	846-2SCR582D3FRATLCT-ND, 846-2SCR582D3FRATLCT-ND, 846-2SCR582D3FRATLCT-ND, 846-2SCR582D3FRATLCT-ND, 849-2SCR582D3FRATL-ND, 846-2SCR582D3FRATLCT-ND, 846-2SCR582D3FRATLCT-ND, 846-2SCR582D3FRATLCT-ND	1.76	$14.08
27	2	RES_SMD_0_2512_1W_1%	RES SMD 0 OHM 1% 1W 2512	R1, R6	Yageo	RC2512JK-070RL	DigiKey	YAG1232CT-ND	.2	$0.40
28	27	RES_SMD_10K_0805_1/4W_1%	RES SMD 10K OHM 1% 1/4W 0805	R2, R3, R7, R8, R11, R16, R27, R30, R31, R32, R45, R46, R47, R48, R49, R51, R52, R63, R66, R67, R77, R78, R79, R80, R81, R82, R83	Yageo	RC0805FR-7W10KL	DigiKey	13-RC0805FR-7W10KLCT-ND	.10	$2.70
29	2	RES_SMD_47K_0805_1/8W_1%	RES SMD 47K OHM 1% 1/8W 0805	R4, R13	Yageo	RC0805FR-1347KL	DigiKey	13-RC0805FR-1347KLCT-ND	.1	$0.20
30	2	RES_SMD_1.24K_0805_1/8W_1%	RES SMD 1.24K OHM 1% 1/8W 0805	R5, R15	Yageo	RC0805FR-071K24L	DigiKey	311-1.24KCRCT-ND	.1	$0.20
31	1	RES_SMD_2.1K_0805_1/8W_1%	RES SMD 2.1K OHM 1% 1/8W 0805	R9	Yageo	RC0805FR-072K1L	DigiKey	311-2.10KCRCT-ND	.1	$0.10
32	7	RES_SMD_0_0805_1/8W_1%	RES SMD 0 OHM 1% 1/8W 0805	R10, R20, R26, R50, R53, R56, R62	Yageo	RC0805JR-070RL	DigiKey	311-0.0ARCT-ND	.1	$0.70
33	1	RES_SMD_1.0K_0805_1/8W_1%	RES SMD 1.0K OHM 1% 1/8W 0805	R12	Yageo	RC0805FR-071KL	DigiKey	311-1.00KCRCT-ND	.1	$0.10
34	1	RES_SMD_100K_0805_1/4W_1%	RES SMD 100K OHM 1% 1/4W 0805	R14	Yageo	RC0805FR-07100KL	DigiKey	311-100KCRCT-ND	.13	$0.13
35	1	RES_SMD_13.7K_0805_1/8W_1%	RES SMD 13.7K OHM 1% 1/8W 0805	R17	Yageo	RC0805FR-0713K7L	DigiKey	311-13.7KCRCT-ND	.10	$0.10
36	8	RES_SMD_100_0805_3.5W_1%	RES SMD 100 OHM 1% 3.5W 2512	R18, R19, R22, R23, R54, R55, R58, R59	Ohmite	ALN2512F100RE-1	DigiKey	273-ALN2512F100RE-1CT-ND	1.50	$12.00
37	2	RES_SMD_1M_0805_1/4W_1%	RES SMD 1K OHM 1% 1/4W 0805	R21, R57	Yageo	RC0805FR-7W1ML	DigiKey	13-RC0805FR-7W1MLCT-ND	.10	$0.20
38	16	RES_SMD_0.1_1206_1/4W_1%	RES SMD 0.1 OHM 1% 1/4W 1206	R24, R25, R36, R37, R38, R40, R41, R42, R60, R61, R68, R69, R70, R72, R73, R74	Yageo	311-0.1LWCT-ND	DigiKey	311-100KCRCT-ND	.45	$7.20
39	2	RES_SMD_240_2512_3W_5%	RES 240 OHM 5% 3W 2512	R28, R64	Yageo	RC2512JK-07240RL	DigiKey	13-RC2512JK-07240RLCT-ND	.28	$0.56
40	2	RES_SMD_270_2512_3W_5%	RES 270 OHM 5% 1W 2512	R29, R65	Yageo	RC2512JK-07270RL	DigiKey	13-RC2512JK-07270RLCT-ND	.21	$0.42
41	1	RES_SMD_1.58K_0805_1/8W_1%	RES SMD 1.58K OHM 1% 1/8W 0805	R33	Yageo	RC0805FR-071K58L	DigiKey	311-1.58KCRCT-ND	.1	$0.10
42	1	RES_SMD_4.7K_0805_1/8W_1%	RES SMD 4.7K OHM 1% 1/8W 0805	R34	Yageo	RC0805FR-134K7L	DigiKey	13-RC0805FR-134K7LCT-ND	.1	$0.10
43	1	RES_SMD_100_0805_1/8W_1%	RES SMD 100 OHM 1% 1/8W 0805	R35	Yageo	RC0805FR-07100RL	DigiKey	311-100CRCT-ND	.1	$0.10
44	2	RES_SMD_0.0033_2512_3W_1%	RES SMD 0.0033 OHM 1% 3W 2512	R39, R71	Vishay Dale	WSLP25123L300FEA	DigiKey	541-10151-1-ND	1.23	$2.46
45	4	RES_SMD_10_0805_1/8W_1%	RES SMD 10 OHM 1% 1/8W 0805	R43, R44, R75, R76	Yageo	RC0805FR-1310RL	DigiKey	13-RC0805FR-1310RLCT-ND	.1	$0.40
46	1	RELAY_AZ733-2AE-5DE	RELAY REED SPDT 250MA 5V	REL1	American Zettler	AZ733-2AE-5DE	DigiKey	3385-AZ733-2AE-5DE-nd	2.18	$2.18
47	2	RELAY_HE721C0500	RELAY REED SPDT 250MA 5V	REL2, REL4	Littlefuse	HE721C0500	DigiKey	HE112-ND	3.77	$7.54
48	2	RELAY_G5LE-1-36 DC5	RELAY GEN PURPOSE SPDT 10A 5V	REL3, REL5	Omron	G5LE-1-36 DC5	DigiKey	G5LE-1-36DC5-ND	1.24	$2.48
49	2	RELAY_TLP170AM(TPLE	SSR RELAY SPST-NO 700MA 0-60V	REL6, REL7	Toshiba	TLP170AM(TPLE	DigiKey	264-TLP170AM(TPLECT-ND	1.33	$2.66
50	1	SWITCH_SLW-12689-4A-N-D	SWITCH SLIDE SPDT 300MA 50V	SW1	Same Sky	SLW-12689-4A-N-D	DigiKey	2223-SLW-12689-4A-N-D-ND	.48	$0.48
51	1	SWITCH_EVQ-Q2U02W	SWITCH TACTILE SPST-NO 0.02A 15V	SW2	American Zettler	EVQ-Q2U02W	DigiKey	P12954SCT-ND	.25	$0.25
52	8	CONN_TEST_POINT_S1751-46R	PCB TEST POINT CONNECT	TP1, TP2, TP3, TP4, TP5, TP6, TP11, TP12	Harw in Inc	S1751-46R	Digi-Key	952-1478-1-ND	.28	$2.24
53	1	IC_TPS54202DDCR	IC REG BUCK ADJ 2A SOT23	U1	Texas Instruments	TPS54202DDCR	Digi-Key	296-TPS54202DDCRCT-ND	.97	$0.97
54	5	OPAMP_TLV9351IDCKR	IC OPAMP GP 3.5MHZ 350uV C70-5	U2, U3, U5, U10, U12	Texas Instruments	TLV9351IDCKR	DigiKey	296-TLV9351IDCKRCT-ND	.49	$2.45
55	2	IC_MCP45HV31-104E/ST	IC DGT POT 100KOHM 128TP 14TSSOP	U4, U11	Microchip	MCP45HV31-104E/ST	DigiKey	MCP45HV31-104E/ST-ND	1.82	$3.64
56	1	OPAMP_LMP2011MFX/NOPB	IC OPAMP GP 3MHZ .12uV CIRCUIT SOT23-5	U6	Texas Instruments	LMP2011MFX/NOPB	DigiKey	LMP2011MFX/NOPBCT-ND	2.33	$2.33
57	1	IC_LM4041CYM3-ADJ-TR	IC VREF SHUNT ADJ 0.5% SOT23-3	U7	Microchip	LM4041CYM3-ADJ-TR	DigiKey	576-1049-1-ND	.39	$0.39
58	2	IC_INA199A1DCKR	IC CURRENT SENSE 1.5% 50V/V SC70-6	U8, U13	Texas Instruments	INA199A1DCKR	DigiKey	296-27329-1-ND	.45	$0.90
59	1	MODULE_STM32F746G-DISCO	DISCOVERY STM32 F7 EVAL BRD	U9	ST Microelectronics	STM32F746G-DISCO	DigiKey	497-15680-5-ND	57.50	$57.50
Approved				**Notes**				**Bill of Cost (Unit Buy):**		**$268.96**