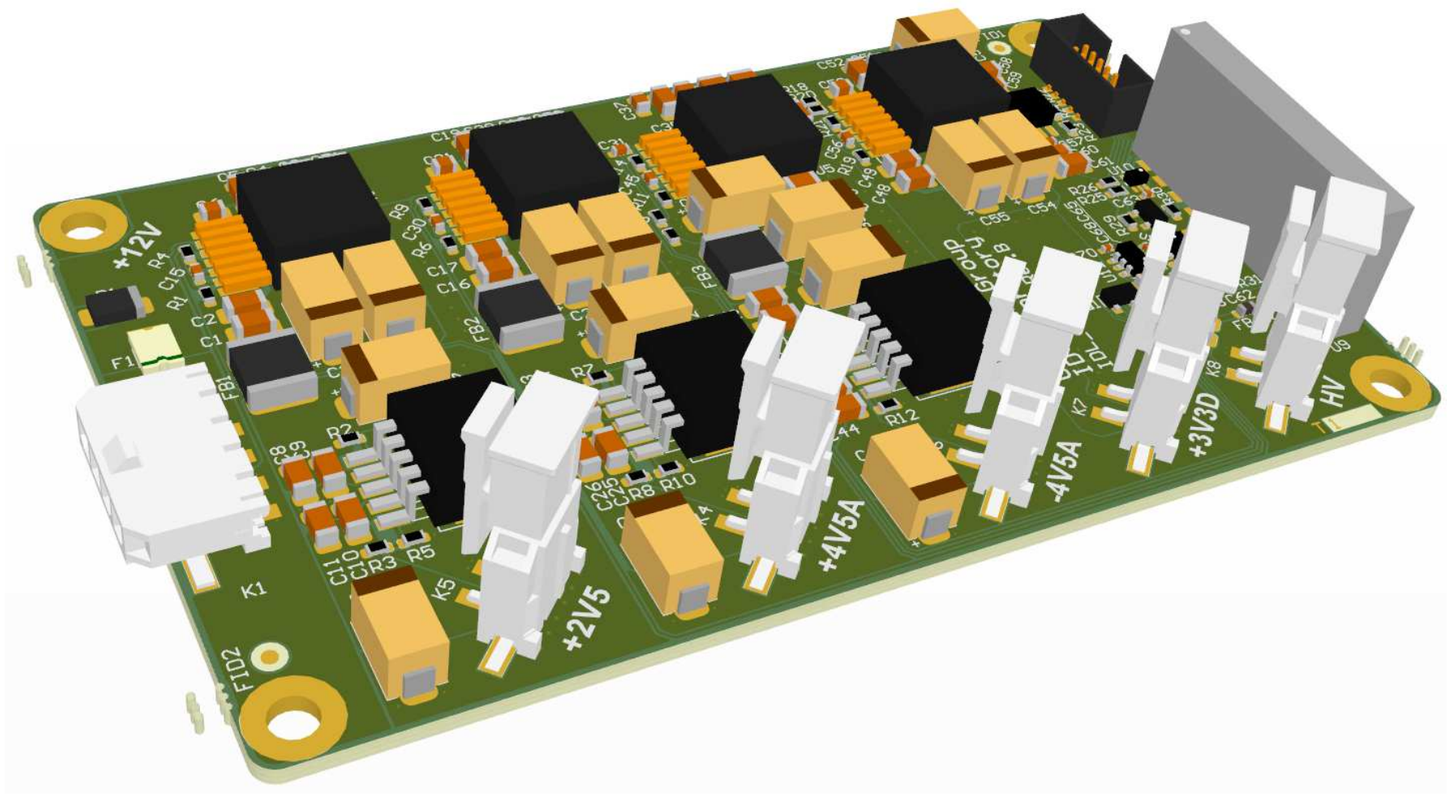

UNIVERSITY of HAWAI'I® MĀNOA

High Energy Physics Group
Instrumentation Development Laboratory
2505 Correa Road, Honolulu, HI 96822

Production Documentation for:

Project Name:	***Compact SciFi Tracker***
Board Name:	***CSciFi Power Supply***
IDL num:	***IDL_15_30***
Revision:	***B***
Variant:	***[No Variations]***
Designer:	***Peter Orel***
Drawn by:	***Peter Orel***
Approved by:	***Gary S. Varner***

High Energy Physics Group, Instrumentation Development Lab		Designer:	Peter Orel	IDLAB design #:	IDL_15_30
Project name:	**Compact SciFi Tracker**	Drawn By:	Peter Orel	Revision:	B
		Approved By:	Gary S. Varner	Variant:	[No Variations]
Board name:	**CSciFi Power Supply**			Modif. Date:	20. avg 2015
				Sheet 1 of 3	

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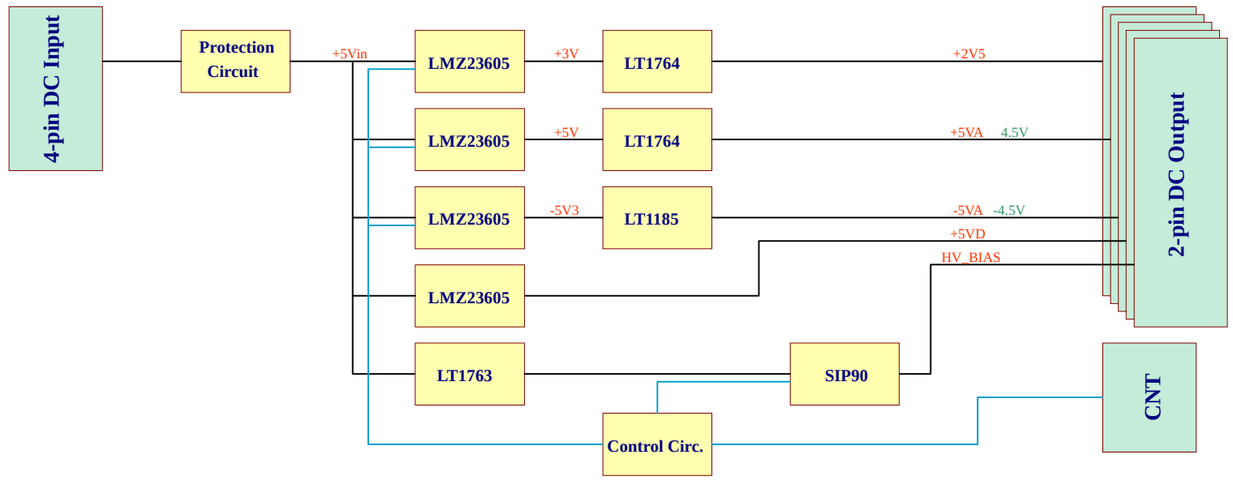

High Energy Physics Group, Instrumentation Development Lab	Designer: Peter Orel	IDLAB design #: IDL_15_30	
Board: **CSciFi Power Supply**	Drawn By: Peter Orel	Revision: B	
	Approved By: Gary S. Varner	Variant: [No Variations]	
Sheet Title: **Functional Block Schematic**		Modif. Date: 17. avg 2015	
		Sheet 2 of 3	

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PW Board Input @from AC/DC

K1 43650-0413 — +12VIN* — 3.315A 39.78W — F1 16V 5A — +12VIN — D1 PMEG3050EP

Step-Down SW Regulator @Positive supply

U2 LMZ23605H (Vin, Vout, Sync, EN, GND, FB, SS/TRK) — 812kHz — +2V5EN

C71 100uF 16V, C3 100uF 16V, C4 10uF 16V, C5 10uF 16V, C6 1uF 25V

C15 470nF 25V

+3VA_SW1 — R1 3k0, R4 1k07

C1 10uF 16V, C2 10uF 16V, C12 220uF 6.3V, C13 220uF 6.3V

3.03V — FB1 74279224151 — +3VA_SW2

C7 330uF 16V, C8 10uF 16V, C9 10uF 16V

Linear Regulator (LDO), Positive

Pdiss=(Vin-Vout)*I=1W

U1 LDO_LT1764AEQ (IN, OUT, SHDN, GND, ADJ)

R2 4k7, R3 11k0, R5 10k0 — Vdrop=0.34V

C10 10uF 16V, C11 10uF 16V, C14 220uF 6.3V

2.5V — +2V5 — 2.6A — K5 43650-0225

PW Board Output @to MB

Step-Down SW Regulator @Positive supply

U4 LMZ23605H (Vin, Vout, Sync, EN, GND, FB, SS/TRK) — 812kHz — +5VAEN

C72 100uF 16V, C18 100uF 16V, C19 10uF 16V, C20 10uF 16V, C21 1uF 25V

C30 470nF 25V

+5VA_SW1 — R6 5k76, R9 1k07

C16 10uF 16V, C17 10uF 16V, C27 220uF 6.3V, C28 220uF 6.3V

5.08V — FB2 74279224151 — +5VA_SW2

C22 330uF 16V, C23 10uF 16V, C24 10uF 16V

Linear Regulator (LDO), Positive

Pdiss=(Vin-Vout)*I=1.4W

U3 LDO_LT1764AEQ (IN, OUT, SHDN, GND, ADJ)

R7 4k7, R8 27k4, R10 10k0 — Vdrop=0.34V

C25 10uF 16V, C26 10uF 16V, C29 220uF 6.3V

4.524V — +4V5A — 1.8A — K4 43650-0225

Step-Down SW Regulator @Negative supply

U5 LMZ23605H (Vin, Vout, Sync, EN, GND, FB, SS/TRK) — 812kHz — -5VAEN*

C73 100uF 16V, C34 100uF 16V, C35 10uF 16V, C36 10uF 16V, C37 1uF 25V

C45 470nF 25V

C31 22nF 50V — -5.4VA_SW1

R11 6k2, R14 1k07

C32 10uF 16V, C33 10uF 16V, C38 220uF 6.3V, C39 220uF 6.3V

-5.4V — 74279224151 FB3

C47 10uF 50V

R16 10k0, R17 10k0

Linear Regulator (LDO), Negative

Pdiss=(Vin-Vout)*I=1.62W

U6 LDO_LT1185CQ (REF, GND, FB, IN, OUT) — -5.4VA_SW2

R12 4k7, R13 2k37, R15 2k15

C40 330uF 16V, C41 10uF 16V, C42 10uF 16V

C43 10uF 16V, C44 10uF 16V, C46 220uF 6.3V

-4V5A — -4.50V — 1.8A — K6 43650-0225

Step-Down SW Regulator @SCROD supply

U7 LMZ23605H (Vin, Vout, Sync, EN, GND, FB, SS/TRK) — 812kHz

3.7V -> 3k9 for old version of MB

3.3V

C50 330uF 16V, C51 10uF 16V, C52 10uF 16V, C53 1uF 25V

R18 20k, R20 10k0

C56 470nF 25V

R19 3k40, R21 1k07

C48 10uF 16V, C49 10uF 16V, C54 220uF 6.3V, C55 220uF 6.3V

+3V3D — 1A — K7 43650-0225

Linear Regulator (LDO), Positive @HV supply

U8 LT1763CS8 (IN, OUT, PD, GND, BYP, ADJ) — +5HV

C58 10uF 16V, C59 1uF 25V

R22 4k7

C57 10nF 50V

R23 3k32, R24 1k07

C60 1uF 25V, C61 10uF 16V

PW Board Control @from MB

K2 IDC10pin LPV

HVDAC_CS# 1, HVDAC_SDI 3, +5VAEN 5, +2V5EN 7, HVDAC_SCK 2, -5VAEN 4, HVEN# 6

Q1 BSS84 — -5VAEN — -5VAEN*

DAC for High Voltage Source Setting

U10 LTC2630-HZ12 (VCC, CS/LD, SCK, SDI, VOUT, GND) — Internal 4.096 reference needs to be enabled by SW

HVDAC_CS#, HVDAC_SCK, HVDAC_SDI

R25 10k0, R26 4k7, C63 100nF 50V — +5HV

R31 10k0, R32 10k0

U11 LTC2050CS5 (-IN, +IN, V+, V-)

C62 100nF 50V, R27 12k, C65 100nF 50V

C68 100nF 50V, R33 12k

U12 LT1790ACS6-4.096 (In, Vout, GND, NC) — 4.096REF

C70 100nF 50V, C69 1uF 25V

Programmable High Voltage Source

U9 SIP90 (LV_IN, HV_OUT, DIS, PROG, GND) — +5HV

C64 10uF 16V, R29 10k0, R30 10k0

Q2 Q-MMBF170 — HVEN#

R28 100R, FB4 600Rac — HV_BIAS — K8 43650-0225

C66 1uF 100V, C67 1uF 100V

Mechanical

PCB

FID1 FIDRT, FID2 FIDRT

High Energy Physics Group, Instrumentation Development Lab	Designer: Peter Orel	IDLAB design #: IDL_15_30	
Board: CSciFi Power Supply	Drawn By: Peter Orel	Revision: B	
	Approved By: Gary S. Varner	Variant: [No Variations]	
Sheet Title: Power Supply Generation and Distribution		Modif. Date: 16. sep 2015	
		Sheet 3 of 3	

University of Hawai'i Mānoa

Bill Of Material per Board — Compact SciFi Tracker

Source Data From: IDL_15_30_B.PrjPcb
Project: CSciFi Power Supply
Revision: B
Variant: None
IDLAB Design #: IDL_15_30

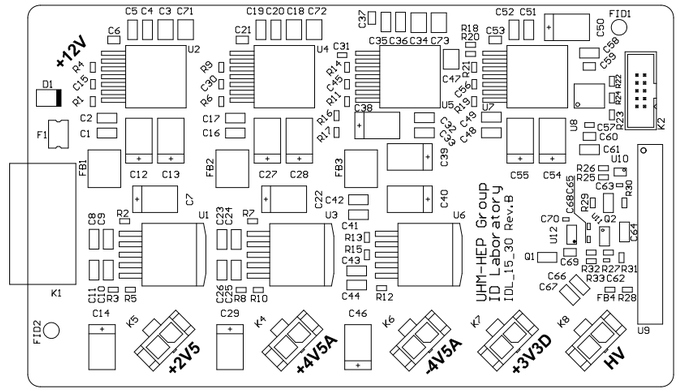
Report Date: 16:28:19 20. avg 2015
Print Date: 7:57 21.08.2015

UNIVERSITY of HAWAI'I MĀNOA
High Energy Physics Group
Instrumentation Development Lab

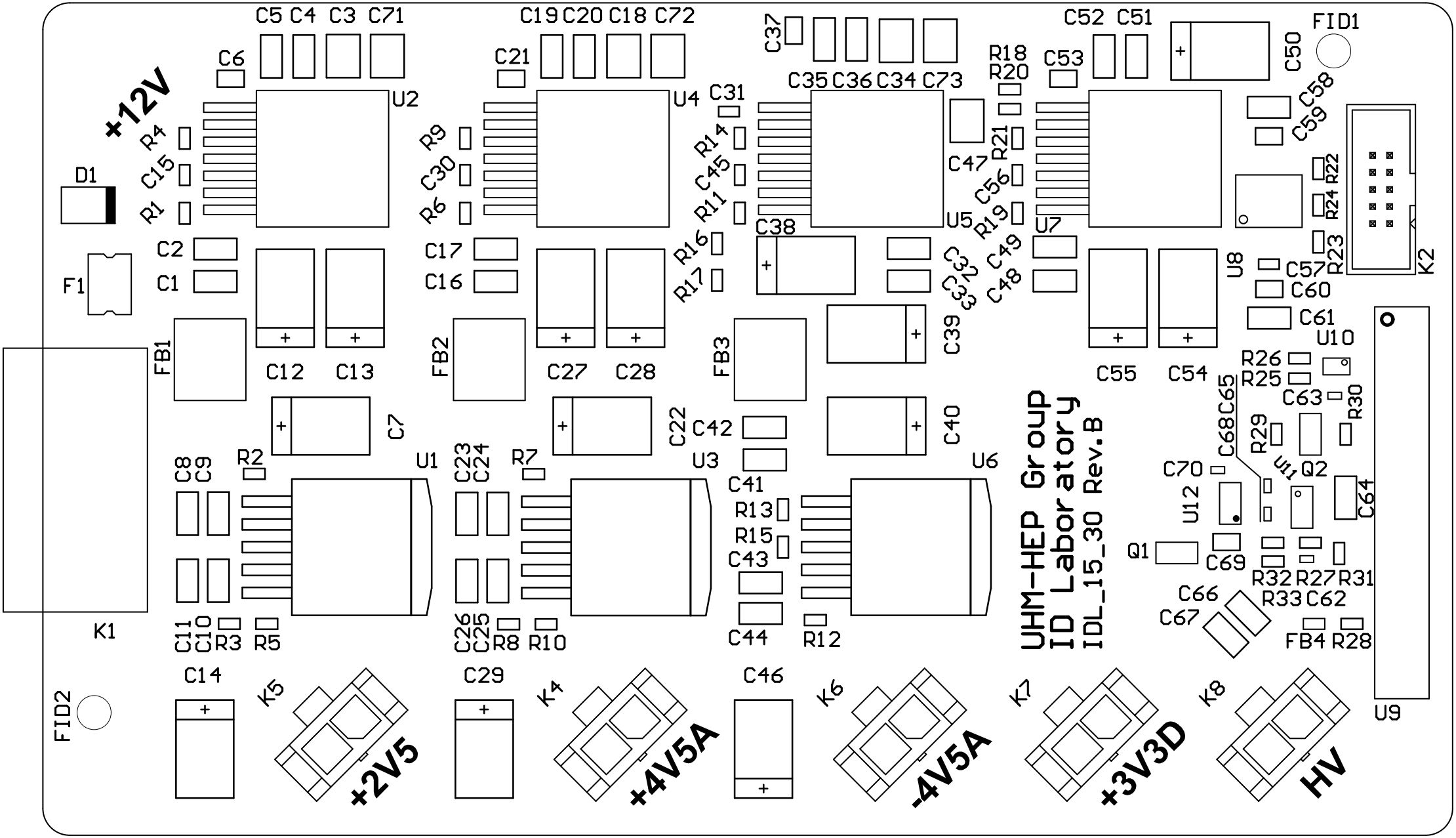
Note: The components listed in this document can be purchased from different suppliers, following the original manufacturer's part number.
Standard components (resistors and capacitors) can be produced by different manufacturers, however they must adhere to the quality requirements specified for the original components defined in this document.
For all other components, the purchasing and assembly of alternatives, not specified in this document, must be authorized by the Instrumentation Development Laboratory

#	Designator	Quantity per Board	Description	Comment	Manufacturer	Manufacturer No	Supplier	Supplier Part Number	Supplier Subtotal
1	FID1, FID2	2	Fiducial top round open mask	FIDRT					0
2	PCB1	1	Printed Circuit Board 4 layer FR4 1.6mm 35um Cu	PCB...	PCB Universe	IDL_15_30			0
3	K2	1	Connector IDC 10 pin vertical 1.27mm SMD	IDC10pin LPV	FCI	20021521-00010T1LF	Digi-Key	609-4054-ND	1,1
4	C1, C2, C4, C5, C8, C9, C10, C11, C16, C17, C19, C20, C23, C24, C25, C26, C32, C33, C35, C36, C41, C42, C43, C44, C48, C49, C51, C52, C58, C61, C64	31	Capacitor chip ceramic 1206 16V X7R	10uF	TDK	C3216X7R1C106M160AC	Digi-Key	445-1601-1-ND	9,114
5	C3, C18, C34, C71, C72, C73	6	Capacitor chip ceramic 1210 16V X5R	100uF	Kemet	C1210C107M4PAC7800	Digi-Key	311-2052-1-ND	10,98
6	C6, C21, C37, C53, C59, C60, C69	7	Capacitor chip ceramic 0805 25V X7R	1uF	Kemet	C0805C105K3RACTU	Digi-Key	399-8004-1-ND	1,33
7	C7, C22, C40, C50	4	Capacitor tantal smd 7343-43 16V 50mResr	330uF	Kemet	T521X337M016ATE050	Digi-Key	399-10365-1-ND	24,92
8	C12, C13, C14, C27, C28, C29, C38, C39, C46, C54, C55	11	Capacitor Aluminium Polymer, High Ripple, smd 7343-43 6.3V 7mResr	220uF	Panasonic	EEF-UE0J221LR	Digi-Key	PCE4263CT-ND	40,15
9	C15, C30, C45, C56	4	Capacitor chip ceramic 0603 25V X7R	470nF	Murata	GRM188R71E474KA12D	Digi-Key	490-3291-1-ND	0,68
10	C31	1	Capacitor chip ceramic 0603 50V X7R	22nF	TDK	C1608X7R1H223K080AA	Digi-Key	445-1312-6-ND	0,1
11	C47	1	Capacitor chip ceramic 1210 50V X7R	10uF	TDK	GRM32ER71H106KA12L	Digi-Key	490-6544-1-ND	0,73
12	C57	1	Capacitor chip ceramic 0603 50V X7R	10nF	Murata	GRM188R71H103KA01D	Digi-Key	490-1512-1-ND	0,1
13	C62, C63, C65, C68, C70	5	Capacitor chip ceramic 0402 50V X7R	100nF	TDK	C1005X7R1H104K050BB	Digi-Key	445-5932-1-ND	0,75
14	C66, C67	2	Capacitor chip ceramic 1206 100V X7R	1uF	TDK	C3216X7R2A105K160AA	Digi-Key	445-4467-1-ND	0,98
15	D1	1	Schottky diode 6A 30V 500ns 0.36Vf	PMEG3050EP	NXP	PMEG3050EP,115	Digi-Key	568-6753-6-ND	0,52
16	F1	1	PolySwitch Fuse SMD 1812 16V 5A	16V 5A	TE Connectivity	MINISMDC260F/16-2	Digi-Key	MINISMDC260F/16CT-ND	0,58
17	FB1, FB2, FB3	3	Feritte filter smd 2220 5A 10mRdc 150Rac	74279224151	Wurth	74279224151	Digi-Key	732-3423-1-ND	3,69
18	FB4	1	Feritte filter smd 0603 0.2A 1Rdc	600Rac	Murata	BLM18HG601SN1	Digi-Key	490-1033-6-ND	0,19
19	Q1	1	P-Channel MOSFET 50V 0.13A 10R	BSS84	NXP	BSS84	Digi-Key	BSS84CT-ND	0,24
20	Q2	1	N-Channel MOSFET 60V, 0.5A, 0.3W	Q-MMBF170	ON Semiconductor	MMBF170	Digi-Key	MMBF170LT1GOSCT-ND	0,34
21	R1	1	Chip Resistor 0603 100mW 1% 100ppm	3k0	Panasonic	ERJ-3EKF3001V	Digi-Key	P3.00KHCT-ND	0,1
22	R2, R7, R12, R22, R26	5	Chip Resistor 0603 100mW 1% 100ppm	4k7	Panasonic	ERJ-3EKF4701V	Digi-Key	P4.70KHCT-ND	0,5
23	R3	1	Chip Resistor 0603 100mW 1% 100ppm	11k0	Panasonic	ERJ-3EKF1102V	Digi-Key	P11.0KHCT-ND	0,1
24	R4, R9, R14, R21, R24	5	Chip Resistor 0603 100mW 1% 100ppm	1k07	Panasonic	ERJ-3EKF1071V	Digi-Key	P1.07KHCT-ND	0,5
25	R5, R10, R16, R17, R20, R25, R29, R30, R31, R32	10	Chip Resistor 0603 100mW 1% 100ppm	10k0	Panasonic	ERJ-3EKF1002V	Digi-Key	P10.0KHCT-ND	1
26	R6	1	Chip Resistor 0603 100mW 1% 100ppm	5k76	Panasonic	ERJ-3EKF5761V	Digi-Key	P5.76KHCT-ND	0,1
27	R8	1	Chip Resistor 0603 100mW 1% 100ppm	27k4	Panasonic	ERJ-3EKF2742V	Digi-Key	P27.4KHCT-ND	0,1
28	R11	1	Chip Resistor 0603 100mW 1% 100ppm	6k2	Panasonic	ERJ-3EKF6201V	Digi-Key	P6.20KHCT-ND	0,1
29	R13	1	Chip Resistor 0603 100mW 1% 100ppm	2k37	Panasonic	ERJ-3EKF2371V	Digi-Key	P2.37KHCT-ND	0,1
30	R15	1	Chip Resistor 0603 100mW 1% 100ppm	2k15	Panasonic	ERJ-3EKF2151V	Digi-Key	P2.15KHCT-ND	0,1
31	R18	1	Chip Resistor 0603 100mW 1% 100ppm	20k	Panasonic	ERJ-3EKF2002V	Digi-Key	P20.0KHCT-ND	0,1
32	R19	1	Chip Resistor 0603 100mW 1% 100ppm	3k40	Panasonic	ERJ-1GEF3401C	Digi-Key	P3.40KABCT-ND	0,1
33	R23	1	Chip Resistor 0603 100mW 1% 100ppm	3k32	Panasonic	ERJ-3EKF3321V	Digi-Key	P3.32KHCT-ND	0,1
34	R27, R33	2	Chip Resistor 0603 100mW 1% 100ppm	12k	Panasonic	ERJ-3EKF1202V	Digi-Key	P12.0KHCT-ND	0,2
35	R28	1	Chip Resistor 0603 100mW 1% 100ppm	100R	Panasonic	ERJ-3EKF1000V	Digi-Key	P100HDKR-ND	0,1
36	U1, U3	2	Low drop low noise regulator 3A DDPak	LDO_LT1764AEQ	Linear Technology	LT1764AEQ#TRPBF	Digi-Key	LT1764AEQ#PBF-ND	14,82
37	U2, U4, U5, U7	4	3A SIMPLE SWITCHER® Power Module for High Output Voltage	LMZ23605H	Texas Instruments	LMZ23605TZE/NOPB	Digi-Key	LMZ23605TZ/NOPB-ND	73,24
38	U6	1	Negative Low drop regulator 3A	LDO_LT1185CQ	Linear Technologies, Farnell	LT1185CQ#PBF	Digi-Key	LT1185CQ#PBF-ND	7,29
39	U8	1	500mA, Low Noise, LDO	LT1763CS8	Linear Technology	LT1763CS8#PBF	Digi-Key	LT1763CS8#PBF-ND	4,15
40	U10	1	12-Bit Vout DAC 12 bit 4.096IntREF ResetToZero	LTC2630-HZ12	Linear Technology	LTC2630AISC6-HZ12#TRMPBF	Digi-Key	LTC2630AISC6-HZ12#TRMPBFCT-ND	4,95
41	U11	1	Zero-Drift Operational Amplifier	LTC2050CS5	Linear Technology	LTC2050CS5#TRMPBF	Digi-Key	LTC2050CS5#TRMPBFCT-ND	2,9
42	U12	1	Reference 4.096V 10ppm 5mA	LT1790ACS6-4.096	Linear Technology	LT1790ACS6-4.096#TRMPBF	Digi-Key	LT1790ACS6-4.096#TRMPBFCT-ND	7,01
43	K1	1	Connector Header 4 pin rigth-angle SMD 3mm 4A	43650-0413	Molex	436500413	Digi-Key	WM9176CT-ND	3,02
44	K4, K5, K6, K7, K8	5	Connector Header 2 pin vertical SMD 3mm 4A	43650-0225	Molex	0436500225	Digi-Key	WM2638DKR-ND	14,1
45	U9	1	Regulated, Low Ripple High Voltage DC/DC Converter	SIP90	Emco	SIP90	EMCO	SIP90	0
Approved		**Total Quantity per Board**	**Notes:**						**Total Price**
Total components:		136							231,274

#	Designator	Quantity per Board	Description	Comment	Manufacturer	Manufacturer No	Supplier	Supplier Part Number	Supplier Subtotal



Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	ASSEMBLY	ID: **CSciFi Power Supply**
Approved By: Gary S. Varner	Print Date: 20. avg 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Top Assembly Drawing				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D1
F1
K1
FID2
FID1
K2
U1
U2
U3
U4
U5
U6
U7
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U9
U10
U11
U12
Q1
Q2
FB1
FB2
FB3
K5
K4
K6
K7
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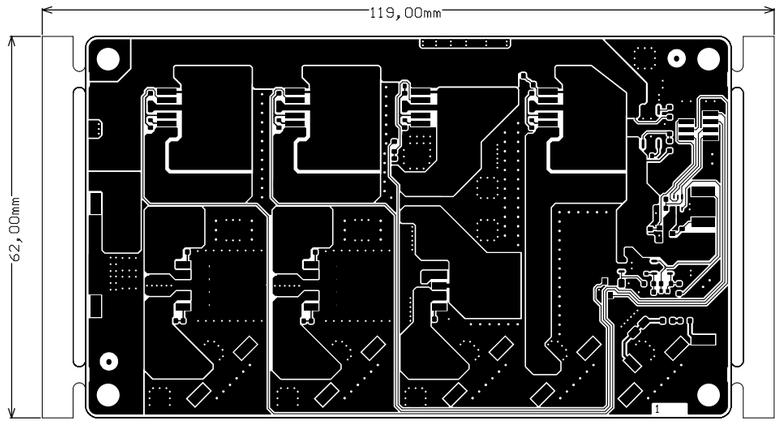
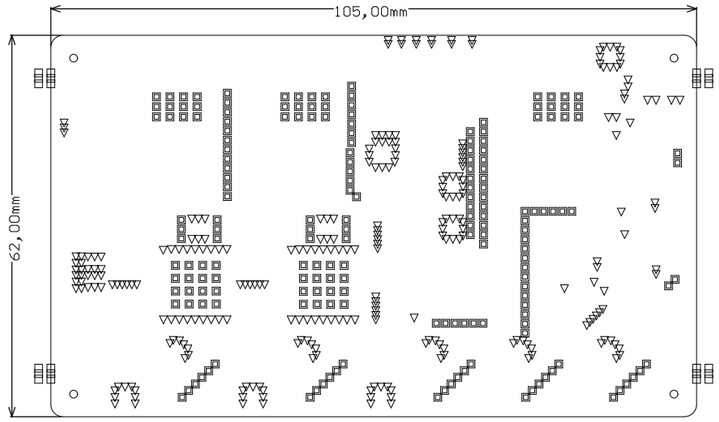
HV
UHM-HEP Group
ID Laboratory
IDL_15_30 Rev.B



Milled with 2.0mm mill

Designer: Peter Orel	Version: .Version	File: IDL_15_30_B_pnl.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
Drawn By: Peter Orel	Modif. Date: (Date)	Variant: [No Variations]	PANEL	ID: **.ProjectName2**
Approved By: Gary S. Varner	Print Date: 16. sep 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Panelization				



Notes:

1. Board shall be fabricated - performace class II as per IPC-6011 and IPC6012
2. PCB manufacturer logo, P/N, revision and/or date code of manufacturing
   shall be printed in top solder mask (not over pcb traces, allowed over copper plane).
   The date code shall be in the format: "WWYY" where WW=week and YY= year, max height 0.15 inches
3. Silkscreen printed on top side
4. Material: high temperature FR4 class epoxy glass rated UL94V-0. UL symbol and rating shall be marked farside
   55um copper for external layers and 35um for all internal layers
   Must be RoHS compliant and survive a lead-free assembly max reflow of 260 deg C (5 passes)
   Td rating: >340 deg C
   Tg = 150 deg C (min)
5. Solder mask: SMOBC per IPC-SM-840C, class T must be Rohs compliant, 0.001" max measured over bare copper plating,
   must clear all lands as indicated on gerber solder mask layers, color= GREEN
6. Finish: HAL-Sn100CL, 7-10 um - over bare copper only
7. Solderability test: Category 2 of J-STD-003
8. Finished boards shall not have nicks, scratches, voids, exposed copper, poor plating or misdrilled holes
9. All holes sizes are after plating
10. PCB manufacturer may add copper thieving as needed to improve manufacturability,
    thieving to be 0.030" round pads at 0.050" spacing.
    Thieving will have a minimum of 0.100" clearance from existing copper and should not be placed under surface mounted devices
11. PCB manufacturer may use tear drops to improve annular rings as long as DRC rules are followed
12. All via connections to power and ground planes are solid
13. All unconnected pads on inner signal layers are removed
14. All finished boards are to be 100% electrically tested
15. Unless otherwise indicated, all linear toleracnes shall be XX.X +/-0.2mm and XX.XX +/- 0.1mm
16. Gerber file GM1 shows board outline (milling line)
17. Table 1 shows Layer stack details

Additional notes:

A1. Finished board thickness = 1.6mm +/- 10%; measured over top/bottom copper and solder mask

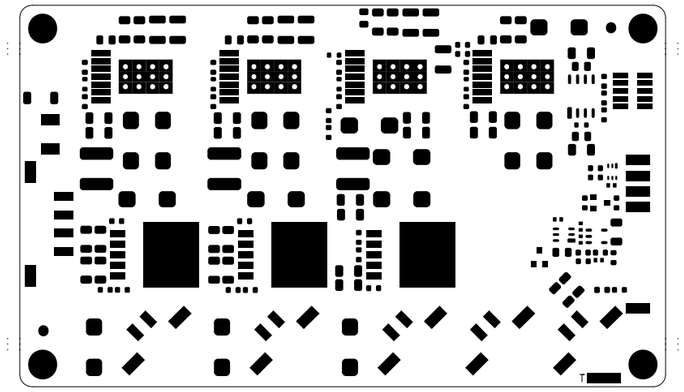
Table 1a: Layer Stack Details for IDL_15_30 Rev.B (Metric Units)

Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0,010mm	3,5	
3	Top Layer - SIG1	Copper	0,055mm		
4	Dielectric 1	FR-4	0,381mm	4,65	
5	Layer 2 - GND1	Copper	0,035mm		
6	Dielectric 3	FR-4	0,660mm	4,65	
7	Layer 3 - SIG2	Copper	0,035mm		
8	Dielectric 6	FR-4	0,381mm	4,65	
9	Bottom Layer - SIG4	Copper	0,055mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

Table 2: NC Drill Details for IDL_15_30 Rev.B

Symbol	Hit Count	Finished Hole Size	Plated	Hole Type
○	4	3,683mm (145,00mil)	PTH	Round
□	24	0,600mm (23,62mil)	NPTH	Round
⧈	190	0,400mm (15,75mil)	PTH	Round
▽	262	0,300mm (11,81mil)	PTH	Round
	480 Total			

Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	PCB	ID: **CSciFi Power Supply**
Approved By: Gary S. Varner	Print Date: 16. sep 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Drill Drawing and Dimensions (GD1)				

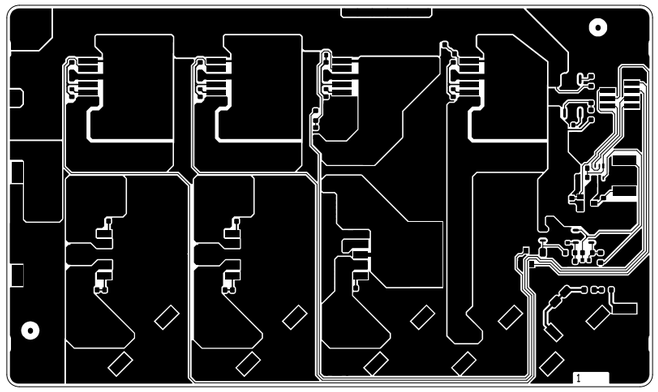


Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1
Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	PCB
Approved By: Gary S. Varner	Print Date: 16. sep 2015	Signature:	Size: A3 H
Title: Top Solder Mask (GTS)			

Code: **IDL_15_30**

ID: **CSciFi Power Supply**

University of Hawaii at Manoa
High Energy Physics Group
Instrumentation Development Laboratory



Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	PCB	ID: **CSciFi Power Supply**
Approved By: Gary S. Varner	Print Date: 16. sep 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Top Layer- SIG1 (GTL)				

Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
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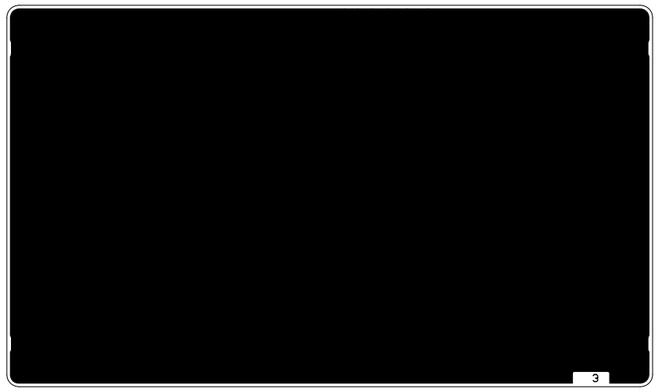
Title: Layer 2 - GND1 (GP1)				



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Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	PCB	ID: **CSciFi Power Supply**
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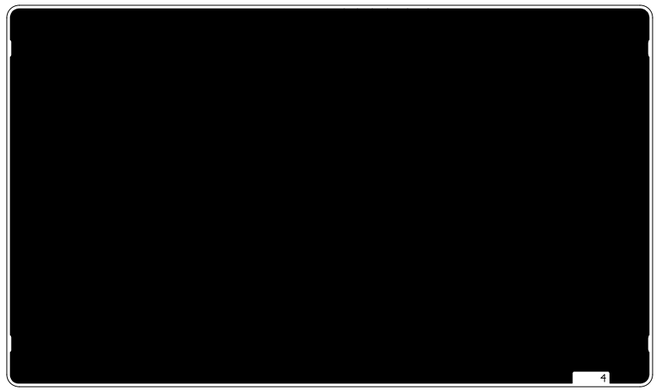
Title: Layer 3 - SIG2 (G1)				



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Title: Bottom Layer - SIG3 (GBL)				

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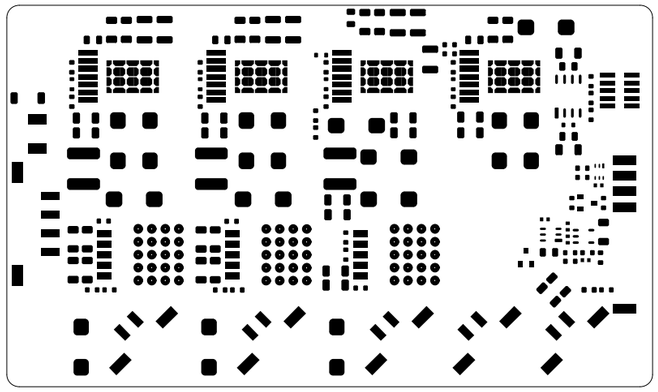
Approved By: Gary S. Varner	Print Date: 16. sep 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Bottom Solder Mask (GBS)				



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Drawn By: Peter Orel	Modif. Date: Date	Variant: [No Variations]	PCB	ID: **CSciFi Power Supply**
Approved By: Gary S. Varner	Print Date: 20. avg 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Top Paste Mask Print GTP				

Designer: Peter Orel	Revision: .Version	File: IDL_15_30_B.PcbDoc	Sheet 1 of 1	Code: **IDL_15_30**
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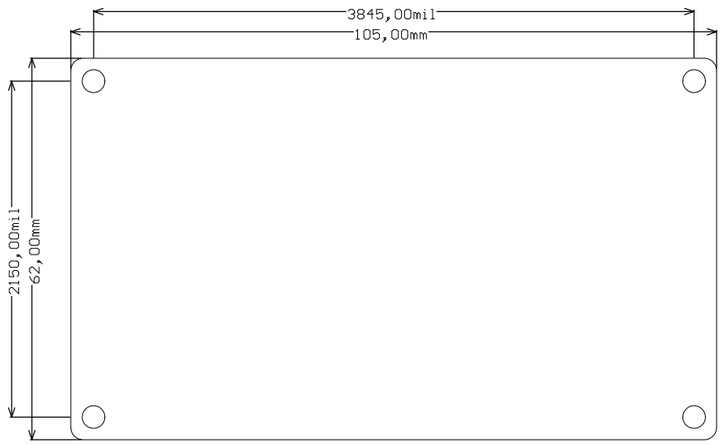
Approved By: Gary S. Varner	Print Date: 20. avg 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Bottom Paste Mask Print GTP				



Mounting Hole Size: 145mil

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Approved By: Gary S. Varner	Print Date: 20. avg 2015	Signature:	Size: A3 H	**University of Hawaii at Manoa** **High Energy Physics Group** **Instrumentation Development Laboratory**
Title: Mechanical Drawing (RF Shield Top)				