

Thunderbird TAS5100EVM Design Document

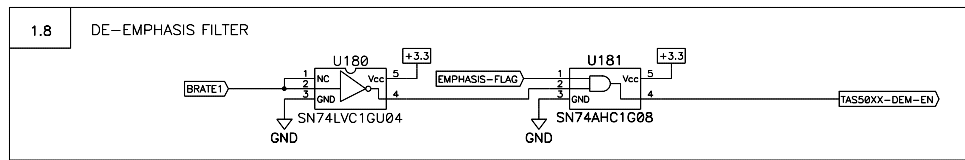
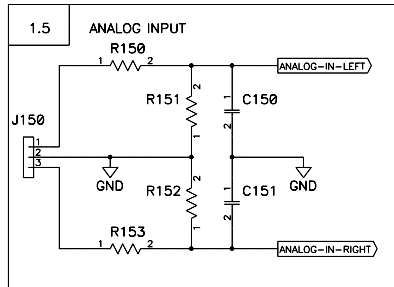
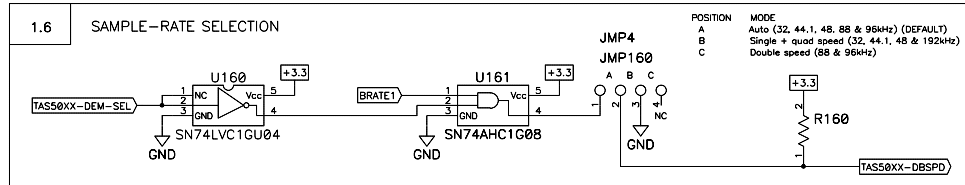
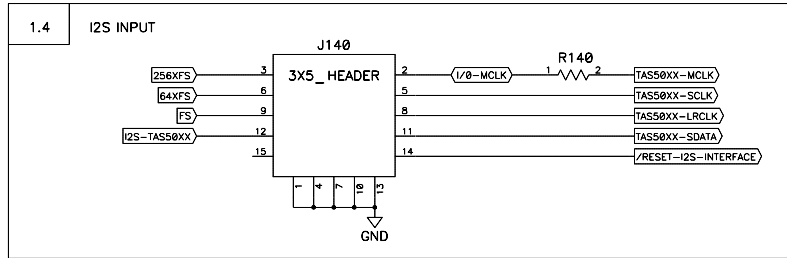
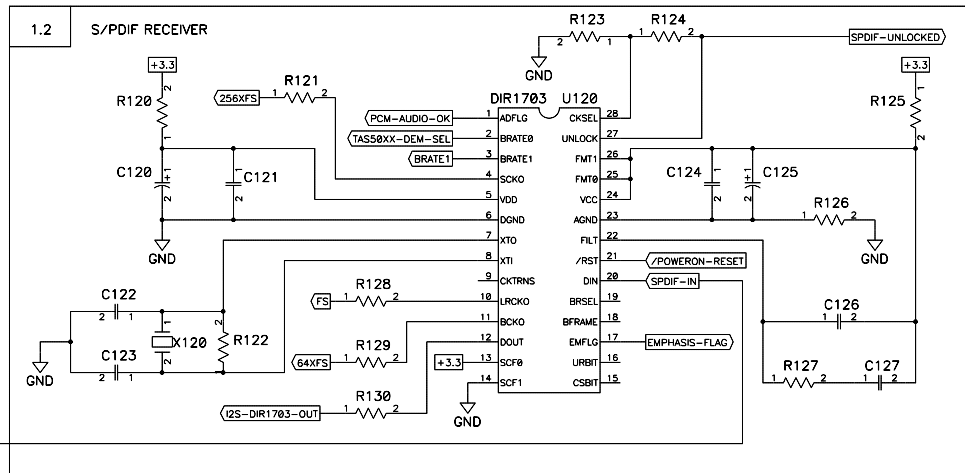
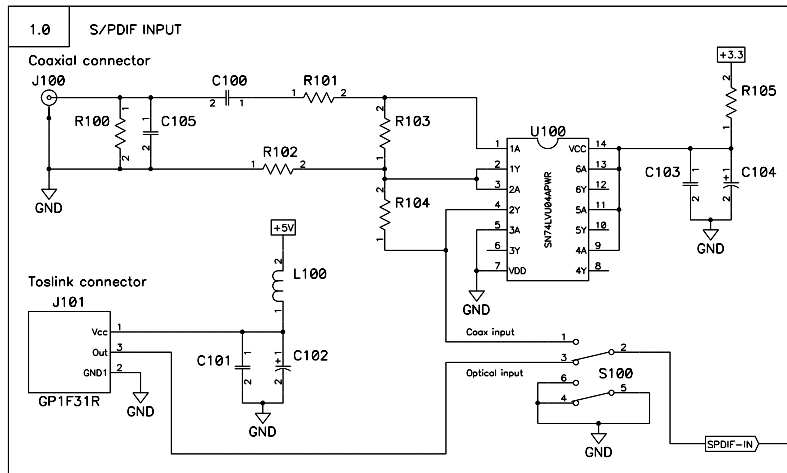
Claus Reckweg

Texas Instruments

Content

TAS5100EVM Schematic	Version 13.00	(6 pages)
TAS5100EVM Parts List	Version 9.00	(5 pages)
TAS5100EVM PCB Specification	Version 2.00	(1 page)
TAS5100EVM PCB Layout	Version 4.00	(4 pages)

AUDIO INPUT SECTION



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Project: **P150 THUNDERBIRD**

Size: A2 Page Title: **AUDIO INPUT SECTION**

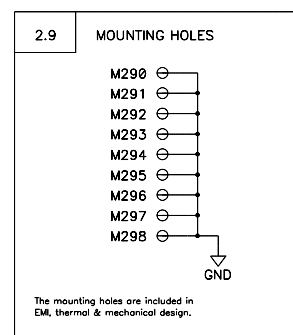
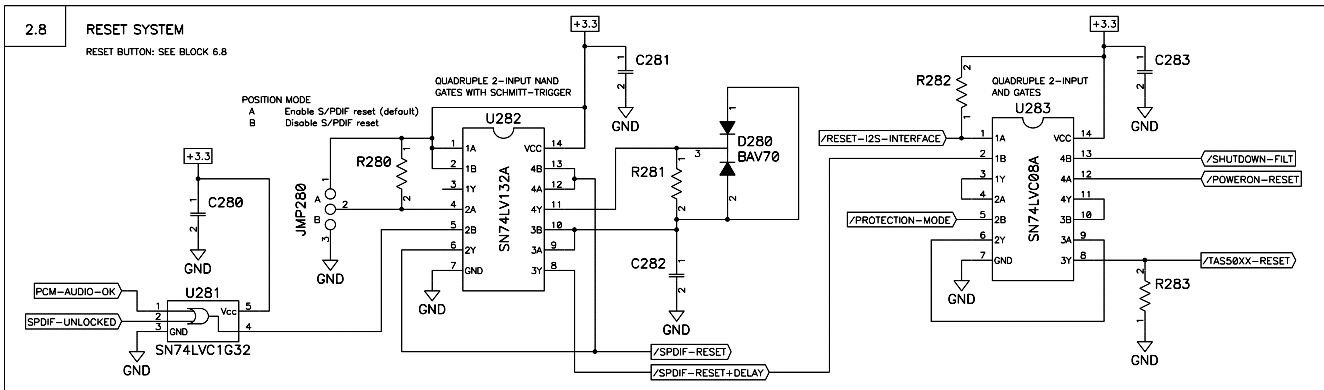
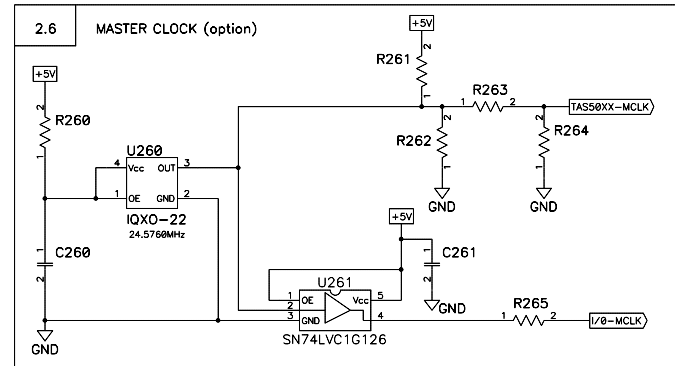
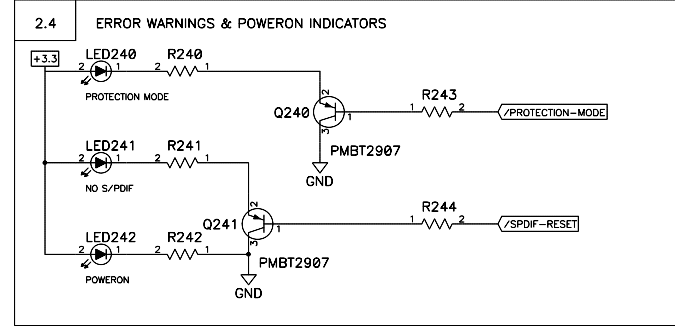
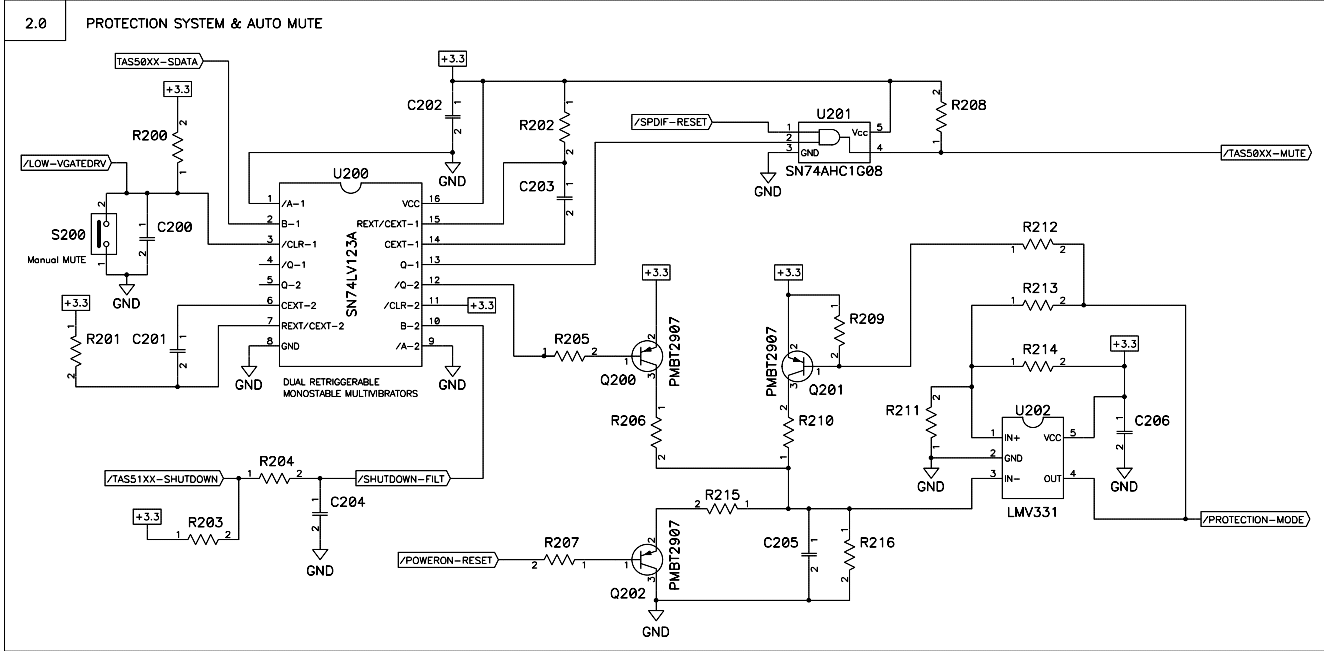
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Date: Fri Feb 01, 2002 Rev: 1.00 Mod: 0 Sheet 1 of 6

Filename: P150-SCH-001(13.00).sch Drawn By: CRW

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CONTROL SECTION



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Project: **P150 THUNDERBIRD**

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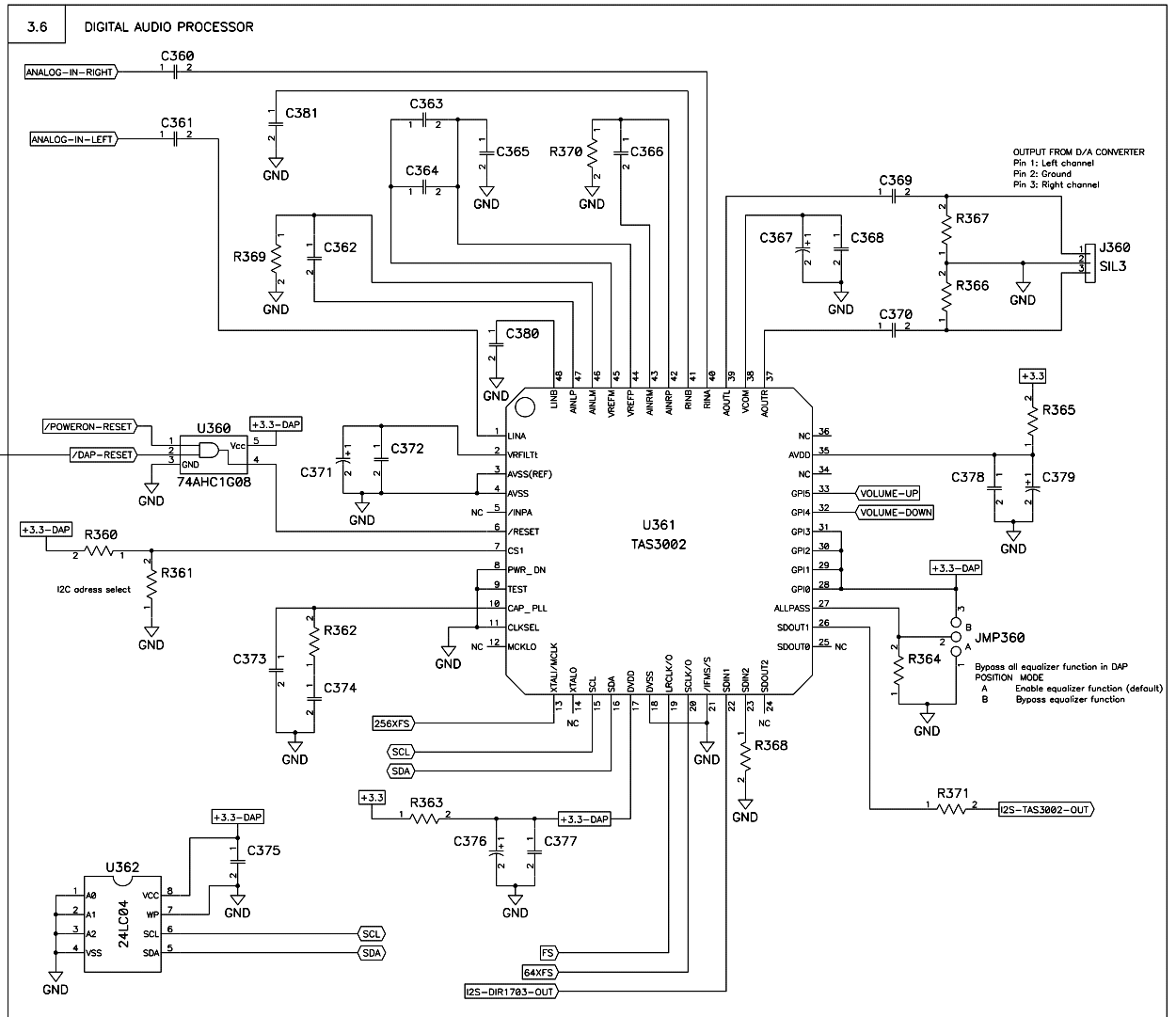
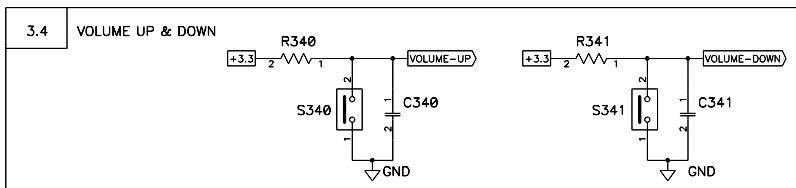
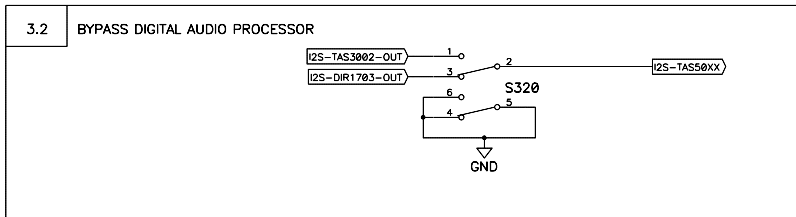
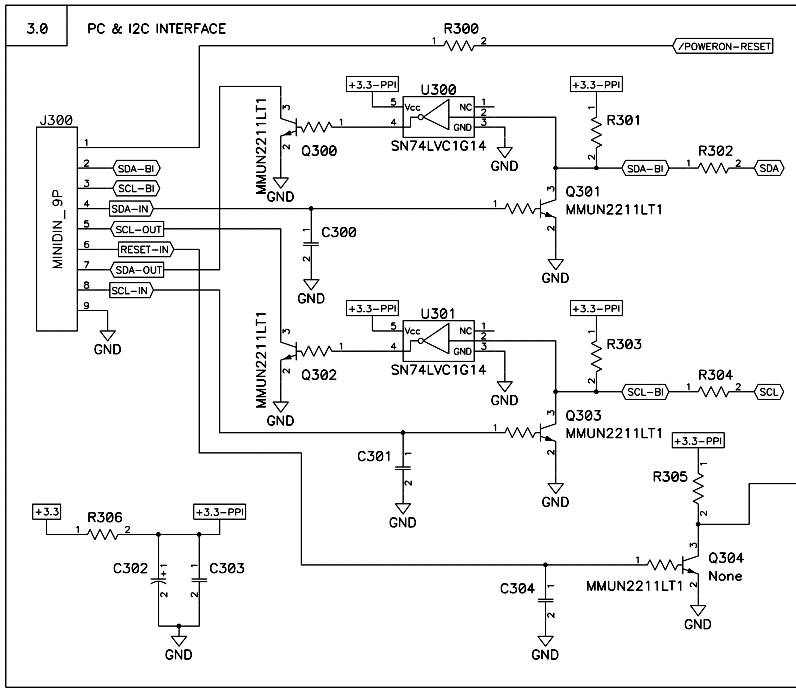
Engineers: Claus Reckweg

Date: Fri Feb 01, 2002 Rev: 1.00 Mod: 0 Sheet 2 of 6

Filename: P150-SCH-001(13.00).sch Drawn By: CRW

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DIGITAL AUDIO PROCESSOR SECTION



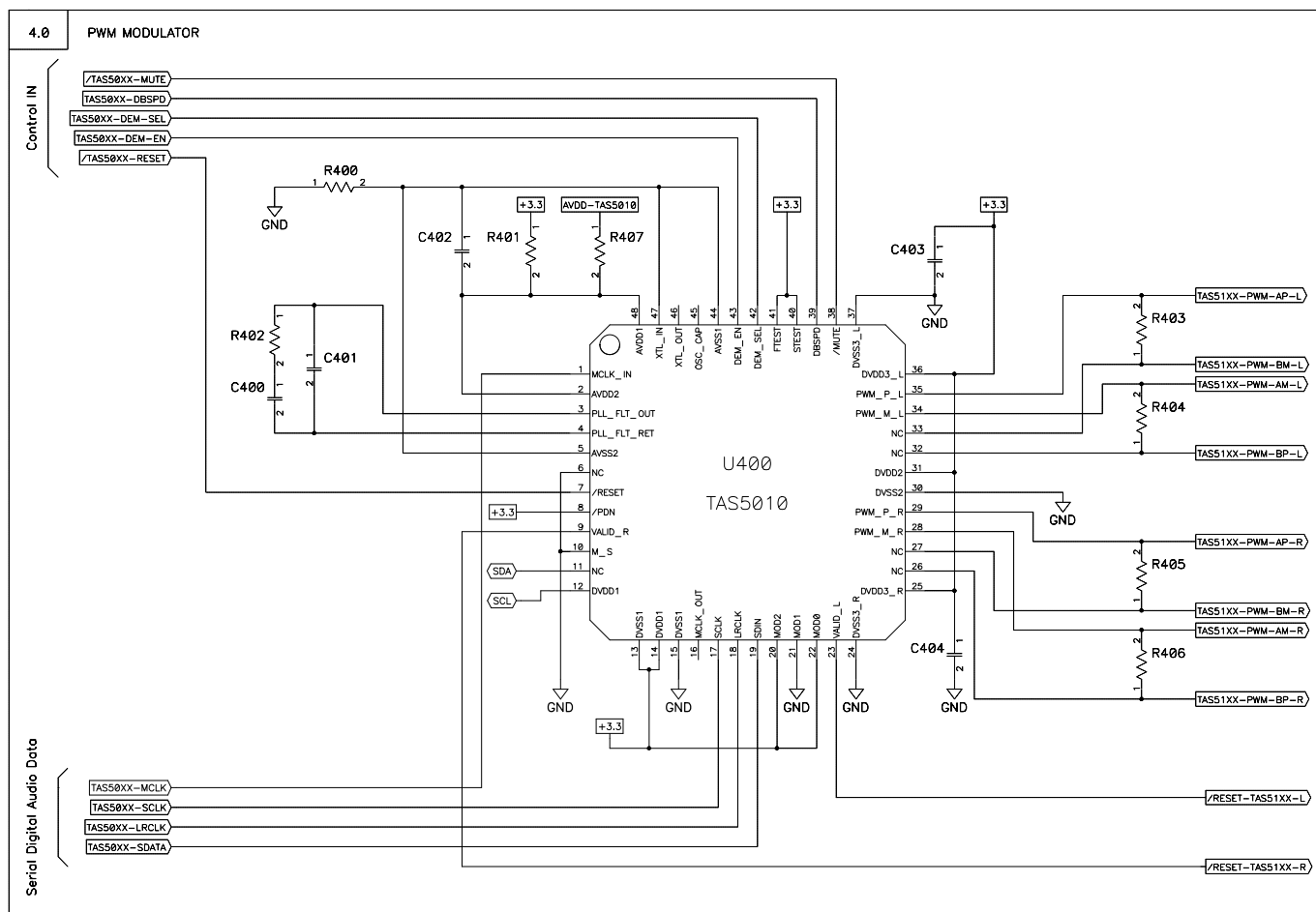
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Project: P150 THUNDERBIRD	
Size: A2	Page Title: DIGITAL AUDIO PROCESSOR SECTION
Engineers: Claus Reckweg	
Date: Fri Feb 01, 2002	Rev: 1.00 Mod: 0 Sheet 3 of 6
Filename: P150-SCH-001(13.00).sch	Drawn By: CRW
File Location:	

PCM TO PWM MODULATOR SECTION



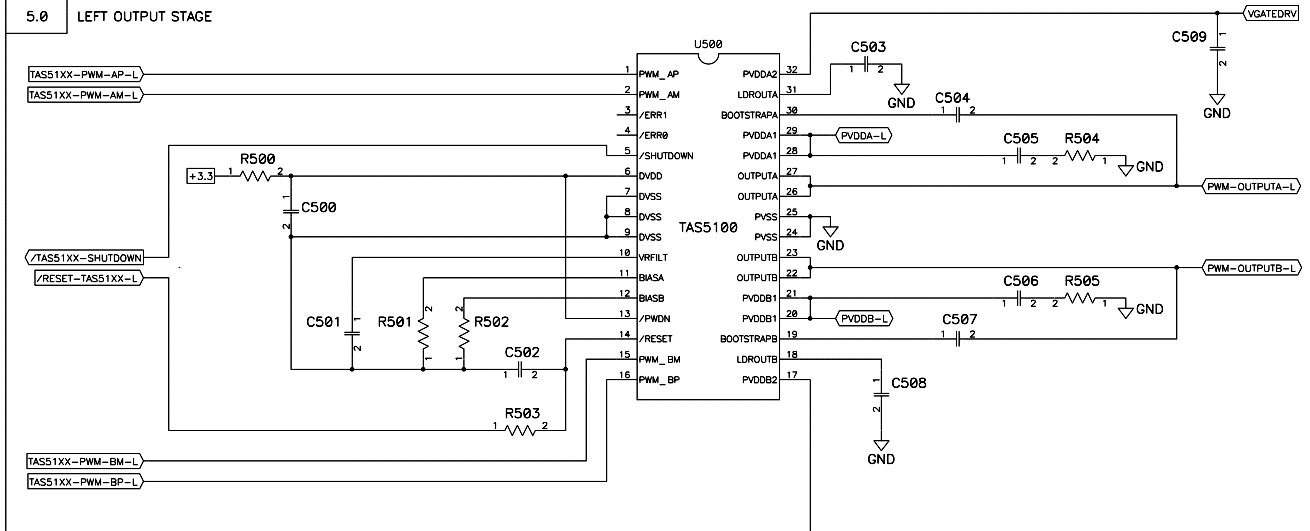
Patents pending in circuitry design and layout (WO99/59241 & WO99/59242).
 This circuitry may only be used together with the integrated circuit TAS5100 from
 Texas Instruments Incorporated.

REFERENCE DESIGN PAGE 1 OF 2

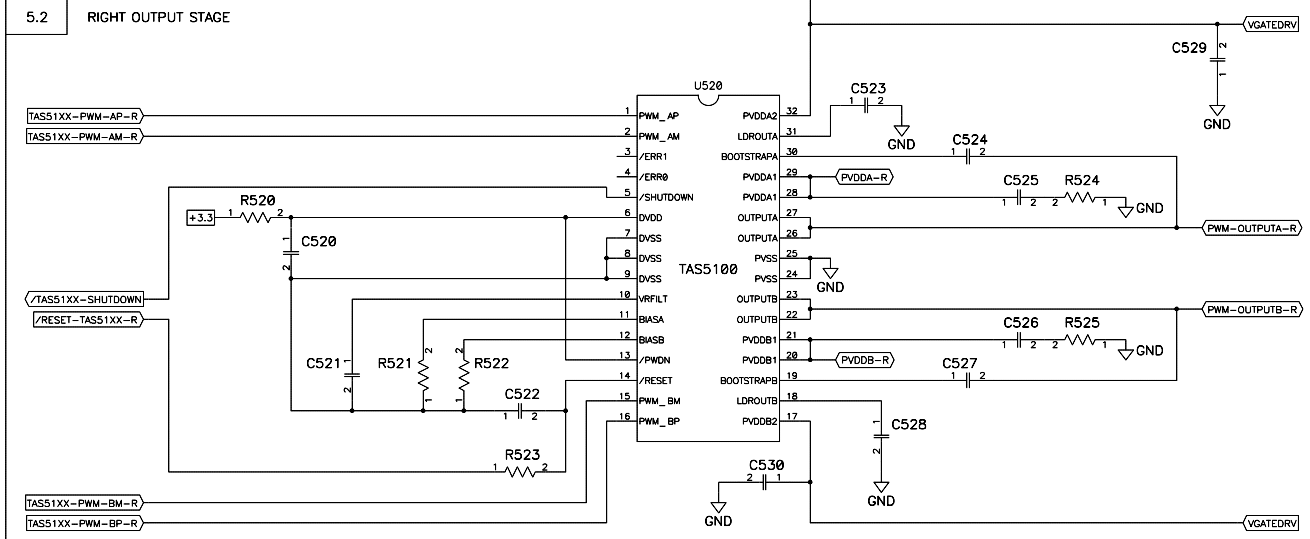
		DIGITAL AUDIO GROUP All rights reserved - Patents pending. Texas Instruments Copenhagen ApS	
Project: P150 THUNDERBIRD			
Size: A2	Page Title: PCM TO PWM MODULATOR SECTION		
Engineers: Claus Reckweg			
Date: Fri Feb 01, 2002	Rev: 1.00	Mod: 0	Sheet 4 of 6
Filename: P150-SCH-001(13.00).sch		Drawn By: CRW	
File Location:			

OUTPUT STAGE SECTION

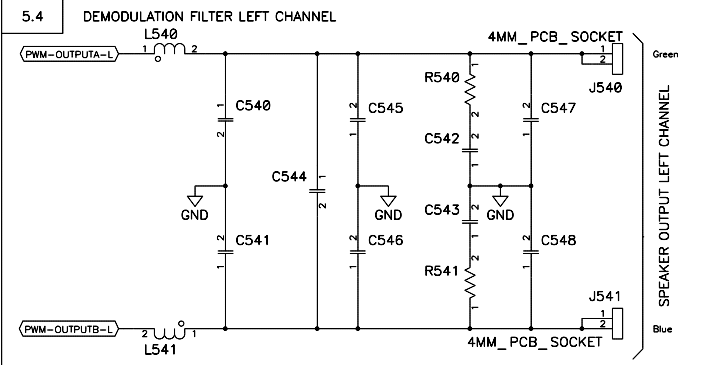
5.0 LEFT OUTPUT STAGE



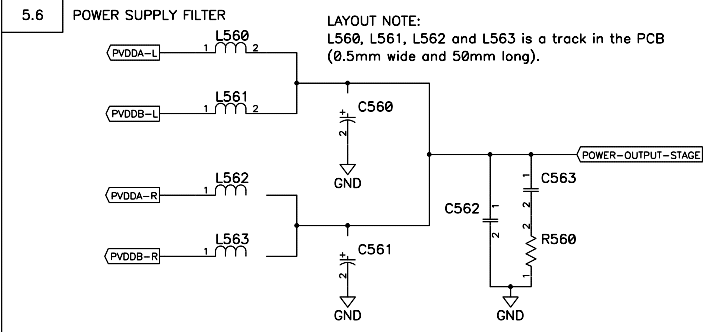
5.2 RIGHT OUTPUT STAGE



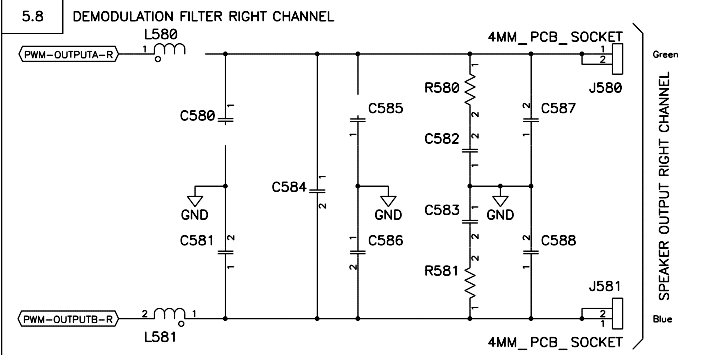
5.4 DEMODULATION FILTER LEFT CHANNEL



5.6 POWER SUPPLY FILTER



5.8 DEMODULATION FILTER RIGHT CHANNEL



Patents pending in circuitry design and layout (WO99/59241 & WO99/59242).
This circuitry may only be used together with the integrated circuit TAS5100 from Texas Instruments Incorporated.

REFERENCE DESIGN PAGE 2 OF 2

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Size: A2 Page Title: OUTPUT STAGE SECTION

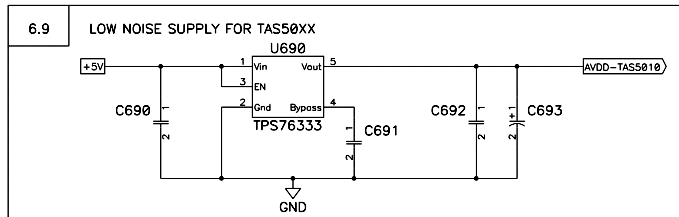
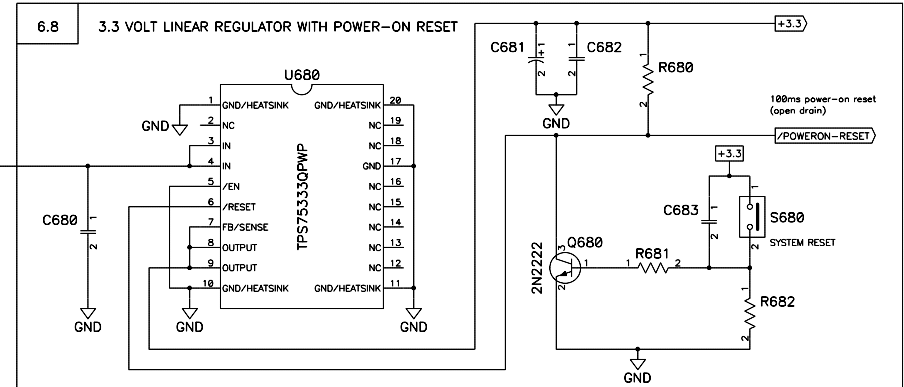
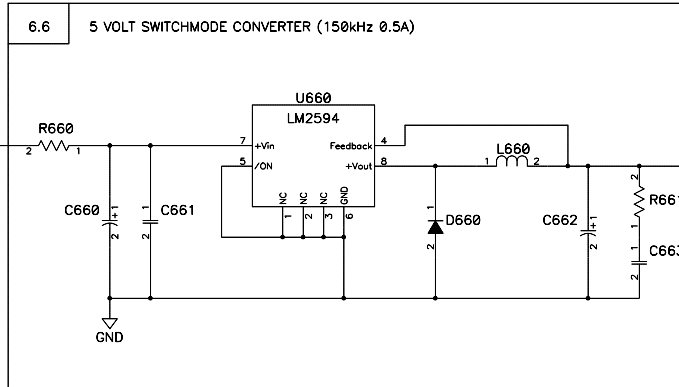
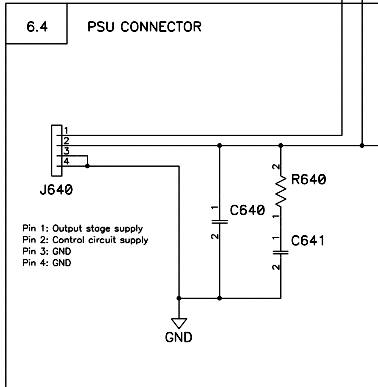
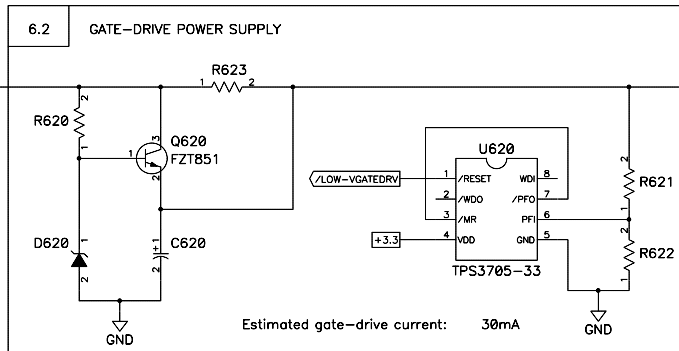
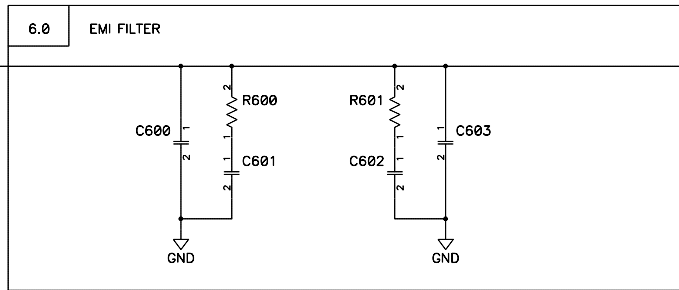
Engineers: Claus Reckweg

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POWER SUPPLY SECTION



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Engineers: Claus Reckweg
Date: Fri Feb 01, 2002 Rev: 1.00 Mod: 0 Sheet 6 of 6
Filename: P150-SCH-001(13.00).sch Drawn By: CRW
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RESISTORS Description	Package	Reference designator	REF QTY	TOTAL QTY	Manufacturer Name	Manufacturer p/n
0 ohm jumper	0603	R124, R140, R361, R403, R404, R405, R406	4	7	BC Components	DCT 0603 jumper
1R0 5% 300ppm 100mW metalfilm	0603	R126, R400, R540, R541, R560, R580, R581	6	7	BC Components	DCT 0603 -00 5% PA 1R0
4R70 5% 300ppm 100mW metalfilm	0603	R363, R365, R407	1	3	BC Components	DCT 0603 -00 5% PA 4R70
10R0 5% 200ppm 100mW metalfilm	0603	R105, R120, R125, R215, R306, R500, R503, R520, R523	4	9	BC Components	DCT 0603 -00 5% PA 10R
27R0 5% 200ppm 100mW metalfilm	0603	R362	0	1	BC Components	DCT 0603 -00 5% PA 27R
47R0 5% 200ppm 100mW metalfilm	0603	R121, R128, R129, R130, R302, R304, R371	0	7	BC Components	DCT 0603 -00 5% PA 47R0
100R 5% 200ppm 100mW metalfilm	0603	R101, R204, R240	0	3	BC Components	DCT 0603 - 00 5% PA 100R
220R 5% 200ppm 100mW metalfilm	0603	R402	1	1	BC Components	DCT 0603 -00 5% PA 220R
300R 5% 200ppm 100mW metalfilm	0603	R241, R242	0	2	BC Components	DCT 0603 -00 5% PA 300R
1k00 5% 200ppm 100mW metalfilm	0603	R205, R207, R209, R212, R243, R244, R300, R622, R681	0	9	BC Components	DCT 0603 - 00 5% PA 1k00
1k20 5% 200ppm 100mW metalfilm	0603	R127	0	1	BC Components	DCT 0603 - 00 5% PA 1k20
2k2 5% 200ppm 100mW metalfilm	0603	R203	0	1	BC Components	DCT 0603 -00 5% PA 2k2
3k30 5% 200ppm 100mW metalfilm	0603	R151, R152	0	2	BC Components	DCT 0603 -00 5% PA 3k30
4k70 5% 200ppm 100mW metalfilm	0603	R301, R303, R305	0	3	BC Components	DCT 0603 -00 5% PA 4k70
6k80 5% 200ppm 100mW metalfilm	0603	R150, R153	0	2	BC Components	DCT 0603 -00 5% PA 6k80
10k0 5% 200ppm 100mW metalfilm	0603	R102, R103, R123, R160, R200, R208, R210, R214, R280, R282, R283, R340, R341, R364, R368, R620, R621, R680, R682	0	19	BC Components	DCT 0603 - 00 5% PA 10k0
13k0 5% 200ppm 100mW metalfilm	0603	R501, R502, R521, R522	4	4	BC Components	DCT 0603 - 00 5% PA 13k0
20k0 5% 200ppm 100mW metalfilm	0603	R211, R369, R370	0	3	BC Components	DCT 0603 - 00 5% PA 20k0
47k0 5% 200ppm 100mW metalfilm	0603	R202	0	1	BC Components	DCT 0603 -00 5% PA 47k0
68k0 5% 200ppm 100mW metalfilm	0603	R281	0	1	BC Components	DCT 0603 -00 5% PA 68k0
100k 5% 200ppm 100mW metalfilm	0603	R213, R366, R367	0	3	BC Components	DCT 0603 - 00 5% PA 100k
470k 5% 200ppm 100mW metalfilm	0603	R201, R206	0	2	BC Components	DCT 0603 -00 5% PA 470k
1M 5% 200ppm 100mW metalfilm	0603	R122	0	1	BC Components	DCT 0603 - 00 5% PA 1M00
4M70 5% 200ppm 100mW metalfilm	0603	R216	0	1	BC Components	DCT 0603 -00 5% PA 4M70
1R00 1% 100ppm 125mW metalfilm	0805	R601	0	1	Philips	2322 734 61008
3R30 1% 100ppm 125mW metalfilm	0805	R600, R640	0	2	Philips	2322 734 63308
75R0 1% 100ppm 0.25W metalfil	1206	R100	0	1	Philips	2322 724 67509
1R50 5% 100ppm 250mW metalfilm *)	RC3715	R504, R505, R524, R525	4	4	Beychlag	MMA0204-100 5% BL 1R50
4R70 1% 50ppm 250mW metalfilm	RC3715	R660	0	1	Beychlag	MMA0204-50 1% BL 4R70

CAPACITORS			REF	TOTAL		
Description	Package	Reference designator	QTY	QTY	Manufacturer Name	Manufacturer p/n
22pF 10% 50V NPO	0603	C122, C123	0	2	KEMET	C0603C220K5GAC
100pF 50V 10% NPO	0603	C300, C301, C304, C502, C522	2	5	KEMET	C0603C101K5GAC
470pF 10% 50V NPO	0603	C150, C151	0	2	KEMET	C0603C471K5GAC
1nF 10% 50V NPO	0603	C200, C204, C340, C341, C562, C683	1	6	KEMET	C0603C102K5GAC
1.2nF 50V 10% X7R	0603	C362, C366, C373	0	3	KEMET	C0603C122M5RAC
4.7nF 50V 20% X7R	0603	C401	1	1	KEMET	C0603C473M5RAC
8.2nF 50V 10% X7R	0603	C126	0	1	KEMET	C0603C822M5RAC
10nF 50V 20% X7R	0603	C100, C201, C282, C542, C543, C563, C582, C583	5	8	KEMET	C0603C103M5RAC
47nF 16V 20% X7R	0603	C400	1	1	KEMET	C0603C473M2RAC
68nF 16V 20% X7R	0603	C127, C374	0	2	KEMET	C0603C683M2RAC
100nF 16V 20% X7R	0603	C101, C103, C121, C124, C202, C203, C206, C280, C281, C283, C303, C364, C368, C372, C375, C377, C378, C380, C381, C402, C403, C404, C500, C520, C682, C690, C691, C692	5	28	KEMET	C0603C104M4RAC
1nF 50V 2% NPO	0805	C603	0	1	Philips	2222 861 14102
10nF 50V 20% X7R	0805	C602, C640	0	2	Philips	2222 600 xxx36
33nF 50V 20% X7R	0805	C504, C507, C524, C527	4	4	Philips	2222 580 16634
100nF 50V 20% X7R	0805	C365, C503, C505, C506, C508, C509, C523, C525, C526, C528, C529, C530, C601, C641, C661	11	15	Philips	2222 580 16741
220nF 20% 16V X7R	0805	C205, C680	0	2	KEMET	C0805C224M4RAC
470nF 16V 20% X7R	0805	C360, C361, C369, C370	0	4	Philips	2222 780 16758
1uF 16V 20% X7R	0805	C363	0	1	KEMET	C0805C105M4RAC
10uF 16V 20% LYT	LY4x5SMD	C102, C104, C120, C125, C302, C367, C376, C379, C620, C693	0	10	Panasonic	ECE V 1C A 100 SR
22uF 16V 20% LYT	LY5x6SMD	C371	0	1	Panasonic	ECE V 1C A 220 SR
33uF 25V 20% LYT	LY6x7SMD	C681	0	1	Panasonic	ECE V 1E A 330 SP
1800uF 35V 20% 22mR 2.6A *)	C7M5PD18	C560, C561	2	2	Panasonic	EEUFC1V182
47uF 35V 20% low esr	C1PD2_5	C660, C662	0	2	RUBYCON	35YXF47MY0611
150nF 63V polyester	C2	C545, C546, C585, C586	4	4	Wima	MKS2 150nF 63V 10% PCM5
470nF 63V 10% polyester, lead pitch = 10	B4B2_5	C544, C584	2	2	Wima	MKS 4 470nF 63V 10%
INDUCTORS			REF	TOTAL		
Description	Package	Reference designator	QTY	QTY	Manufacturer Name	Manufacturer p/n
10uH 20% 24mOhm *)	DO3340	L540, L541, L580, L581	4	4	Taiyo Yuden	LHFP13BB100M
100uH / 60mA	1008	L100	0	1	EPCOS	B82494-A1104-K
220uH 20% 0.5A 0.39R		L660	0	1	CoilCraft	DT3316P-224
Trace in the PCB (0.5mm wide, 50mm long)		L560, L561, L562, L563	(4)	4		

SEMICONDUCTORS			REF	TOTAL		
Description	Package	Reference designator	QTY	QTY	Manufacturer Name	Manufacturer p/n
70V/250mA Small signal dual diode A-C-A	SOT-23	D280	0	1	General Semiconductor	BAV70
22V/400mW 5% Zener Diode	0805P	D620	0	1	Philips	BZX284C22V
1A/40V Schottky diode	SMA	D660	0	1	International Rectifier	10MQ040N
RED 10mA LED SMD	0603P	LED240	0	1	Toshiba	TLSU1008
YELLOW 10mA LED SMD	0603P	LED241	0	1	Toshiba	TLYU1008
GREEN 10mA LED SMD	0603P	LED242	0	1	Toshiba	TLGU1008
PNP 40V/800mA Small signal transistor	SOT-23	Q200, Q201, Q202, Q240, Q241	0	5	Fairchild	MMBT2907A
NPN 50V/0.1A 10k Rb switch transistor	SOT-23	Q300, Q301, Q302, Q303	0	4	ON Semiconductor/Motorola	MMUN2211LT1
NPN 60V/6A Planar High current transistor	SOT-223	Q620	0	1	Zetex	FZT851
NPN 40V/600mA Small signal transistor	SOT-23	Q680	0	1	Philips	PMBT2222
4K I2C serial EEPROM	SO8	U362	0	1	Microchip	24LC04BSN
5V/0.5A Buck Converter	SO8	U660	0	1	National Semiconductor	LM2594M-5.0V
TEXAS INSTRUMENTS INTEGRATED CIRCUITS			REF	TOTAL		
Description	Package	Reference designator	QTY	QTY	Manufacturer Name	Manufacturer p/n
Digital Audio Interface Receiver	SSOP-28	U120	0	1	Texas Instruments	DIR1703E
Digital Audio Processor with CODEC	S-PQFP-G38	U361	0	1	Texas Instruments	TAS3002PFB
Digital Audio PWM Processor	TQFP48	U400	1	1	Texas Instruments	TAS5010PFB
TDAA Power Output Stage	HTSSOP32	U500, U520	2	2	Texas Instruments	TAS5100ADAP
Differential Comparator	SOT23-5	U202	0	1	Texas Instruments	LMV331IDBVR
Hex Inverter, LVU	TSSOP14	U100	0	1	Texas Instruments	SN74LVU04APWR
Single Inverter, LVC	SOT23-5	U160, U180	0	2	Texas Instruments	SN74LVC1GU04DBVR
Single AND gate, AHC	SOT23-5	U161, U181, U201, U360	0	4	Texas Instruments	SN74AHC1G08DBVR
Quad AND gate, LVC	TSSOP14	U283	0	1	Texas Instruments	SN74LVC08APWR
Single Schmitt-Trigger Inverter, LVC	SOT23-5	U300, U301	0	2	Texas Instruments	SN74LVC1G14DBVR
Single 2-input OR gate, LVC	SOT23-5	U281	0	1	Texas Instruments	SN74LVC1G32DBVR
Dual Retrigr. Monostab. Multivib. LV	TSSOP16	U200	0	1	Texas Instruments	SN74LV123APWR
QUAD NAND Schmitt-trigger, LV	TSSOP14	U282	0	1	Texas Instruments	SN74LV132APWR
3.3V Supp. Volt. Supervisor, 200ms Delay	MSOP8	U620	0	1	Texas Instruments	TPS3705-33DGN
3.3V/1.5A Low drop Lin. Reg.	HTSSOP20	U680	0	1	Texas Instruments	TPS75333QPWP
3.3V/150mA Low drop Lin. Reg	SOT23-5	U690	0	1	Texas Instruments	TPS76433DBVR
3.3V/150mA Low drop Lin. Reg	SOT23-5	U690	0	1	Texas Instruments	TPS76433DBVR

MISCELLANEOUS PARTS			REF	TOTAL		
Description	Package	Reference designator	QTY	QTY	Manufacturer Name	Manufacturer p/n
TOSLINK Receiver, 5V	GP1F31	J101	0	1	SHARP	GP1F31R
3 pin 2.54mm Pitch Header	MX3SI	JMP280, JMP360	0	2	Molex	90120-0123
3 pin 2.54mm Pitch Header, friction lock		J150, J360	0	2	Molex	22-27-2031
4 pin 2.54mm Pitch Header	MX4SI	JMP160	0	1	Molex	90120-0124
4 Pin 3.96mm Pitch Header	MY4S	J640	0	1	JST	B4P-VH
Phono RCA connector		J100	0	1	MONACOR	T-709
4mm PCB mount socket blue		J541, J581	(2)	2	Deltron	571-0200
4mm PCB mount socket green		J540, J580	(2)	2	Deltron	571-0200
9 pol Mini-DIN with shield		J300	0	1	CUI STACK	MD-90SM
15 pin 3x2.54mm Pitch Header		J140	0	1	Molex	39-27-4154
12.288MHz Crystal HC49		X120	0	1	C-MAG	12.288MHz HC49/4H
Tact switch, SPMT, 12V/50mA		S200, S340, S341, S680	0	4	Panasonic	EVQ-PPDA25
Switch DPDT on-on pcb mount - SUBMINI		S100, S320	0	2	NKK-Nikkai	G-DPDT-AP
MECHANICS				TOTAL		
Description				QTY	Manufacturer Name	Manufacturer p/n
Aluminium plate - 160x115x2mm				1	Texas Instruments	P150-MECH-001 (2.00)
Screw, pan head, pozidriv, stainless stel, M3/6mm.				9		
Screw, countersunk head, pozidriv, stainless stel, M3/6mm.				9		
Washer, stainless stel, M3, outside diamter = 7mm.				9		
Aluminium hex stand-off with internal threads - M3/10mm.				9	Ettinger	05.03.108
Printed Circuit Board				1	Texas Instruments	P150-PCB-001 (4.00)
NOT USED & DELETED COMPONENTS				TOTAL		
Description		Reference designator		QTY		
Deleted		C320, L600, R320		0	3	
Not used		C105, C260, C261, C501, C521, C540, C541, C547, C548, C580, C581, C587, C588, C600, C663, Q304, R104, R260, R261, R262, R263, R264, R265, R360, R401, R623, R661, U260, U261		0	15	

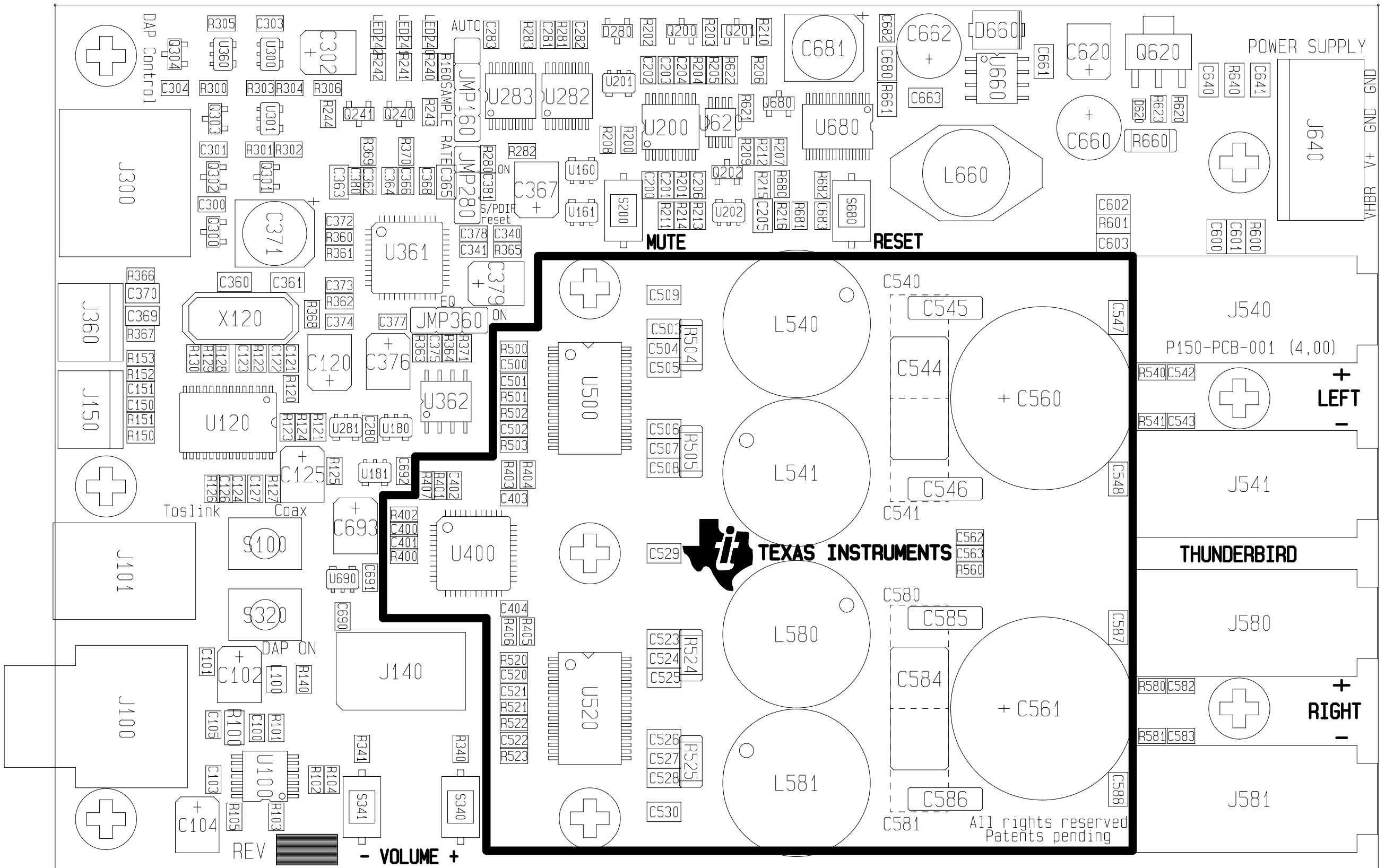
HISTORY		
P150-LST-002 (9.00)	R402	2k4 -> 220R
	C400	680pF -> 47nF
	C401	47pF -> 4.7nF
	U500	TAS5100DAP -> TAS5100ADAP
	U520	TAS5100DAP -> TAS5100ADAP

TAS5100EVM PCB SPECIFICATION

Version 2.00

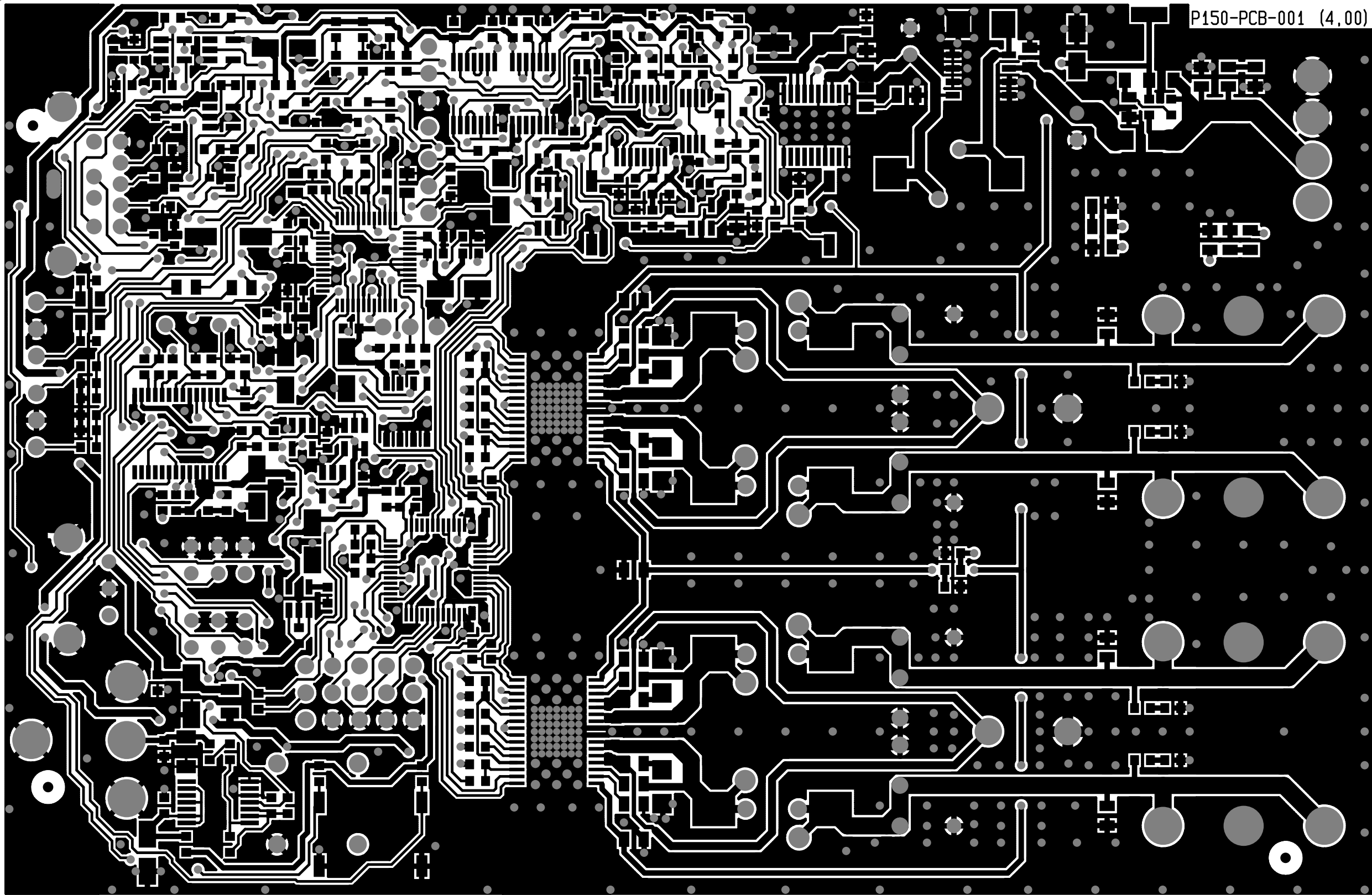
BOARD IDENTIFICATION:	P150-PCB-001 (4.00)
BOARD TYPE:	DOUBLE-SIDED PLATED-THROUGH BOARD
LAMINATE TYPE:	FR4
LAMINATE THICKNESS:	1mm
COPPER THICKNESS:	70µm (INCL. PLATING EXTERIOR LAYER)
COPPER PLATING OF HOLES:	>25µm
MINIMUM HOLE DIAMETER	0.3 mm
SILKSCREEN COMPONENT SIDE:	WHITE - REMOVE SILKSCREEN FROM SOLDER AREA & PRE-TINNED AREAS
SILKSCREEN SOLDER SIDE:	WHITE - REMOVE SILKSCREEN FROM SOLDER AREA & PRE-TINNED AREAS
SOLDER MASK COMPONENT SIDE:	GREEN
SOLDER MASK SOLDER SIDE:	GREEN
PROTECTIVE COATING:	SOLDER COATING AND CHEMICAL SILVER ON FREE COPPER
ELECTRICAL TEST:	PCB MUST BE ELECTRICAL TESTED
MANUFACTURED TO:	PERFAG 2E (www.perfag.dk)
APERTURE TABLE:	PERFAG 10A (www.perfag.dk)
BOARD SIZE:	85 x 130 mm

COMP. LAYOUT COMP DpS 4741 011022
 TI Copenhagen P150-PCB-001 (4.00)

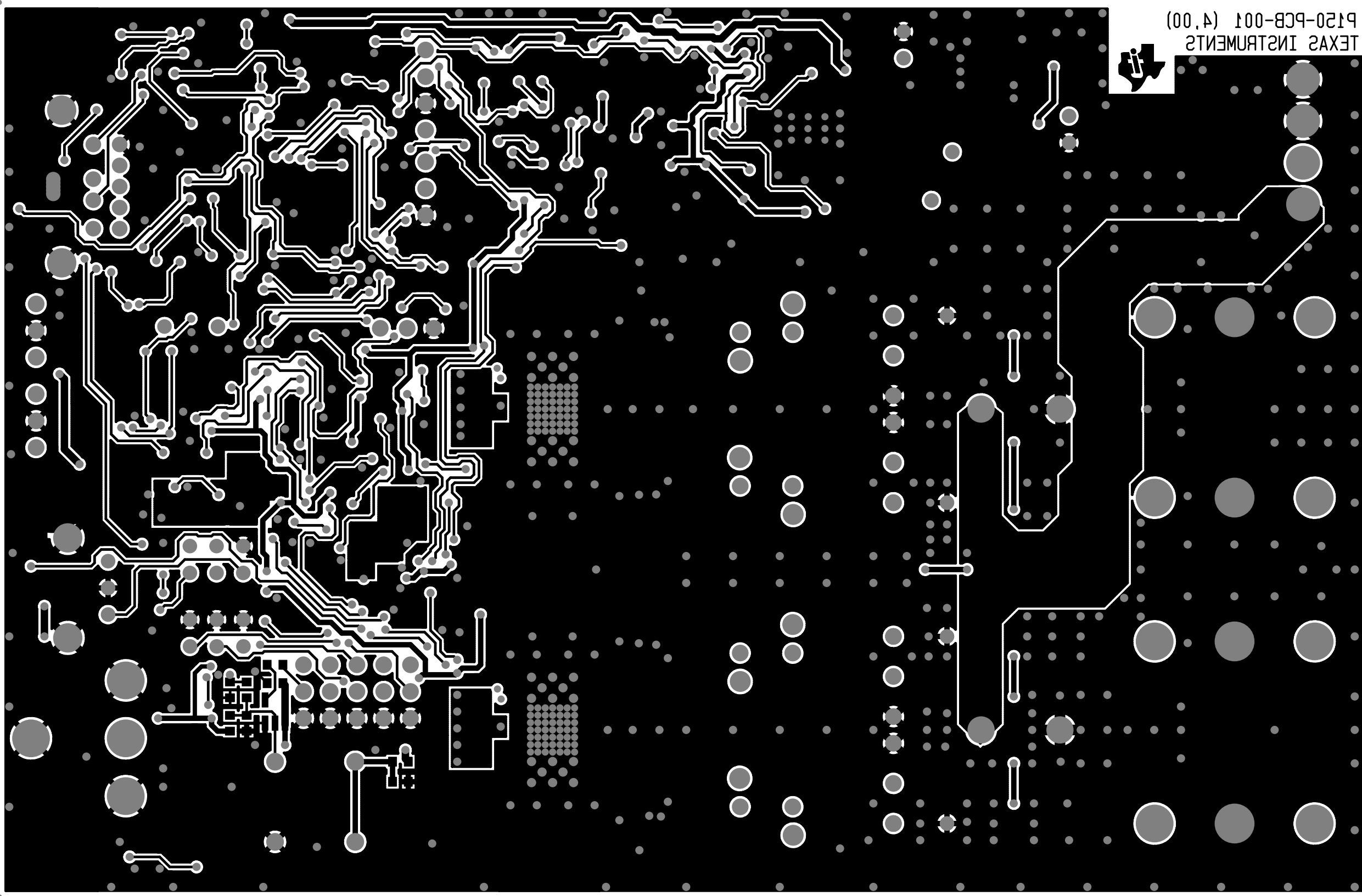


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 Patents pending

COMPONENT SIDE	DpS 4741 011022
TI Copenhagen P150-PCB-001	(4.00)



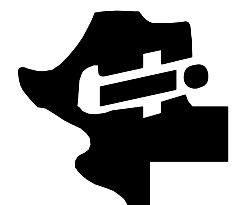
SS0110 1A7A 2q0		20LDER 2IDE
TI Copernicus P120-PCB-001 (4.00)		



TEXAS INSTRUMENTS
P120-PCB-001 (4.00)

TI Coburnsgen P120-PCB-001 (4.00)
COMP. LAYOUT 20LD 0p2 4741 011055

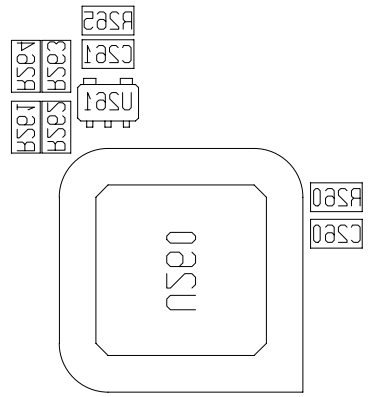
STNEMURTNI 2AXET
b9v79291 2fhgr1 IIA
gnibn9q 2fn9f69



■ QP1B93QNUHT
MVE01122AT \ MVE00122AT

(00.4) 100-BC9-0219

■
M2



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