

SoundDock[®] 10


Digital Music System



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SAFETY INFORMATION

1. Parts that have special safety characteristics are identified by the  symbol on schematics or by special notes on the parts list. Use only replacement parts that have critical characteristics recommended by the manufacturer.

2. Make leakage current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the unit to the customer. Use the following checks to perform these measurements:

A. Leakage Current Hot Check-With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) UL60065 / IEC 60065 paragraph 9.1.1. With the unit powered on, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the unit (antennas, handle bracket, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the unit power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

B. Insulation Resistance Test Cold Check-(1) Unplug the power supply and connect a jumper wire between the two prongs of the plug. (2) Turn on the power switch of the unit. (3) Measure the resistance with an ohmmeter between the jumpered AC plug and each exposed metallic cabinet part on the unit. When testing 3 wire products, the resistance measured to the product enclosure should be between 2 and infinite MOhms. Also, the resistance measured to exposed input/output connectors should be between 4 and infinite MOhms. When testing 2 wire products, the resistance measured to exposed input/output connectors should be between 4 and infinite MOhms. If it is not within the limits specified, there is the possibility of a shock hazard, and the unit must be repaired and rechecked before it is returned to the customer.

CAUTION: The SoundDock® 10 Digital Music System contains no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

WARNING: Danger of explosion if remote battery is incorrectly replaced. Replace with only Duracell, Eveready, Energizer, Maxell or Toshiba CR2032 or DL2032 3-volt lithium battery.

PROPRIETARY INFORMATION

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF BOSE CORPORATION WHICH IS BEING FURNISHED ONLY FOR THE PURPOSE OF SERVICING THE IDENTIFIED BOSE PRODUCT BY AN AUTHORIZED BOSE SERVICE CENTER OR OWNER OF THE BOSE PRODUCT, AND SHALL NOT BE REPRODUCED OR USED FOR ANY OTHER PURPOSE.

SPECIFICATIONS

Electrical

Input Power Rating:

U.S.A/Canada	100-120VAC 50/60Hz, 150W
International:	220-240VAC 50/60Hz, 150W 100-240VAC 50/60Hz, 150W

Acoustic

Drivers:

Size:	2 - 50 mm Twiddler® speakers
Nominal Impedance:	4 Ohms
Port Tuning:	230 Hz

Woofers:

Size:	116mm
Nominal Impedance:	1 Ohm
Port Tuning:	47 Hz

Physical Description

Dimensions:	8.7"H x 17"W x 9.6"D (22.1 cm x 43.2 cm x 24.4 cm)
Weight:	18.5 lb (8.4 kg)
Enclosure:	Ultrasonically welded PC/ABS plastic

ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICE HANDLING


This unit contains ESDS devices. We recommend the following precautions when repairing, replacing or transporting ESDS devices:

- Perform work at an electrically grounded work station.
- Wear wrist straps that connect to the station or heel straps that connect to conductive floor mats.
- Avoid touching the leads or contacts of ESDS devices or PC boards even if properly grounded. Handle boards by the edges only.
- Transport or store ESDS devices in ESD protective bags, bins, or totes. Do not insert unprotected devices into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap or plastic trays.

WARRANTY

The SoundDock® 10 Digital Music System electronics is covered by a limited 1-year transferable warranty.

PART LIST NOTES

1. This part is not normally available from Customer Service. Approval from the Field Service Manager is required before ordering.
2. The individual parts located on the PCBs are listed in the Electrical Part List.
3.  This part is critical for safety purposes. Failure to use a substitute replacement with the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards.
4. This part is referenced for informational purposes only. It is not stocked as a repair part. Refer to the next higher assembly for a replacement part.

PRODUCT OVERVIEW

PRODUCT DESCRIPTION

SoundDock® 10 is a single-piece, powered speaker for use with the iPod and other leading MP3 players. As the premium stationary digital music system, SoundDock 10 has acoustic performance noticeably better than the original SoundDock, SoundDock Portable, as well as Apple's Hi-Fi.

New features -

- Software updates through a USB connection.
- Video output
- Removable Dock (Bluetooth Dock available as a separate purchase)

REMOTE CONTROL

An infrared Remote control is included. It uses the same battery that is used with our credit card style remote controls: CR2032. The infrared codes used for this remote overlap with the SoundDock Series II remote with two additional buttons available, the AUX and iPod buttons.

SOFTWARE UPGRADES

Software upgrades may be necessary to keep SoundDock 10 compatible with new iPods. When upgrades are available, Owners.com will have the software and the instructions available to customers and service personnel to run the updates. A USB adapter cable will be needed to connect the PC to the system. Part number 320877-001.

Connect your device

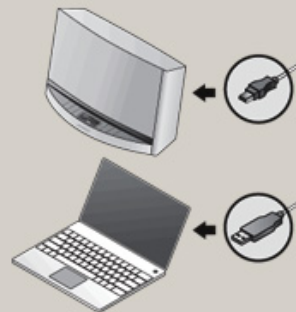
Connect your device using the following steps:

1. Make sure power is connected to your device.
2. Plug the smaller end of the mini-USB cable into the "update" port on the back of your device.
3. Connect the other end of the cable to a USB port on your computer.
4. Wait a few seconds.

The update process will proceed automatically once the device is detected.

If your computer did not detect your device, [try the troubleshooting steps](#).

If the problem persists, [call Bose Support](#).



PACKAGING PART LIST

Bose® SoundDock® 10 Digital Music System

Item Number	Description	Part Number	QTY	Note
1	LINE CORD, 120V, PDL, BLK LINE CORD, 220V, EUR, BLK LINE CORD, 230V, KOREA, BLK LINE CORD, 230V, UKS, BLK LINE CORD, 240V, AUS, BLK	262814-001 280135-001 311668-001 280138-001 284243-001	1	⚠
2	COMMITMENT LETTER	251001	1	
3	SHEET, ADDRESS PAGE, BOSE	289347-001	1	
4	OWNERS GUIDE, 3L, US OWNERS GUIDE, 11L, EUR OWNERS GUIDE, 6L, AP	314136 314137 314138	1	
5	PERSONAL AUDIO INBOX BROCHURE	310403-001	1	
6	REMOTE CNTRL, IR, BLK	322254-0100	1	⚠
7	PACKING, TRAY, TOP, 20.8X12.8X6.1	312286	1	
8	SOUNDDOCK-10 DMS 120V SILVER	-	1	
9	PACKING, TRAY, BOT, 20.8X12.8X6.1	312287	1	
10	CARTON, RSC, 20.94X12.94X12.25, US	312288	1	
11	CARTON, DC, 4.12"X2.06"X1.56", BT	319496-0010	1	
12	MODULE, BLUETOOTH, SOUNDDOCK10 (finished good accessory)	310840-0000	1	⚠
-	UNIVERSAL, INSERT (shown on next page)	317402-0010	1	
-	I-DOCK, SUBASSY (shown on next page)	318058-001S	1	

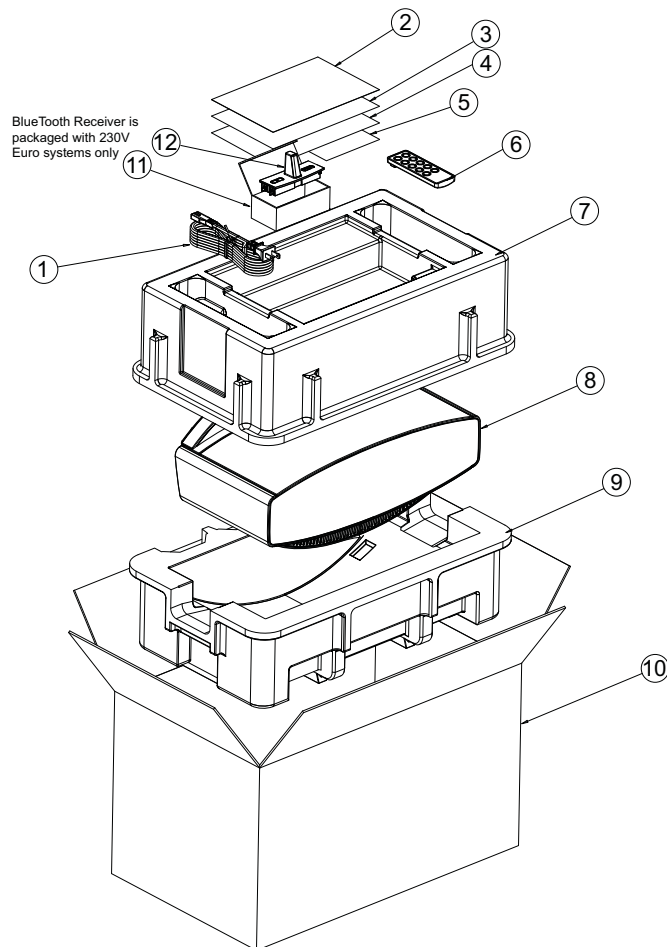


Figure 1. Packing Exploded View

SPEAKER ASSEMBLY PART LIST

Bose® SoundDock® 10 Digital Music System

Item Number	Description	Part Number	Note
1	LENS (N/A, use grille part number)	-	3, ⚠
2	GRILLE (includes lens)	323691-001S	
3	CENTERING TAB	317086-0010	
4	HARNESS, TWIDDLER	318606-0010	
5	FOAM, URETHANE, BLACK, PSA	319723-0010	
6	FOAM, PORON, PSA	319404-0010	
7	SCREW, TAPP, 4-16, PAN, XREC	288372-006	
8	TWIDDLER, 50MM	291636-001	3, ⚠
9	FLOCK GRILLE LEFT	314449-0010	
10	FASTENER, INTERLOCK, 75mm	304106-075	
11	WELDED ASSY	-	3, ⚠
12	FLOCK, FABRIC, 195X11	314450-0010	
13	ENDCAP, RIGHT	310382-001	
14	TRANSDUCER, ASSEMBLY, WOOFER	324318-001S	3, ⚠
15	GASKET, WAVE	313891-004	
16	COVER, WOOFER	310388-001	
17	GASKET, FOAM, TAPE, .070	311559-0010	
18	COVER, REAR	319726-0010	3, ⚠
19	ENDCAP, LEFT	310381-001	3, ⚠
20	SCREW, TAPP, 8-11x5, XREC/SQ	289388-008	
21	DEADFRONT ICONS	310433-001	
22	GASKET, CENTER	316806-002	

Item Number	Description	Part Number	Note
23	PCB, ASSY, IR	319107-001S	
24	HEATSINK	310387-001	3, ⚠
25	PAD, THERMAL	311554-0010	
26	GROMMET, ISOLATION	310389-001	
27	FOAM, TAPE, 345X25X1.75	311559-0030	
28	CABLE, FFC, 6POS	310375-001	
29	CABLE, FFC, 50POS, FOAM	310376-003	
30	CABLE, FFC, 30POS, FOAM	311560-0030	
31	POWER, PCB, ASSY, US	311435-011S	
	POWER, PCB, ASSY, EU	311435-012S	
	POWER, PCB, ASSY, DUAL	311435-016S	
32	INSULATOR, AC	315187-0010	3, ⚠
33	UNIVERSAL, INSERT	317402-0020	
34	I-DOCK, SUBASSY	323693-001S	
35	SLAB, DSP	319110-041S	
36	DOCKFRAME/PCB	323692-001S	
37	SCREW, TAP, 8-11X.625, XRC/SQ	289389-010	
38	LABEL, PRODUCT (N/A)	-	4
39	GASKET, FOAM, PORT	311943-0010	
40	SCREW, 8-11X1/2, WASHER	310539-008	
41	FOOT, RUBBER, 12.5 DIA	301750-002	3, ⚠
42	BASEPLATE	310379-001	3, ⚠
43	FOAM, GASKET STACKED EMI	323770-0010	3, ⚠

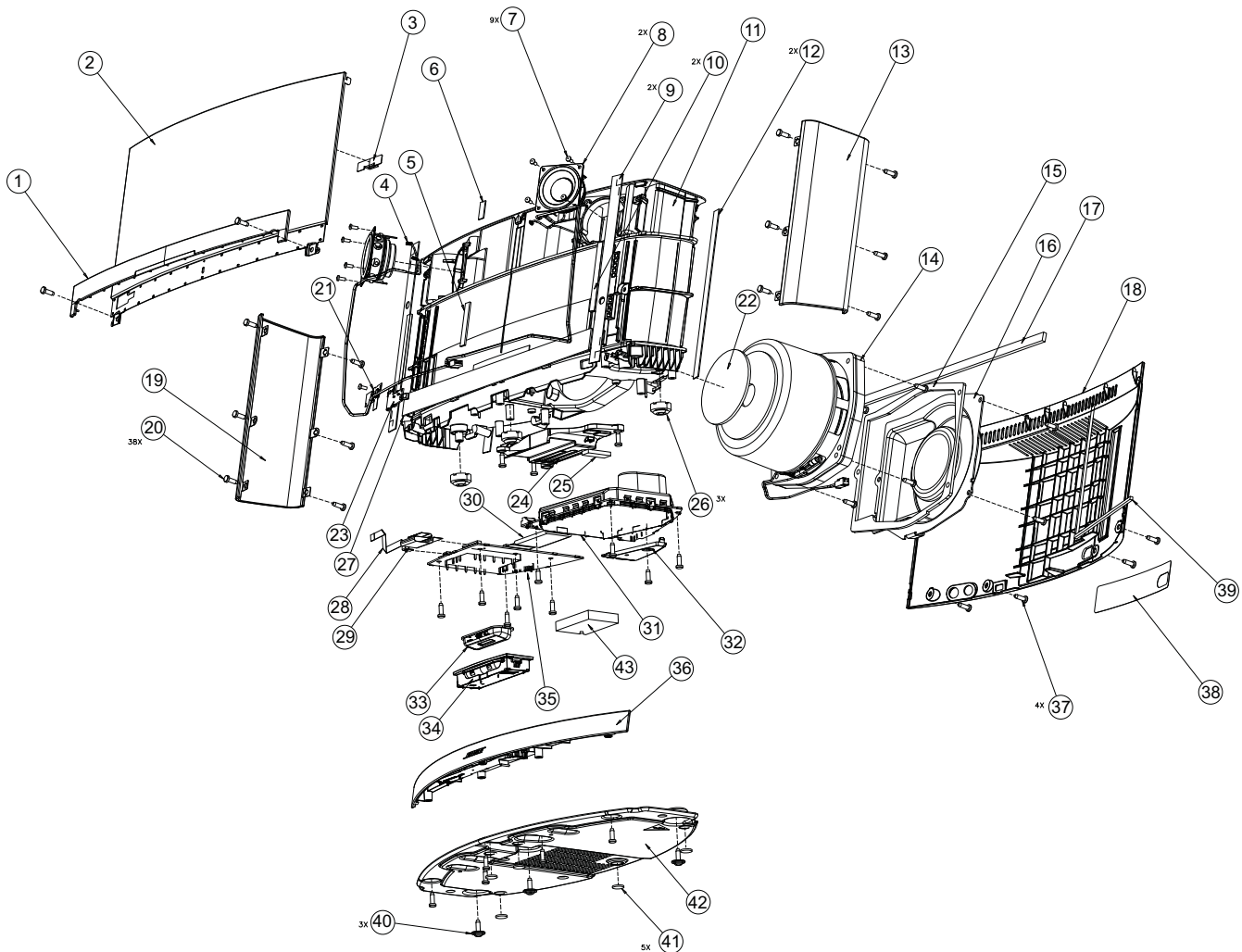


Figure 2. Speaker Assembly Exploded View

ELECTRICAL PART LIST

DSP PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R1000	5.11K, 0603, .1W, 1%	191465-5111	4
R1001	5.11K, 0603, .1W, 1%,	191465-5111	4
R1002	75 OHM, 0805, 1/10W, 5%	133626-7505	4
R1003	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R1004	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R1005	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R1100	51 OHM, 0603, 100MW, 5%,	199403-510	4
R1101	51 OHM, 0603, 100MW, 5%,	199403-510	4
R1102	51 OHM, 0603, 100MW, 5%,	199403-510	4
R1103	51 OHM, 0603, 100MW, 5%,	199403-510	4
R1104	51 OHM, 0603, 100MW, 5%,	199403-510	4
R1105	51 OHM, 0603, 100MW, 5%	199403-510	4
R200	4.99K, 0805, .125W, 1%	133625-4991	4
R201	4.99K, 0805, .125W, 1%	133625-4991	4
R202	4.99K, 0805, .125W, 1%	133625-4991	4
R203	4.99K, 0805, .125W, 1%	133625-4991	4
R204	1M, 0603, .1W, 1%,	191465-1004	4
R205	1M, 0603, .1W, 1%,	191465-1004	4
R206	1M, 0603, .1W, 1%,	191465-1004	4
R207	1M, 0603, .1W, 1%,	191465-1004	4
R208	14K, 0603, .1W, 1%,	191465-1402	4
R209	14K, 0603, .1W, 1%,	191465-1402	4
R210	15K, 0603, .1W, 1%	191465-1502	4
R211	14K, 0603, .1W, 1%,	191465-1402	4
R212	15K, 0603, .1W, 1%	191465-1502	4
R213	14K, 0603, .1W, 1%,	191465-1402	4
R214	15K, 0603, .1W, 1%	191465-1502	4
R215	15K, 0603, .1W, 1%	191465-1502	4
R217	15K, 0603, .1W, 1%	191465-1502	4
R218	15K, 0603, .1W, 1%	191465-1502	4
R219	47OHM, 0603, SMD, 100MW, 5%	199403-470	4
R220	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R221	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R222	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R223	15K, 0603, .1W, 1%	191465-1502	4
R224	15K, 0603, .1W, 1%	191465-1502	4
R225	1.00K, 0805, 1/10W, 5%	133626-1025	4
R233	JUMPER, CHIP, 0603	196042	4
R234	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R300	1.5KOHM, ARRAY, SMT, 50V, 5%	186433-1524	4
R301	130K, 0603, 100MW, 1%	191465-1303	4
R304	4.99K, 0805, .125W, 1%	133625-4991	4
R305	4.99K, 0805, .125W, 1%	133625-4991	4
R309	2K, 0603, .1W, 1%	191465-2001	4
R310	2K, 0603, .1W, 1%	191465-2001	4
R311	2.49K, 0603, .1W, 1%	191465-2491	4
R400	1K, 0603, .1W, 5%	199403-102	4
R401	22 OHMS, 0603, .1W, 5%	199403-220	4
R402	6.04K, 0603, .1W, 1%	191465-6041	4
R403	6.04K, 0603, .1W, 1%	191465-6041	4
R404	3.3K, 0603, .1W, 5%	199403-332	4
R405	20K, 0603, .1W, 5%	199403-203	4
R406	0.47 OHM, 1210, 500mW, 5%	318356-471J	4
R407	100 OHM, 1206, 1/4W, 1%	124894-1000	4
R408	1K, 0603, .1W, 5%	199403-102	4
R409	680 Milli- OHMS, 1210, 500mW, 5%,	318356-681J	4
R410	6.8 OHM, 1206, 1/4W, 5%	124895-6R85	4
R411	330 OHMS, 0603, .1W, 5%,	199403-331	4
R412	22.1K, 0603, .1W, 1%	191465-2212	4
R413	42.2 K, 0603, .1W, 1%	191465-4222	4
R414	510 OHM, 0603, .1W, 1%, 510	191465-5100	4
R415	825 OHM, 0603, SMD, 100MW, 1%	191465-8250	4
R416	1K, 0603, .1W, 5%	199403-102	4
R417	130K, 0402, 63MW, 1%	268361-1303	4
R419	1.27K, 0603, 1/10W, 1%	191465-1271	4
R420	3.9K, 0603, .1W, 1%	191465-3901	4
R421	121 OHM, 0603, .1W, 1%,	191465-1210	4
R422	210 OHM, 0603, .1W, 1%,	191465-2100	4
R423	JUMPER, CHIP, 0603	196042	4
R424	JUMPER, CHIP, 0603	196042	4
R425	JUMPER, CHIP, 0603	196042	4
R426	22 OHMS, 0603, .1W, 5%	199403-220	4
R427	10K, 0603, .1W, 1%	191465-1002	4
R428	2.2 OHM, 1206, 1/4W, 5%	124895-2R25	4
R429	6.8 OHM, 1206, 1/4W, 5%	124895-6R85	4

Resistors

Reference Designator	Description	Part Number	Note
R430	10K, 0603, .1W, 1%	191465-1002	4
R431	3.9K, 0603, .1W, 1%	191465-3901	4
R432	1.00K, 0805, 1/10W, 5%	133626-1025	4
R600	10K, 0603, .1W, 5%	199403-103	4
R601	10K, 0603, .1W, 5%	199403-103	4
R602	330 OHM, 0603, .1W, 1%,	191465-3300	4
R603	330 OHM, 0603, .1W, 1%	191465-3300	4
R604	2K, 0603, .1W, 1%	191465-2001	4
R605	10K, 0603, .1W, 5%	199403-103	4
R606	100K, 0603, .1W, 5%	199403-104	4
R607	49.9K, 0603, .1W, 1%	191465-4992	4
R608	475 OHM, 0603, .1W, 1%,	191465-4750	4
R609	100 OHM, 0603, .1W, 5%	199403-101	4
R611	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R612	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R613	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R614	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R615	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R616	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R617	100 OHM, 1206, 1/4W, 1%	124894-1000	4
R800	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R801	1K, 0603, .1W, 5%	199403-102	4
R802	10K, 0603, .1W, 5%	199403-103	4
R803	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R804	100 OHM, 0603, .1W, 5%	199403-101	4
R805	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R806	10K, 0603, .1W, 5%	199403-103	4
R807	10K, 0603, .1W, 5%	199403-103	4
R808	10K, 0603, .1W, 1%	191465-1002	4
R809	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R810	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R811	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R812	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R813	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R814	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R815	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R816	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R817	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R818	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R819	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R820	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R821	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R822	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R823	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R824	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R825	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R826	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R827	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R828	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R829	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R830	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R831	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R832	4.7K, 0603, .1W, 5%,	199403-472	4
R833	10K, 0603, .1W, 1%	191465-1002	4
R834	10K, 0603, .1W, 1%	191465-1002	4
R835	330 OHM, 0603, .1W, 1%	191465-3300	4
R836	10K, ARRAY, SMT, 4 POS, 5%	186433-1034	4
R837	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R838	10K, 0603, .1W, 1%	191465-1002	4
R839	10K, 0603, .1W, 1%	191465-1002	4
R840	10K, 0603, .1W, 5%	199403-103	4
R841	10K, ARRAY, SMT, 4 POS, 50V, 5%	186433-1034	4
R842	0603, .1W, 1%, 100K	191465-1003	4
R846	10K, ARRAY, SMT, 4 POS, 5%	186433-1034	4
R850	10K, 0603, .1W, 5%	199403-103	4
R851	10K, 0603, .1W, 5%	199403-103	4
R854	JUMPER, CHIP, 0603	196042	4
R855	JUMPER, CHIP, 0603	196042	4
R856	JUMPER, CHIP, 0603	196042	4
R857	JUMPER, CHIP, 0603	196042	4
R859	330 OHM, 0805, 1/10W, 5%	133626-3315	4
R900	10K, 0603, .1W, 5%	199403-103	4
R901	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R902	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R903	4.7K, 0603, .1W, 5%,	199403-472	4

ELECTRICAL PART LIST

DSP PCB Assembly

Resistors (continued)

Reference Designator	Description	Part Number	Note
R904	1K, 0603, .1W, 5%	199403-102	4
R905	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R906	4.7K, 0603, .1W, 5%	199403-472	4
R907	10K, 0603, .1W, 1%	191465-1002	4
R908	10K, ARRAY, SMT, 4 POS, 50V, 5%	186433-1034	4
R909	100 OHM, 0603, .1W, 1%	191465-1000	4
R910	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R911	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R912	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R913	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R914	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R915	1K, 0603, .1W, 5%	199403-102	4
R916	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R917	10K, 0603, .1W, 1%	191465-1002	4
R918	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R919	49.9 OHM, 0402, 63MW, 1%	268361-49R9	4
R920	10K, 0603, .1W, 1%	191465-1002	4
R921	10K, 0603, .1W, 1%	191465-1002	4
R922	3.01K, 0603, .1W, 1%	191465-3011	4
R923	10K, 0603, .1W, 1%	191465-1002	4
R929	90.9K, 0603, .1W, 1%	191465-9092	4
R930	10K, 0603, .1W, 1%	191465-1002	4
R931	1K, 0603, .1W, 5%	199403-102	4
R932	10K, 0603, .1W, 1%	191465-1002	4
R933	51 OHM, 0805, 1/10W, 5%	133626-5105	4

Capacitors

Reference Designator	Description	Part Number	Note
C201	18, COG, 0603, 50V, 5%	188454-181	4
C200	180pF, 0603, COG, 50V, 5%	188454-181	4
C202	18, COG, 0603, 50V, 5%	188454-181	4
C203	180pF, 0603, COG, 50V, 5%	188454-181	4
C204	3.3uF, TANT, 3216, 16V, 10%	268370-335	4
C205	3.3uF, TANT, 3216, 16V, 10%	268370-335	4
C206	3.3uF, TANT, 3216, 16V, 10%	268370-335	4
C207	3.3uF, TANT, 3216, 16V, 10%	268370-335	4
C208	18, COG, 0603, 50V, 5%	188454-181	4
C209	180pF, 0603, COG, 50V, 5%	188454-181	4
C210	18, COG, 0603, 50V, 5%	188454-181	4
C211	18, COG, 0603, 50V, 5%	188454-181	4
C212	0.1, X7R, 0603, 50V, 10%	191470-104	4
C213	0.1, X7R, 0603, 50V, 10%	191470-104	4
C214	18, COG, 0603, 50V, 5%	188454-181	4
C215	18, COG, 0603, 50V, 5%	188454-181	4
C216	.01, X7R, 0603, 50V, 10%	191470-103	4
C217	.01, X7R, 0603, 50V, 10%	191470-103	4
C218	18, COG, 0603, 50V, 5%	188454-181	4
C219	18, COG, 0603, 50V, 5%	188454-181	4
C220	18, COG, 0603, 50V, 5%	188454-181	4
C221	18, COG, 0603, 50V, 5%	188454-181	4
C222	2.2uF, X7R, 1206, OPN, 16V, 10%	283163-225	4
C223	1000pF, 0603, COG, 50V, 5%	188454-102	4
C224	18, COG, 0603, 50V, 5%	188454-181	4
C225	1000pF, 0603, COG, 50V, 5%	188454-102	4
C226	1000, COG, 0603, 50V, 5%	188454-102	4
C227	10uF, TANT, A SIZE, 10V, 20%	196981-A106A2	4
C228	10uF, TANT, A SIZE, 10V, 20%	196981-A106A2	4
C229	0.1, X7R, 0603, 50V, 10%	191470-104	4
C230	0.1, X7R, 0603, 50V, 10%	191470-104	4
C231	10uF, TANT, A SIZE, 10V, 20%	196981-A106A2	4
C232	1000, COG, 0603, 50V, 5%	188454-102	4
C233	33pF, 0603, COG, 50V, 5%	188454-330	4
C234	33nF, X7R, 0402, 16V, 5%	296732-333	4
C235	33nF, X7R, 0402, 16V, 5%	296732-333	4
C236	22pF, COG, 0402, 50V, 5%	268364-220	4
C237	22pF, COG, 0402, 50V, 5%	268364-220	4
C238	22pF, COG, 0402, 50V, 5%	268364-220	4
C239	22pF, COG, 0402, 50V, 5%	268364-220	4
C240	22pF, COG, 0402, 50V, 5%	268364-220	4
C300	1000, COG, 0603, 50V, 5%	188454-102	4

Capacitors (continued).

Reference Designator	Description	Part Number	Note
C301	1000, COG, 0603, 50V, 5%	188454-102	4
C302	1000, COG, 0603, 50V, 5%	188454-102	4
C303	1000, COG, 0603, 50V, 5%	188454-102	4
C304	1uF, TANT, 3216, 20V, 10%	268370-105	4
C305	1uF, TANT, 3216, 20V, 10%	268370-105	4
C306	1uF, TANT, 3216, 20V, 10%	268370-105	4
C307	1uF, TANT, 3216, 20V, 10%	268370-105	4
C308	0.1, X7R, 0603, 50V, 10%	191470-104	4
C309	1000, COG, 0603, 50V, 5%	188454-102	4
C310	33uF, EL, 85, 10V, 20%	177902-330A	4
C311	1000, COG, 0603, 50V, 5%	188454-102	4
C312	1000, COG, 0603, 50V, 5%	188454-102	4
C313	1uF, TANT, 3216, 20V, 10%	268370-105	4
C314	1uF, TANT, 3216, 20V, 10%	268370-105	4
C315	2.2uF, X7R, 1206, OPN, 16V, 10%	283163-225	4
C316	1000, COG, 0603, 50V, 5%	188454-102	4
C317	1, TANT, 3216, 20V, 10%	268370-105	4
C318	1, TANT, 3216, 20V, 10%	268370-105	4
C319	33nF, X7R, 0402, 16V, 5%	296732-333	4
C320	33nF, X7R, 0402, 16V, 5%	296732-333	4
C321	22pF, COG, 0402, 50V, 5%	268364-220	4
C322	22pF, COG, 0402, 50V, 5%	268364-220	4
C323	22pF, COG, 0402, 50V, 5%	268364-220	4
C324	22pF, COG, 0402, 50V, 5%	268364-220	4
C325	22pF, COG, 0402, 50V, 5%	268364-220	4
C326	22pF, COG, 0402, 50V, 5%	268364-220	4
C327	22pF, COG, 0402, 50V, 5%	268364-220	4
C328	22pF, COG, 0402, 50V, 5%	268364-220	4
C329	22pF, COG, 0402, 50V, 5%	268364-220	4
C400	470, COG, 0603, 50V, 5%	188454-471	4
C401	1000, COG, 0603, 50V, 5%	188454-102	4
C402	47, X7R, 0603, 50V, 10%	191470-470	4
C403	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C404	0.1, X7R, 0603, 50V, 10%	191470-104	4
C405	0.1, X7R, 0603, 50V, 10%	191470-104	4
C406	1.0, X7R, 1206, 50V, 10%	286500-105	4
C407	100, COG, 0603, 50V, 5%	188454-101	4
C408	220, COG, 0603, 50V, 5%	188454-221	4
C409	4.7uF, CER, 1210, X7R, 25V, 10%	291431-475	4
C410	2.2, X5R, 1206, 25V, 20%	310601-2253M	4
C411	2.2, X5R, 1206, 25V, 20%	310601-2253M	4
C412	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C413	47, CER, 1206, X5R, 6.3V, 20%	291432-476	4
C414	47, CER, 1206, X5R, 6.3V, 20%	291432-476	4
C415	.022, X7R, 0603, 50V, 10%	191470-223	4
C416	22uF, CER, 1206, X5R, 16V, 20%	321689-226	4
C417	4.7, TANT, 1411, 20V, 20%	188588-475	4
C418	4.7, TANT, 1411, 20V, 20%	188588-475	4
C419	1.0, X7R, 1206, 50V, 10%	286500-105	4
C420	4.7, TANT, 1411, 20V, 20%	188588-475	4
C421	4.7uF, 1411, TANT, 20V, 20%	188588-475	4
C422	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C429	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C430	39.2K, 0603, 1/10W, 0.1%	282986-3922	4
C431	0.1, X7R, 0603, 50V, 10%	191470-104	4
C432	470pF, 0603, COG, 50V, 5%	188454-471	4
C433	0.1, X7R, 0603, 50V, 10%	191470-104	4
C600	33pF, 0603, COG, 50V, 5%	188454-330	4
C601	33pF, 0603, COG, 50V, 5%	188454-330	4
C602	33pF, 0603, COG, 50V, 5%	188454-330	4
C603	1000pF, COG, 25V, 5%	268364-102	4
C604	33nF, X7R, 0402, 16V, 5%	296732-333	4
C605	0.1, X7R, 0603, 50V, 10%	191470-104	4
C606	33nF, X7R, 0402, 16V, 5%	296732-333	4
C607	33pF, 0603, COG, 50V, 5%	188454-330	4
C608	33pF, 0603, COG, 50V, 5%	188454-330	4
C609	33pF, 0603, COG, 50V, 5%	188454-330	4
C610	15, COG, 0603, 50V, 5%	188454-150	4
C611	1000pF, COG, 25V, 5%	268364-102	4
C612	15, COG, 0603, 50V, 5%	188454-150	4
C613	33nF, X7R, 0402, 16V, 5%	296732-333	4
C614	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C615	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C616	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C617	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C618	68pF, COG, 0402, 50V, 5%	268364-680	4

ELECTRICAL PART LIST

DSP PCB Assembly

Capacitors (continued)

Capacitors (continued)

Reference Designator	Description	Part Number	Note
C619	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C700	100uF, 7343, TANT, lo-R, 10V, 10%	275411-107	4
C701	33nF, X7R, 0402, 16V, 5%	296732-333	4
C702	1000pF, COG, 25V, 5%	268364-102	4
C703	33nF, X7R, 0402, 16V, 5%	296732-333	4
C704	1000pF, COG, 25V, 5%	268364-102	4
C705	33nF, X7R, 0402, 16V, 5%	296732-333	4
C706	1000pF, COG, 25V, 5%	268364-102	4
C707	33nF, X7R, 0402, 16V, 5%	296732-333	4
C708	33nF, X7R, 0402, 16V, 5%	296732-333	4
C709	1000pF, COG, 25V, 5%	268364-102	4
C710	33nF, X7R, 0402, 16V, 5%	296732-333	4
C711	1000pF, COG, 25V, 5%	268364-102	4
C712	33nF, X7R, 0402, 16V, 5%	296732-333	4
C713	1000pF, COG, 25V, 5%	268364-102	4
C714	33nF, X7R, 0402, 16V, 5%	296732-333	4
C715	10, TANT, A SIZE, 6.3V, 20%	196981- J106A2	4
C716	68pF, COG, 0402, 50V, 5%	268364-680	4
C717	68pF, COG, 0402, 50V, 5%	268364-680	4
C719	68pF, 0603, COG, 50V, 5%	188454-680	4
C720	68pF, COG, 0402, 50V, 5%	268364-680	4
C721	68pF, COG, 0402, 50V, 5%	268364-680	4
C722	68pF, COG, 0402, 50V, 5%	268364-680	4
C723	68pF, COG, 0402, 50V, 5%	268364-680	4
C724	68pF, COG, 0402, 50V, 5%	268364-680	4
C725	68pF, COG, 0402, 50V, 5%	268364-680	4
C726	68pF, COG, 0402, 50V, 5%	268364-680	4
C727	68pF, COG, 0402, 50V, 5%	268364-680	4
C728	68pF, COG, 0402, 50V, 5%	268364-680	4
C729	68pF, COG, 0402, 50V, 5%	268364-680	4
C730	68pF, COG, 0402, 50V, 5%	268364-680	4
C731	68pF, 0603, COG, 50V, 5%	188454-680	4
C732	68pF, COG, 0402, 50V, 5%	268364-680	4
C733	68pF, COG, 0402, 50V, 5%	268364-680	4
C734	68pF, COG, 0402, 50V, 5%	268364-680	4
C735	68pF, COG, 0402, 50V, 5%	268364-680	4
C736	68pF, COG, 0402, 50V, 5%	268364-680	4
C737	68pF, COG, 0402, 50V, 5%	268364-680	4
C738	68pF, COG, 0402, 50V, 5%	268364-680	4
C739	68pF, COG, 0402, 50V, 5%	268364-680	4
C740	68pF, COG, 0402, 50V, 5%	268364-680	4
C741	68pF, COG, 0402, 50V, 5%	268364-680	4
C742	68pF, COG, 0402, 50V, 5%	268364-680	4
C743	68pF, COG, 0402, 50V, 5%	268364-680	4
C744	68pF, COG, 0402, 50V, 5%	268364-680	4
C800	33nF, X7R, 0402, 16V, 5%	296732-333	4
C801	1000pF, COG, 25V, 5%	268364-102	4
C802	33nF, X7R, 0402, 16V, 5%	296732-333	4
C803	1000pF, COG, 25V, 5%	268364-102	4
C804	33nF, X7R, 0402, 16V, 5%	296732-333	4
C805	1000pF, COG, 25V, 5%	268364-102	4
C806	33nF, X7R, 0402, 16V, 5%	296732-333	4
C807	1000pF, COG, 25V, 5%	268364-102	4
C808	33nF, X7R, 0402, 16V, 5%	296732-333	4
C809	1000pF, COG, 25V, 5%	268364-102	4
C810	33nF, X7R, 0402, 16V, 5%	296732-333	4
C811	1000pF, COG, 25V, 5%	268364-102	4
C812	10, TANT, A SIZE, 6.3V, 20%	196981- J106A2	4
C816	33nF, X7R, 0402, 16V, 5%	296732-333	4
C817	22pF, 0603, COG, 50V, 5%	188454-220	4
C817	22pF, 0603, COG, 50V, 5%	188454-220	4
C818	33pF, 0603, COG, 50V, 5%	188454-330	4
C819	33pF, 0603, COG, 50V, 5%	188454-330	4
C820	33pF, 0603, COG, 50V, 5%	188454-330	4
C821	68pF, COG, 0402, 50V, 5%	268364-680	4
C822	68pF, COG, 0402, 50V, 5%	268364-680	4
C823	68pF, COG, 0402, 50V, 5%	268364-680	4
C824	68pF, COG, 0402, 50V, 5%	268364-680	4
C825	68pF, 0603, COG, 50V, 5%	188454-680	4
C826	68pF, COG, 0402, 50V, 5%	268364-680	4
C827	68pF, COG, 0402, 50V, 5%	268364-680	4
C828	68pF, COG, 0402, 50V, 5%	268364-680	4
C829	68pF, COG, 0402, 50V, 5%	268364-680	4

Reference Designator	Description	Part Number	Note
C830	68pF, COG, 0402, 50V, 5%	268364-680	4
C831	68pF, 0603, COG, 50V, 5%	188454-680	4
C832	68pF, COG, 0402, 50V, 5%	268364-680	4
C833	1500pF, 0603, X7R, 50V, 10%	191470-152	4
C834	100pF, COG, 0402, 50V, 5%	268364-101	4
C835	68pF, COG, 0402, 50V, 5%	268364-680	4
C836	68pF, COG, 0402, 50V, 5%	268364-680	4
C837	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C838	68pF, COG, 0402, 50V, 5%	268364-680	4
C839	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C840	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C841	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C842	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C843	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C844	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C845	68pF, COG, 0402, 50V, 5%	268364-680	4
C846	68pF, COG, 0402, 50V, 5%	268364-680	4
C847	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C848	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C849	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C850	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C851	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C852	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C853	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C854	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C855	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C856	27pF, COG, 0402, 50V, 5%	268364-270	4
C857	27pF, COG, 0402, 50V, 5%	268364-270	4
C858	27pF, COG, 0402, 50V, 5%	268364-270	4
C859	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C860	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C861	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C862	68pF, COG, 0402, 50V, 5%	268364-680	4
C863	68pF, COG, 0402, 50V, 5%	268364-680	4
C864	68pF, COG, 0402, 50V, 5%	268364-680	4
C865	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C866	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C867	68pF, COG, 0402, 50V, 5%	268364-680	4
C868	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C869	68pF, COG, 0402, 50V, 5%	268364-680	4
C870	68pF, COG, 0402, 50V, 5%	268364-680	4
C871	68pF, COG, 0402, 50V, 5%	268364-680	4
C872	68pF, COG, 0402, 50V, 5%	268364-680	4
C873	68pF, COG, 0402, 50V, 5%	268364-680	4
C874	68pF, COG, 0402, 50V, 5%	268364-680	4
C875	68pF, COG, 0402, 50V, 5%	268364-680	4
C876	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C877	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C878	68pF, COG, 0402, 50V, 5%	268364-680	4
C879	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C880	68pF, COG, 0402, 50V, 5%	268364-680	4
C881	68pF, COG, 0402, 50V, 5%	268364-680	4
C882	68pF, COG, 0402, 50V, 5%	268364-680	4
C883	68pF, COG, 0402, 50V, 5%	268364-680	4
C884	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C885	68pF, COG, 0402, 50V, 5%	268364-680	4
C886	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C887	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C888	0.1, X7R, 0603, 50V, 10%	191470-104	4
C900	10, TANT, A SIZE, 6.3V, 20%	196981- J106A2	4
C901	33nF, X7R, 0402, 16V, 5%	296732-333	4
C902	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C903	33nF, X7R, 0402, 16V, 5%	296732-333	4
C904	33nF, X7R, 0402, 16V, 5%	296732-333	4
C905	1000, COG, 0603, 50V, 5%	188454-102	4
C906	27, COG, 0603, 50V, 5%	188454-270	4
C907	27, COG, 0603, 50V, 5%	188454-270	4
C908	10uF, TANT, A SIZE, 6.3V, 20%	196981- J106A2	4
C909	0.1, X7R, 0603, 50V, 10%	191470-104	4
C911	0.1, X7R, 0603, 50V, 10%	191470-104	4
C912	0.1, X7R, 0603, 50V, 10%	191470-104	4
C913	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C916	0.1, X7R, 0603, 50V, 10%	191470-104	4

ELECTRICAL PART LIST

DSP PCB Assembly

Capacitors (continued)

Reference Designator	Description	Part Number	Note
C917	33nF, X7R, 0402, 16V, 5%	296732-333	4
C919	220, COG, 0603, 50V, 5%	188454-221	4
C920	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C921	68pF, COG, 0402, 50V, 5%	268364-680	4
C922	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C923	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C924	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C925	68pF, COG, 0402, 50V, 0.1%,	268364-680	4
C1000	47pF, 0603, X7R, 50V, 10%	191470-470	4
C1001	47pF, 0603, X7R, 50V, 10%	191470-470	4
C1002	0.1, X7R, 0603, 50V, 10%	191470-104	4
C1004	X7R, 1206, 10%, 2.2, 16V, OPN	283163-225	4
C1005	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C1006	TVS, ESD SUPPRESSOR, LOW CAP	286375-001	4
C1007	1500pF, 0603, X7R, 50V, 10%	191470-152	4
C1100	22pF, 0603, COG, 50V, 5%	188454-220	4

Inductors

Reference Designator	Description	Part Number	Note
FB1000	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1001	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1002	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1003	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1004	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1005	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1006	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB1007	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB200	330 OHM, BEAD, FERRITE, BLM18P, 0603	302257-331	4
FB201	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB202	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB203	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB204	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB205	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB206	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB207	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB208	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB209	120 OHM, BEAD, FERRITE, 0402, 0.3A	324216-121B	4
FB600	FERRITEBD, IND0603, 200MA	268373-331	4
FB700	220 OHM, BEAD, FERRITE, 0603, 2A	322644-221A	4
FB701	220 OHM, BEAD, FERRITE, 0603, 2A	322644-221A	4
FB800	220 OHM, BEAD, FERRITE, 0603, 2A	322644-221A	4
FB801	120 OHM, BEAD, FERRITE, 0603, 200mA	324058-121A	4
FB900	330 OHM, BEAD, FERRITE, IND0603, 200MA	268373-331	4

Diodes

Reference Designator	Description	Part Number	Note
D1000	DIODE, SOT-23, BAV 99	147239	4
D1001	DIODE, SOT-23, BAV 99	147239	4
D1002	DIODE, SOT-23, BAV 99	147239	4
D400	DIODE, SCHOTTKY, 40V, 3A, SMB	193847-001	4
D401	DIODE, SCHOTTKY, 40V, 3A, SMB	193847-001	4
D402	DIODE, SCHOTTKY, 40V, 3A, SMB	193847-001	4
D403	DIODE, SCHOTTKY, 40V, 3A, SMB	193847-001	4
D405	DIODE, SOT-23, BAV 99	147239	4
ZR1000	DIODE, ZEN, 3.6V, 225MW, 5%, SOT-23	135247-5227	4
ZR400	DIODE, ZEN, 5.1V, 225MW, 5%, SOT-23	135247-5231	4
ZR401	DIODE, ZEN, 10.V, 225MW, 5%, SOT-23	135247-5240	4
ZR402	DIODE, ZEN, 5.1V, 225MW, 5%, SOT-23	135247-5231	4

Transistors

Reference Designator	Description	Part Number	Note
Q400	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q401	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q402	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q405	XISTOR, MOSFET, N-CH, 100V, 1.7A	312197-001	4
Q406	TRANSISTOR, MOSFET, N-CH, 2.5V	302882-001	4
Q407	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q600	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	4

Integrated Circuits

Reference Designator	Description	Part Number	Note
U200	IC, Stereo ADC, 24-Bit, 192kHz	307160-001	4
U201	IC, OP-AMP, DUAL, SOIC-8, TLC-2272	174989	4
U202	IC, OP-AMP, DUAL, SOIC-8, TLC-2272	174989	4
U300	IC, DAC, 24-bit, 192kHz, 6-ch, 20-P	309061-001	4
U400	IC, I-MODE PWM CONTROLLER	312199-001	4
U401	IC, VOLT REG, ADJ., 500MA, DPAK	258496-001	4
U600	IC, RESET, SOT-23, MAX809, 2.63V	191158-06	4
U601	IC, INVERTER, SMD	266582-001	4
U603	IC, DSP, TMS320DA705, MASKED	289857-7051	4
U800	IC, CPLD, w/ 570FF, JTAG, 144-P	307343-002	4
U801	IC, SERIAL, FLASH, 3.3V, 32Mbit, SO-8W	323017-032W	4
U802	IC, SECURITY, APPLE, 2.0B, C6	309630-006	4
U900	IC, uC, 3.6V, 64-pin, TQFP	307303-001	4
U901	IC, REST, 1.60V-4.63V, SC-70, MAX803	319732-293	
VR400	IC, VREG, LDO, ADJ, 1A, 1.5 to 5.5V, 8-P	324229-5500	4, 3
VR401	IC, Vreg, POS., LDO, .5A, ADJ. V	312828-002	4
VR402	IC, Vreg, POS., LDO, .5A, ADJ. V	312828-002	4

ELECTRICAL PART LIST

DSP PCB Assembly

Miscellaneous

Reference Designator	Description	Part Number	Note
J1000	CONN., USB, MINI-B TYPE, SMT	309011-003	4
J1001	CONN., RA, 6-P, 1.0MM PITCH, SMT	319448-006	4
J1003	CONN., SMT, LIF, 30 POS., SIDE	255130-030	4
J1007	CONN. RCA SINGLE YELLOW	314707-0010	4
J1100	CONN., FFC, .5mm, S-Entry, 50-PIN	310573-050	4
J200	CONN, JACK, HEADPHONE, PCB MNT, 9P	148583	4
JP1000	JUMPER, CHIP, 0603	196042	4
JP1001	JUMPER, CHIP, 0603	196042	4
X600	XTAL, SMD, 105, AT41CD2, 18.432MHz	269923-18R43C16	4
X900	CRYSTAL, MC49, 4.00MHZ	270245	4

ELECTRICAL PART LIST

Power PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R200	1K, 0603, .1W, 1%	191465-1001	4
R201	1K, 0603, .1W, 1%	191465-1001	4
R202	1K, 0603, .1W, 1%	191465-1001	4
R203	1K, 0603, .1W, 1%	191465-1001	4
R206	1K, 0603, .1W, 1%	191465-1001	4
R207	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R208	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R209	100 OHM, 0603, .1W, 1%	191465-1000	4
R210	220K, 0603, .1W, 5%	199403-224	4
R211	33 OHMS, 0603, .1W, 5%	199403-330	4
R212	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R300	100 OHM, 0603, .1W, 1%	191465-1000	4
R301	1K, 0603, .1W, 1%	191465-1001	4
R302	10K, 0603, .1W, 1%	191465-1002	4
R303	100 OHM, 0603, .1W, 1%	191465-1000	4
R304	100K, 0603, .1W, 1%	191465-1003	4
R305	10K, 0603, .1W, 1%	191465-1002	4
R306	221K, 0603, .1W, 1%	191465-2213	4
R307	221K, 0603, .1W, 1%	191465-2213	4
R308	221K, 0603, .1W, 1%	191465-2213	4
R309	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R310	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R311	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R312	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R313	10K, 0603, .1W, 1%	191465-1002	4
R314	221K, 0603, .1W, 1%	191465-2213	4
R315	221K, 0603, .1W, 1%	191465-2213	4
R316	221K, 0603, .1W, 1%	191465-2213	4
R317	33 OHMS, 0603, .1W, 5%	199403-330	4
R318	33 OHMS, 0603, .1W, 5%	199403-330	4
R403	499K, 1206, 1/4W, 1%	124894-4993	4
R404	499K, 1206, 1/4W, 1%	124894-4993	4
R407	499K, 1206, 1/4W, 1%	124894-4993	4
R412	150K, 1206, 1/4W, 1%	124894-1503	4
R413	150K, 1206, 1/4W, 1%	124894-1503	4
R416	100 OHM, ARRAY, SMT, 4 POS, 5%	186433-1014	4
R417	100 OHM, ARRAY, SMT, 4 POS, 5%	186433-1014	4
R418	0603, .1W, 1%, 1.0 OHM	191465-01R0	4
R500	100 OHM, 1206, 1/4W, 5%	124895-1015	4
R502	220K, 0603, .1W, 5%	199403-224	4
R503	100 OHM, 0603, .1W, 1%	191465-1000	4
R505	21.5kOHM, 0603, .1W, 1%	191465-2152	4
R506	130K, 1206, 1/4W, 1%	124894-1303	4
R507	130K, 1206, 1/4W, 1%	124894-1303	4
R508	68.1K, 0603, .1W, 1%	191465-6812	4
R509	18.2K, 0603, .1W, 1%	191465-1822	4
R510	60.4 OHMS, 0805, .125W, 1%	133625-60R4	4
R511	301 OHMS, 0805, .125W, 1%	133625-3010	4
R512	2512, 1W, 5%, 10 OHM	181895-10R0	4
R513	1K, 0603, .1W, 1%	191465-1001	4
R514	200 OHM, 0603, .1W, 1%	191465-2000	4
R515	0.066OHM, 2512, 1W, 1%	260699-066F	4
R516	0.066OHM, 2512, 1W, 1%	260699-066F	4
R517	10K, 0603, .1W, 1%	191465-1002	4
R518	49.9K, 0603, .1W, 1%	191465-4992	4
R519	22.1 OHM, 1206, 1/4W, 1%	124894-22R1	4
R520	22.1 OHM, 1206, 1/4W, 1%	124894-22R1	4
R521	10.2K, 0603, .1W, 1%	191465-1022	4
R522	1.18K OHM, 0603, 100MW, 1%	191465-1181	4
R524	10K, 0603, .1W, 1%	191465-1002	4
R525	20K, 0603, .1W, 1%	191465-2002	4
R526	1.33K, 0603, 100MW, 1%	191465-1331	4
R527	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R528	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R530	2.2 OHM, 1210, 330mW, 200V, 10%	321468-2R2K	4
R532	0603, .1W, 1%, 1.62K	191465-1621	4
R533	2.2K, 0603, .1W, 5%	199403-222	4
R534	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R535	220K, 0603, .1W, 5%	199403-224	4
R540	100K, 0603, .1W, 1%	191465-1003	4
R541	100K, 0603, .1W, 1%	191465-1003	4
R542	2.2K, 0603, .1W, 5%	199403-222	4
R544	1M, 0603, .1W, 1%	191465-1004	4
R545	1M, 0603, .1W, 1%	191465-1004	4
R546	100K, 0603, .1W, 1%	191465-1003	4

Resistors (continued)

Reference Designator	Description	Part Number	Note
R547	3.92K, 0603, .1W, 1%	191465-3921	4
R548	10K, 0603, .1W, 1%	191465-1002	4
R549	100K, 0603, .1W, 1%	191465-1003	4
R550	100 OHM, 0603, .1W, 1%	191465-1000	4
R551	49.9K, 0603, .1W, 1%	191465-4992	4
R552	100K, 0603, .1W, 1%	191465-1003	4
R553	1K, 0603, .1W, 1%	191465-1001	4
R554	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R555	10 OHMS, 0805, .125W, 1%	133625-10R0	4
R556	49.9K, 0603, .1W, 1%	191465-4992	4
R558	4.02K, 0603, .1W, 1%	191465-4021	4
R559	4.02K, 0603, .1W, 1%	191465-4021	4
R560	0603, .1W, 1%, 909 OHM	191465-9090	4
R561	0603, .1W, 1%, 6.04K	191465-6041	4
R562	220K, 0603, .1W, 5%	199403-224	4
R563	1.21K, 0402, 63MW, 1%	268361-1211	4
RT400	25 OHM, THERMISTOR, 2A, 20J, DIP/HEAT SHRINK	324066-2000H	4
VR402	VARISTOR, MET OX, 275V, 75JOULE	170189	3,4

Capacitors

Reference Designator	Description	Part Number	Note
C201	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C203	.47uF, X7R, 16V, 5%	196995-474	4
C205	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C207	47uF, EL, SMD, 105, 25V, 20%	306169-470EF	4
C208	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C209	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C210	0.1uF, X7R, 0603, 10%, 50V	191470-104	4
C211	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C213	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C214	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C216	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C217	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C218	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C219	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C220	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C221	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C224	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C225	220pF, 0603, COG, 50V, 5%	188454-221	4
C226	220pF, 0603, COG, 50V, 5%	188454-221	4
C229	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C232	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C233	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C234	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C235	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C236	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C237	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C238	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C239	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C240	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C241	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C242	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C243	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C244	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C245	22pF, COG, 0402, 50V, 5%	268364-220	4
C246	22pF, COG, 0402, 50V, 5%	268364-220	4
C247	22pF, COG, 0402, 50V, 5%	268364-220	4
C248	22pF, COG, 0402, 50V, 5%	268364-220	4
C249	22pF, COG, 0402, 50V, 5%	268364-220	4
C250	22pF, COG, 0402, 50V, 5%	268364-220	4
C252	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C253	27pF, COG, 0402, 50V, 5%	268364-270	4
C300	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C301	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C302	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C303	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C304	100pF, 0603, COG, 50V, 5%	188454-101	4
C305	220pF, 0603, COG, 50V, 5%	188454-221	4
C306	220pF, 0603, COG, 50V, 5%	188454-221	4
C307	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C308	.01uF, 0603, X7R, 50V	191470-103	4

ELECTRICAL PART LIST

Power PCB Assembly

Capacitors Cont.

Reference Designator	Description	Part Number	Note
C309	1uF, CAP., EL., SMD, 105, 50V, 20%	306245-1R0FA	4
C310	.22 uF, 0805, X7R, 25V, 10%	181264-224	4
C311	.22 uF, 0805, X7R, 25V, 10%	181264-224	4
C312	.22 uF, 0805, X7R, 25V, 10%	181264-224	4
C313	.22 uF, 0805, X7R, 25V, 10%	181264-224	4
C314	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C315	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C316	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C317	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C318	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C319	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C320	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C321	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C322	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C323	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C328	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C329	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C330	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C331	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C332	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C333	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C334	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C335	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C336	100pF, 0603, COG, 50V, 5%	188454-101	4
C337	100pF, 0603, COG, 50V, 5%	188454-101	4
C338	68pF, COG, 0402, 50V, 5%	268364-680	4
C339	68pF, COG, 0402, 50V, 5%	268364-680	4
C409	470uF, EL, 105C, 250V, 20%	310510-471EAE	3,4
C410	470uF, EL, 105C, 250V, 20%	310510-471EAE	3,4
C412	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C413	100pF, 0603, COG, 50V, 5%	188454-101	4
C414	100pF, 0603, COG, 50V, 5%	188454-101	4
C415	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C416	.015uF, 0603, X7R, 50V, 10%	191470-153	4
C418	100pF, 0603, COG, 50V, 5%	188454-101	4
C420	100pF, 0603, COG, 50V, 5%	188454-101	4
C422	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C423	100pF, 0603, COG, 50V, 5%	188454-101	4
C500	33uF, CAP., EL., SMD, 105, 35V, 20%	306245-330ED	4
C502	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C504	220pF, 0603, COG, 50V, 5%	188454-221	4
C507	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C508	1.2nF, 0603, COG, 50V, 5%	188454-122	4
C509	100pF, 0603, COG, 50V, 5%	188454-101	4
C511	270pF, 0603, X7R, 50V, 0.1%	191470-272	4
C517	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C518	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C519	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C521	3300uF, EL, 105C, 35V, 20%	310927-332MVBMP	4
C524	.1uF, 1206, X7R, 100V, 10%	279056-104	4
C525	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C526	.047uF, 0805, X7R, 50V, 10%	286499-473	4
C527	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C529	100pF, 0603, COG, 50V, 5%	188454-101	4
C531	47uF, EL, SMD, 105, 50V, 20%	317164-4701HF	4
C532	47uF, EL, SMD, 105, 50V, 20%	317164-4701HF	4
C535	1.0uF, 1206, X7R, 50V, 10%	286500-105	4
C536	100pF, 0603, COG, 50V, 5%	188454-101	4
C537	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C538	20pF, 0603, COG, 50V, 5%	188454-200	4
C539	390pF, 0603, COG, 50V, 5%	188454-391	4
C544	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C545	470pF, X7R, 0603, 200V, 10%	317820-471K	4
C546	220pF, 0603, COG, 50V, 5%	188454-221	4
C549	1.0uF, X5R, 0603, 16V, 20%	300292-105	4
C550	4.7uF, X5R, 0805, 16V, 10%	273592-475C	4
C551	1.0uF, X5R, 0603, 16V, 20%	300292-105	4

Capacitors Cont.

Reference Designator	Description	Part Number	Note
C552	56pF, COG, 0402, 50V, 5%	268364-560	4
C566	27pF, 0603, COG, 50V, 5%	188454-270	4
C567	27pF, 0603, COG, 50V, 5%	188454-270	4
C569	68pF, COG, 0402, 50V, 5%	268364-680	4

Inductors

Reference Designator	Description	Part Number	Note
L201	BEAD, FERRITE, 0603, 220 OHM, 2A	322644-221A	4
L209	INDUCTOR, PLANAR, 4-LAYER, 4T, ERF28-450	319196-450	4
L209A	CORE, FERRITE, ERF28, 450nH/N^2	314443-450	4
L300	INDUCTOR, PLANAR, 4-LAYER, 8T, ERF17-160	318999-160	4
L300A	CORE, FERRITE, ERF17, 160nH/N^2	314442-160	4
L301	INDUCTOR, PLANAR, 4-LAYER, 8T, ERF17-160	318999-160	4
L301A	CORE, FERRITE, ERF17, 160nH/N^2	314442-160	4
L400	10mH INDUCTOR, COM MODE CHOKE	310640-002	3,4
L401	10mH INDUCTOR, COM MODE CHOKE (not used on all systems)	310640-003	3,4
L501	INDUCTOR, FIXED, 22uH, 20%	307181-223M	4
L502	INDUCTOR, 28.75uH+/-10%, Toroid	310734-001	4
ON L209	PAD,FOAM, ADHESIVE BACK,	285787-002	4

Diodes

Reference Designator	Description	Part Number	Note
BR400	DIODE, BRIDGE RECT, 3A, 600V	311102-0600	4
D502	DIODE, SOT-23, BAV 99	147239	4
D503	DIODE, REC, FAST SWTG, 4A, 400V, FORMED	258432-087	4
D504	DIODE, SWITCHING, 75V, 200mA	148582	4
D505	DIODE, SWITCHING, 75V, 200mA	148582	4
D506	DIODE, PWR SCHOTTKY, 1A, 150V, SMA	321276-001	4
D509	DIODE, RECT, FAST, 600V, 1A	317066-600	4
Z500	DIODE, ZEN, SMD, 47V	181994-47R	4


Transistors

Reference Designator	Description	Part Number	Note
Q300	XSISTOR, BPLR, N, 4.7K, SOT23	192603	4
Q500	TRANSISTOR, MFET, N-CH, 600V	310519-001	4
Q501	TRANSISTOR, MFET, N-CH, 600V	310519-001	4
Q502	XSISTOR, P, 47K, BIAS SOT23	258025	4
Q504	XSISTOR, BPLR, N, 4.7K, SOT23	192603	4
Q505	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q506	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	4
Q507	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4
Q509	XSISTOR, P, 47K, BIAS SOT23	258025	4
Q510	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	4
Q511	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	4




ELECTRICAL PART LIST

Power PCB Assembly

Integrated Circuits

Reference Designator	Description	Part Number	Note
U200	IC, NOR GATE, QUAD, 2-INPUT, 5.5V, SOIC	324043-0010	4
U201	IC, POWER AMP, TDF8599TH, HSOP36, PAD UP	302183	4
U300	IC, PWR-AMP, Class D, 20W	298092-001	4
U401	IC, Vreg., 5.0V, FIXED., LDO, SOIC	313374-050	4
U501	IC, AMP, OPTICALLY ISOL., 0.5%	310589-001	3,4 
U503	IC, VREG, ADJ., 1.2-32V, SOIC	310726-001	4
U504	IC, HALF-BRIDGE GATE DRIVER	317085-001	4
U505	IC, PWM CONTROLLER, 50%DUTY CY	317119-002	4
U506	IC, SCHMITT TRIGGER, 18V, SSOP-5	317128-001	4

Miscellaneous

Reference Designator	Description	Part Number	Note
F400	FUSE, TIME LAG, 4A, 250V	310538-4000A	4
J400	AC CONN, SINGLE PIECE LEADS	301125-001	3,4 
T501	TRANSFORMER,PULSE, RATIO 1:1.667	310977-001	3,4 
T502	240Uh, XFORMER, OCL, W/QUIET TAP, 2PIN-UPL	310658-003	3,4 

ELECTRICAL PART LIST

IR PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R1200	75 OHM, 0603, .1W, 5%	199403-750	4
R1201	2K, 0603, .1W, 5%	199403-202	4
R1202	47 OHM, 0603, SMD, 100MW, 5%	199403-470	4
R1203	2K, 0603, .1W, 5%	199403-202	4
R1204	75 OHM, 0603, .1W, 5%	199403-750	4
R1205	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R1206	51 OHM, 0805, 1/10W, 5%	133626-5105	4
R1207	51 OHM, 0805, 1/10W, 5%	133626-5105	4

Capacitors

Reference Designator	Description	Part Number	Note
C1200	1.0uF, X5R, 0805, 6.3V, 10%	273592-105J	4
C1201	1.0uF, X5R, 0805, 6.3V, 10%	273592-105J	4
C1202	.1uF, X7R, 0603, 50V, 10%	191470-104	4
C1203	.1uF, X7R, 0603, 50V, 10%	191470-104	4
C1204	.1uF, X7R, 0603, 50V, 10%	191470-104	4

Diodes

Reference Designator	Description	Part Number	Note
D1201	DIODE, SWITCHING, 100V, BAV99, SOT363	319113-001	4
D1202	DIODE, SWITCHING, 100V, BAV99, SOT363	319113-001	4
D1203	DIODE, SWITCHING, 100V, BAV99, SOT363	319113-001	4
D1204	DIODE, SOT-23, BAV 99	147239	4
DS1200	DIODE, LED, WHITE, R angle	301111-001	4
DS1201	DIODE, LED, WHITE, R angle	301111-001	4

Transistors

Reference Designator	Description	Part Number	Note
Q1200	XSISTOR, BPLR, N, SOT23, 40V, 200mA	146819	4
Q1201	XSISTOR, BPLR, N, SOT23, 40V, 200mA	146819	4

Integrated Circuits

Reference Designator	Description	Part Number	Note
RR1200	IC, IR RECEIVER MODULE	290155-001	4

Miscellaneous

Reference Designator	Description	Part Number	Note
J1200	CONN, RA, 6-P, 1.0MM PITCH, SMT	319448-006	4

DISASSEMBLY PROCEDURE

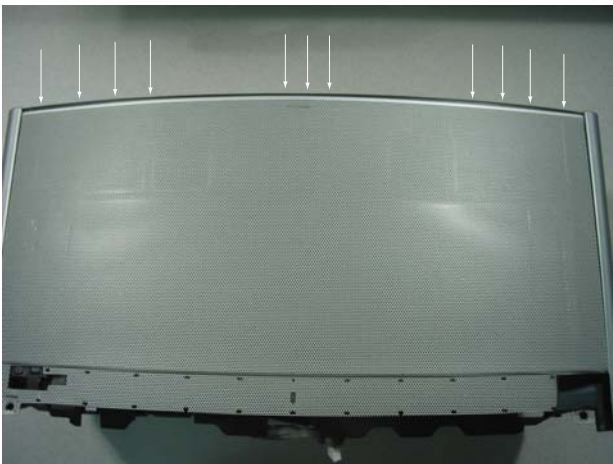
1. Grill removal



1.1 Remove the three Phillips-head screws from the bottom baseplate.



1.2 Disconnect the flex cable from J1100 and remove the two screws securing the grille assembly.



1.3 Before moving the grille, push down in the direction of the arrows to release the centering tab to avoid pulling the tap off.



1.3 Lift the grill from the bottom allowing the tabs to release.

2. Dock Removal



2.1 Remove the 5 Phillips-head screws from the baseplate to allow the dock frame PCB to be removed.

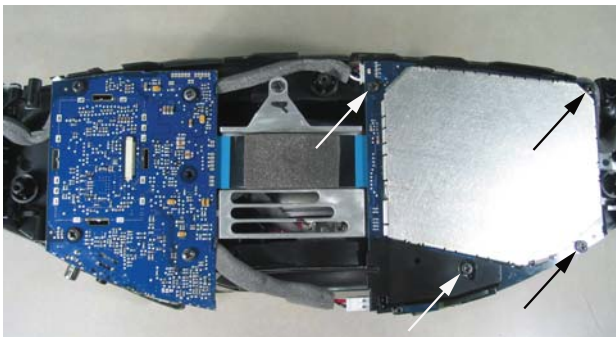
DISASSEMBLY PROCEDURE CONTINUED

3. Rear Cover Removal



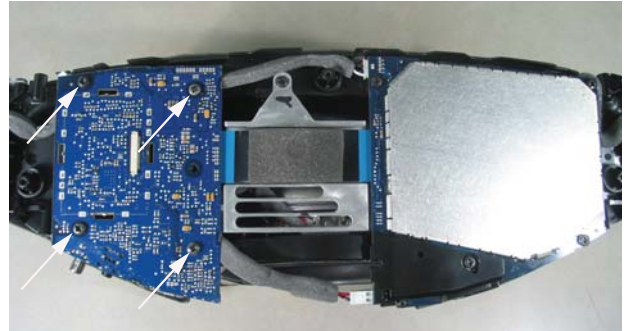
3.1 Remove the four Phillips-head screws securing the rear cover.

4. Power PCB Removal



4.1 Remove the four Phillips-head screws from the power supply board.

5. DSP PCB Removal



5.1 Remove the four Phillips-head screws from the DSP board.

6. Heatsink Removal



6.1 Remove the three Phillips-head screws from the heatsink.

7. Woofer Removal



7.1 Remove the four Phillips-head screws securing the rear cover.

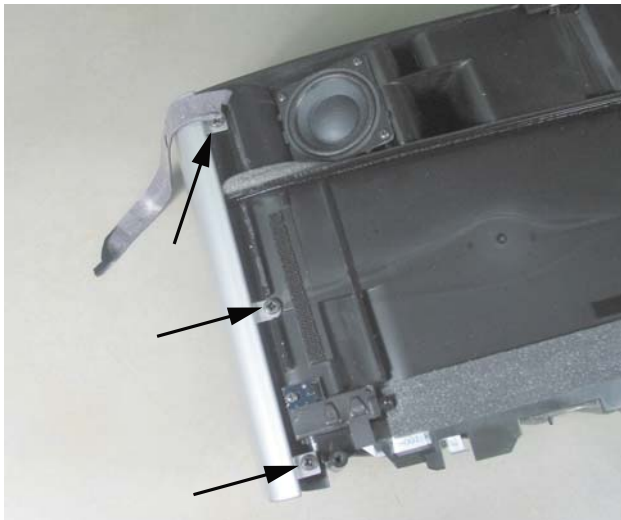
DISASSEMBLY PROCEDURE CONTINUED

Woofer Removal Continued.



7.1 Remove the four Phillips-head screws holding the woofer in place.

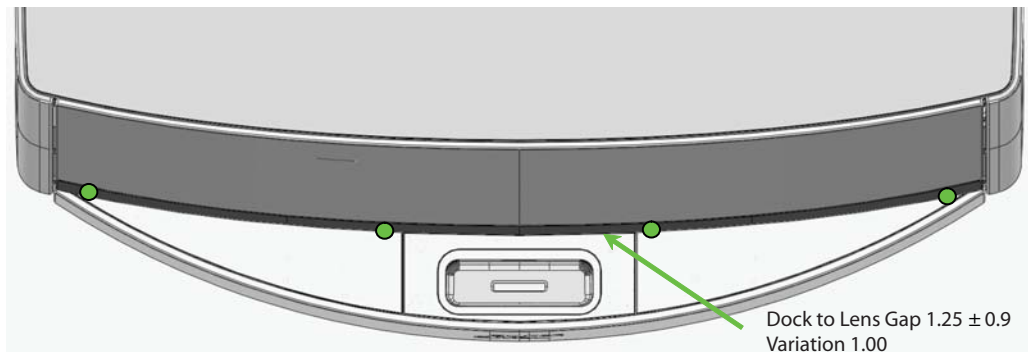
8. End Cap Removal



8.1 Carefully remove the fabric tape on both sides of the endcap. Remove the three Phillips-head screws on each side that secure endcap to the acoustic enclosure.

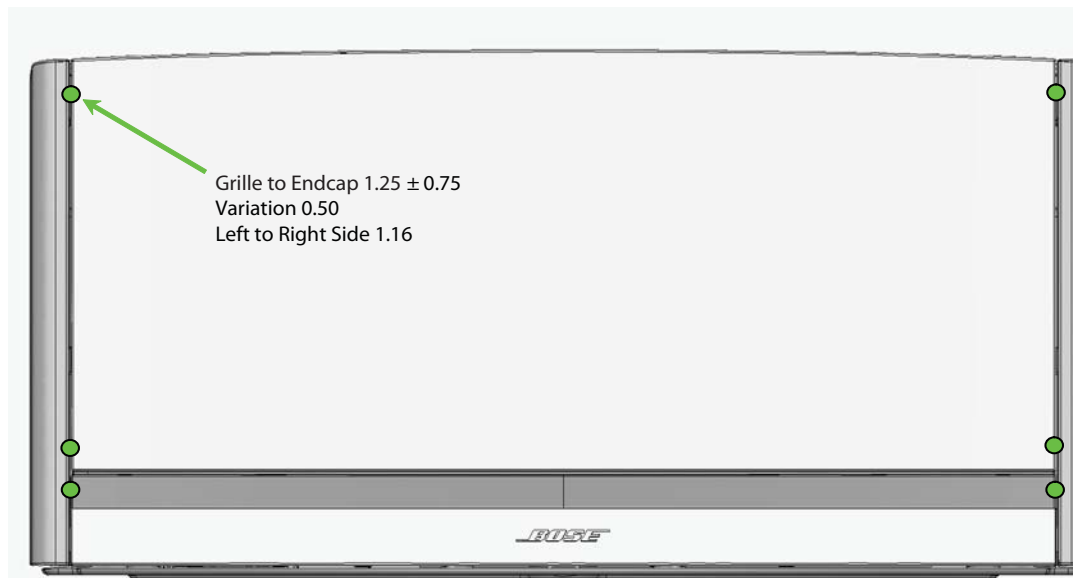
COSMETIC INSPECTION AFTER REPLACEMENT OF DOCK FRAME AND/OR THE END CAPS

9. Dock to Grille Lens Measurement



When replacing the Dock Frame assembly (item 36 on page 8) of the SoundDock® 10, the distance between the dock and the lens may fall out of specification. The measurement between the dock and the lens is critical to the operation of the system. If the dock and the lens are too close together, buzzing from the assembly and skipping from the iPod is possible. To avoid these issues, ensure the distance between the dock and lens is 1.25mm +/- .09mm. It may be necessary to disassemble and reassemble dock to align it correctly.

10. End Cap to Grill Measurement



When an endcap (item 10 or 13 on page 8) is replaced on the SoundDock 10, the distance between the grille and the endcap may fall out of the 1.25mm specification. During reassembly, ensure the distance between the endcap and the grille is 1.25mm +/- 0.75mm. It may be necessary to disassemble and reassemble the endcap to align it correctly.

TEST PROCEDURES

SoundDock® 10 Digital Music System Functional Tests

Equipment Required

Audio Signal Generator

Notes:

1. Begin the test with no power applied.
2. Confirm the Audio Signal Generator output is set to zero volts before connecting.

1. Twiddler Air Leak Test

1.1 Connect the audio signal generator to the mini jack AUX input on the back of SoundDock 10.

1.2 Set the signal generator output to:

- A. Voltage = 0V
- B. Frequency = 80Hz +/- 10%

1.3 Apply power to the SoundDock 10, the system will default to the AUX input if there is nothing connected to the dock. Press and hold the volume plus button for 15 seconds, this should set the system to max volume.

1.4 Set the Signal generator output to:
A. Input Voltage = 0.06Vrms +/- 10%
B. Frequency = 250Hz +/- 5Hz

1.5 Listen for air leaks around all the cabinet seams, joints, and wire harness through-holes.

PASS if no audible air leaks can be heard at a distance of less than 1ft (0.3M) from any exterior surface of the enclosure.

FAIL if any air leaks can be heard at a distance less than 1ft (0.3M) from any exterior surface of the enclosure.

2. Woofer Air Leak Test

2.1 Set the signal generator output to:

- A. Input Voltage = 0.06 Vrms +/- 10%
- B. Frequency = 44Hz +/- 5Hz

2.2 Listen for air leaks around all the cabinet seams, joints, and wire harness through-holes.

PASS if no audible air leaks can be heard at a distance of less than 1ft (0.3M) from any exterior surface of the enclosure.

FAIL if any air leaks can be heard at a distance less than 1ft (0.3M) from any exterior surface of the enclosure.

3. Left / Right Driver Test

3.1 Apply an input signal to the SoundDock left channel only. Set generator as in step 1.3 and 1.4, except set the frequency to 800Hz and confirm that only the left driver plays.

3.2 Reduce generator output to zero volts

3.3 Repeat step 3.1 for the right channel.

3.4 Reduce input signal to zero volts and reconnect the right channel.

4. Frequency Sweep Test

4.1 Set audio signal generator to:
A. Voltage = 0.06 Vrms \pm 10%
B. Sweep range = 35Hz - 3KHz \pm 10%

4.2 Execute the sweep for a minimum of 3 seconds up and 3 seconds down.

4.3 Listen for any extraneous noises such as buzzes, rattles, ticks, and distortion.

PASS if no noise can be heard at a distance of less than 1ft (0.3M).

FAIL if any noise can be heard at a distance less than 1ft (0.3M).

4.4 Reduce the input signal to zero volts.

TEST PROCEDURES CONTINUED

SoundDock® 10 Digital Music System iPhone Test

Equipment Required

Apple® iPhone.

1. Authorization Test

1.1 Apply AC power to the SoundDock 10 system. Allow the system to power up by waiting for the boot beep sound from the speakers.

1.2 Place the iPhone on the dock cradle.

1.3 Confirm the following message does not appear on the iPhone screen.



Note: If this screen appears on the display, re-dock the iPhone to determine if the problem appears again. It is normal to see this screen on an occasional basis.

2. iPhone Functional Test

2.1 Apply AC power to the SoundDock 10 system. Allow the system to power up by waiting for the boot beep sound from the speakers.

2.2 Place the iPhone on the dock.

2.3 Press the play button on the remote, adjust the volume to a moderate level. Confirm audio is clean and no distortion can be heard.

2.4 Use the volume control on the iPhone touch screen. Confirm the volume goes up and down as the volume control on the display is adjusted.

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
9/2009	00	Document released at revision 00	Service Manual release	All
10/2009	01	iDock and dock frame part number change.	Part number change	8
11/2009		iDock from 318058-001S to 323693-001S Dock frame from 318057-001S to 323692-001S		8
		Grille part number change from 318054-001S to 323691-001S		8
		Item 43 added - Foam Gasket part number 323770-0010		8
		Item 33 part number change - Universal Insert 317402-0020	Missing from original drawing Paint change	8 8
1/2010	02	Installation instructions on the Dock Frame and the End Caps has been modified.	More detailed information available.	21
02/2010	03	DSP and Power Supply part number change.	Software change on DSP board.	
06/15/2010		DSP - 319110-021S to 319110-041S SPS - 311435-001S to 311435-011S 311435-002S to 311435-012S 311435-006S to 311435-016S	Electrical change to the SPS board to allow Low Standby Mode.	
		RT400 part number added		14
8/27/2010		SPS Board: Change the values of R412, R413, R506, R507 Change PN 191470-101 to 188454-101, locations C304, C336, C337, C403, C413, C414, C417-C420, C423, C509, C529, C536	Enhance the FT for the Mid Rail Voltage.	14 14

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE



Bose Corporation
The Mountain
Framingham Massachusetts USA 01701

P/N: 309505-SM Rev. 04 8/2009 (H)
<http://serviceops.bose.com>

SERVICE BULLETIN

Bulletin Part Number: 309505-SB1

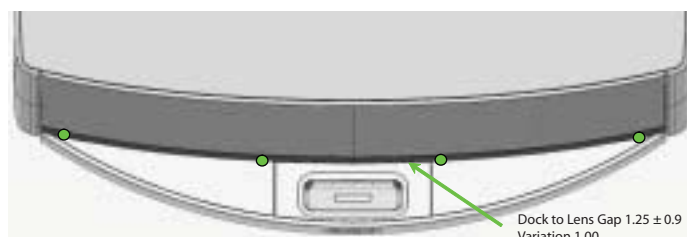
Product: SoundDock® 10 Digital Music System

Subject: Improper assembly of the dock frame after repair is performed.

Disposition: This is a potential problem each time the system is disassembled and reassembled.

Symptom: Buzz sound from assembly or video skipping on iPod caused by incorrect assembly.

Solution: When assembling the system, follow the specification measurements documented below.



During reassembly of the SoundDock 10, the distance between the dock and the lens may fall out of specification. The measurement between the dock and the lens is critical to the operation of the system. If the dock and the lens are too close together, buzzing from the assembly and skipping from the iPod is possible. To avoid these issues, ensure the distance between the dock and lens is 1.5mm +/- .09mm. It may be necessary to disassemble and reassemble dock multiple times to align it correctly.



When the endcap is removed from the SoundDock 10, the distance between the grille and the endcap may fall out of the 1.50mm specification. During reassembly, ensure the distance between the endcap and the grille is 1.50mm +/- 0.75mm. It may be necessary to disassemble and reassemble the endcap multiple times to align it correctly.

Date Issued: 10/25/09

Rev. 00

SERVICE BULLETIN



Bulletin Part Number: 309505-B2

Product: SoundDock® 10 Digital Music System

Subject: Software update.

Disposition: There may be systems in the field that have older software, updating them to the latest version will ensure SPS and DSP board compatibility. The updates are available on the SoundDock 10 service information page.

Symptom: Systems should be updated regardless of the symptom.

Solution: Update the SoundDock 10 system with the latest software found on the Technical Services Website.

Internal website: <http://intranet.bose.com/tsg/>

External website: <http://serviceops.bose.com>

(Updates are available on the SoundDock 10 service information page)

ECN 46752

Date Issued: 10/26/09

SERVICE BULLETIN

Bulletin Part Number: 309505-B3

Product: SoundDock® 10 Digital Music System.

Subject: Hardware and Software update to allow low power standby on product built before a specific date of manufacture (list of DOM's below).

Note: The software on the SoundDock 10 must be updated prior to this modification. Software updates are available on the SoundDock 10 service information page (See Service Bulletin 309505-B2)

Disposition: Systems built before the DOM's below may have the original software and original SPS board.

Variant	Date of Manufacture
US	9344
EU	9337
DUAL VOLTAGE	9340
AP	0041

DOM (date of Manufacture)

To determine the DOM, look at the serial number located on the bottom of the system.

Example -

050425993440338AE

The first 6 characters identify the product code - 050425

Characters 8 to 11 identify the DOM - 9344

9344 = the 344th day of 2009

Symptom: System does not go into low power standby. It is also possible to have Q500 and Q501 defective causing no power.

Reason: Possible failure of Q500 and Q501 if the system is allowed to go into the low standby mode without the modification to the SPS board.

Solution: Update the software and perform the following modification by replacing the original parts with the new part numbers shown in figure 1.

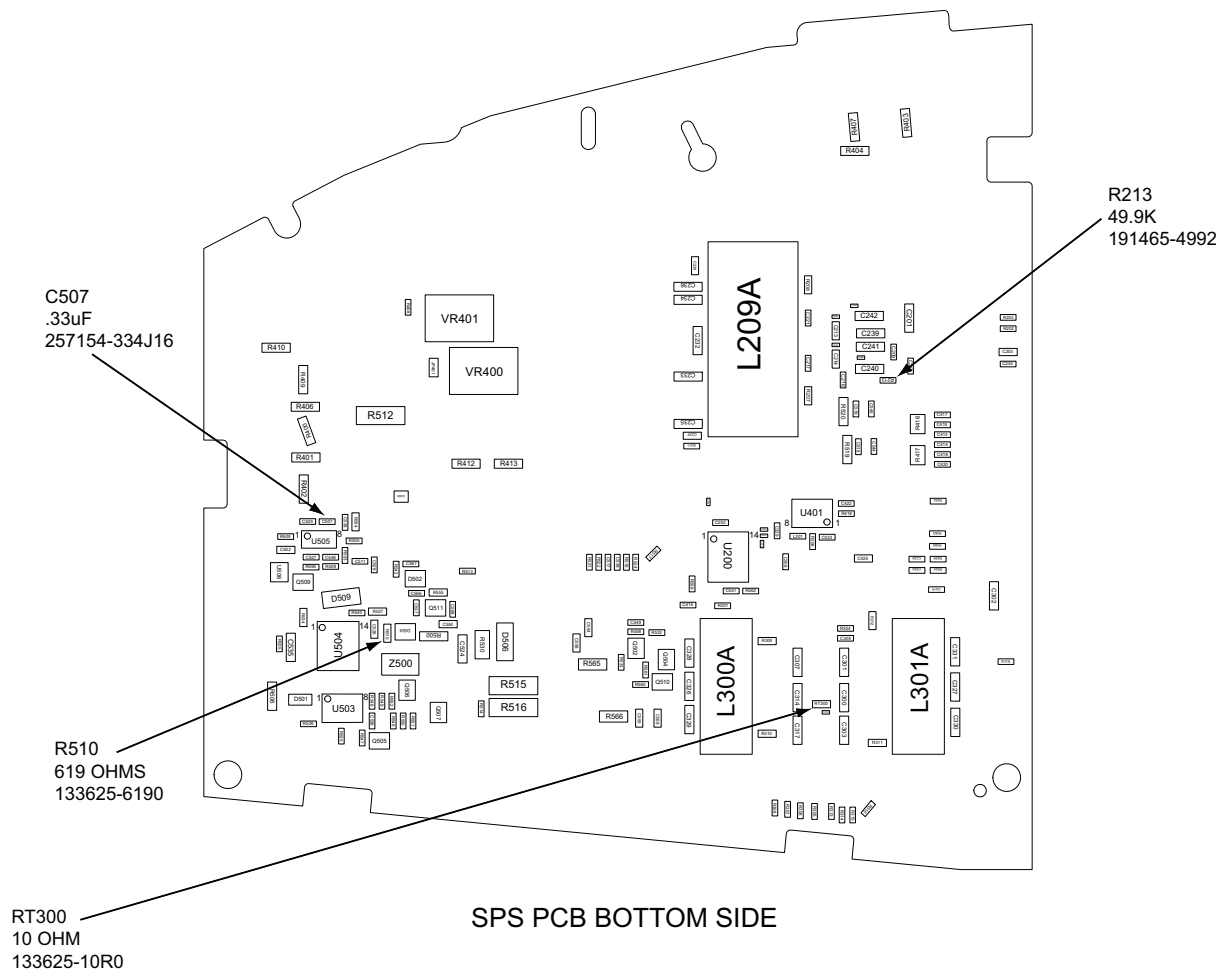
Reference Designator	Original Value	New Value	New part number
C569	68pF	Remove part	-
R563	1.21K	49.9 OHM	268361-49R9
C500	33uF	47uF	306245-470EE
R510	60.4 OHM	619 OHM	133625-6190
R213	Not Populated	49.9K	191465-4992
RT300	Not Populated	10 OHM	133625-10R0
C507	1uF	.33uF	257154-334J16

Figure 1.

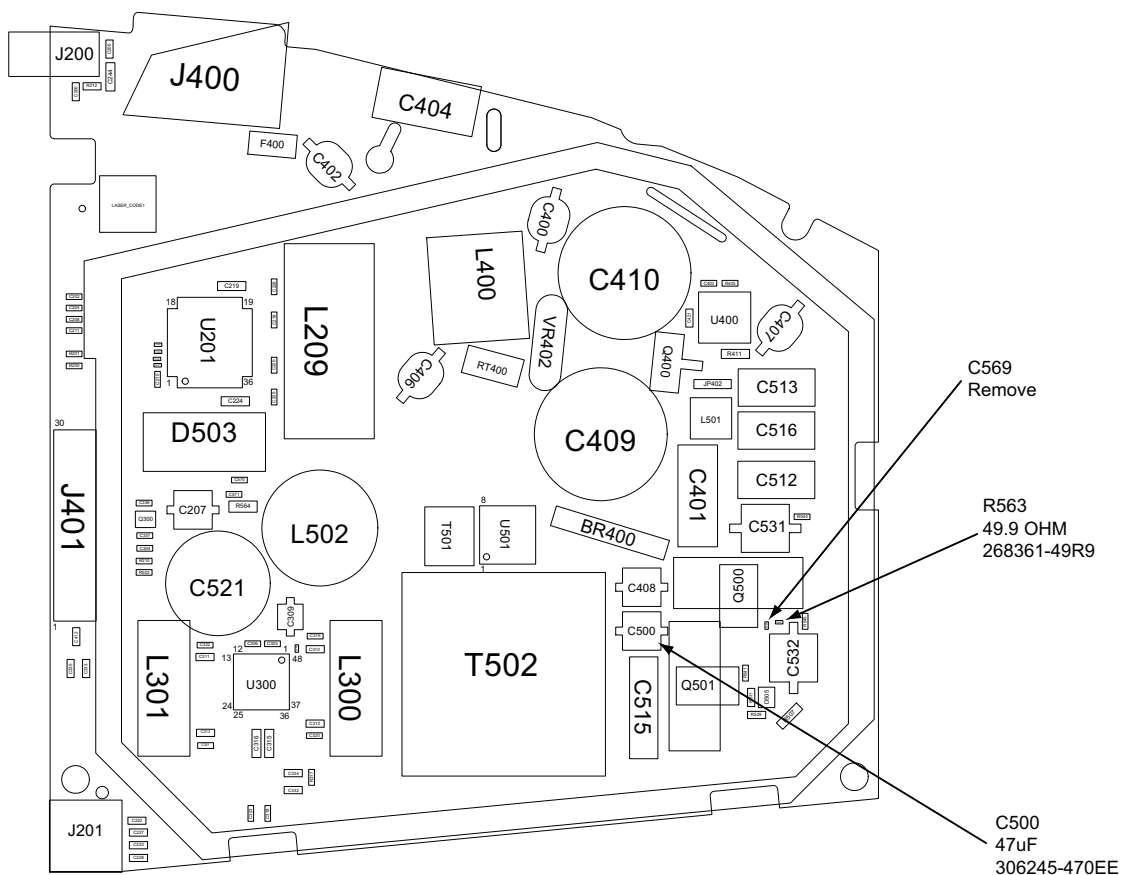
See next page for board layouts

Date Issued: 12/14/09

Rev. 01



SPS PCB BOTTOM SIDE



SPS PCB TOP SIDE

SERVICE BULLETIN

Bulletin Part Number: 309505-B4

Product: SoundDock® 10 Digital Music System.

Subject: The black plastic insulator that is adhered to the underside of the power supply shield is missing and through hole component leads may be too close to the conductive shield.

Disposition: All systems built prior to 8/25/2010 (DOM 0238) could potentially be missing the insulator.

DOM range = All system built prior to DOM 0298

DOM (date of Manufacture)

To determine the DOM, look at the serial number located on the bottom of the system.

Example -

050425902380338AE

The first 6 characters identify the product code -
050425

Characters 8 to 11 identify the DOM - 0238
0238 = the 238th day of 2010

Symptom: System may fail HiPot testing. Component leads may arc to the power supply shield.

Reason: The black plastic insulator prevents the primary component leads from arcing to the secondary side of the power supply.

Solution: Inspect the SoundDock 10 by looking under the bottom plate (system does not need to be disassembled) and confirm the black plastic insulator is in place. If missing, install new insulator and shield with part numbers shown below.

Part Number	Description
311564-0010	Bottom Shield, Power Supply
311794-0010	Plastic Insulator

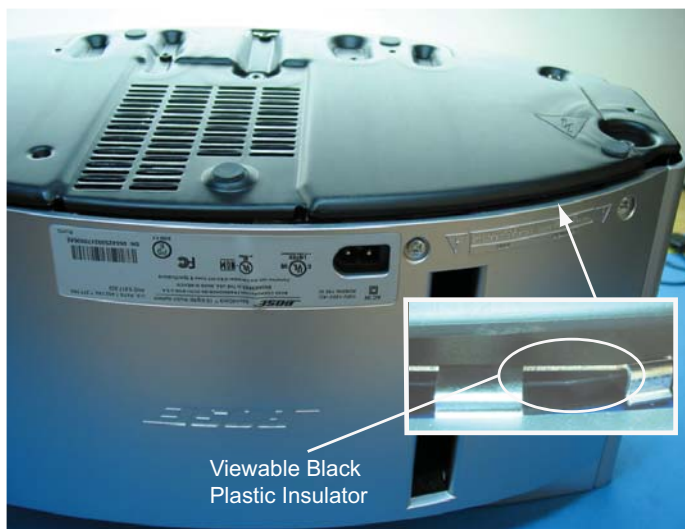
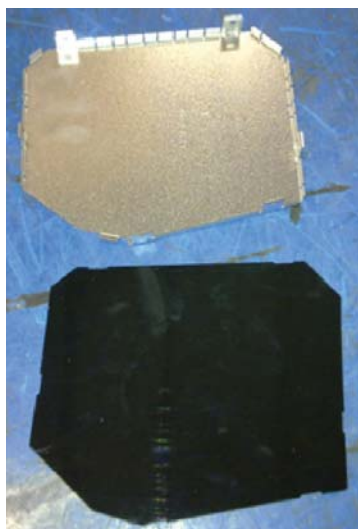


Figure 1.

SoundDock® 10 Digital Music System

Refer to the SoundDock® Digital Music System Series II service manual, reference number 309505-SM for schematics, PCB layouts and parts lists located on service web site.

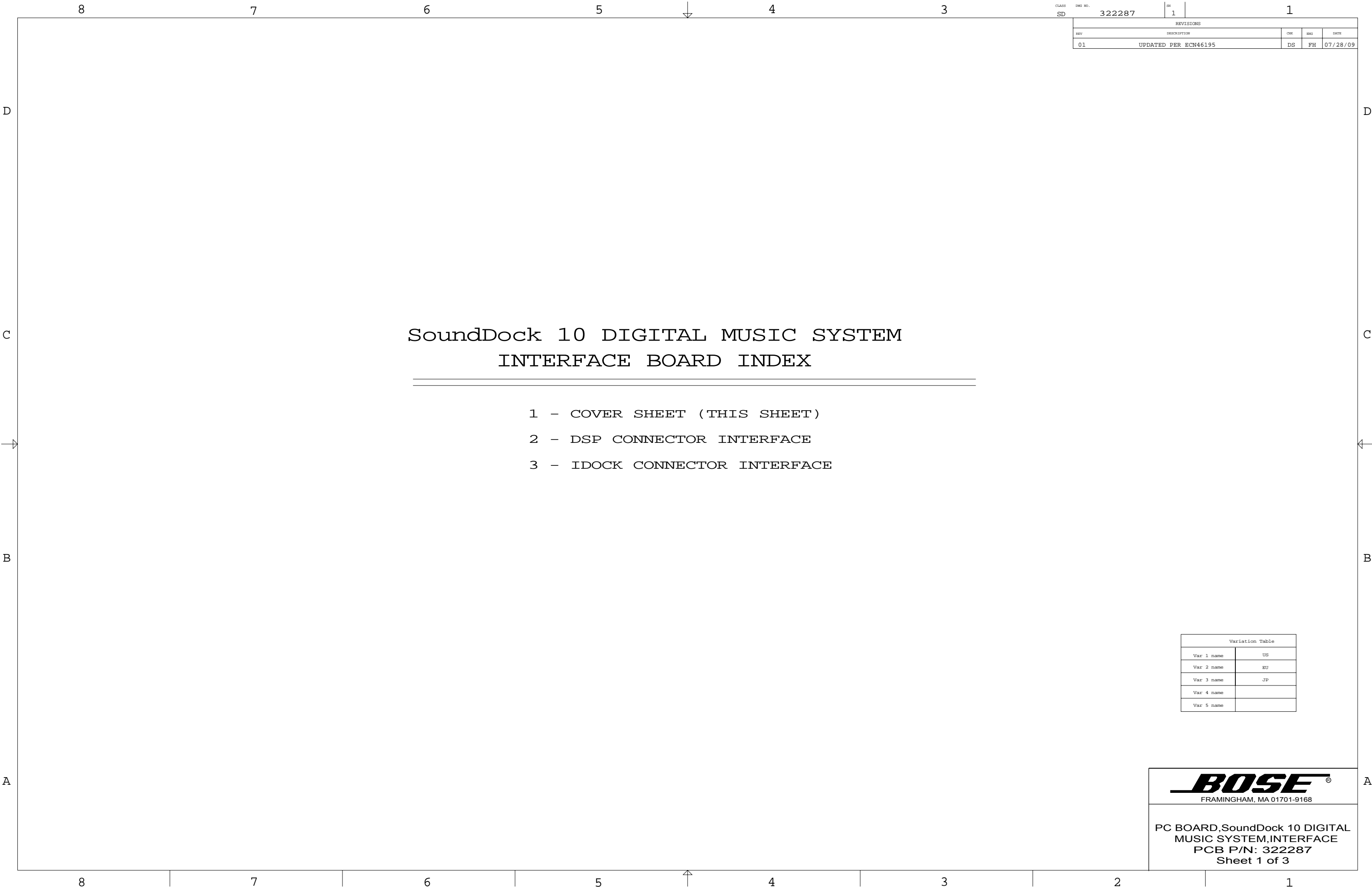
Preventative Repair Measures

Note: Perform the following on all units returned for repair.

Product	Check	Action
SoundDock 10	Dock frame after reassembling unit.	When replacing the Dock Frame assembly of the SoundDock® 10, the distance between the dock and the lens may fall out of specification. Refer to service manual 309505-SM page 21 for more detail.
SoundDock 10	Software revision	Update the SoundDock 10 system with the latest software found on the Technical Services Website.
SoundDock 10	Inspect the system by looking under the bottom plate (system does not need to be disassembled) to confirm the black plastic insulator is in place.	If black plastic insulator is missing, install new insulator and shield. Refer to Service Bulletin 309505-SB4

Troubleshooting Tips

Product	Symptom	Check	Action
SoundDock 10	No power	Q500 and Q501	Refer to service bulletin 309505-SB3 . Check L209 and C521 for cold solder, and F400.
SoundDock 10	No/Intermittent audio and battery charging.	Dock assembly	Replace dock assembly if defective.
SoundDock 10	No / intermittent audio from L or R speaker	Wire harness	The speaker wire harness may be pinched, replace if defective.
SoundDock 10	No audio	Ribbon cable	The ribbon cable that connects the dock pcb to the dsp pcb may be defective.




CLASS	DWG NO.	SH				
SD	322287	1	1			
REVISIONS						
REV	DESCRIPTION			CHK	ENG	DATE
01	UPDATED PER ECN46195			DS	FH	07/28/09

SoundDock 10 DIGITAL MUSIC SYSTEM
INTERFACE BOARD INDEX

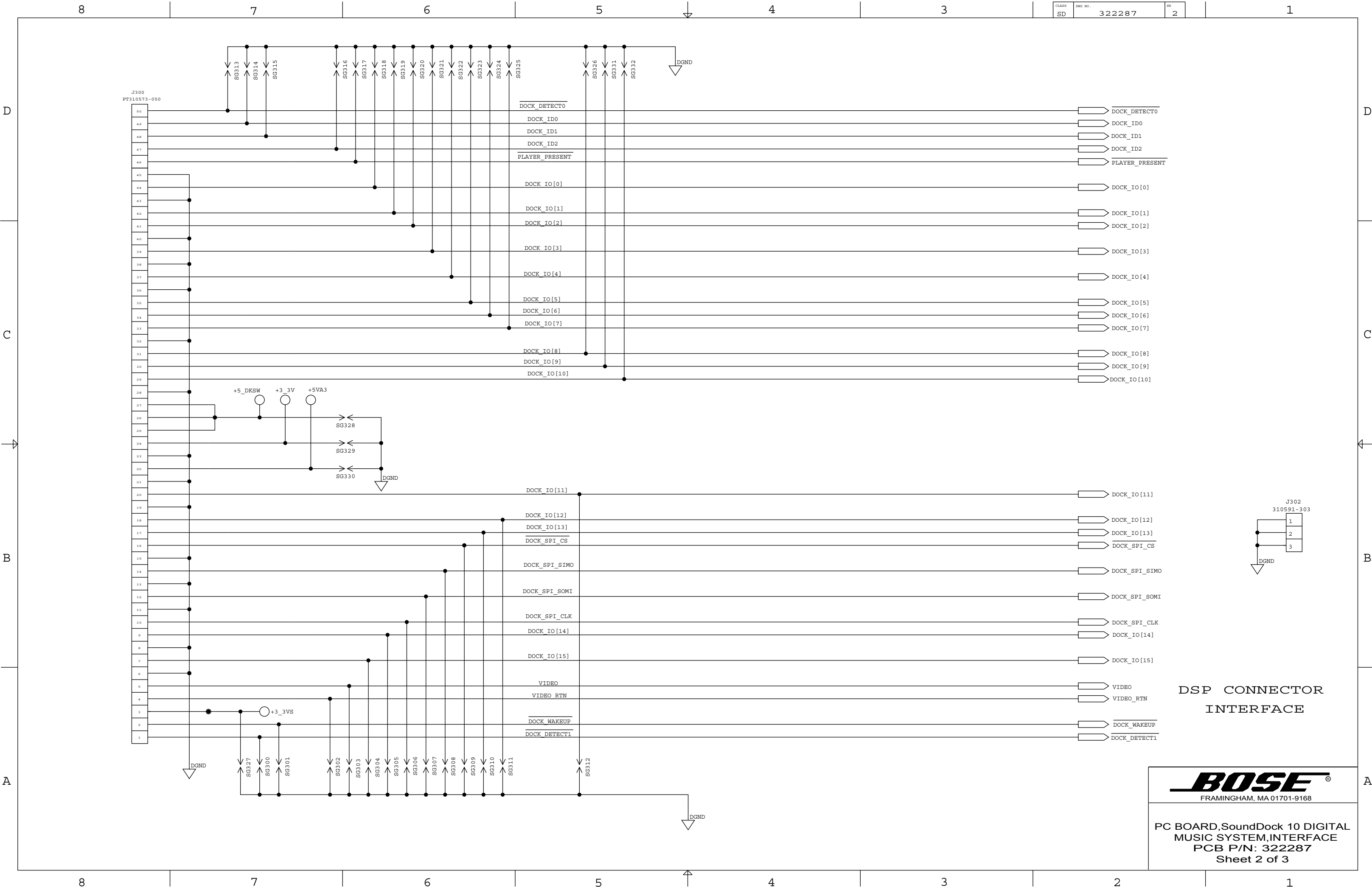
- 1 - COVER SHEET (THIS SHEET)
- 2 - DSP CONNECTOR INTERFACE
- 3 - IDOCK CONNECTOR INTERFACE

Variation Table	
Var 1 name	US
Var 2 name	EU
Var 3 name	JP
Var 4 name	
Var 5 name	



FRAMINGHAM, MA 01701-9168

PC BOARD,SoundDock 10 DIGITAL
MUSIC SYSTEM,INTERFACE
PCB P/N: 322287
Sheet 1 of 3



D

C

B

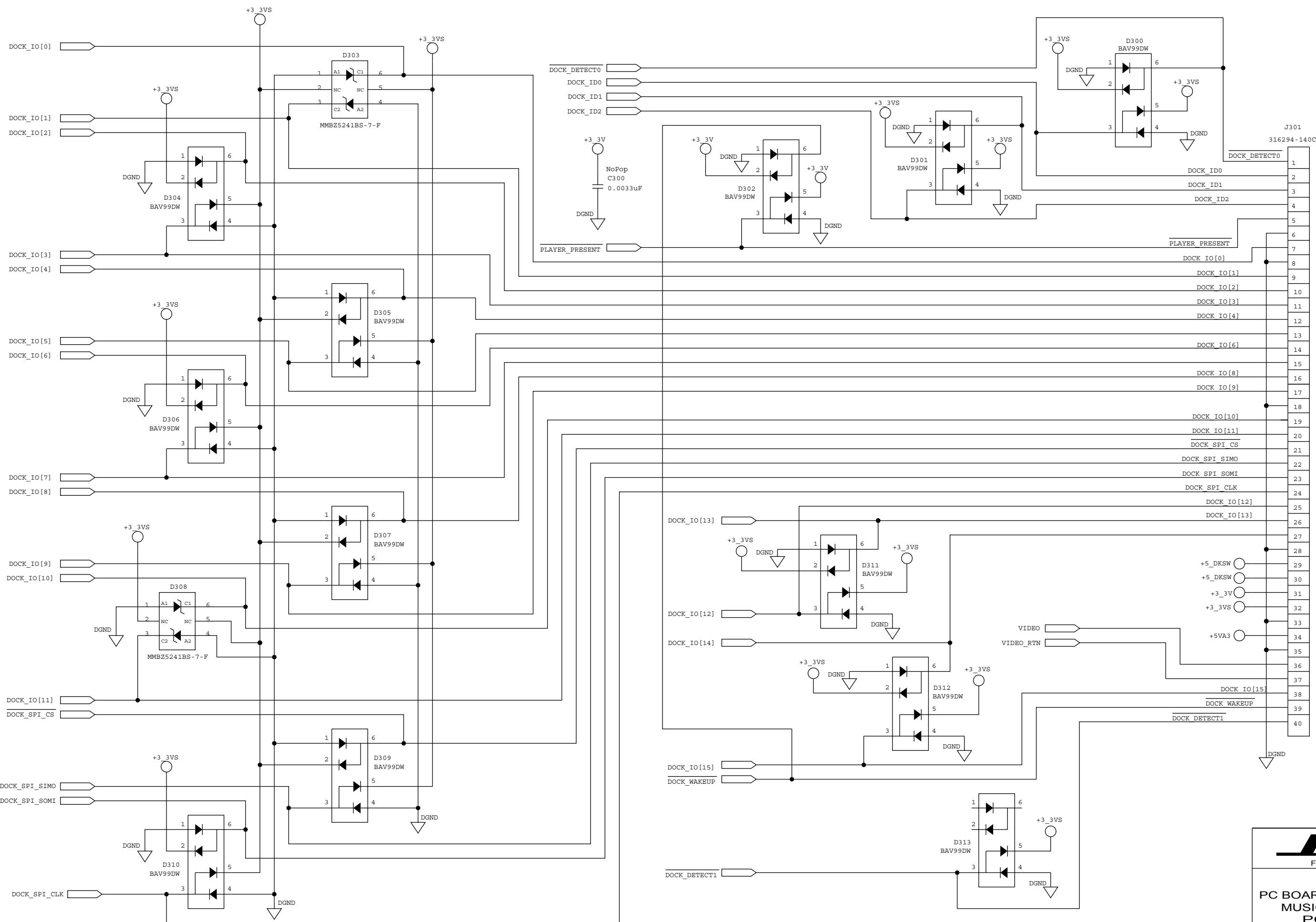
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D

C

B

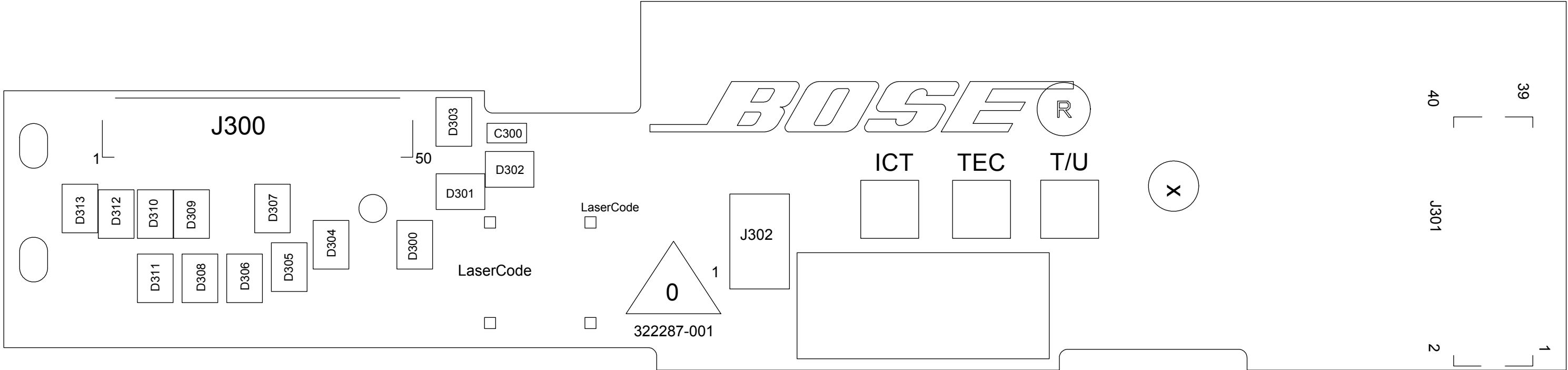
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IDOCK CONNECTOR INTERFACE

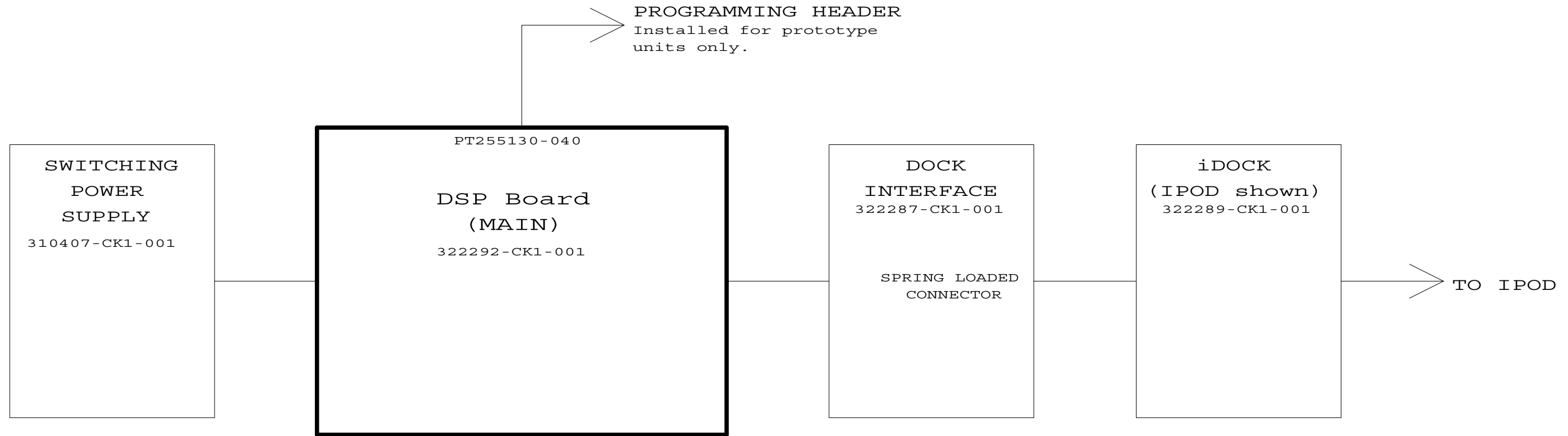
BOSE
FRAMINGHAM, MA 01701-9168

PC BOARD, SoundDock 10 DIGITAL
MUSIC SYSTEM, INTERFACE
PCB P/N: 322287
Sheet 3 of 3



SoundDock 10 Digital Music
System Acoustic Package
System Interconnect

ISS	ENG NO.	EN		1
D	322292	1		
REVISIONS				
REV	DESCRIPTION	CHK	ENG	DATE
01	CHANGE PER ECN 46108	DS	FT	07-15-09



DSP BOARD INDEX

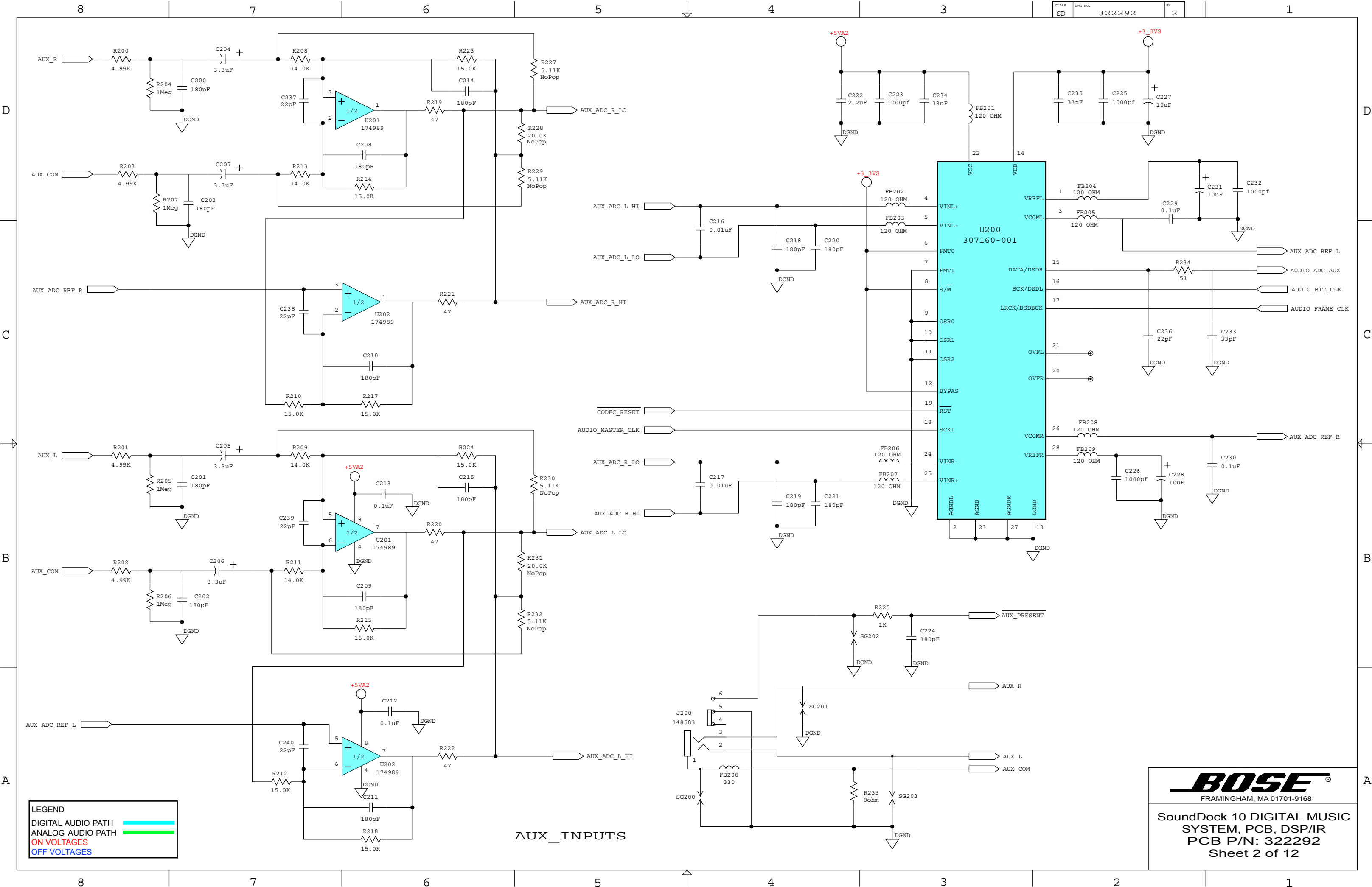
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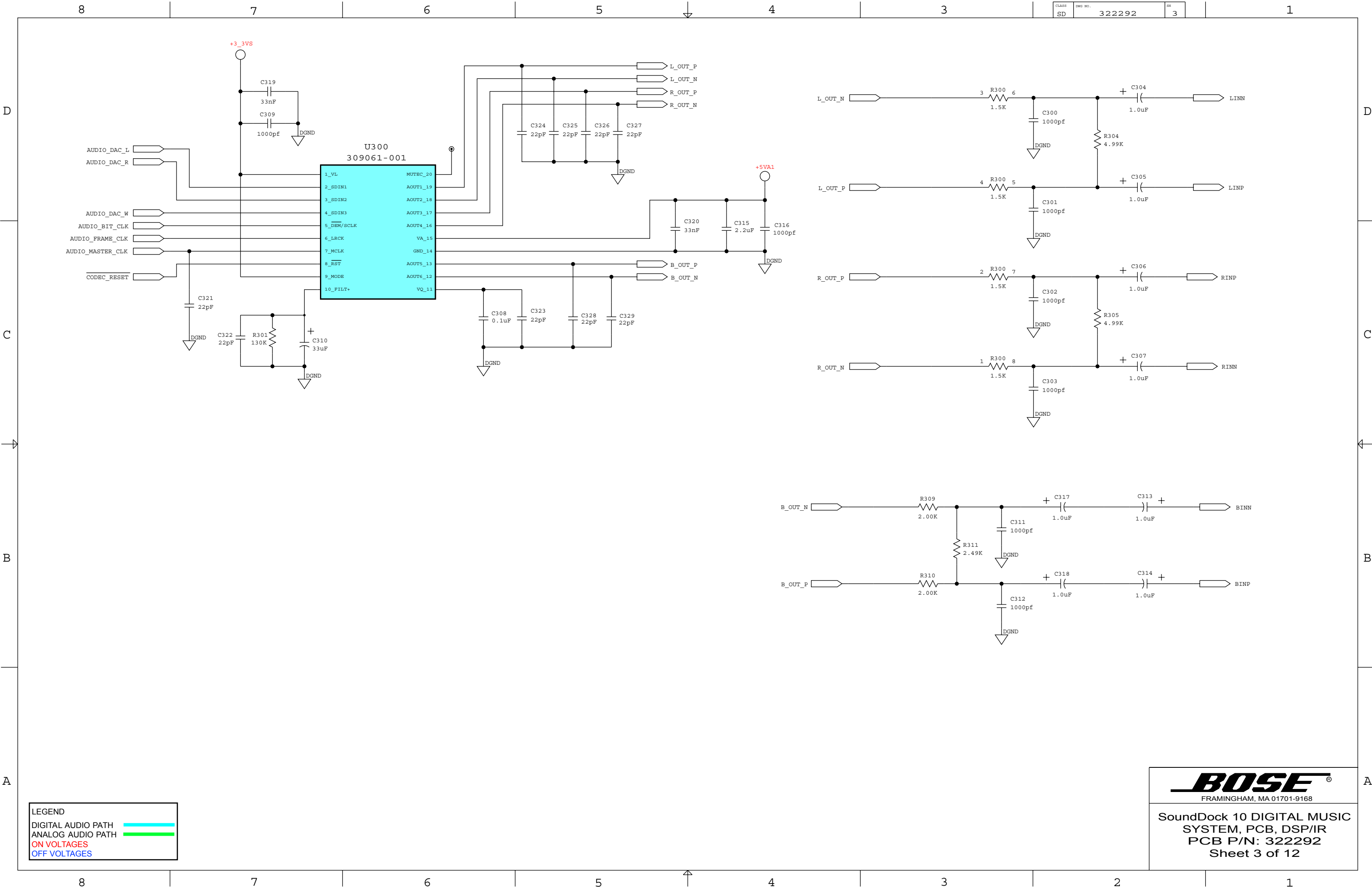
1 - COVER SHEET (THIS SHEET)
2 - AUX INPUTS
3 - ANALOG OUT
4 - POWER MANAGEMENT
5 - DSP
6 - DSP
7 - CPLD
8 - CPLD
9 - PIC
10 - CONNECTOR INTERFACE
11 - DOCK INTERFACE
12 - IR BOARD (SHEET-12)

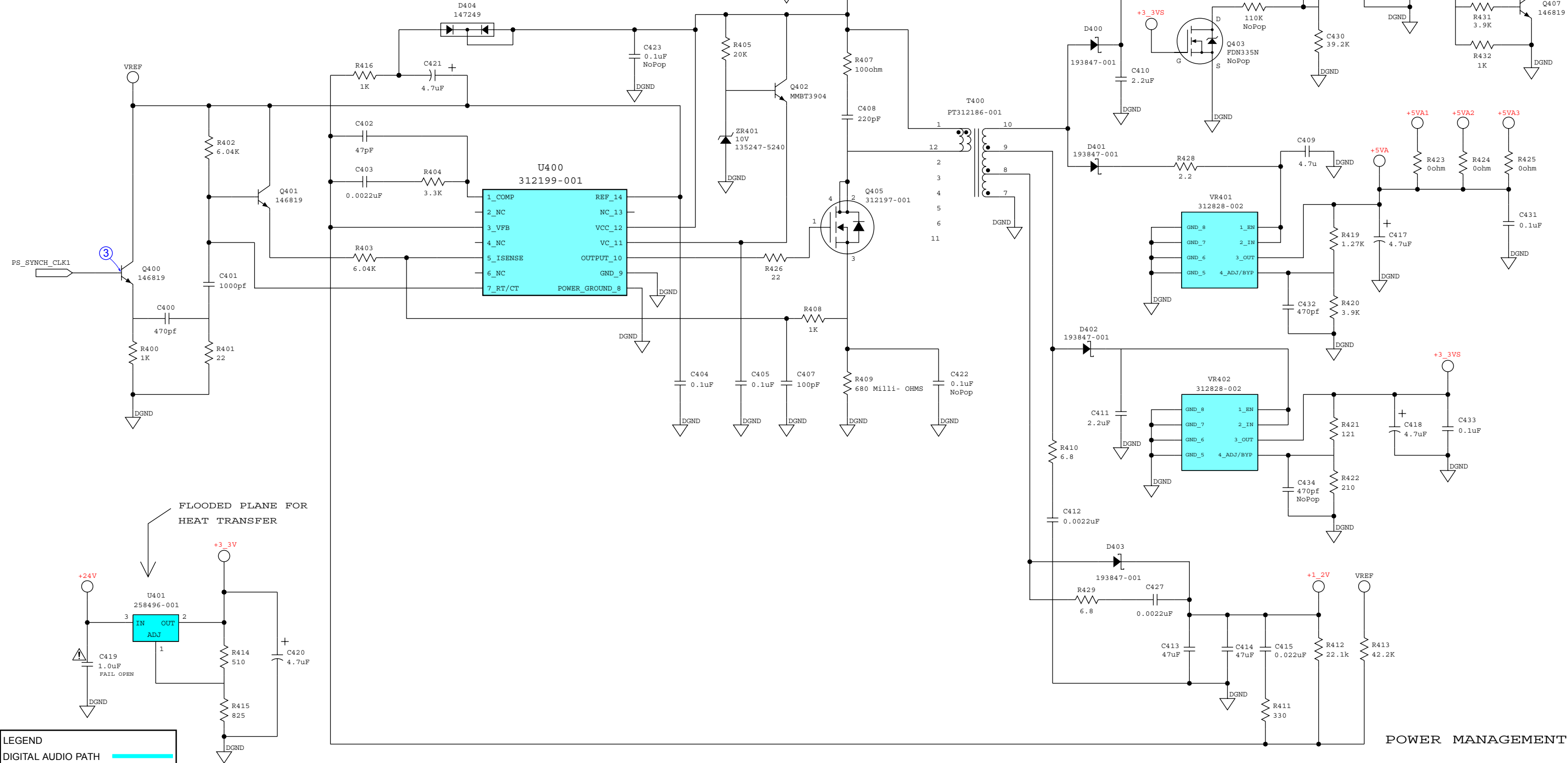
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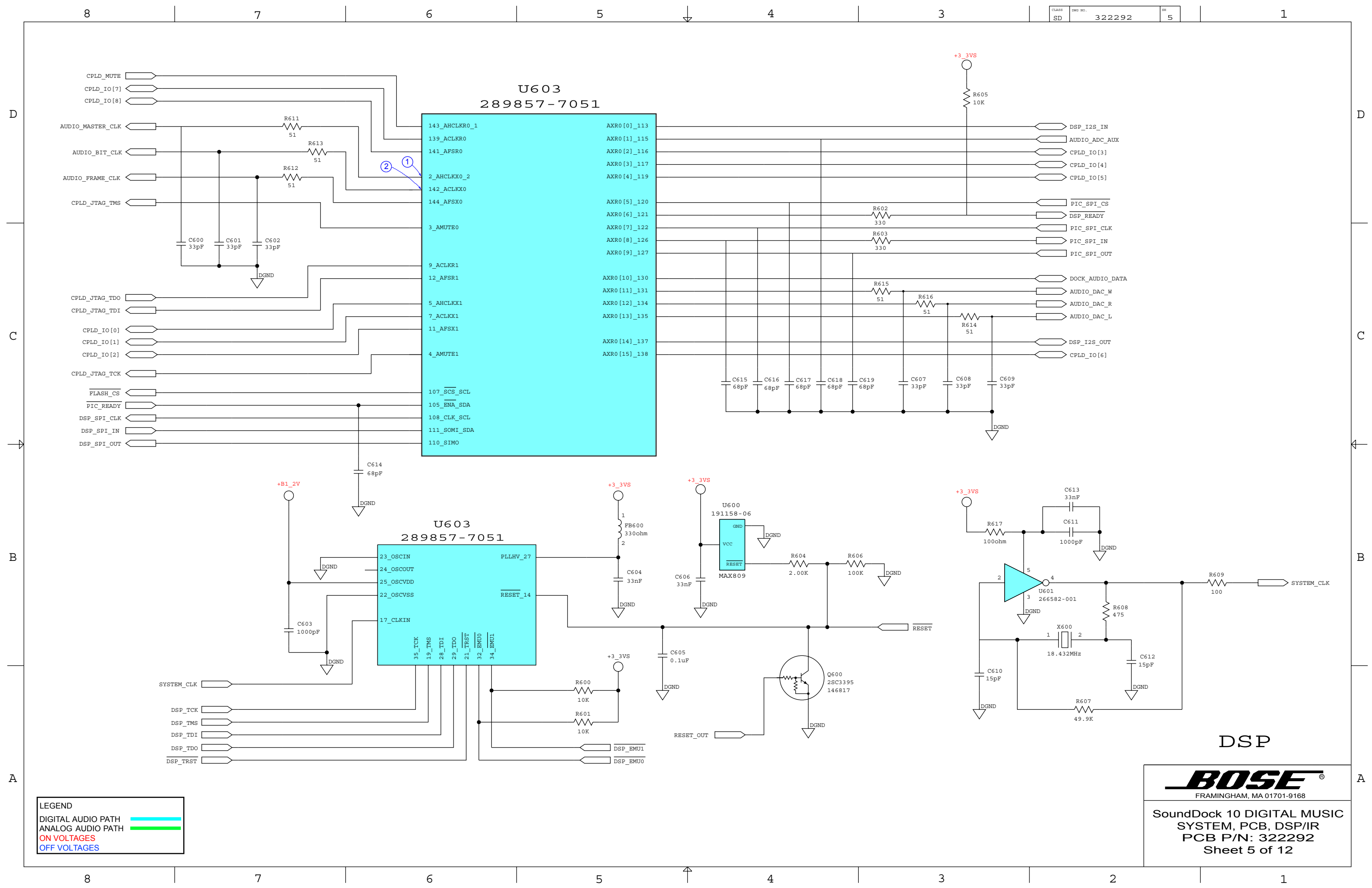
SoundDock 10 DIGITAL MUSIC  
SYSTEM, PCB, DSP/IR  
PCB P/N: 322292  
Sheet 1 of 12

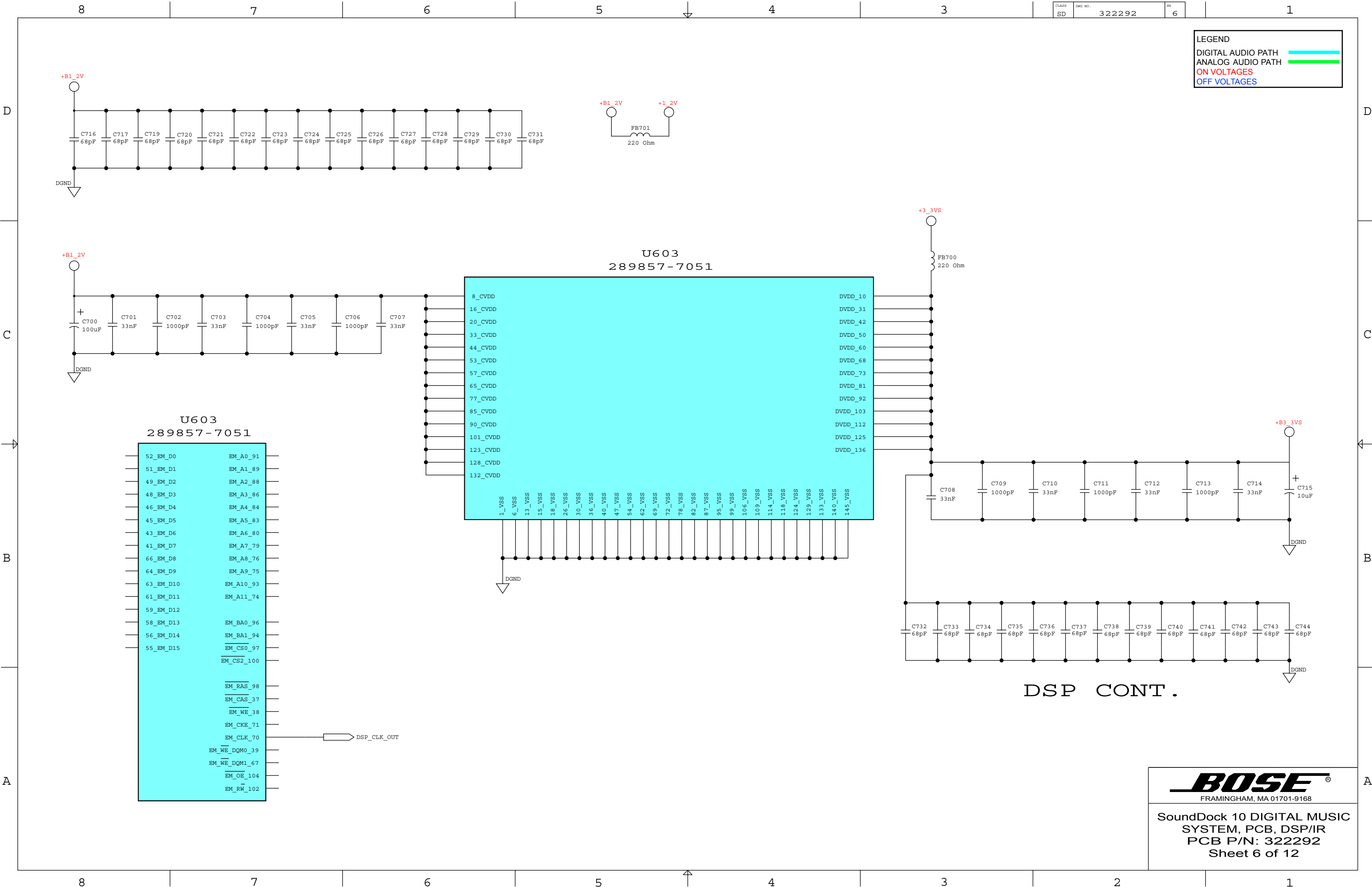












LEGEND

DIGITAL AUDIO PATH

ANALOG AUDIO PATH

ON VOLTAGES

OFF VOLTAGES

LEGEND

DIGITAL AUDIO PATH

ANALOG AUDIO PATH

ON VOLTAGES

OFF VOLTAGES

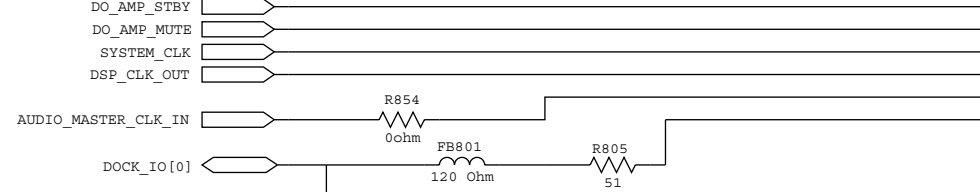
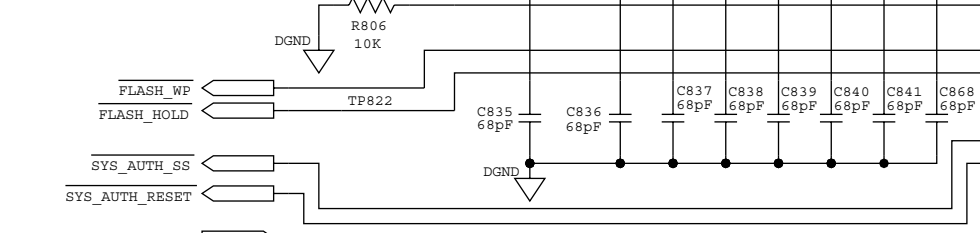
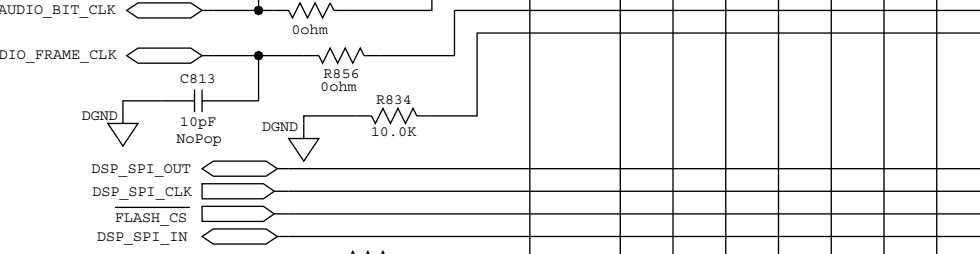
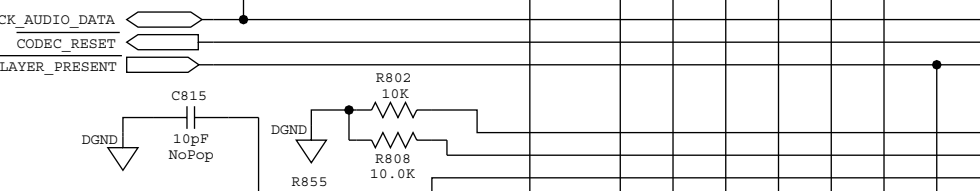
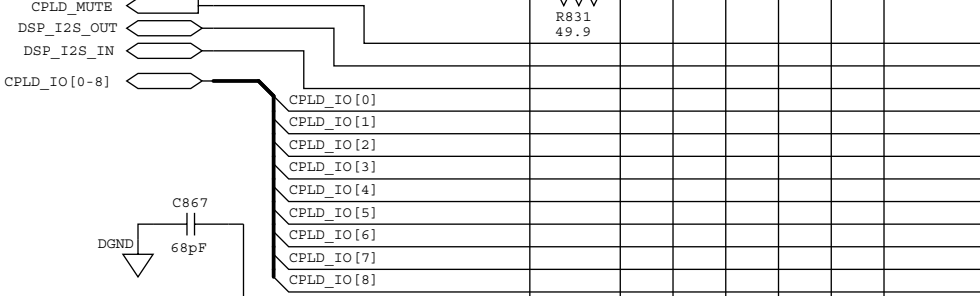
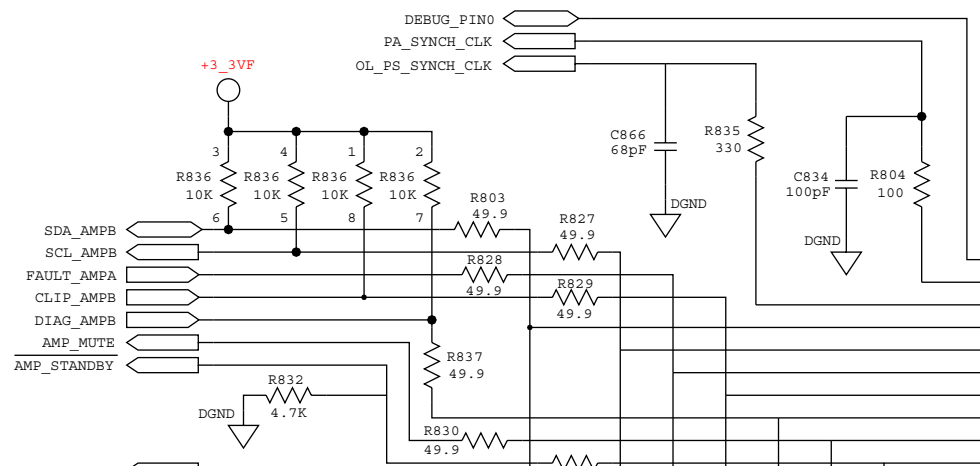
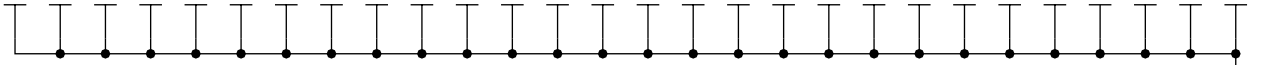
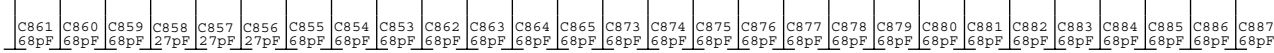
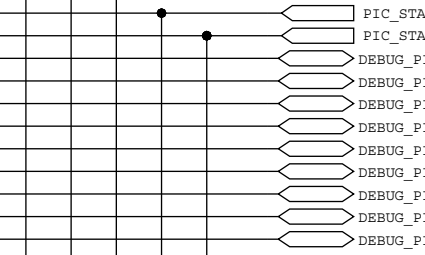
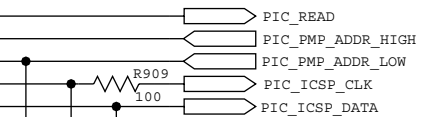
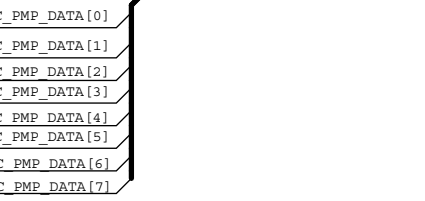
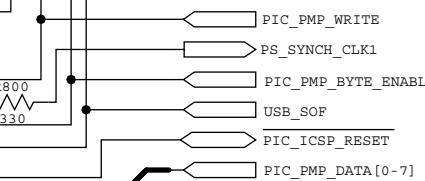
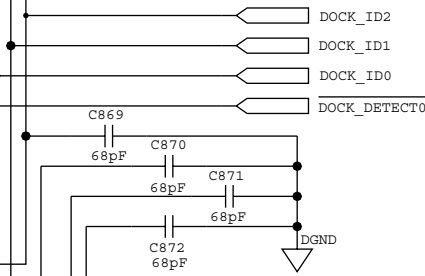
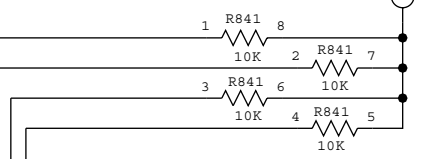
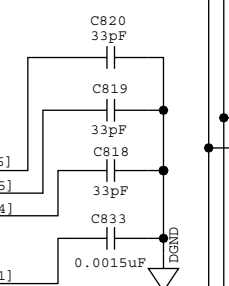
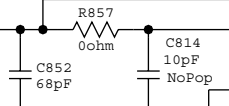
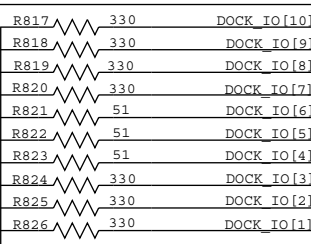
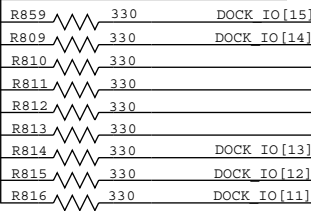
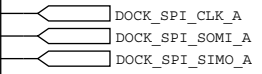
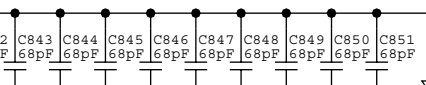
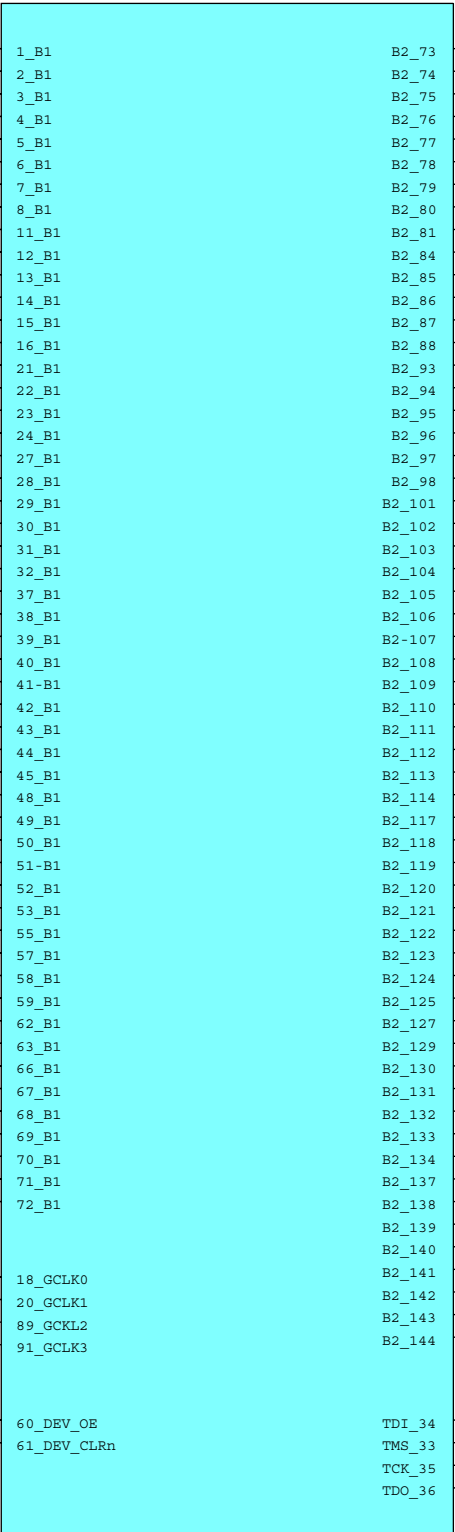
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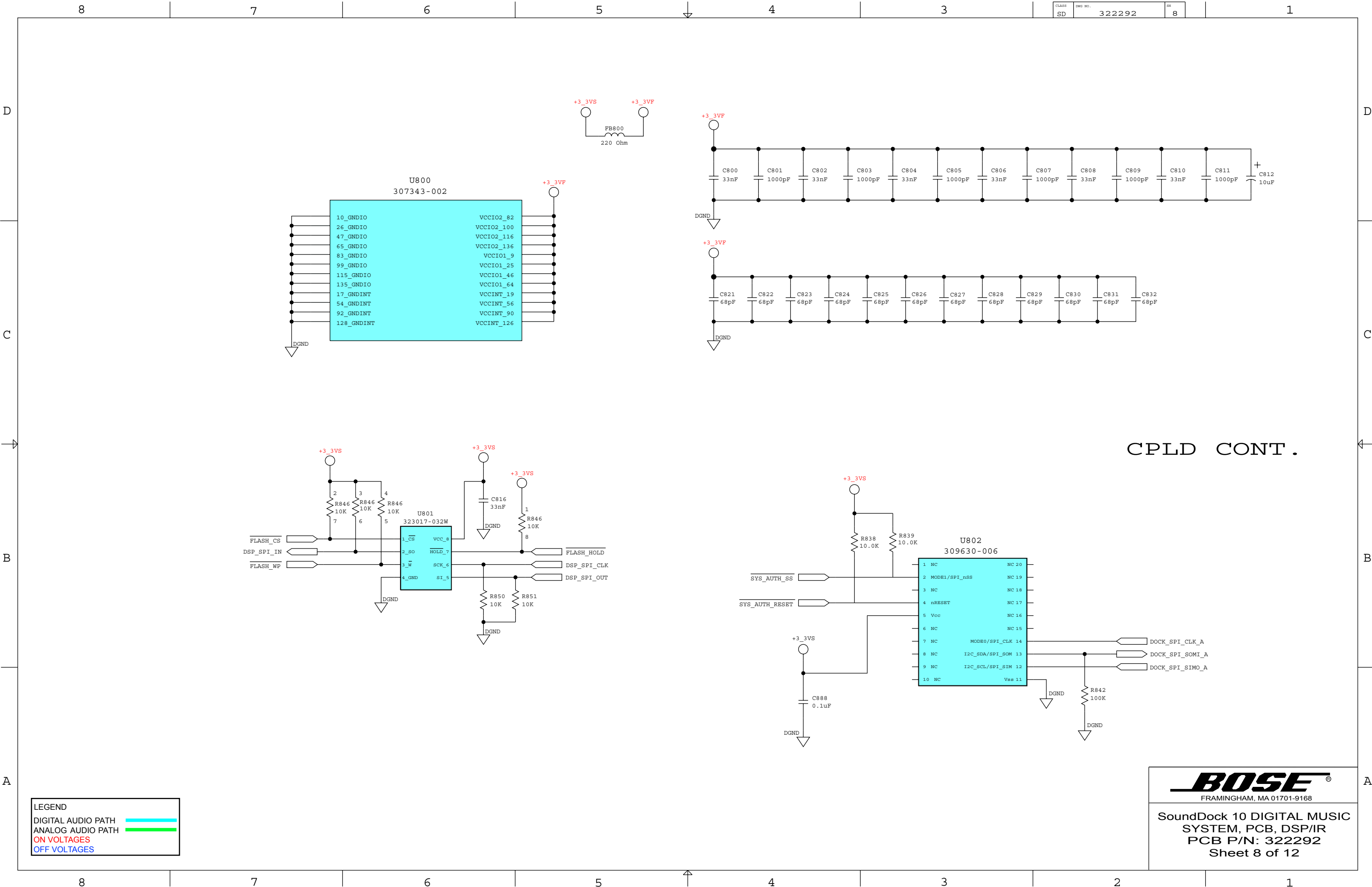
FRAMINGHAM, MA 01701-9168

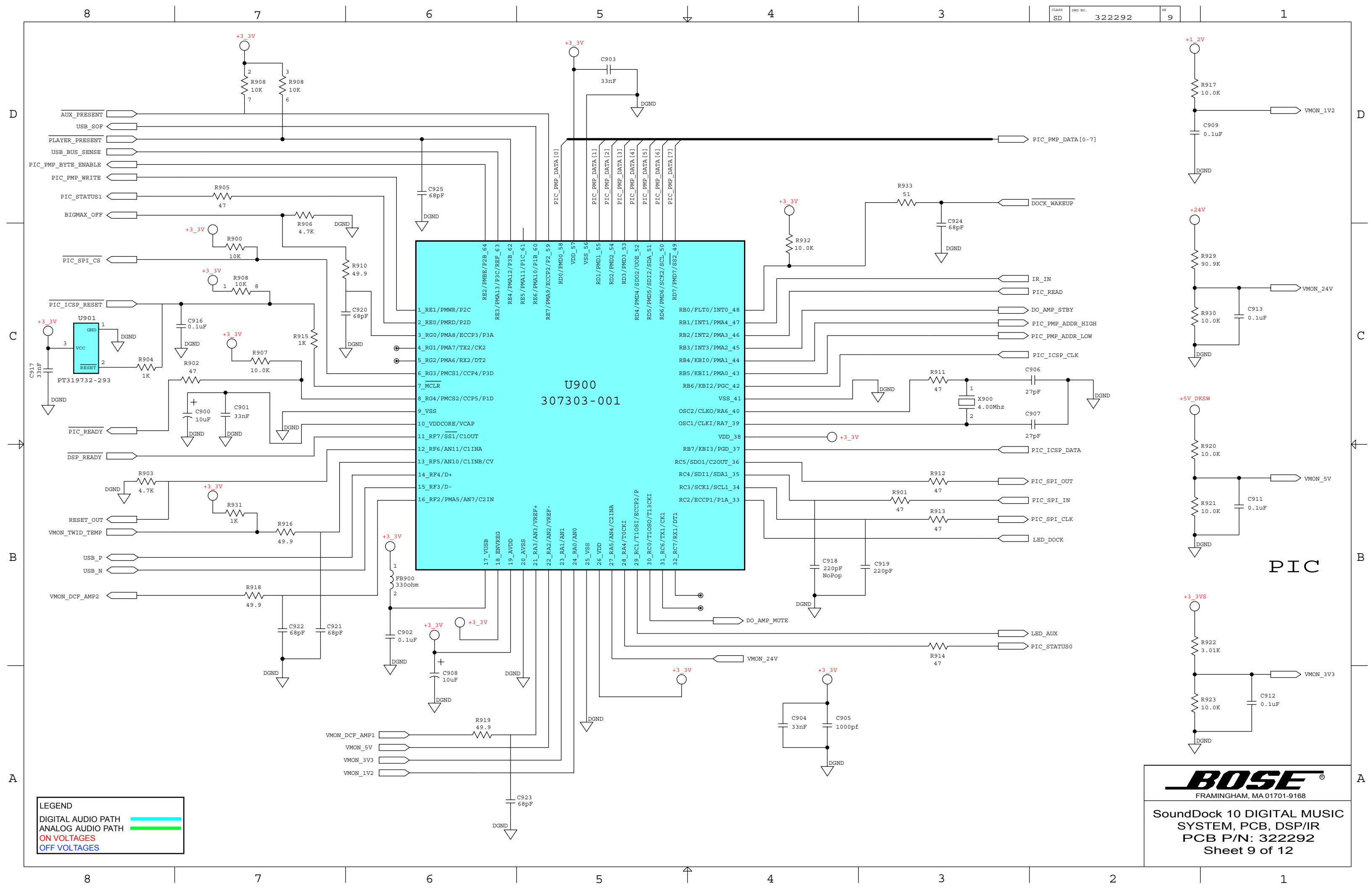
SoundDock 10 DIGITAL MUSIC  
SYSTEM, PCB, DSP/IR  
PCB P/N: 322292  
Sheet 7 of 12

CPLD

U800  
307343-002







D

C

B

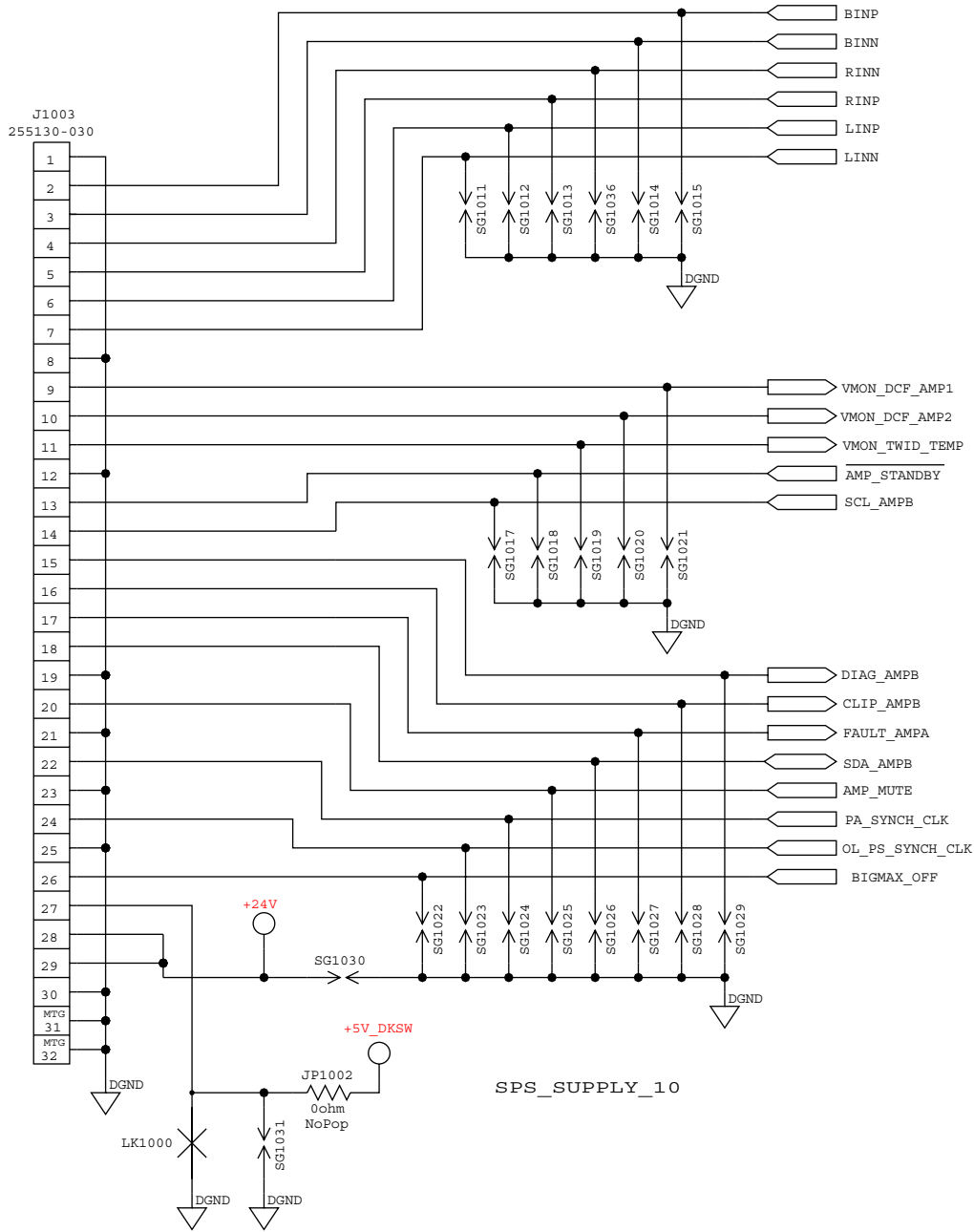
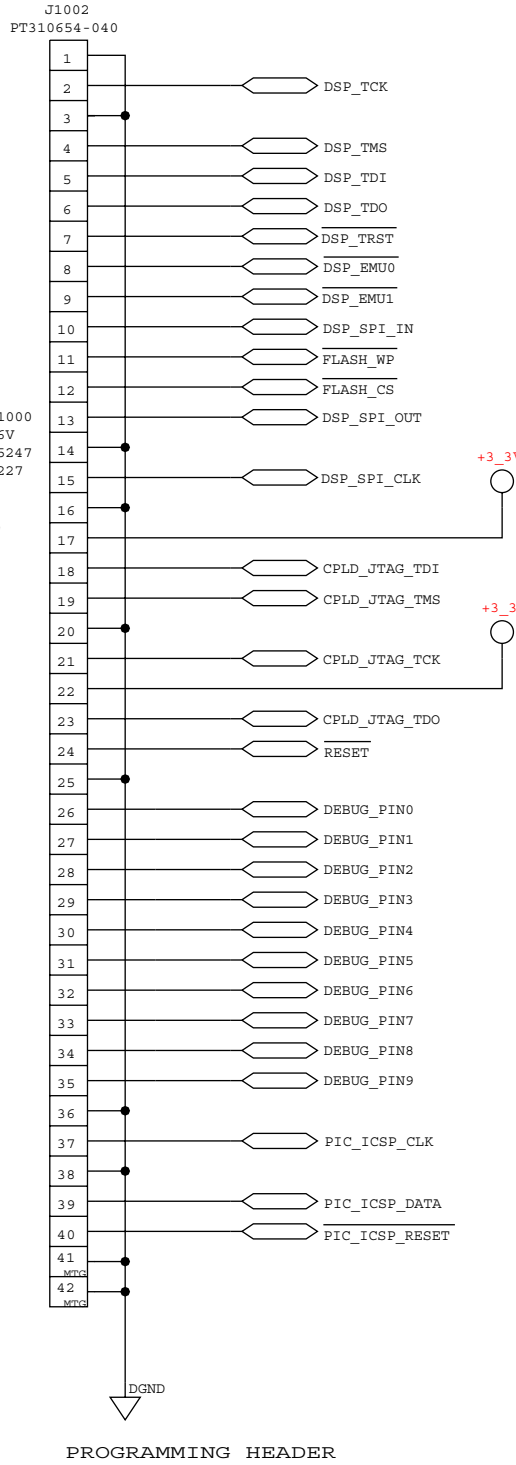
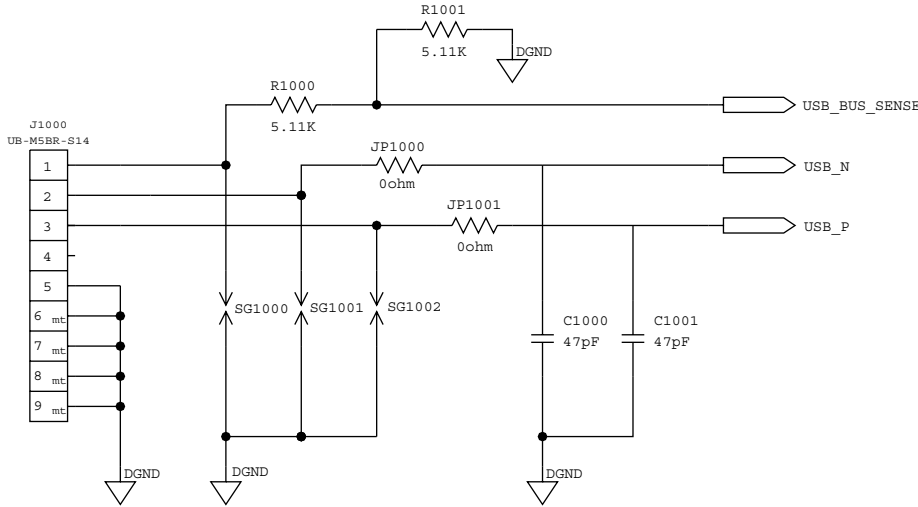
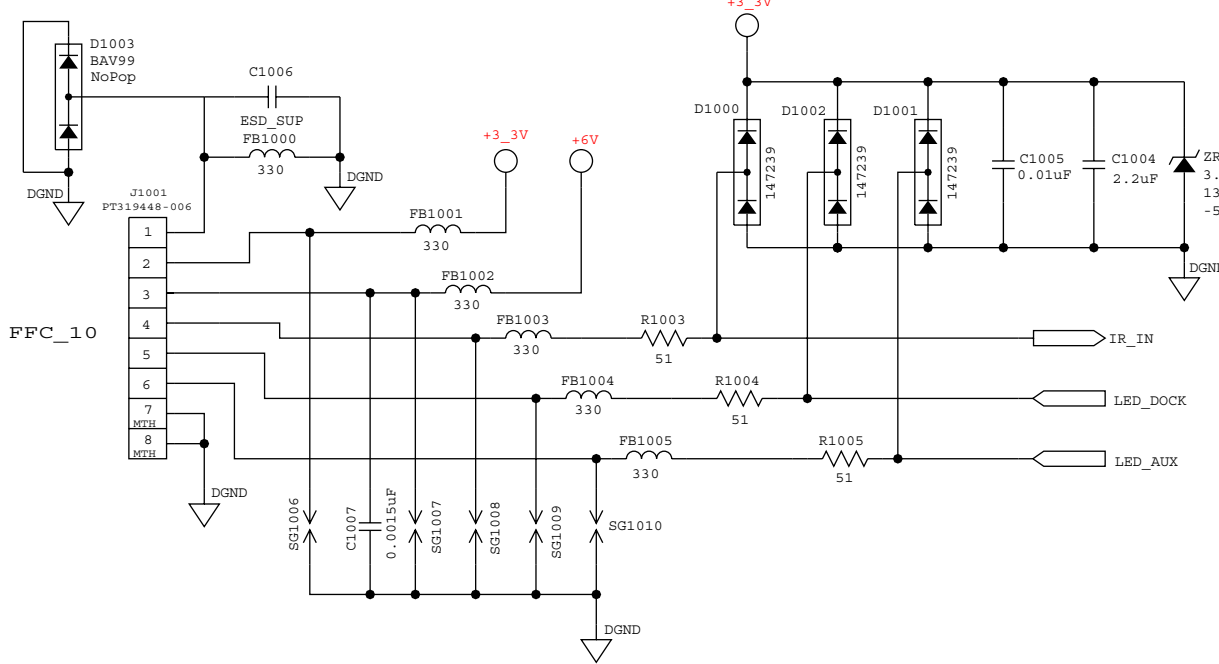
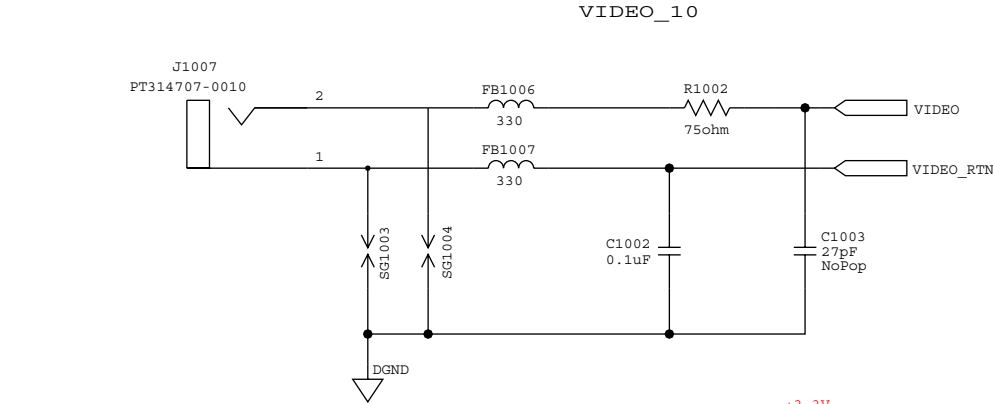
A

D

C

B

A



# CONNECTOR INTERFACE

LEGEND

DIGITAL AUDIO PATH

ANALOG AUDIO PATH

ON VOLTAGES

OFF VOLTAGES

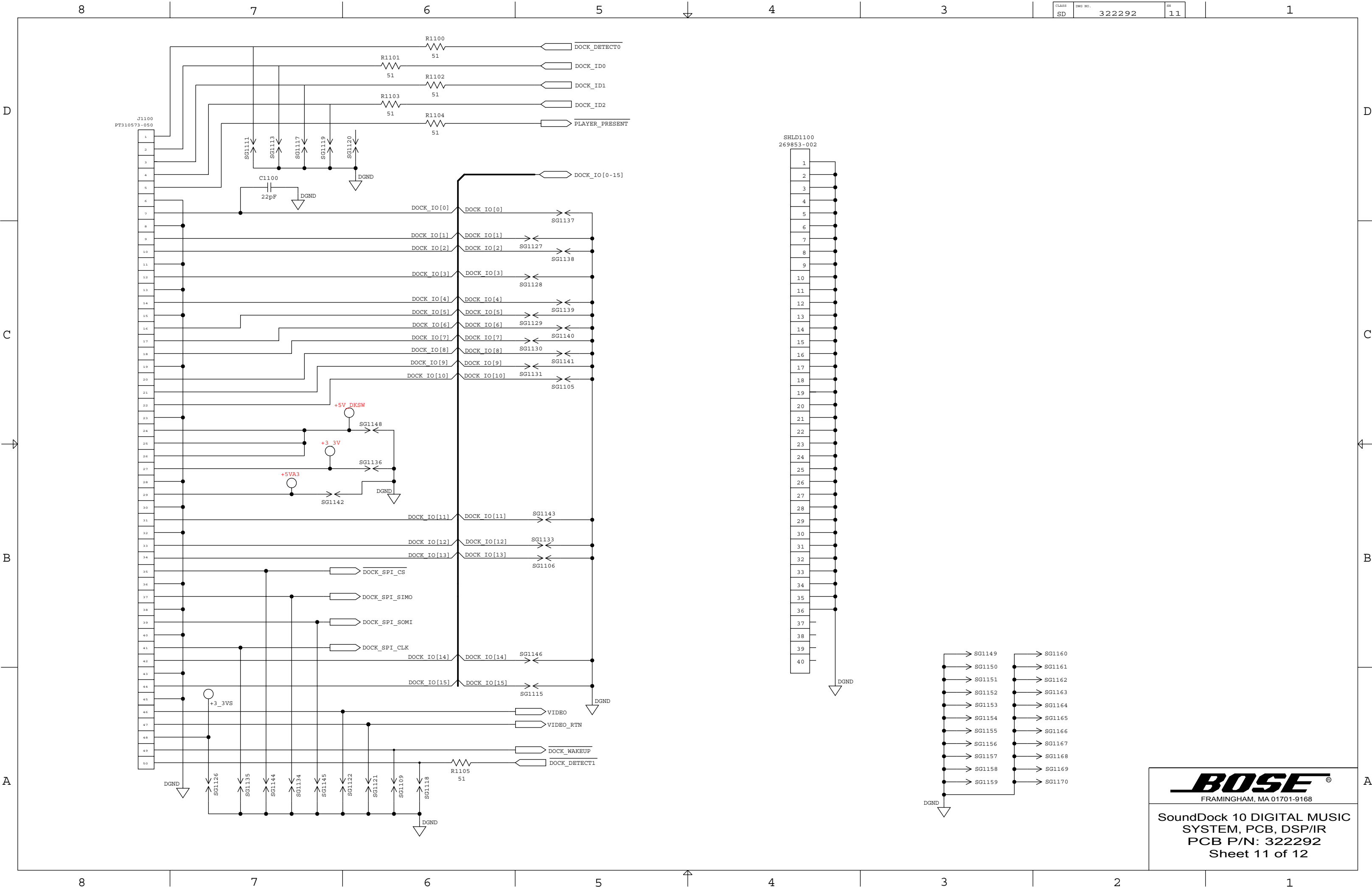
**BOSE**<sup>®</sup>

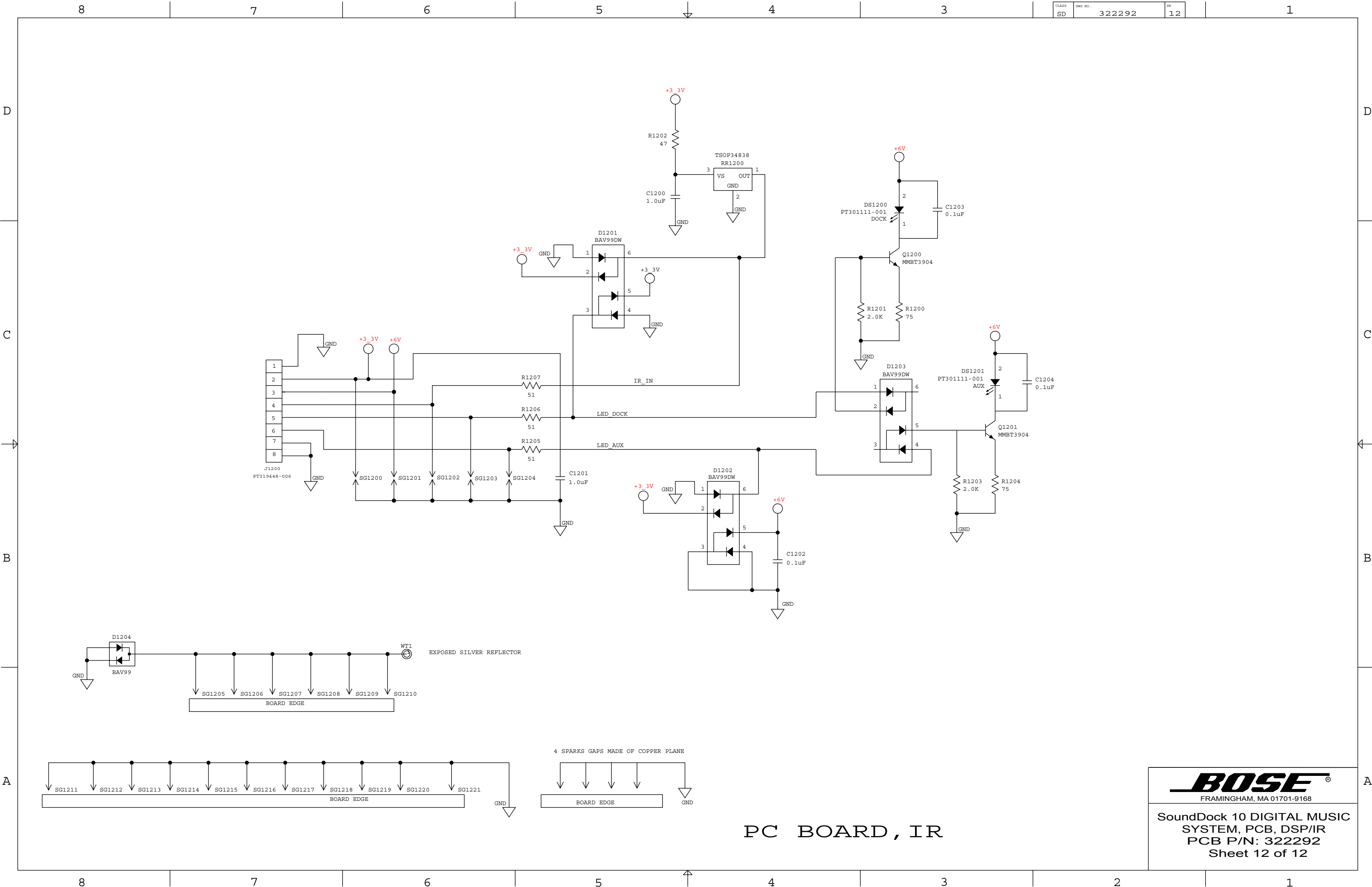
FRAMINGHAM, MA 01701-9168

SoundDock 10 DIGITAL MUSIC SYSTEM, PCB, DSP/IR

PCB P/N: 322292

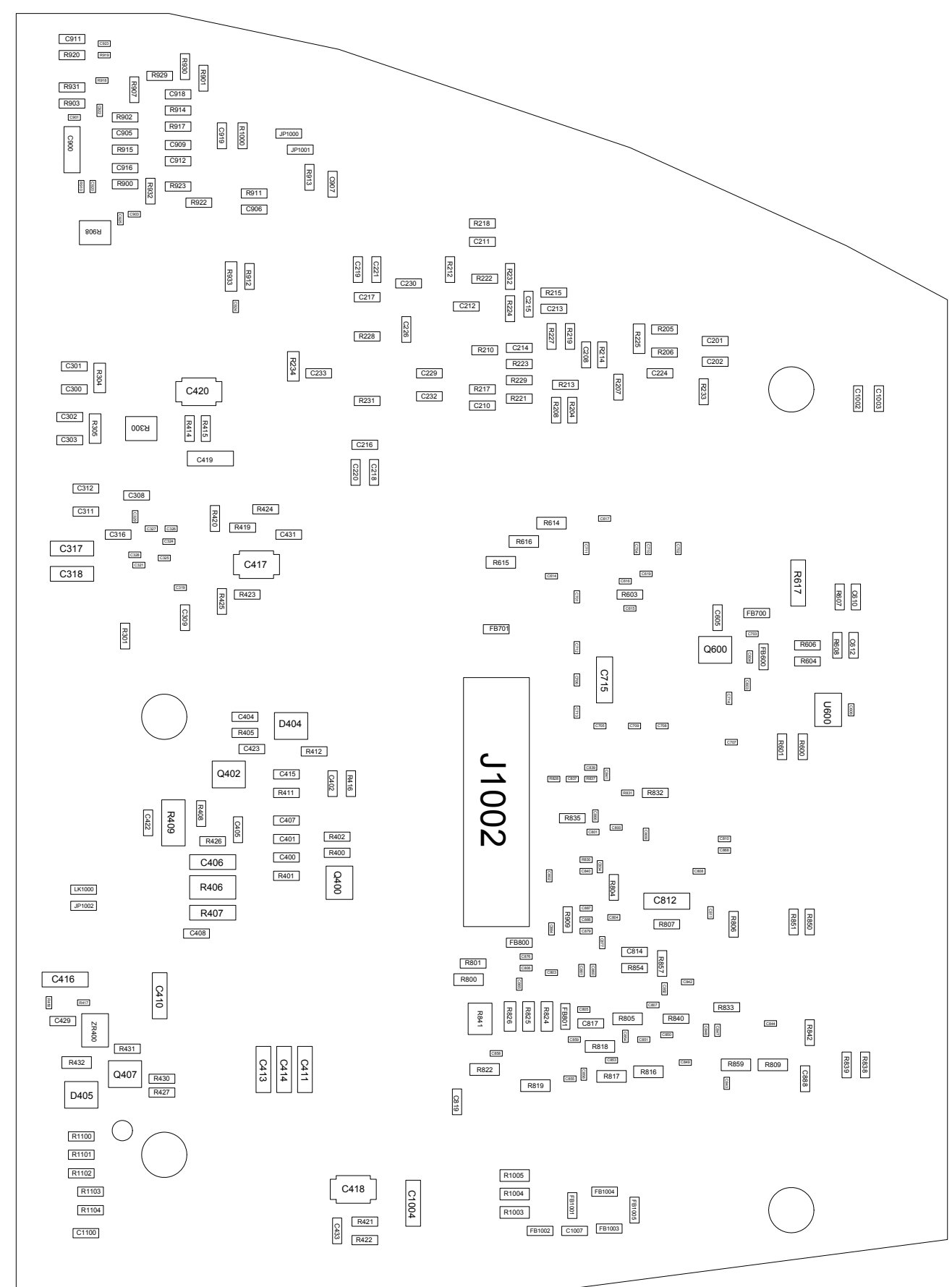
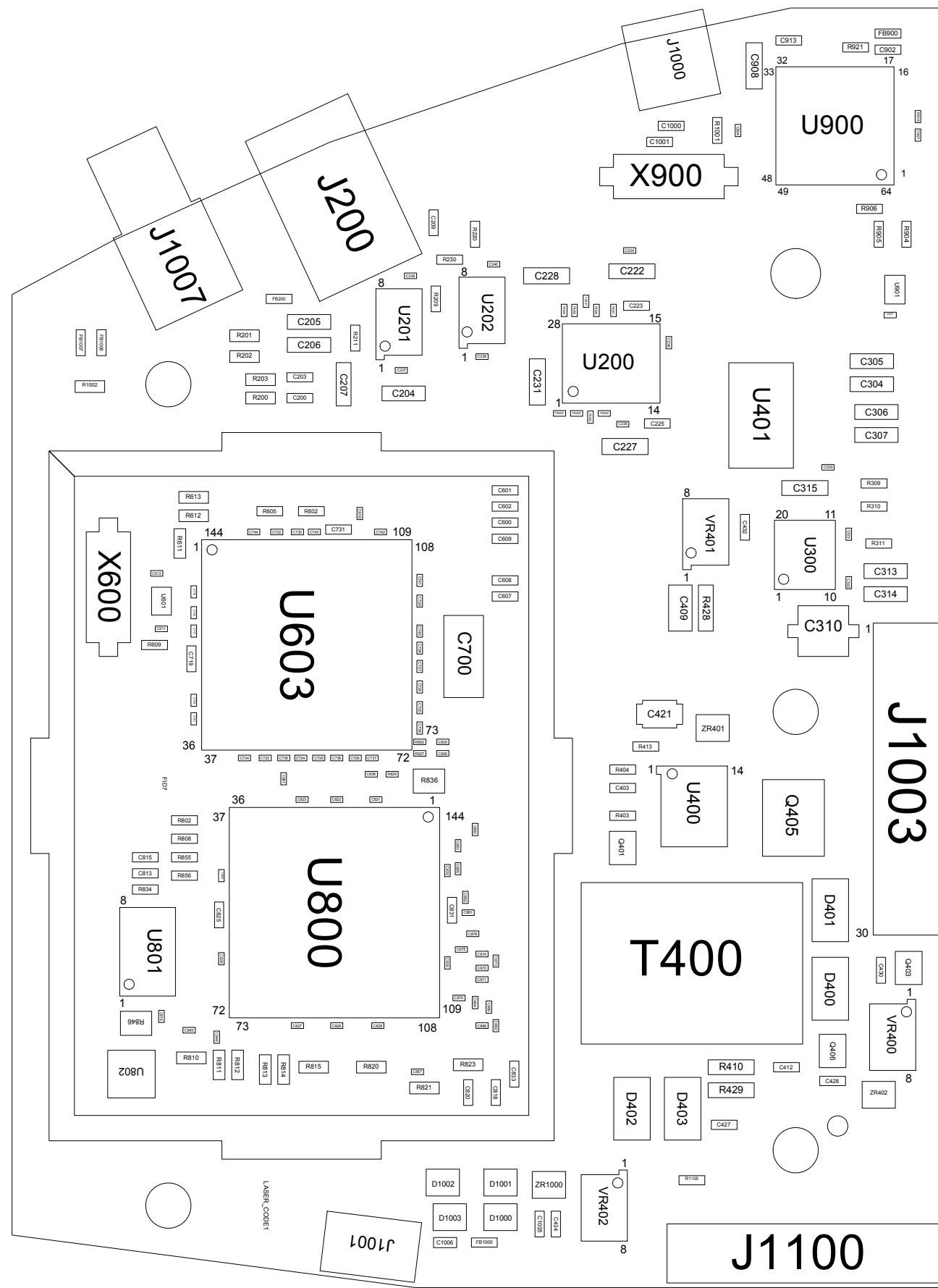
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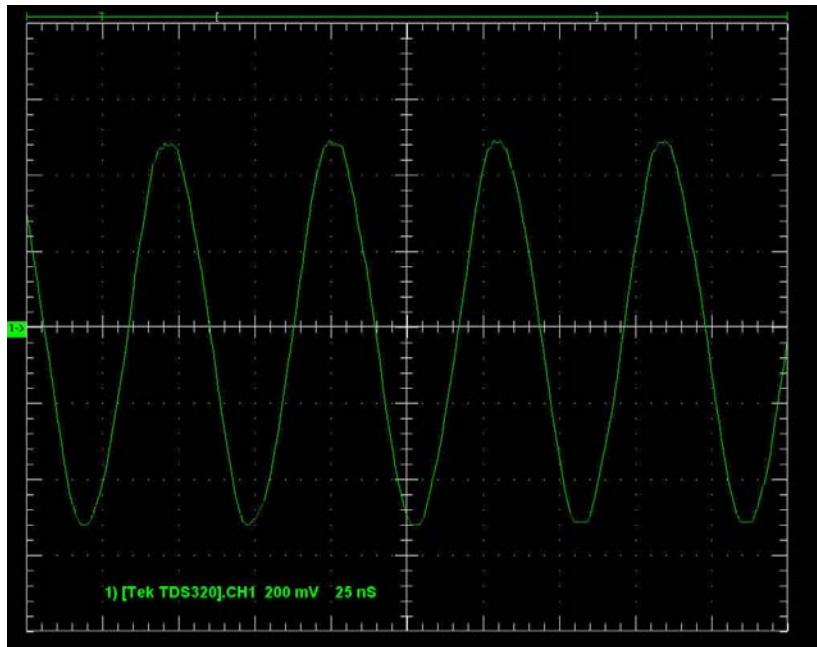




PC BOARD, IR



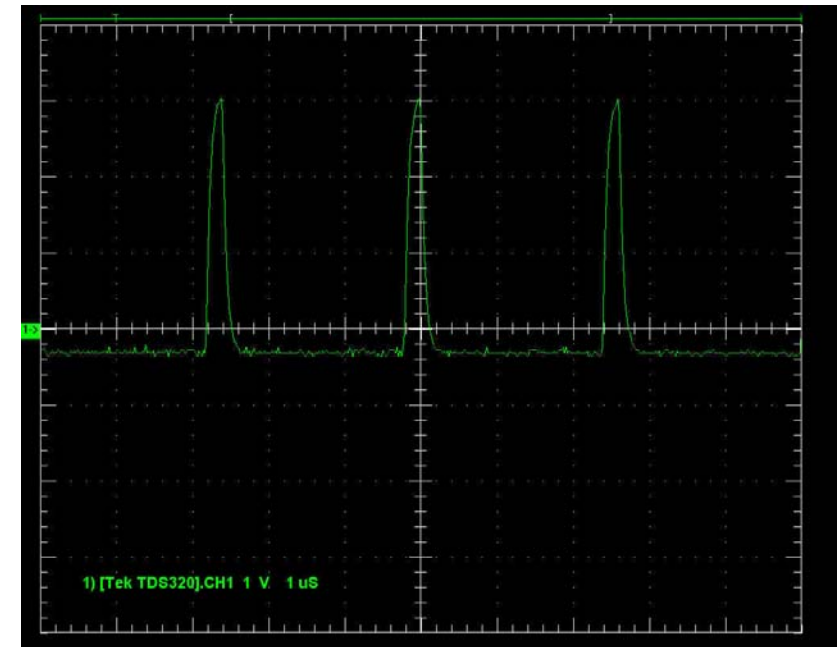




(1) U603 PIN 2 (AUDIO\_MASTER\_CLK)

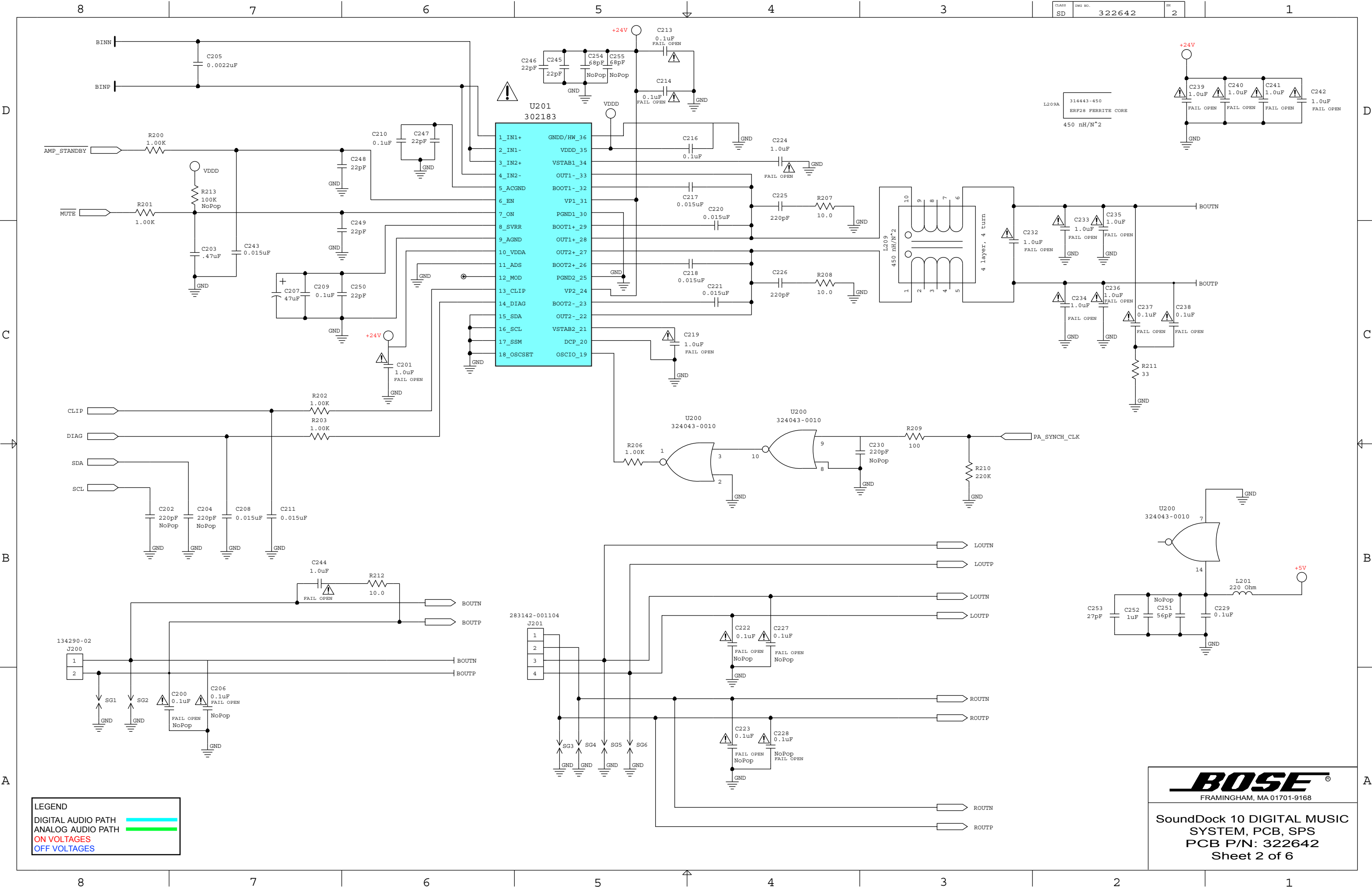


(2) U7000 PIN 24 (AUDIO\_BIT\_CLK)



(3) U2 PIN 6 (PS\_SYNC\_CLK1)





LEGEND

DIGITAL AUDIO PATH

ANALOG AUDIO PATH

ON VOLTAGES

OFF VOLTAGES

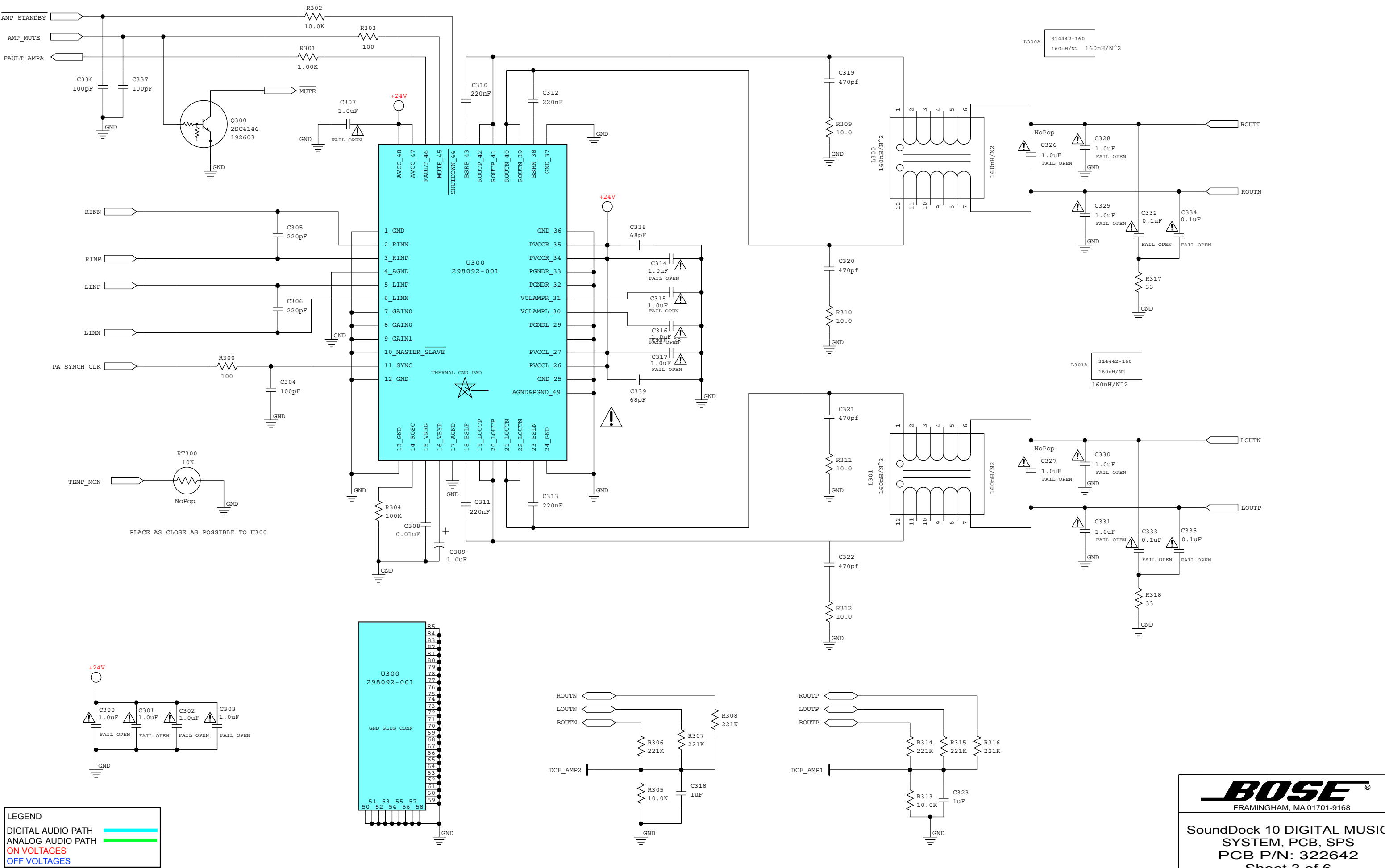
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FRAMINGHAM, MA 01701-9168

SoundDock 10 DIGITAL MUSIC SYSTEM, PCB, SPS

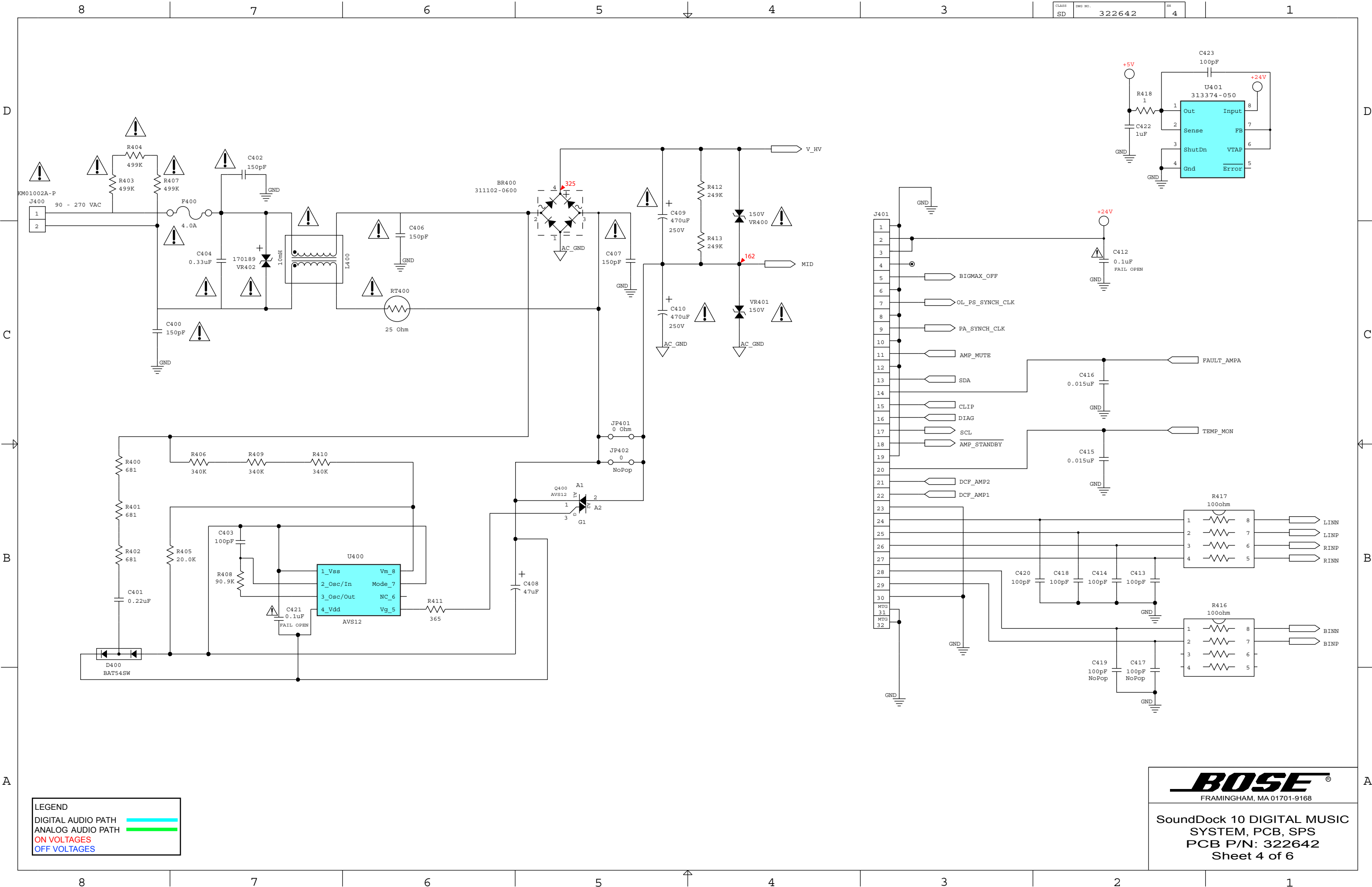
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Sheet 2 of 6



LEGEND  
DIGITAL AUDIO PATH  
ANALOG AUDIO PATH  
ON VOLTAGES  
OFF VOLTAGES

**BOSE**  
FRAMINGHAM, MA 01701-9168  
SoundDock 10 DIGITAL MUSIC  
SYSTEM, PCB, SPS  
PCB P/N: 322642  
Sheet 3 of 6



LEGEND

DIGITAL AUDIO PATH

ANALOG AUDIO PATH

ON VOLTAGES

OFF VOLTAGES

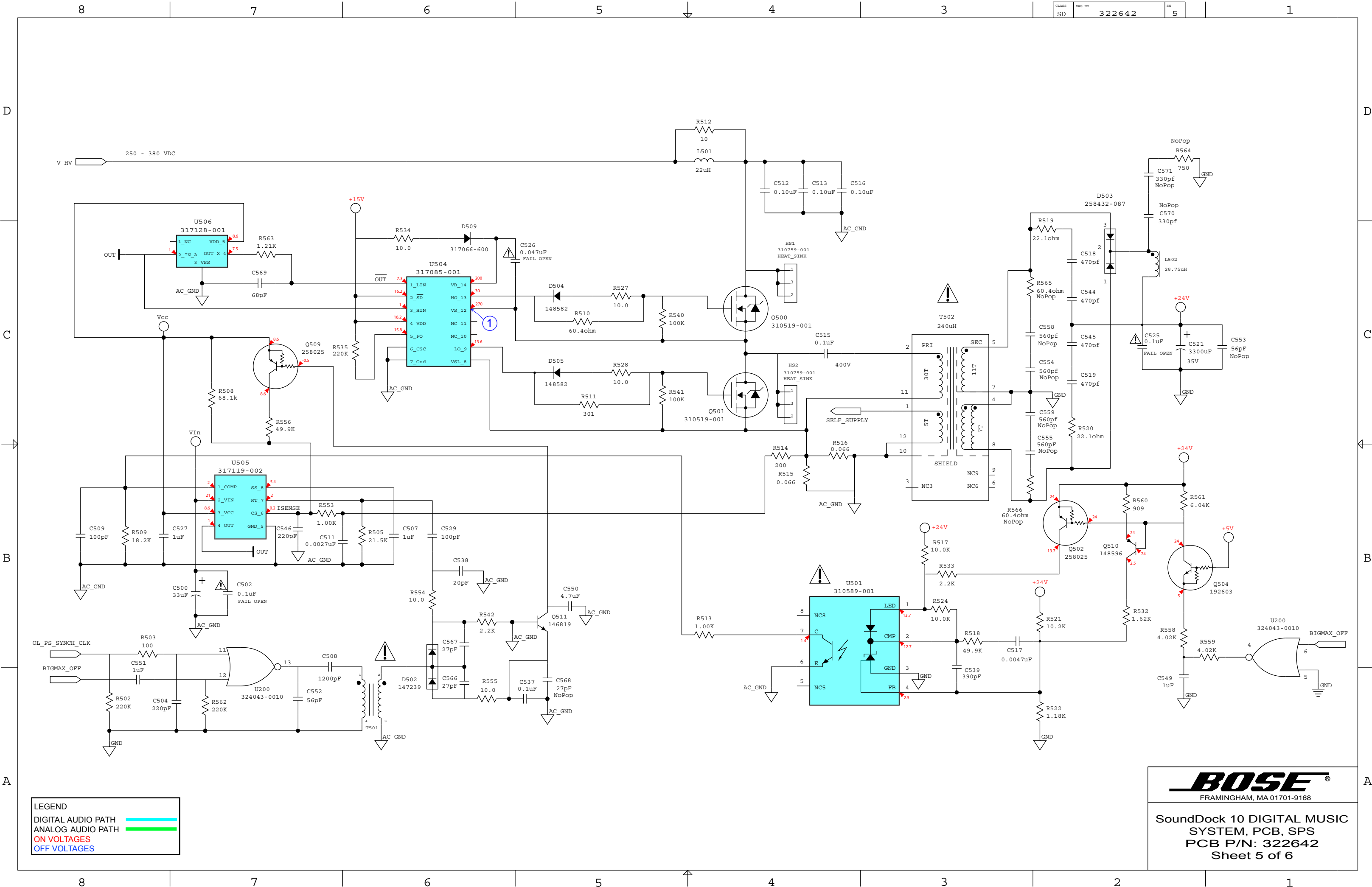
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SoundDock 10 DIGITAL MUSIC SYSTEM, PCB, SPS

PCB P/N: 322642

Sheet 4 of 6

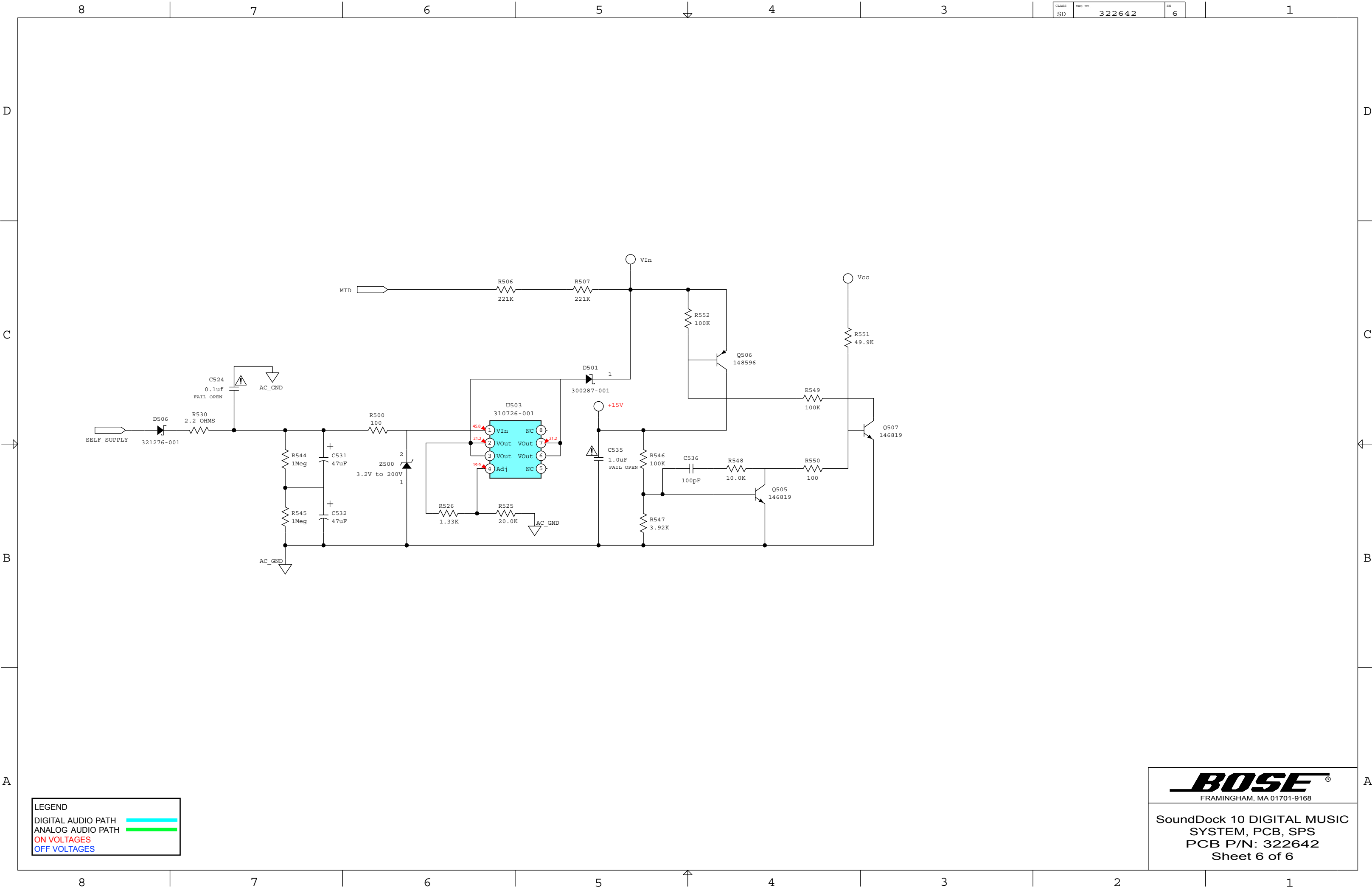


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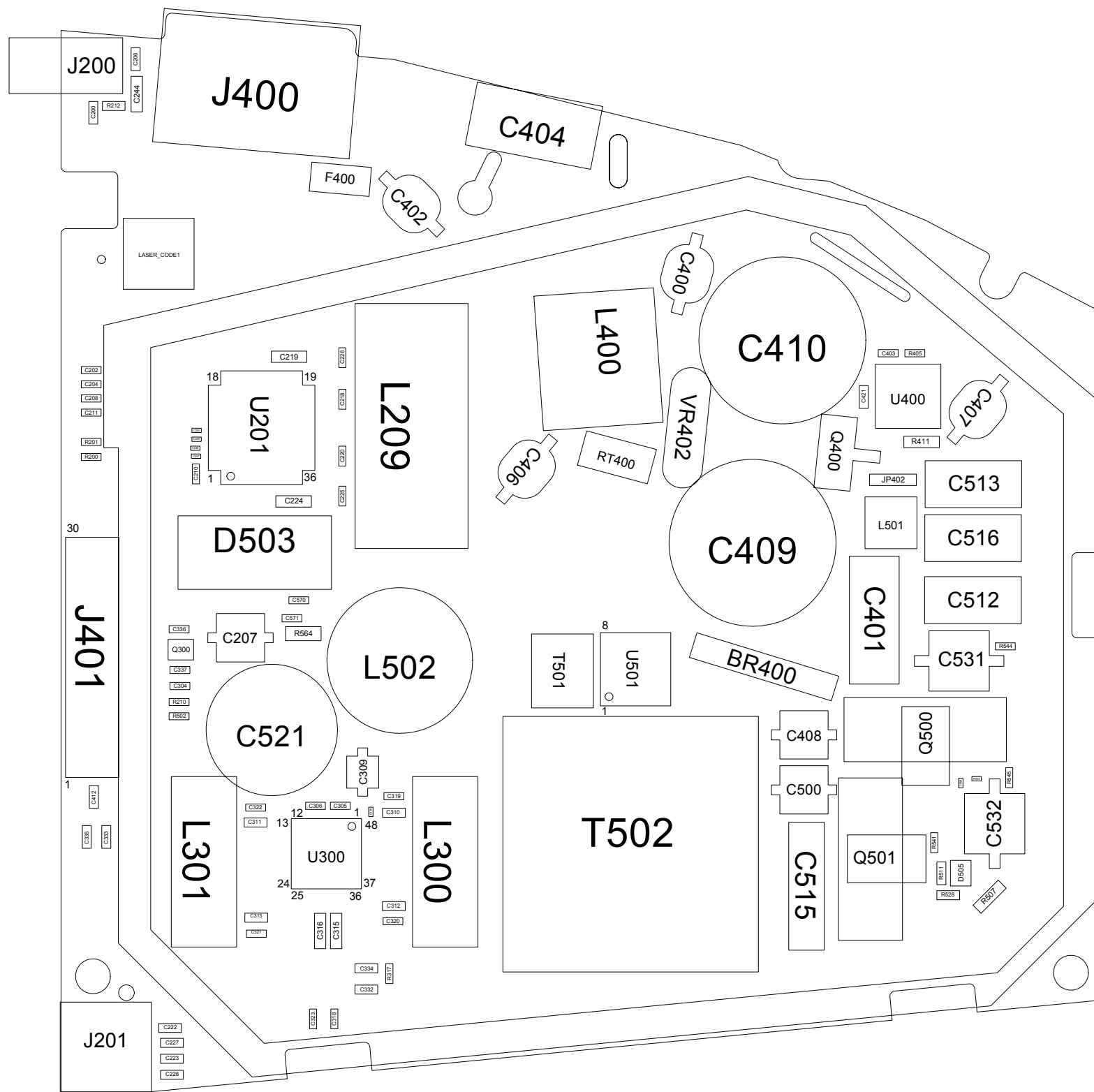
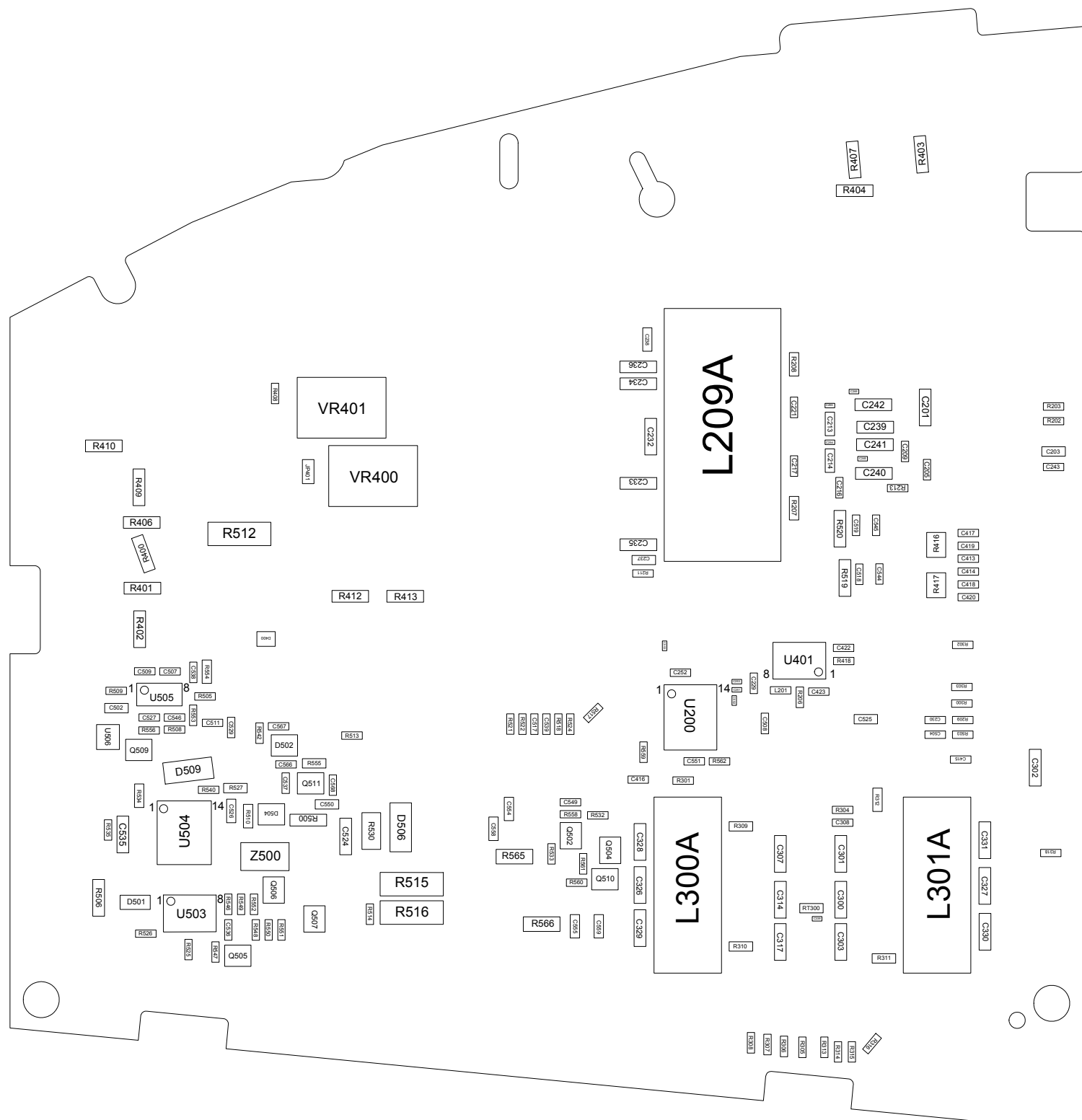
- DIGITAL AUDIO PATH
- ANALOG AUDIO PATH
- ON VOLTAGES
- OFF VOLTAGES

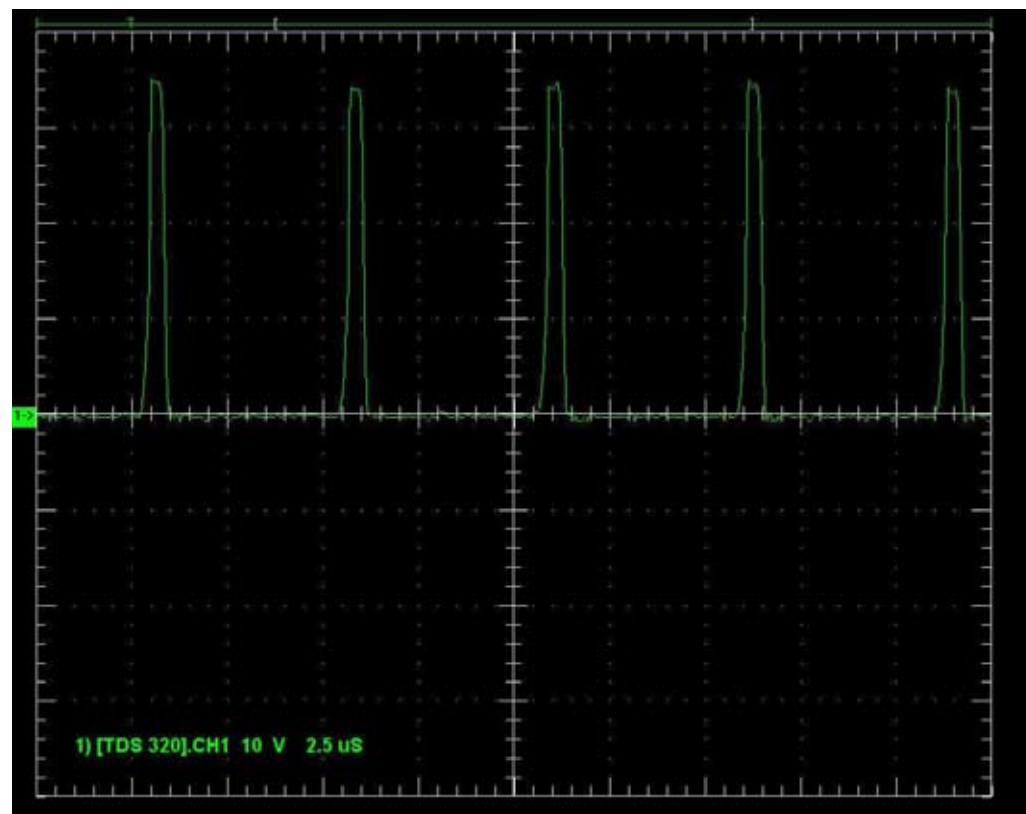
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SoundDock 10 DIGITAL MUSIC  
SYSTEM, PCB, SPS  
PCB P/N: 322642  
Sheet 5 of 6







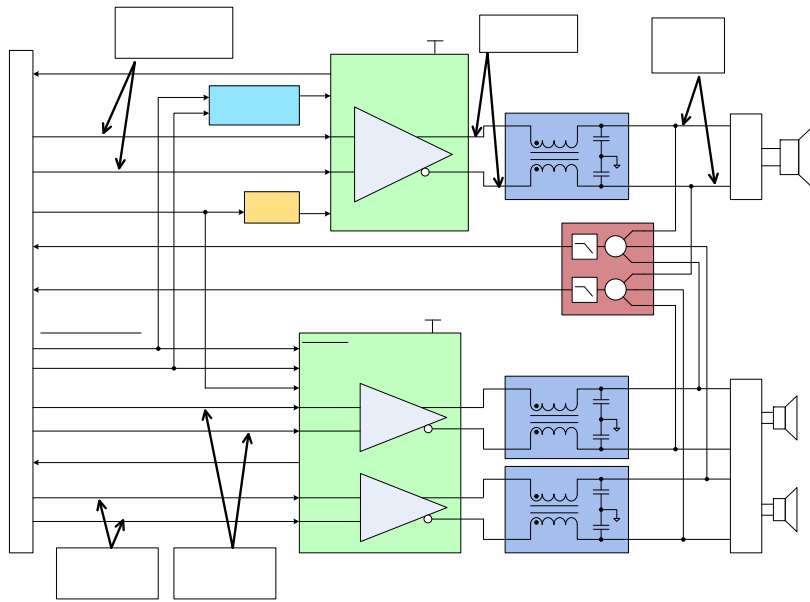


U504 PIN 12

## Power Amplifier

- Power Amplifier electronics integrated into same PCB as 24V switching power supply
- Class 'D' switching amplifiers drive 3 audio channels
- TI TPA3100D2 drives stereo “twiddler” transducers
- NXP TDF8599TH drives single woofer channel  
(dual channel amplifier configured for mono operation with paralleled outputs)

### Block Diagram



### Audio Path

- Continuous analog differential audio inputs from DSP (3 channels)
- Power Amp ICs provide effective voltage gain of 20x for bass channel, 10x for twiddler channels
- Outputs of amplifiers are Pulse-Width-Modulated, requires 2nd order low-pass L-C filters to reconstruct continuous signals prior to speaker loads

## Amplifier Characteristics

- Supply voltage: +24V
- Full scale output (after filter):
  - 18V peak into 1.5 ohms for bass
  - 14V peak into 3.5 ohms for twiddlers
- Full scale input from DSP:
  - 0.95V for bass
  - 1.5V for twiddler channels
- PWM switching frequency: 288kHz
  - Synchronized to PA\_SYNCH\_CLK provided by DSP
- PWM modulation mode: 'BD'

## Bass Amplifier Configuration

- Slave mode for externally supplied clock
- Internal PLL disabled
- BD modulation
- I2C bus disabled
- Paralleled outputs
- Load detection and DC offset protection disabled

## Twiddler Amplifier Configuration

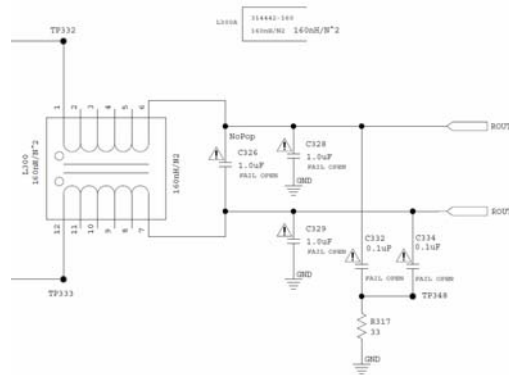
- Slave mode for externally supplied clock
- Gain set to 20dB (GAIN0 and GAIN1 pins grounded)
- Uses internal PLL (cannot be disabled)

## Output Filters

- 2nd order low-pass L-C
- Inductor is “planar” construction – inductor windings formed by PCB traces, ferrite core is glued to PC board
- Provide large common mode inductance (20 to 50uH) needed for attenuation of large common mode voltage swing present in BD modulated output stage

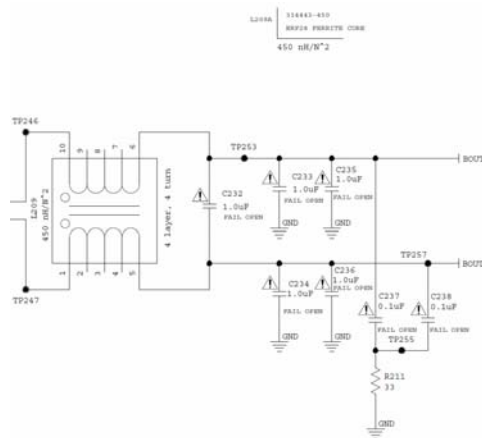
## Output Filters

Twiddler channels:



- Nominal diff mode inductance: 11.5uH
- Capacitance: 0.5uF
- Resonant frequency: ~66kHz
- DM attenuation at 288kHz: >20dB
- CM attenuation at 288kHz: >40dB
- C332, C334, and R317 provide damping for common-mode transients on start-up

Bass channel:



- Nominal diff mode inductance: 7.5uH
- Capacitance: 2uF
- Resonant frequency: ~40kHz
- DM attenuation at 288kHz: >30dB
- CM attenuation at 288kHz: >40dB

## Sync Clock Distribution

- DSP supplies PA\_SYNCH\_CLK, a 3.3V, 50% duty cycle clock for synchronizing switching amplifiers to 6x 48kHz audio sample rate (288kHz)
- PA\_SYNCH\_CLK routed directly to TPA3100
- TDF8599 needs 4V minimum level for sync clock, requires buffering through HCT NOR gate (U200) to provide a 5V logic swing.

## Low Power Modes

- Charging Standby
  - Supply voltage controlled to +24V
  - Amplifiers muted (AMP\_MUTE held high by DSP)
  - AMP\_STANDBY held high (amps active)
  - TDF8599 continues to switch, TPA3100 does not
- Low Power Standby
  - Supply voltage controlled to +7V
  - AMP\_STANDBY held low (amps inactive)

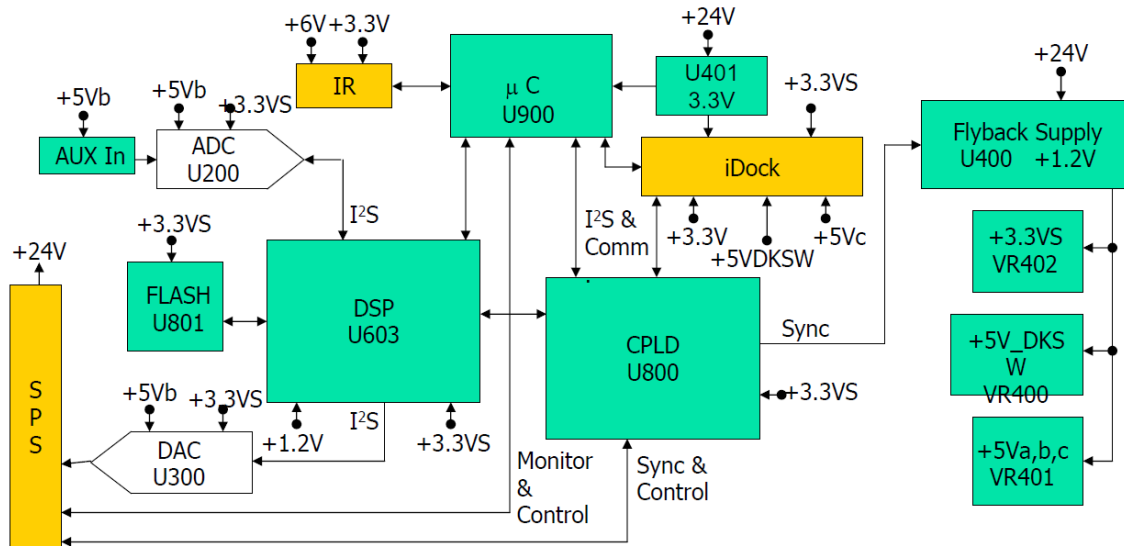
## Fault Detection

- Both Amplifier ICs employ internal fault detection
- TDF8599
  - Pulls DIAG signal low on short circuit detect, over-current, over-temperature, or over/under-voltage
  - Exact cause of fault reported on I2C bus (not available on SoundDock 10)
- TPA3100
  - Sets FAULT pin high on short circuit detect
  - FAULT detect may also be caused by overheating
- Both ICs clear faults when fault-producing condition is removed
-

## DC Offset Detection

- DC Offset Detection protects against unsafe transducer overheating caused by excessive DC voltages across voice-coil
- Simple resistor summing circuit adds outputs of all three amplifier channels together, DCF\_AMP1 and DCF\_AMP2 signals routed to ADC on DSP board
- Microcontroller with built-in ADC continuously monitors DC voltage between DCF\_AMP1 and DCF\_AMP2
- Amplifiers will be disabled and unit will be placed into low power standby if voltage on any single transducer exceeds 3 to 4V threshold for more than 2 seconds.

## DSP Block Diagram

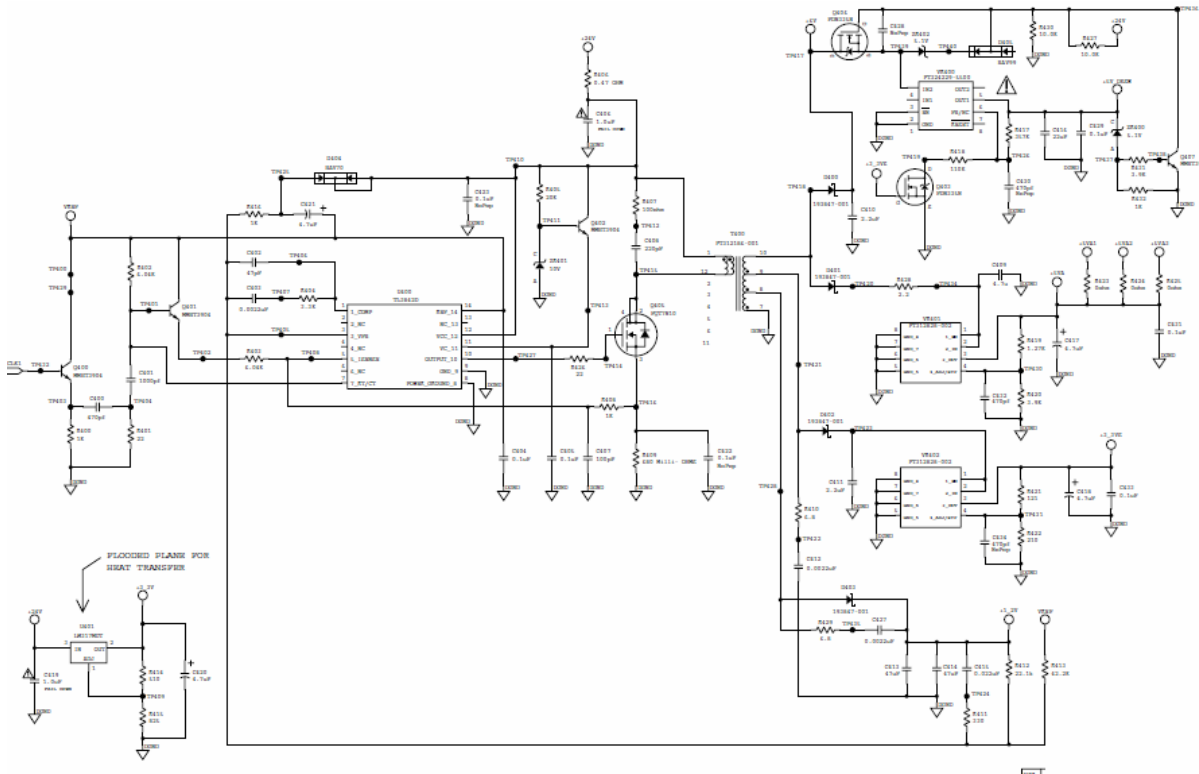


## DSP Power Management

- +3.3V linear regulator directly from +24V to run PIC
- +3.3VS to run remainder of 3.3V logic
- +5VA,B,C to run DACs, ADCs, and op-amps
- +5V\_DKSW to charge iPod
- +6V unregulated to drive LEDs

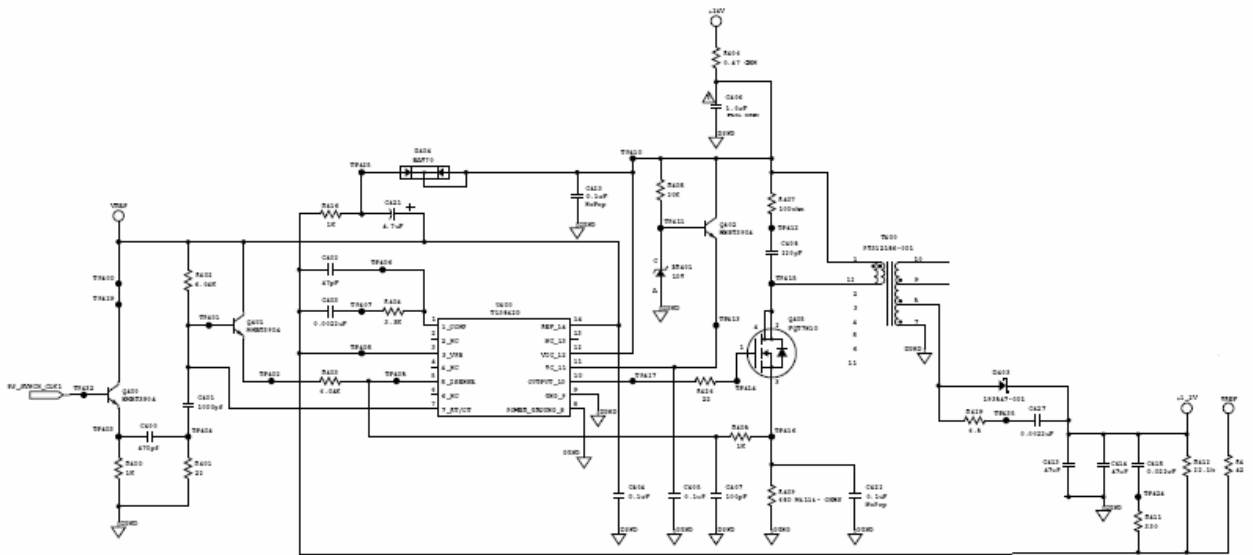
## DSP power modes

- Normal- flyback running off +24V powering DSP board
- Low Power standby- +24V reduced below 7V; flyback controller off
- Charging standby- flyback running off +24V powering DSP board, but all processes idle except for iPod charging





## Flyback supply

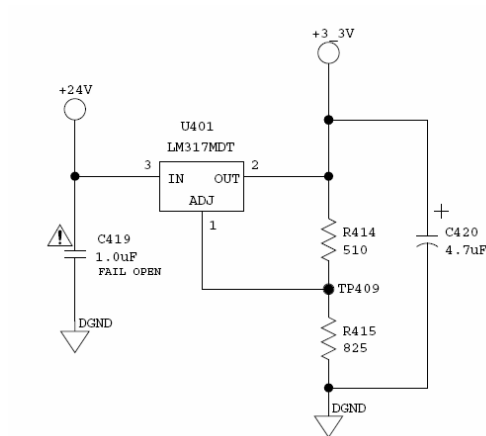


## Flyback operation

$$V_{Flyback} = 24V + (1.2V + 0.5V_{(V_{Schottky})}) \cdot 15_{Turns} = 49.5V$$

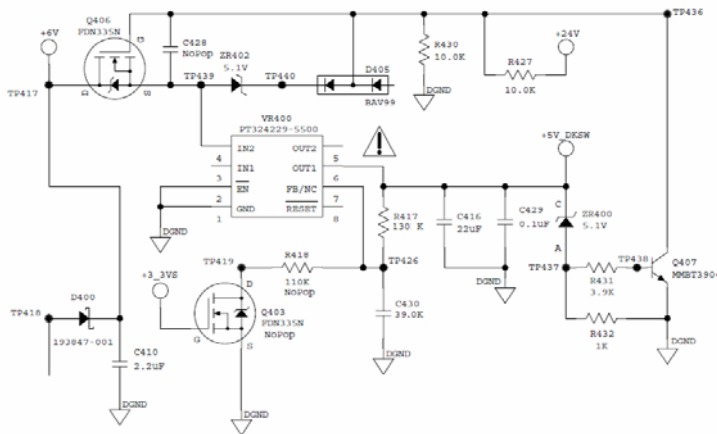
- 24V is the SPS supply voltage
- 1.2V is the regulated output
- 15 is the turns ratio
- 0.5V is the forward drop of the Schottky diode

## Microcontroller supply voltage



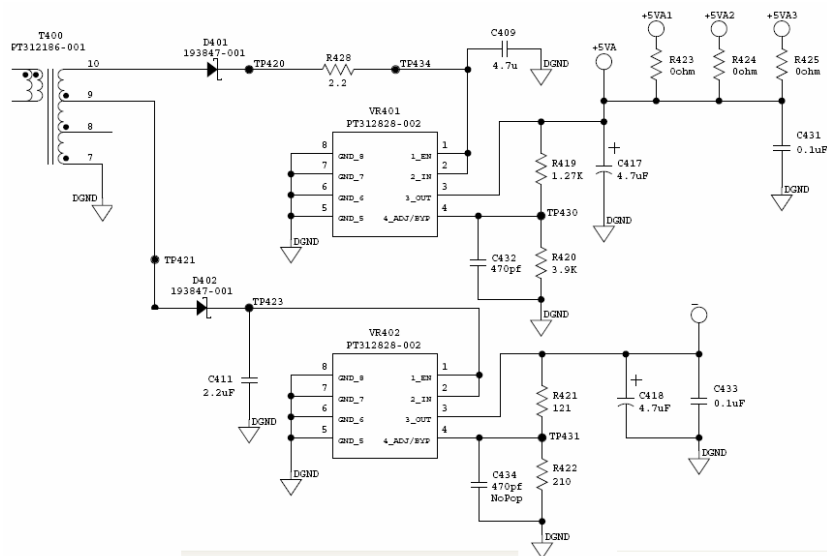
- +3.3V supply for PIC micro-controller
- Always on
- +24V reduced to below 7V in low power mode

## iPod Charging



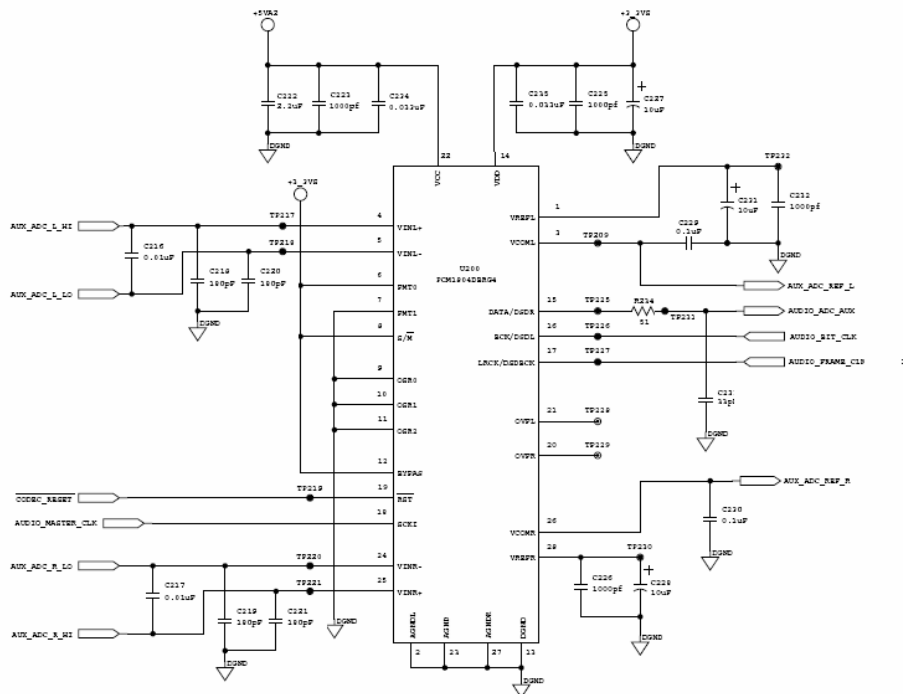
- +5V\_DKSW is the iPod charging voltage
- ZR400, R431-432 and Q406-407 are the over voltage protection for iPhone compatibility

## +3.3VS & +5Va,b,c supplies

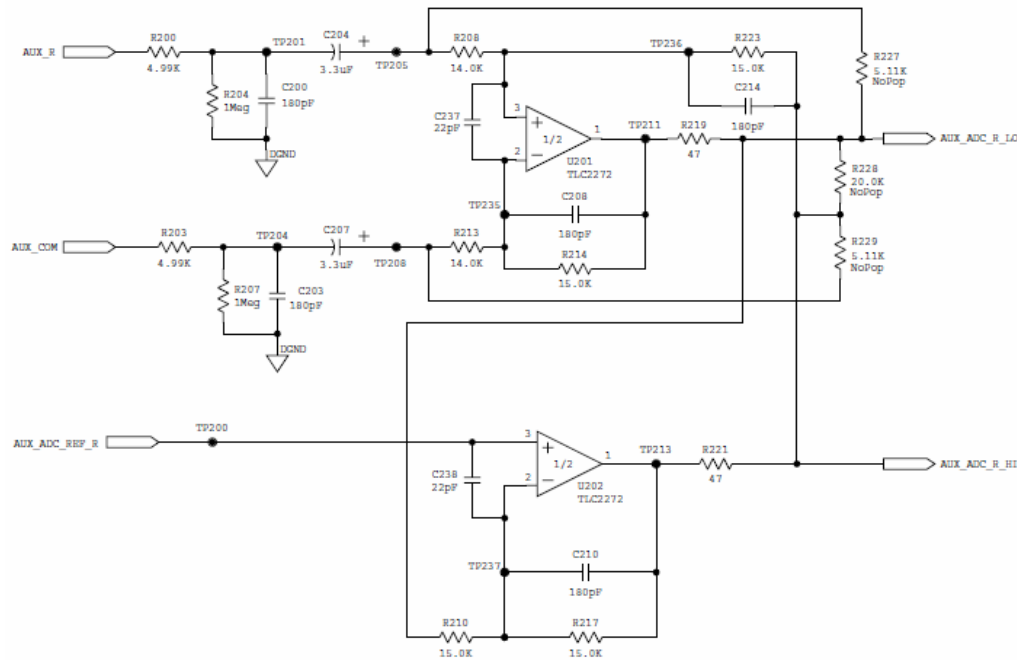


- U401-403 are basic low-dropout linear regulators
- +5Va,b,c to run DACs, ADCs, and op-amps
- 3.3VS run all 3.3V logic except PIC and some dock functions

## AUX ADC



## ADC Signal conditioning

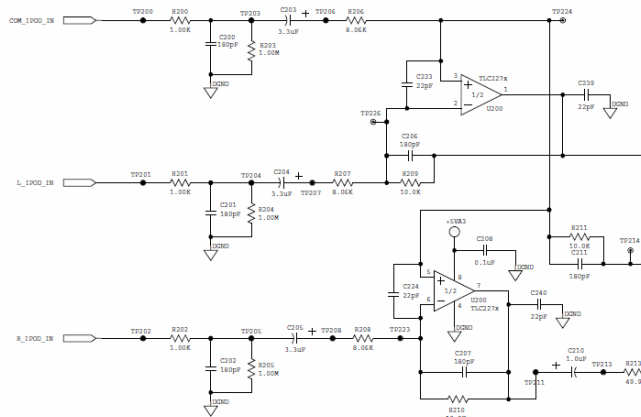


- U201 takes signal & subtracts AUX\_COM to reduce noise
- U202 inverts U201's output & creates a differential signal to drive the ADC
- U202's noise is common mode, & subtracted out by the ADC's own differential input

## I2S test points

- ADC
- Master Clock- TP650
- Bit Clock- TP226
- LR Clock- TP227
- Data- TP231
- DAC
- Master Clock- TP650
- Bit Clock- TP226
- LR Clock- TP227
- Data- TP645 (Woofer), TP646 (L), & TP637 (R)





- 12

## SoundDock 10 Theory of Operation

### SPS Board

#### AC Connector (J400)

The AC Connector is our standard polarized connector with enclosed leads. Care has been taken to put extra holes in the board to increase spacing from line to neutral and to expel liquids should they be spilt on the board.

#### Line Filtering

The line filtering is comprised of a common mode chokes (L400), 4 150pF Y capacitors (C400, C402, C406, and C407), an X capacitor (C404). These components work to reduce conducted (and radiated) emissions. C404 is especially critical in reducing the 192kHz switching frequency differential mode emissions. The Y caps and common mode choke work together to reduce common mode emissions.

R403, R404, and R407 are there to dissipate power and reduce the voltage seen at the AC connector after AC power is removed.

VR402 is used to suppress line surges and especially protects C404. If the line surge is large enough the fuse (F400) will open before anything is damaged.

#### Fuse (F400) and NTC (RT400)

The fuse is a 4A rated slow blow fused. It was chosen for its high I<sup>2</sup>T value to avoid false tripping due to spurious line spikes etc. The NTC provides inrush current suppression.

#### Bridge Rectifier (BR400)

BR400 is a standard thru-hole bridge rectifier. It is easily able to dissipate just over 1W of power under worst case conditions.

#### Voltage Doubler or Auto Switch

The Auto Switch components are only populated in the dual voltage variant which looks at the AC input line voltage and decides if it should double this voltage (< ~160Vac) or not. In countries where the input voltage will never exceed 160Vac, the circuit is configured to always double the input voltage. The dual voltage systems can be used in any country, however it was decided that it was not cost effective to populate the auto switch components in countries where the line voltage always stays within a certain range.

The voltage doubler works by charging each bulk cap (C409 and C410) one half cycle at a time. It works by applying a short at JP401. Note that in this configuration only 2 of the 4 diodes in the bridge rectifier are used.

The Auto switch looks at the input line voltage at pin 8 through the R406, R409, R410/ R405 resistor divider to determine if it should double the voltage by turning on the triac

(Q400). R406, R409, and R410 are 3 discrete resistors in series rather than a single resistor so that we do not exceed the maximum voltage rating of the resistors.

R400, R401, R402, and C401 AC couple the line voltage into the D400 rectifying diode which charges C408. This circuit works with U400's internal voltage clamp to create a ~9V supply rail. Note that this is negative with respect to pin 1 of the triac. U400 pulses pin 5 to turn on the triac. It uses pulses rather than a constant voltage to minimize power dissipation. C403, R408 work together to generate clock pulses for U400.

### **DC Set Point Resistors (R412, R412, R506, and R507)**

DC set point resistors are needed when the bulk capacitors are charged in series which is the case in the 240V variant or the dual voltage variant with a 240Vac input. These resistors work to set the voltage on each bulk capacitor. Without them the DC voltage would be set solely by the leakage current on each bulk capacitor which could result in asymmetric charging which could cause an overvoltage condition in one of the capacitors.

### **Switching MOSFETS (Q500 and Q501)**

Q500 and Q501 work together to send a square wave into the primary side of T502. The duty cycle of each is controlled by the PWM controller and is proportional to the input voltage and output voltage. It is critical that Q500 and Q501 are never on at the same time.

These MOSFETS have a surface mount heat spreader attached to them to keep their temperature down. These devices actually run hotter at lower output power levels because they are run more into hard switching (switching while the voltage across them is non-zero).

### **Transformer (T502)**

The transformer is a key component in the asymmetrical half bridge. It takes the square wave generated by Q500 and Q501 through the C515 DC blocking cap and sends it out of the secondary windings as well as another primary side winding used to generate the "self supply". This transformer has been carefully designed to ensure there is no cross conduction and to minimize Q500 and Q501 switching losses. The transformer has asymmetric secondary windings in order to minimize voltage ripple on the secondary/ keep the output inductor and capacitor size to a minimum. This comes at the expense of generating a slight DC magnetizing current which has to be kept well away from the saturation level of the core. Asymmetric half bridges work best when there is a fixed input and output voltage. Our system has this to some degree but deviates when the AC line voltage changes.

### **Output Diodes (D503)**

The output diodes work to half wave rectify the square wave pulses sent out by the transformer. They are rated at 400V because they need to block nearly 200V plus derating and there are little to no 300V rated diodes. These diodes require heat sinking to perform over full range of output power. Care should be taken to heatsink the TO-220



package when the SPS board is operated on a lab bench at higher (>1A/25W) power levels.

### **Output Inductor (L502)**

The output inductor works in conjunction with the output capacitor (C521) to filter the output voltage. This inductor works well away from its saturation point and is adequately sized to keep the output voltage ripple to a minimum.

### **Voltage Feedback Circuitry**

The combination of U200 (1/4 of quad NOR gate), Q504, Q510, Q502 and associated resistors and capacitors provide the capability for the DSP to control the DC voltage for the +24V bus over a range of +7V to +24V. The capability to reduce the +24V rail to +7V is necessary to meet low power requirements in standby mode, and the capability to ramp the voltage slowly and continuously between these two voltages is necessary for proper operation of the PWM controller (U505) between transitions.

The basic function of this circuit is to synthesize two variable resistors, one connected between the node at TP536 and +24V, and one connected between the node at TP530 and +24V, with the value of the resistors controlled by the duty cycle of the BIGMAX\_OFF 3.3V CMOS logic signal from the DSP module. One of the synthesized resistors is in parallel with R521, the value of which determines the setpoint of the +24V rail, and the second synthesized resistor is in parallel with R517, the value of which determines the bias level for the LED internal to the optocoupler, U501. *Refer to the optocoupler and PWM controller sections on the operation of the main switching power supply voltage control loop for an explanation of how R521 and R517 control the voltage and LED bias....*

When Big Max is playing audio or in charging standby, the +24V rail is controlled to +24V. In this condition, BIGMAX\_OFF is logic LOW. This results in +5V at node TP595 (through the inversion of the NOR GATE), resulting in zero emitter current in Q504. The node at TP546 is thus pulled high by R561, keeping Q510 and Q502 turned off. With the collectors of these two transistors essentially infinite impedance, the optocoupler essentially sees a 10.2k resistor for the top side of the setpoint divider and a 10k resistor to +24V for the LED bias. This is the static condition necessary for controlling the supply rail to +24V.

When Big Max is in low power standby, the +24V rail is controlled to approximately +6.9V. In this condition, BIGMAX\_OFF is logic HIGH. This results in 0V at node TP595. With the base of Q504 held at +5V, the voltage between Q504's emitter and TP595 results in approximately 0.53mA emitter and collector current, which is sufficient to pull the base of both Q510 and Q502 to low enough voltages with respect to their emitters such that they are both in saturation. Under this condition, the optocoupler sees 10.2k in parallel with 909 ohms + 1.62k (R560 and R532 in series), or a combined resistance of 2.0k for the top side of the setpoint divider, and 10k in parallel with 2.2k or a combined resistance of 1.8k for the LED bias. This is the static condition necessary for controlling the supply rail to +6.9V.

When Big Max transitions from playing audio (or charging standby) to low power standby, the DSP module begins to pulse width modulate BIGMAX\_OFF with a duty cycle that ramps continuously from 0% to 100%. The pulse width modulated signal is low-pass filtered by R559 and C549 to provide a DC voltage at TP577 that is proportional to the duty cycle of BIGMAX\_OFF. Q504 can be described as a common-base current source, with the collector current set by the voltage across R558 (between the fixed emitter voltage of Q504 and TP577). As the duty cycle of BIGMAX\_OFF increases from 0%, the collector current in Q504 increases, which biases Q510 into linear constant-current mode. In this condition, the combination of Q504, Q510, R561, and R560 act as a current source controlled by the duty cycle of BIGMAX\_OFF. This current is injected into the feedback node of the opto-coupler.

### **Optocoupler (U501)**

The optocoupler closes the asymmetric half bridge control loop by sending the output voltage from the secondary side to the PWM controller on the primary side. The optocoupler modulates the LED output according to the comparison of the voltage on pin 4 to an internal 2.5V regulator. The higher pin 4 with respect to 2.5V, the more we turn on the PNP transistor on the primary side (pins 6 and 7). This in turn lowers the current sense comparator threshold on the PWM controller.

The optocoupler is equipped with a CMP pin which is proportional to the output of the comparison of pin 4 to the 2.5V regulator. This configuration can be thought of as an inverting opamp. R518 and C517 create a low pass filter.

### **PWM Controller (U505)**

The PWM controller in short outputs a PWM signal proportional to the ratio of the output to input voltage ratio. This signal is then used to turn on and off the MOSFETS through IC's that will be talked about shortly.

The PWM controller has a built in comparator that turns on the output until the Isense pin voltage exceeds that of pin 1 (COMP). The PWM controller therefore uses current mode feedback.

### **Inverter (U506)**

The inverter is necessary to generate a pulse stream opposite of the output of the PWM controller. This is necessary because the gate driver requires separate input signals to drive each of the MOSFET's. In theory one could put the inverter at the output of the gate driver, however the special voltage levels required to drive the upper MOSFET (Q500) render this impractical. This inverter needs to be able to run at 8.5V because this voltage supply is readily available from the PWM controller. If we wanted to use a standard 5V inverter part we would have to generate a separate 5V supply on the primary. The RC combination (R563 and C569) provide additional delay that results in increased deadtime between lower FET (Q501) turn off and upper FET (Q500) turn on.

## Gate Driver (U504)

Simply takes the PWM inputs and translates them into an output voltage that each of the MOSFET's can use. It also makes sure that both MOSFET's are never turned on at the same time. It does this by inserting a dead time between the turn off of one MOSFET to the turn on of the other. This is true even if the input signals call for both MOSFET's to be turned on at the same time.

The gate driver has a built in high voltage section that allows the circuitry to float at the source voltage of Q500. The gate driver uses a charge pump to generate a voltage higher than that of the source of Q500 to be able to turn the MOSFET on at the appropriate time.

## Self Supply Circuitry

The self supply circuitry has several functions. First, the dc set point resistor divider is used to charge C500 on Vin. When Vin gets above approximately 20V, the PWM controller turns on it's 8.5V regulator at Vcc and starts to operate. This Vcc signal is then fed into the self supply circuitry via R551 which in turn turns on Q507. Second, once Q507 is on, Q505 and Q506 along with associated resistors (and capacitor) act as a Vbe multiplier to generate a rough 15V. This 15V then is fed to the gate driver which allows the supply to start to work. As the primary is switched, the other winding on the primary provides power to this self supply circuitry and is half wave rectified through D506. Thirdly, this self supply waveform is rectified and fed to U503 which generates ~21V on the Vin line. The power supply is at steady state at this point and the PWM controller will be supplied through self supply and U503 rather than through the dc set point resistor dividers.

## 5V LD Regulator (U401)

U401 is a low drop 5V regulator. It is used to power the NOR gate even when the system is in low power mode and the +24V rail is at 6.9V.

## NOR gate (U200)

Pins 11, 12, and 13 of the NOR gate are used to drive a signal from one side of the pulse transformer to the other. The inputs NOR together both BIGMAX\_OFF and OL\_PS\_SYNCH\_CLK. Under normal conditions, OL\_PS\_SYNCH\_CLK toggles at 384kHz which synchronizes the PWM controller. When the +24V output is PWM'd down through BIGMAX\_OFF, OL\_PS\_SYNCH\_CLK is turned off (low) and BIGMAX\_OFF sends a pulse through the pulse transformer. The reason for this is explained below in the *peak detect circuitry* section.

## Isolation Pulse Transformer (T501)

The isolation pulse transformer takes the AC couples pulses from the NOR gate on the secondary side and outputs pulses on the secondary side through D502 which also serves to reset the windings. This pulse is AC coupled to the sync pin of the PWM controller through a 100pF capacitor (C529). The PWM controller operates at approximately 150kHz (output switching frequency = input sync/2) in freerun mode which

is set by R505. The sync pulse, when applied through the DSP to OL\_PS\_SYNCH\_CLK, sets the output switching frequency to 192kHz.

### Peak Detect Circuitry

This circuitry peak detects the output of the isolation pulse transformer on the primary side and uses the absence or presence of pulses to shift a threshold in the PWM controller. When the sync pulses are present (either through OL\_PS\_SYNCH\_CLK or BIGMAX\_OFF), Q508 turns on which in turn switches in R556 in parallel with R508. This shifts the DC set point of Isense which effectively switches the threshold at which the PWM controller enters pulse skip mode. We do this to ensure that the PWM controller is not in pulse skip mode when the power amps are on. This is done to avoid both acoustic noise from the transformer itself caused by pulse skip mode (the amount of this noise is proportional to the load) and noise created from the beat frequencies of the power amp and power supply switching at different frequencies.

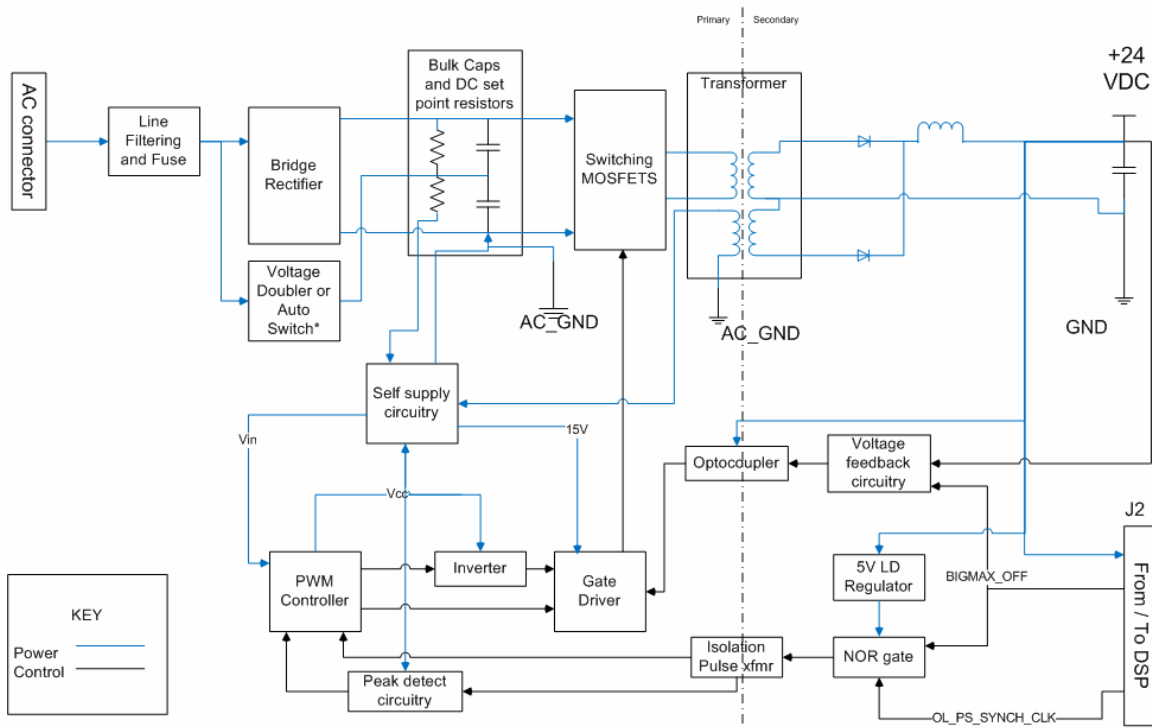
The power supply is required to be in pulse skip mode in low power mode to reduce the power drawn from the wall by reducing switching losses. Acoustic noise from the transformer is less of a problem in this mode because there is less current through the windings of the transformer. We also pot the transformer to reduce the acoustic noise emitted in this mode.

### Quick Half Bridge Details:

|                                                         |                                                                                        |
|---------------------------------------------------------|----------------------------------------------------------------------------------------|
| Input voltage range                                     | 212VDC (75Vac (Japan low line) *2 *1.414) to 423VDC (299Vac (India high line) * 1.414) |
| Turns ratio, magnetizing inductance, leakage inductance | (30/11/7, 220uH, 5.3uH)                                                                |
| Output inductor value                                   | 28.75uH                                                                                |
| Output capacitor value                                  | 3300uF                                                                                 |
| DC blocking capacitor value.                            | .1uF                                                                                   |

## SoundDock 10 Theory of Operation

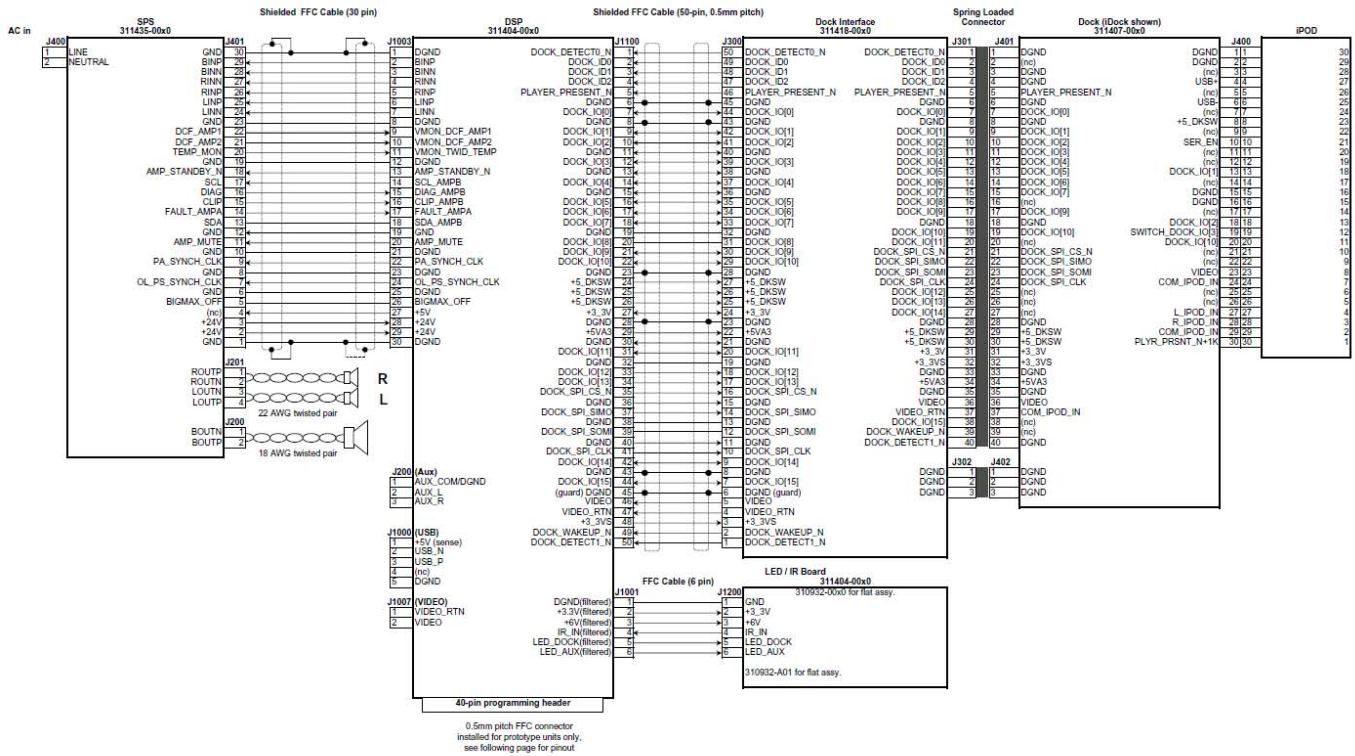
Big Max Power Electronics Board Block Diagram



\* US/Japan (120/100) variants are populated with a hard short. Dual voltage variants have the auto switch circuitry populated

## SoundDock 10 Theory of Operation

**SoundDock 10 Interconnect Diagram** rev. 1.0 09/08/2009



## SoundDock 10 Theory of Operation

