BOSE®
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CineMate® Series II
CineMate® GS Series II

Digital Home Theater Speaker System

Service Manual
Reference Number 318842-SM Rev. 11
Electronic Copy Only

CONTENTS

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) 60065 / IEC 60056 paragraph 9.1.1. With the unit AC switch first in the ON position and then in OFF position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the unit (antennas, handle bracket, metal cabinet, screwheads, 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 CineMate® Series II 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.

SPECIFICATIONS

System Specifications:

Power Rating:	
US/Canada:	100 - 240VAC, 50/60 Hz, 300W
Europe/UK/Aus:	100 - 240VAC, 50/60 Hz, 300W
Japan:	100 - 240VAC, 50/60 Hz, 300W
Dual Voltage:	100 - 240VAC, 50/60 Hz, 300W
Maximum Ambient Temperature:	45 degrees C
Low Frequency Cut-off (typical):	
Basic System:	
Arrays:	180 Hz
Bass Module:	45 Hz
GS System:	
Arrays:	220 Hz
Bass Module:	45 Hz
Woofer Impedance:	1.5 Ohms nominal DC resistance single woofer
Weights:	
Bass Module:	24.9 lb (11.77 kg)
Arrays, each:	3.0 lb (1.40 kg)
IR Remote Control (batteries installed):	0.44 lb (0.20 kg)
Interface Module	.65 lb (0.29 kh)
Total Packaged System:	38.35 lb (17.39 kg)
Dimensions:	
Bass Module:	14 x 8.8 x 19.2 inches (35.6 x 18.4 x 51.1 cm)
Bass Module internal volume:	1205 cubic inches (19.7 liters)
Arrays Basic:	7.9 x 5.3 x 3.4 inches (200 x 134 x 86 mm)
Arrays Premium:	5.6 x 2.6 x 4.2 inches (142 x 65 x106 mm)
IR Remote Basic:	3.9 x 1.5 x .70 inches (101.4 x 39.0 x 17.9 mm)
IR Remote Premium:	9.0 x 2.6 x 1.2 inches (229.6 x 64.8 x 31.2 mm)
Interface Module:	3.2 x 2.1 x 1.0 inches (82.5 x 53.8 x 25.4mm)
Distortion and Noise:	-78 dB FS THD+N, unweighted, 22-22 kHz for a 1kHz signal at FS -1dB
	-90 dB FS THD+N, unweighted, 22-22 kHz for a 1kHz signal at FS -10dB
Dynamic Range:	-90 dB FS THD+N, unweighted, 22-22 kHz for a 1 kHz signal at FS -60 dB
Distortion:	< 0.1% @ 0.5 W
Noise when Muted:	< 400 uVrms, A-weighted
DC Offset:	< 50 mVdc, all channels
Channel Balance:	+/- 1.5 dB for all volume settings
Channel Separation:	> 40 dB @ 1 kHz, > 30 dB @ 10 kHz, stereo mode
Input Impedance:	100k Ohms nominal +/- 10%

PRODUCT DESCRIPTION

CineMate® Series II is a refresh of CineMate that includes two array speakers, Acoustimass® module, interface module with digital and analog audio input and a remote control. The system offers digital audio for an impactful, spacious audio experience and a simple remote control that avoids the need for programming. It also has a fresh industrial design for its array speakers and interface module.

Two versions of the CineMate Series II are available:

- CineMate Series II - includes two standard array speakers and a basic remote.
- CineMate GS Series II - includes two gem stone array speakers and premium remote.

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 CineMate Series II electronics are covered by a limited 1-year transferable warranty. The speaker arrays are covered by a 5-year limited 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.

MAIN PART LIST

Item Number	Description	Part Number	Qty.	Note
1	QUICK START GUIDE, CINEMATE® SERIES II GS	323022-0010	1	4
2	LITERATURE KIT, 120V, INCLUDES	-	1	4
	BATTERY, AA, BAGGED & LABELED	194392	1	
	BUMPER, RECESSED, FOOT, .88"	142839	4	
	CARD, REGISTRATION AND WARRANTY	262933	1	
	GUIDE, OWNER, CINEMATE SERIES II, US/AIM GUIDE, OWNER, CINEMATE SERIES II, APAC	323023-0010 323025-0010	1	
	DVD SET-UP DISC, CINEMATE, NTSC	318861	1	
	SHEET SLIP COMPONENT AUDIO	255805	1	
3	BAG, FOAM, 28"X24"X.03"	322279-0010	1	
4	PACKING, INSERT, EPS, BASSMOD, CINEMATE PACKING,INSERT, EPS, BASSMOD, CINEMATE GS	319347-001 370944-0010	2	
5	ACCESSORY KIT – SEE PAGE 7	-		
6	ARRAY ASSY, BLK, CINEMATE ARRAY ASSY, BLK, CINEMATE, GEMSTONE	255198-103 320560-0010	2	
7	CARTON, RSC, 23.75X19.38X12.25, CINEMATE II CARTON, RSC, 23.75X19.4X12.25, CINEMATE II GS	319345-001 320576-0001	1	
8	ASSY, BASS MODULE, 120-240V, CINEMATE II ASSY, BASS MODULE, 100V, CINEMATE II	362020-110S 362020-310S	1	

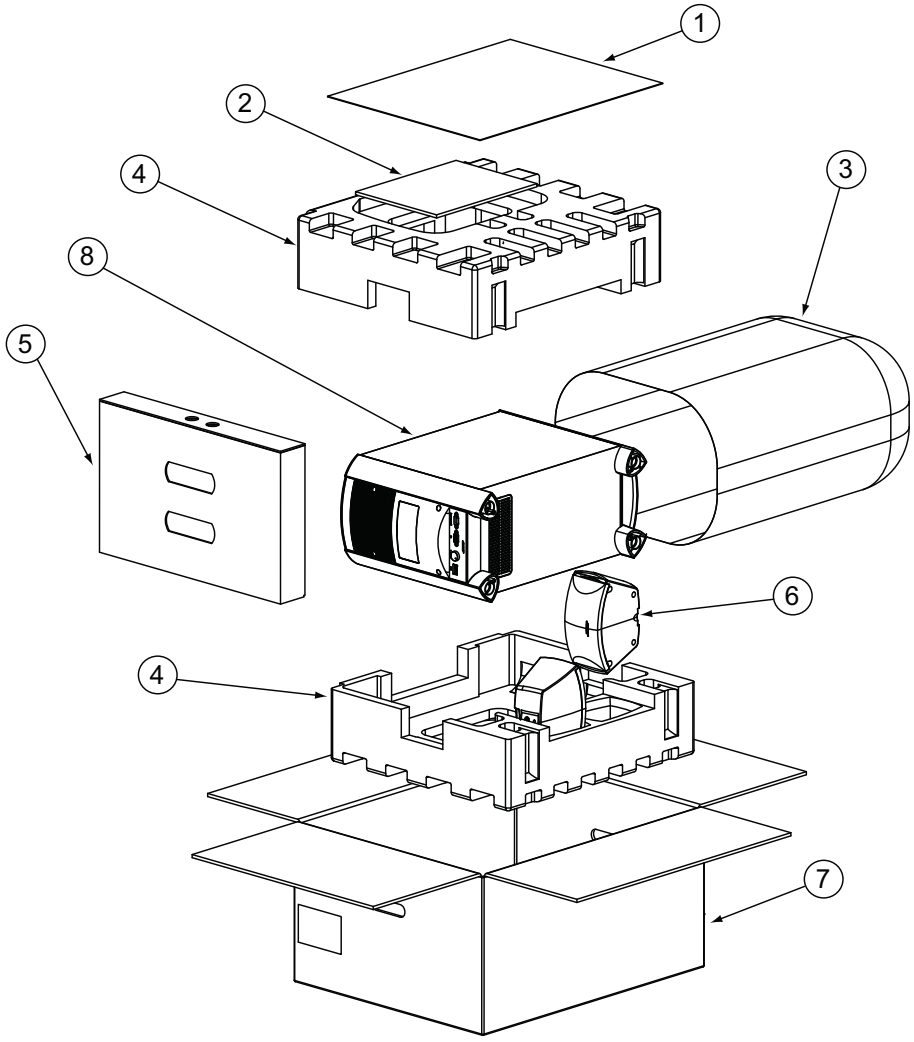


Figure 1. CineMate Series II System Packaging View

ACCESSORY KIT PACKING LIST

Item Number	Description	Part Number	Qty.	Note
1	LINE CORD, 120V, POL, DET, BLK, 96" LINE CORD, 120V, POL, DET, BLK, 60"	260082-001 262814-0310	1	3
2	LINE CORD, 230V, UKS, DET, BLK, 96" LINE CORD, 230V, UKS, DET, BLK, 60"	280138-001 280138-0310	1	
3	LINE CORD, EURO, DETACHABLE, 96" LINE CORD, EURO, DETACHABLE, 60"	148203 280135-0310	1	
4	LINE CORD, 240V, AUS, DET, BLK, 96" LINE CORD, 240V, AUS, DET, BLK, 60"	284243-001 284243-0310	1	
5	LINE CORD, 100V, JP, POL, DET, BLK, 96" LINE CORD, 100V, JP, POL, DET, BLK, 60"	260086-001 280136-0310	1	
6	CABLE, RCA, 6 FT	185931-101	1	
7	ADAPTER, SCART	266221-001	1	
8	CABLE, INTERFACE MODULE, BLK	318638-1030 or 318638-101	1	
9	BUMPER, RECESSED, FOOT, .88"	142839	1	
10	FOOT, CLEAR, .312x.085, 4'	178321-04		
11	REMOTE, CINEMATE II (PREMIUM) REMOTE, CINEMATE II EURO (PREMIUM) REMOTE, IR, CINEMATE, 1SR, BLK (PREMIUM) REMOTE, CINEMATE II (BASIC)	323075-1100 323075-1200 342835-1210 323715-0010	1	
12	CABLE, ARRAY, 9PIN, BLK CABLE, GS, ARRAY, 9PIN, BLK	255123-003 269984-004	1	
13	CABLE, OPTICAL, 2 METER	288629-002 or 347411-0010	1	
14	PACKING, INSERT	267071	1	
15	CARTON, D/C	286868	1	

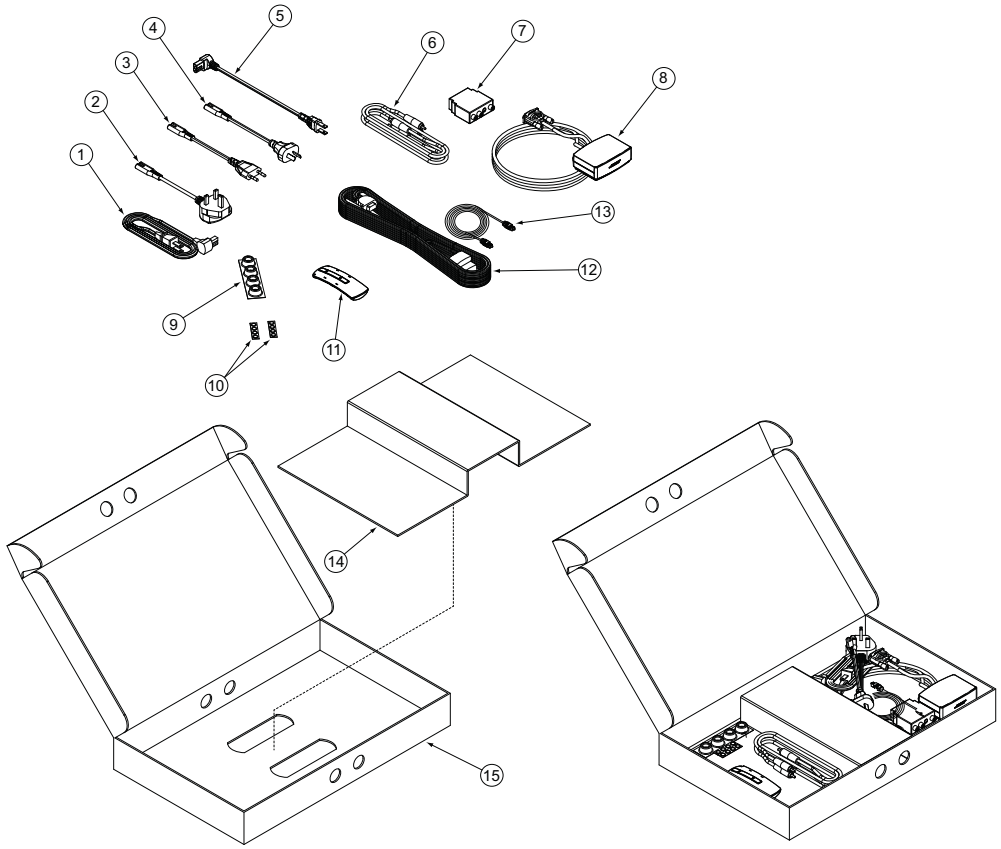


Figure 2. Accessory Kit Packing List

PACKAGING PART LIST

Item Number	Description	Part Number	Note
1	SCREW, TT, 8-32X0.5,PAN, XREC/SQ	289393-008	4
2	ENCLOSURE, REAR, PAINTED, BLK	318960-403	1
3	SCREW, TAPP, 6-32, PAN, TORX	279948-08	4
4	SHIELD, POWER SUPPLY	319739-0010	1
5	CINEMATE II, PS, SERVICE BOM	361720-001S	1
6	SCREW, TAPP, 8-11x.75, PAN, XRC/SQ	289388-012	4
7	GASKET, EMI, HEATSINK, 33MM	276873-002	
8	PAD, THERMAL	323653-0010	
9	BRACKET, POWER SUPPLY	319738-0010	
10	CABLE ASSY, SECONDARY PWR SUPPLY	319494-0010	
11	CABLE ASSY, PRIMARY, PWR SUPPLY	319486-1020	
12	GASKET, FOAM, .32"X12.0"X.125"	255202	2
13	BRACKET, COVER, BASS MODULE	255179	
14	GRILLE, VENT, AMP, BLK,KAISER	255178-203	

Item Number	Description	Part Number	Note
15	SCREW, TAPP, 8-11x.437, PAN, XRC/S	289388-007	1
16	SHIM, DSP PCB, SNAP HEATSINK	319839-0010	
17	CINEMATE II, DSP, SERVICE BOM	318878-011S	
18	BRACKET, HEATSINK,SNAP	304144-001	
19	SCREW, 6-13x.5, PAN, XREC/SQ	288374-008	
20	BRACKET, PCB	267182-001	
21	CINEMATE II, IO, SERVICE BOM	361719-001S	See Service Bulletin SB-4
22	PAD, FOAM, .25" X .75" X .06"	278144-001	
23	CABLE, ARRAY, 10 CONDUCTOR	271561-0190	
24	CABLE, I/O, DIGITAL	322528-001	
25	CLIP, SPRING, KNOB	262542	
26	KNOB, VOLUME CONTROL, BLACK	318324-001	

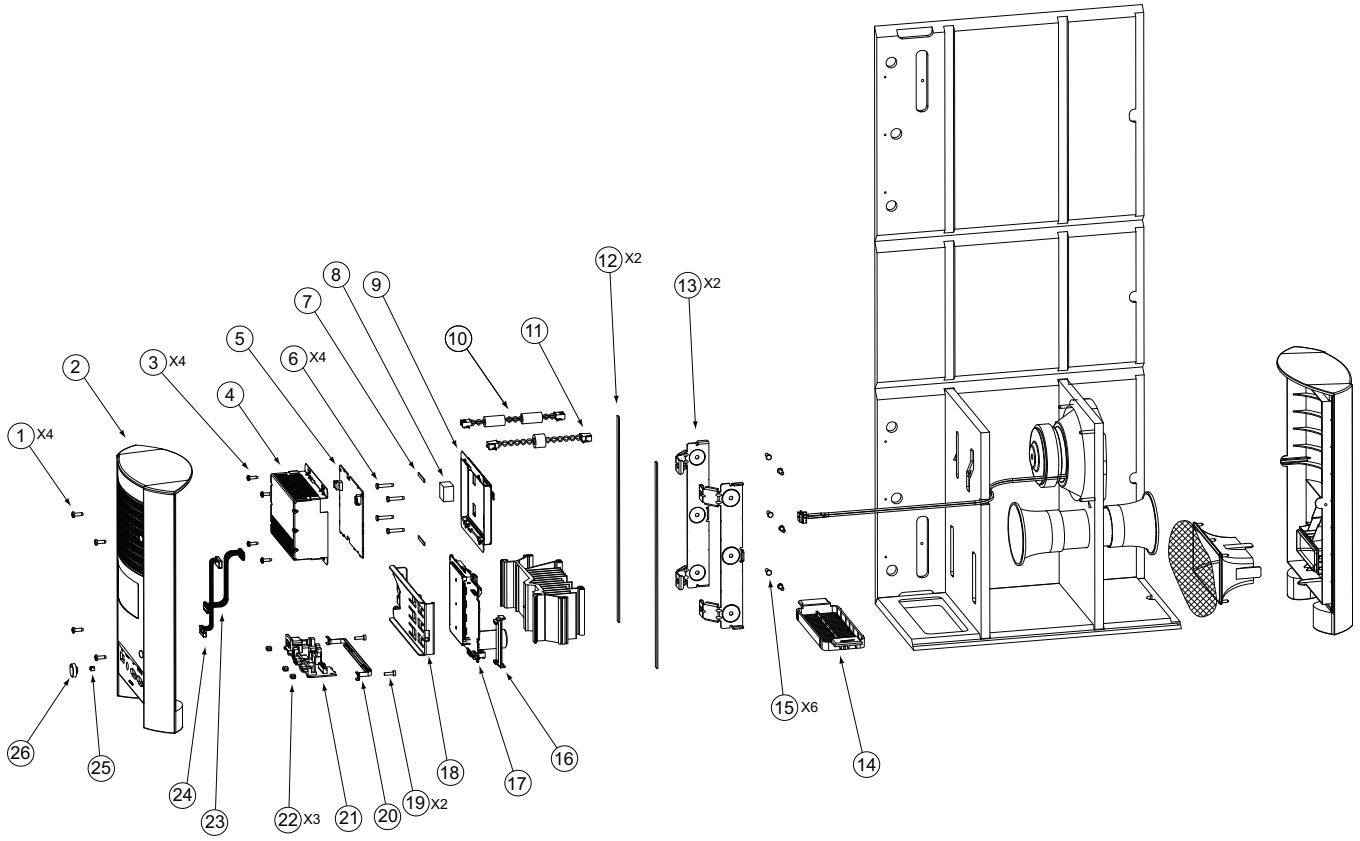


Figure 3. Bass Module Exploded View

SPEAKER ARRAY ASSEMBLY PART LIST

Item Number	Description	Part Number	Qty.	Note
1	GRILLE, ASSEMBLY	323211-0010	1	
2	NAMEPLATE, BOSE LOGO	319457-0010	1	

Note: Only the parts listed above are replaceable.

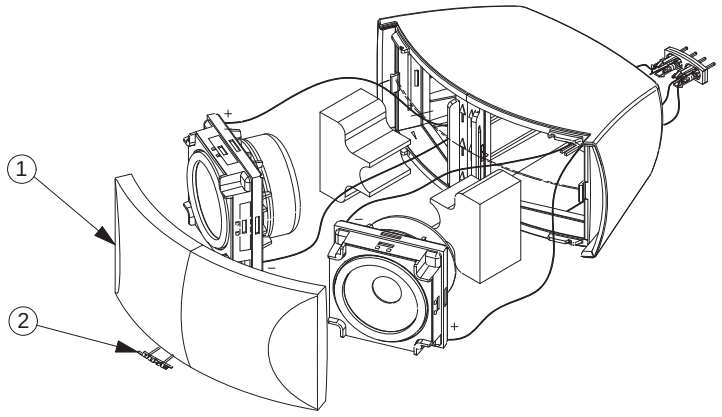


Figure 4. Basic Speaker Array Assembly

Item Number	Description	Part Number	Qty.	Note
1	GRILLE, ARRAY, BLK	302256-004	1	3 ⚠
2	NAMEPLATE, BOSE® LOGO	319457-0010	1	
3	SCREW, HILO, 4-16 x .375, PAN, XREC	288372-006	8	
4	TWIDDLER™ DRIVER ASSY, 50MM	291636-001	2	3 ⚠

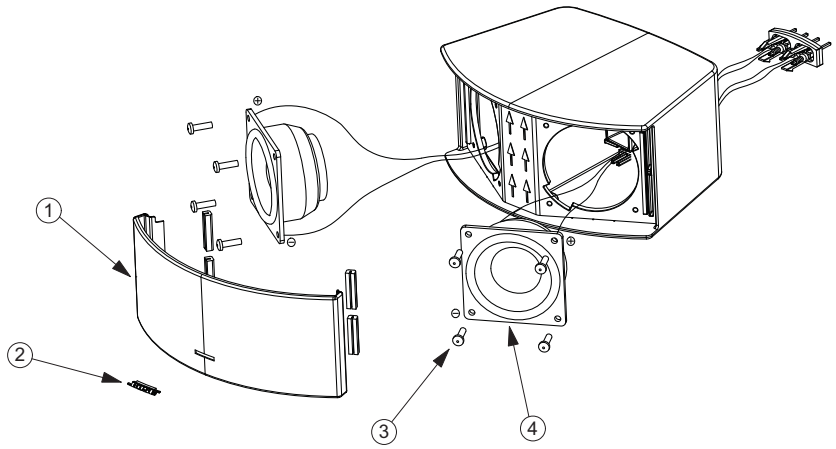


Figure 5. Premium Speaker Array Assembly

ELECTRICAL PART LIST

Bass Module DSP PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R2	60.4K, 0603, .1W, 1%	191465-6042	4
R3	26.7K, 0603, .1W, 1%	191465-2672	4
R4	68.1K, 0603, .1W, 1%	191465-6812	4
R5	2K, 0603, .1W, 1%	191465-2001	4
R6	100K, 0603, .1W, 1%	191465-1003	4
R7	10 OHM, 0603, .1W, 5%	199403-100	4
R8	1K, 0603, .1W, 5%	199403-102	4
R9	0.10 OHM, 0805, 1/8W, 5%	304926-R10	4
R10	3.32K, 0603, .1W, 1%	191465-3321	4
R24	8.66K, 0603, .1W, 1%	191465-8661	4
R27	22 OHM, 2512, 1W, 5%	181895-22R0	4
R28	75 OHM, 0603, .1W, 5%	199403-750	4
R150	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	4
R151	7.87K, 0603, .1W, 1%	191465-7871	4
R152	7.87K, 0603, .1W, 1%	191465-7871	4
R162	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R163	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R164	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R165	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R250	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	4
R251	7.87K, 0603, .1W, 1%	191465-7871	4
R252	7.87K, 0603, .1W, 1%	191465-7871	4
R262	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R263	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R264	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R265	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R350	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	4
R351	7.87K, 0603, .1W, 1%	191465-7871	4
R362	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R363	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R364	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R365	3.32 OHM, 0603, SMD, 100MW, 1%	191465-3R32	4
R450	10K, 0603, .1W, 5%	199403-103	4
R451	47K, 0603, .1W, 5%	199403-473	4
R452	4.7K, 0603, .1W, 5%	199403-472	4
R454	4.7K, 0603, .1W, 5%	199403-472	4
R1001	510, ARRAY, SMT, 4 POS, 5%	186433-5114	4
R1005	510, ARRAY, SMT, 4 POS, 5%	186433-5114	4
R1006	100K, 0603, .1W, 5%	199403-104	4
R1007	100K, 0603, .1W, 5%	199403-104	4
R4200	4.7K, 0603, .1W, 5%	199403-472	4
R4201	75 OHM, 0603,.1W,5%	199403-750	4
R4202	75 OHM, 0603,.1W,5%	199403-750	4
R4203	75 OHM, 0603,.1W,5%	199403-750	4
R4204	10K, 0603, .1W, 5%	199403-103	4
R4300	1.8K, ARRAY, SMT, 4 POS, 5%	186433-1824	4
R4301	1.8K, ARRAY, SMT, 4 POS, 5%	186433-1824	4
R4302	1.8K, ARRAY, SMT, 4 POS, 5%	186433-1824	4
R4500	100 OHM, 0603, .1W, 5%	199403-101	4
R4501	75 OHM, 0603, .1W, 5%	199403-750	4
R4502	75 OHM, 0603, .1W, 5%	199403-750	4
R4505	100 OHM, 0603, .1W, 5%	199403-101	4
R4506	75 OHM, 0603, .1W, 5%	199403-750	4
R4600	1.21K, 0603, .1W, 1%	191465-1211	4
R4602	47K, 0603, .1W, 5%	199403-473	4
R4603	47K, 0603, .1W, 5%	199403-473	4
R4604	47K, 0603, .1W, 5%	199403-473	4
R4700	4.7K, 0603, .1W, 5%	199403-472	4
R4701	75 OHM, 0603, .1W, 5%	199403-750	4
R6000	3.3K, 0603, .1W, 5%	199403-332	4
R6001	1.00K, 0805, 1/10W, 5%	133626-1025	4
R6100	2K, 0603, .1W, 5%	199403-202	4
R6104	75 OHM, 0603, .1W, 5%	199403-750	4
R6105	75 OHM, 0603, .1W, 5%	199403-750	4
R6501	75 OHM, 0603, .1W, 5%	199403-750	4
R7000	470 OHM, 0603, .1W, 5%	199403-471	4
R7001	22 OHM, 0603, .1W, 5%	199403-220	4
R7100	75 OHM, 0603, .1W, 5%	199403-750	4
R7102	4.7K, 0603, .1W, 5%	199403-472	4
R7103	4.7K, 0603, .1W, 5%	199403-472	4
R7104	75 OHM, 0603, .1W, 5%	199403-750	4
R7105	75 OHM, 0603, .1W, 5%	199403-750	4
R7106	75 OHM, 0603, .1W, 5%	199403-750	4

Resistors

Reference Designator	Description	Part Number	Note
R7107	2K, 0603, .1W, 5%	199403-202	4
R7108	75 OHM, 0603, .1W, 5%	199403-750	4
R7109	75 OHM, 0603, .1W, 5%	199403-750	4
R7110	75 OHM, 0603, .1W, 5%	199403-750	4
R7111	75 OHM, 0603, .1W, 5%	199403-750	4
R7112	75 OHM, 0603, .1W, 5%	199403-750	4
R7113	75 OHM, 0603, .1W, 5%	199403-750	4
R7114	75 OHM, 0603, .1W, 5%	199403-750	4
R7200	100K, 0603, .1W, 5%	199403-104	4
R7201	10K, 0603, .1W, 5%	199403-103	4
R7202	4.7K, 0603, .1W, 5%	199403-472	4
R7203	4.7K, 0603, .1W, 5%	199403-472	4
R7204	47 OHM, 0603, SMD, 100MW, .1W, 1%	199403-470	4
R7205	1M, 0603, .1W, 5%	199403-105	4
R7206	10K, 0603, .1W, 5%	199403-103	4
R7209	200 OHM, 0805, .125W, 1%	133625-2000	4
R7211	75 OHM, 0603, .1W, 5%	199403-750	4

Capacitors

Reference Designator	Description	Part Number	Note
C2	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C3	470pF, 0603, X7R, 50V, 10%	191470-471	4
C4	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C5	100pF, 0603, X7R, 50V, 10%	191470-101	4
C6	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C7	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C8	100pF, 0603, X7R, 50V, 10%	191470-101	4
C9	100uF, 7343, TANT, LO-R, 10V, 10%	275411-107	4
C10	0.22uF, 0805, X7R, 50V, 10%	286499-224	4
C11	0.1uF, 0805, X7R, 50V, 10%	286499-104	4
C12	3300pF, 0805, X7R, 50V, 10%	286499-332	4
C13	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C14	100uF, EL, SMD, 105, 35V, 20%	306245-101EE	4
C16	100uF, EL, SMD,105, 35V, 20%	306245-101EE	4
C17	10uF, EL, 85C, 16V, 20%	177902-100C	4
C18	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C19	10uF, EL, 85C, 16V, 20%	177902-100C	4
C20	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C22	.01F, EL, 105C, SNP, 25V, 20%	269823-103EZ	4
C50	100uF, EL, 85C, 25V, 20%	177902-101EB	4
C59	470pF, 0603, X7R, 50V, 10%	191470-471	4
C151	.047uF, 0805, X7R, 50V, 10%	286499-473	4
C152	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C153	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C154	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C155	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C156	1uP, EL, 85C, 50V, 20%	177902-010H	4
C157	1uP, EL, 85C, 50V, 20%	177902-010H	4
C158	1000pF, 0805, COG, 50V, 5%	133622-102	4
C159	1uP, EL, 85C, 50V, 20%	177902-010H	4
C160	1uP, EL, 85C, 50V, 20%	177902-010H	4
C161	1000pF, 0805, COG, 50V, 5%	133622-102	4
C251	.047uF, 0805, X7R, 50V, 10%	286499-473	4
C252	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C253	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C254	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C255	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C256	1uP, EL, 85C, 50V, 20%	177902-010H	4
C257	1uP, EL, 85C, 50V, 20%	177902-010H	4
C258	1000pF, 0805, COG, 50V, 5%	133622-102	4
C259	1uP, EL, 85C, 50V, 20%	177902-010H	4
C260	1uP, EL, 85C, 50V, 20%	177902-010H	4
C261	1000pF, 0805, COG, 50V, 5%	133622-102	4
C351	.047uF, 0805, X7R, 50V, 10%	286499-473	4
C352	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C353	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C354	.01uF, 0603, X7R, 50V, 10%	191470-103	4

ELECTRICAL PART LIST

Bass Module DSP PCB Assembly

Capacitors Continued

Reference Designator	Description	Part Number	Note
C255	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C256	1uP, EL, 85C, 50V, 20%	177902-010H	4
C257	1uP, EL, 85C, 50V, 20%	177902-010H	4
C258	1000pF, 0805, COG, 50V, 5%	133622-102	4
C259	1uP, EL, 85C, 50V, 20%	177902-010H	4
C260	1uP, EL, 85C, 50V, 20%	177902-010H	4
C261	1000pF, 0805, COG, 50V, 5%	133622-102	4
C351	.047uF, 0805, X7R, 50V, 10%	286499-473	4
C352	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C353	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C354	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C355	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C356	1uP, EL, 85C, 50V, 20%	177902-010H	4
C357	1uP, EL, 85C, 50V, 20%	177902-010H	4
C358	1000pF, 0805, COG, 50V, 5%	133622-102	4
C360	470pF, 0603, COG, 50V, 5%	188454-471	4
C361	470pF, 0603, COG, 50V, 5%	188454-471	4
C362	470pF, 0603, COG, 50V, 5%	188454-471	4
C363	470pF, 0603, COG, 50V, 5%	188454-471	4
C1000	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C1001	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C1002	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C1003	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4001	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C4002	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C4003	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C4104	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C4105	2200pF, 0603, X7R, 50V, 10%	191470-222	4
C4200	2.2uF, EL, 85C, 50V, 20%	177902-2R2H	4
C4300	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4301	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4302	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4303	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4304	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4306	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4307	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4308	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4309	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4310	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C4400	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C4401	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C4500	68pF, 0603, COG, 50V, 5%	188454-680	4
C4501	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C4502	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C4600	.047uF, 0603, X7R, 25V, 5%	196999-473	4
C4601	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C4602	.047uF, 0603, X7R, 25V, 5%	196999-473	4
C4603	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C4605	.01uF, 0603, X7R, 50V, 10%	191470-103	4
C4606	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C6000	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C6100	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C6101	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C6102	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C6501	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7000	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7001	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7002	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7003	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7004	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7005	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7006	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7007	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7008	22pF, 0603, COG, 50V, 5%	188454-220	4
C7009	22pF, 0603, COG, 50V, 5%	188454-220	4
C7011	150pF, 0603, COG, 50V, 5%	188454-151	4
C7108	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7109	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7110	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7111	47pF, 0603, COG, 50V, 5%	188454-470	4
C7114	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7200	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7300	.047uF, 0603, X7R, 50V, 10%	191470-473	4

Capacitors Continued

Reference Designator	Description	Part Number	Note
C7301	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7302	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7303	.047uF, 0603, X7R, 50V, 10%	191470-473	4
C7304	1uF, X7R, 0805, 16v, 10%	273596-105	4
C7305	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7307	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7308	4700pF, 0603, X7R, 50V, 10%	191470-472	4
C7309	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C7310	1000pF, 0603, X7R, 50V, 10%	191470-102	4
C7311	1000pF, 0603, X7R, 50V, 10%	191470-102	4

Inductors

Reference Designator	Description	Part Number	Note
L1	400 OHM, CHIP, 0805	188587-401	4
L2	100uH, SMD, 20%	256773-101	4
L50	400 OHM, CHIP, 0805	188587-401	4
L71	400 OHM, CHIP, 0805	188587-401	4
L73	400 OHM, CHIP, 0805	188587-401	4

Diodes

Reference Designator	Description	Part Number	Note
D2	DIODE, SCHOTTKY, 40V, 3A, SMB	193847-001	4
D258	PAD, THERMAL, COMPLIANT	266954-001	4
D450	DIODE, ZEN, SOT-235.1V, 225MW, 5%	135247-5231	4
D4500	DIODE, SOT-23, BAV 99	147239	4
D4501	DIODE, SOT-23, BAV 99	147239	4
D4503	DIODE, SOT-23, BAV 99	147239	4
D4505	DIODE, SOT-23, BAV 99	147239	4
D4509	DIODE, SOT-23, BAV 99	147239	4
D4510	DIODE, SOT-23, BAV 99	147239	4
D4511	DIODE, SOT-23, BAV 99	147239	4
D4512	DIODE, SOT-23, BAV 99	147239	4

Transistors

Reference Designator	Description	Part Number	Note
Q2	XSISTOR, MFET, P, 40V, 3.0A, SOT-23	303215-001	4
Q450	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	4
Q451	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	4
Q0452	XSISTOR, BPLR, PNP, 500MA, SOT23	189290-001	4
Q7200	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	4

ELECTRICAL PART LIST

Bass Module DSP PCB Assembly

Integrated Circuits

Reference Designator	Description	Part Number	Note
U2	IC, PWM, V, CNTRLLR, TPS40200	303218-001	4
U3	IC, VOLT REG, ADJ, 500MA, DPAK	258496-001	4
U150	IC, PWR AMP, PSO-20, TDA8566TH	257975	4
U250	IC, PWR AMP, PSO-20, TDA8566TH	257975	4
U350	IC, PWR AMP, PSO-20, TDA8566TH	257975	4
U4000	IC, CODEC, 24-BIT, CS4228A-KS, TS	254192-003	4
U4400	IC, RCVR, DIG AUD, CS8415A, TSSOP	267616-002	4
U6000	IC, RESET, 3.3V, SOT23, 5-PIN	256123-001	4
U6100	IC, INVERTER, 5V, 74VCHU04	258464-004	4
U7000	IC, DSP, QFP208, ADSP21065LKS_264	254191-003	4
U7200	IC, PROM, FLASH, 4MBIT (not programmed)	260332-002	4
U7300	IC, SDRAM, 64MBIT, 2MX32, 3.3V	254182-010	4

Miscellaneous

Reference Designator	Description	Part Number	Note
FB70	BEAD, FERRITE, CHIP, 1806	256116-181	4
J0005	CONNECTOR, HEADER, RTANGLE	190552-03	4
J150	CONN, HEADER, RTANG, 2.5MM, 10 POS	145402-10	4
J350	CONN, THRU BOARD, TH, 4 POS	266952-04	4
J7100	CONN, HEADER, 2.5MM, THRU, 16 POS	270584-016	4

ELECTRICAL PART LIST

Bass Module Power Supply PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R701	20K, 0603, .1W, 1%	191465-2002	4
R703	47K, 0603, .1W, 1%	191465-4702	4
R704	47K, 0603, .1W, 1%	191465-4702	4
R705	10 OHM, 0603, .1W, 5%	199403-100	4
R706	2.49K, 0603, .1W, 1%	191465-2491	4
R707	1K, 0603, .1W, 1%	191465-1001	4
R708	100K, 0603, .1W, 5%	199403-104	4
R709	200K, 0603, SMD, 1W, 5%	199403-204	4
R711	150K, 1206, 1/4W, 1%	124894-1503	4
R712	150K, 1206, 1/4W, 1%	124894-1503	4
R713	40.2K, 0603, .1W, 1%	191465-4022	4
R714	47OHM, 1206, 1/4W, 5%	124895-4705	4
R715	1K, 0603, .1W, 1%	191465-1001	4
R716	1M, 1206, 1/4W, 5%	124895-1055	4
R717	1M, 1206, 1/4W, 5%	124895-1055	4
R718	1M, 1206, 1/4W, 5%	124895-1055	4
R719	1M, 1206, 1/4W, 5%	124895-1055	4
R720	1M, 1206, 1/4W, 5%	124895-1055	4
R721	1M, 1206, 1/4W, 5%	124895-1055	4
R722	2.49K, 0603, .1W, 1%	191465-2491	4
R723	102K, 0603, .1W, 1%	191465-1023	4
R724	10K, 0603, .1W, 1%	191465-1002	4
R725	10K, 0603, .1W, 1%	191465-1002	4
R727	100K, 0603, .1W, 5%	199403-104	4
R728	30.1K, 0603, .1W, 1%	191465-3012	4
R729	JUMPER, CHIP, 0603	196042	4
R730	150K, 1206, 1/4W, 1%	124894-1503	4
R732	402 OHM, 0603, .1W, 1%	191465-4020	4
R734	100K, 0603, .1W, 5%	199403-104	4
R735	1M, 1206, 1/4W, 5%	124895-1055	4
R736	0.075 OHM, 1210, 500mW, 5%	318356-750J	4
R740	2.49K, 0603, .1W, 1%	191465-2491	4
R741	64.9K, 0603, .1W, 1%	191465-6492	4
R742	30.1K, 0603, .1W, 1%	191465-3012	4
R744	100 OHM, 0603, .1W, 5%	199403-101	4
RT701	JUMPER, CHIP, 0603	196042	4

Capacitors

Reference Designator	Description	Part Number	Note
C701	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C702	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C703	.01uF, X7R, 0603, 50V, 10%	304991-104	4
C704	1uF, X7R, 0805, 16v, 10%	273596-105	4
C705	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C706	100pF, 0603, COG, 50V, 5%	188454-101	4
C707	1000pF, 0603, COG, 50V, 5%	188454-102	4
C709	0.1uF, FILM, 275VAC, 10MM, 20%	268166-104A	4
C710	100uF, EL, 105C, 450V, SNAP-IN, 20%	261614-101WB3	4
C711	22uF, EL, 85C, 35V, 20%	177902-220V	4
C712	0.33uF, FILM,X2, 305VAC, 15MM, 20%	310415-334ME	4,3 ⚠
C713	0.1uF, FILM, X2, 275VAC, 10MM, 20%	268166-104A	
C714	1000pF, CER, Y1, 250VAC, 10MM, 20%	310461-102MB	
C715	470pF, CER, Y1, 250VAC, 10MM, 20%	310461-471KB	
C717	330pF, 0805, COG, 200V MIN, 5%	260668-331J	4
C718	1000uF, EL,105C, 25V, 10MM DIA CUT, 20%	196991-102E6P50	4
C719	1000uF, EL,105C, 25V, 10MM DIA CUT, 20%	196991-102E6P50	4
C720	3300pF, 0805, X7R, 50V, 10%	286499-332	4
C721	0.33uF, FILM, X2, 305VAC, 15MM, 20%	310415-334ME	4,3 ⚠
C722	.01uF, X7R, 0603, 50V, 10%	304991-104	4
C723	.01uF, X7R, 0603, 50V, 10%	304991-104	4
C724	1000pF, CER, Y1, 250VAC, 10MM, 20%	310461-102MB	4,3 ⚠
C725	.01uF, X7R, 0603, 50V, 10%	304991-104	4
C727	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C728	0.1uF, X7R, 0603, 50V, 10%	191470-104	4
C729	470pF, CER, Y1, 250VAC, 10MM, 20%	310461-471KB	4
C730	3300pF, 0603, X7R, 50V	191470-332	4,3 ⚠

Capacitors Continued

Reference Designator	Description	Part Number	Note
C729	470pF, CER, Y1, 250VAC, 10MM, 20%	310461-471KB	4
C730	3300pF, 0603, X7R, 50V	191470-332	4,3 ⚠

Inductors

Reference Designator	Description	Part Number	Note
L702	3.30mH, CHOKE, 1.2A, 250V	321518-001	4,3 ⚠
L703	2.2uH, COM MODE	187598-2R2	
L704	2.2uH, COM MODE	187598-2R2	
L705	2.2uH, COM MODE	187598-2R2	

Diodes

Reference Designator	Description	Part Number	Note
BR701	DIODE, BRIDGE, RECT, 3A, 600V	311102-0600	4
D701	DIODE, RECT, FAST, 600V, 1A	317066-600	4
D702	DIODE, SWITCHING, SOD123, 1N4148W	257662	4
D703	DIODE, PWR SCHOTTKY, D2PAK, 8A, 100V	319763-100	4
D706	DIODE, SCHTKY, SC70, 30V, SERIES	268381-004	4
D707	DIODE, SCHTKY, SC70, 30V, SERIES	268381-004	4
Z701	DIODE, ZENER, SMT, IN5262, 51V	174265-5262	4
Z702	DIODE, ZEN, SOT-23, 15V, 225MW, 5%	135247-5245	4
ZR701	TVS, UNI-DIR, SMCJ130A, 1500W, 130V, 200A	320498-1300	4

Transistors

Reference Designator	Description	Part Number	Note
Q701	XSISTOR, MFET, N-CH, 600V	310519-001	4
Q702	XSISTOR, MFET, N-CH, 600V	310519-001	4
Q703	XSISTOR, SOT-23, N, MFET, 2.5V	252043	4
Q704	XSISTOR, SOT23, BPLR, N, 40V, 200mA	146819	4
Q705	XSISTOR, SOT23, BPLR, N, 40V, 200mA	146819	4
Q706	FET, P-CHANNEL, BSS84	269693	4
Q707	XSISTOR, TO-92AP, PWR, NPN, 500V,1.5A	320835-002	4
Q708	IC, OPTOISOLATOR, CNY17F-1X007	254120-002	4,3 ⚠
Q709	IC, OPTOISOLATOR, CNY17F-1X007	254120-002	
Q701	XSISTOR, MFET, N-CH, 600V	310519-001	4
Q702	XSISTOR, MFET, N-CH, 600V	310519-001	4

Integrated Circuits

Reference Designator	Description	Part Number	Note
U701	IC, PWM CONTROLLER, 80% DUTY CY	317119-001	4
U702	IC, HALF-BRIDGE GATE DRIVER	317085-001	4
U703	IC, VREF, SHUNT, ADJ, 1.24V, SOT23-3	322217-001	4

Miscellaneous

Reference Designator	Description	Part Number	Note
T701	TRANSFORMER, PWR, EER BOBBIN, 40AWG	322253-0003	4,3 ⚠
J701	CONN, SIDE ENTRY, W/PCB STAB	258436	
J702	CONNECTOR, HEADER, RTANGLE	190552-03	

ELECTRICAL PART LIST

Bass Module I/O PCB Assembly

Resistors

Reference Designator	Description	Part Number	Note
R600	POTENTIOMETER, 10K, 20%	273741-001	4,3 ⚠
R601	470K, 0805, 1/10W, 5%	133626-4745	4
R602	470K, 0805, 1/10W, 5%	133626-4745	4
R603	470K, 0805, 1/10W, 5%	133626-4745	4
VR701	VARISTOR, bMET OX, 14mm DISC, 300V, 125J	361431-0020	3 ⚠

Capacitors

Reference Designator	Description	Part Number	Note
C601	4.7uF, EL, 85C, 35V, 20%	177902-4R7V	4
C602	2.2uF, EL, 85C, 50V, 20%	177902-2R2H	4
C603	2.2uF, EL, 85C, 50V, 20%	177902-2R2H	4
C604	0.1uF, FILM, X2, 275VAC, 10MM	268166-104A	4,3 ⚠
C605	CAP, 0603, X7R, 50V, 4700pF	191470-472	4

Miscellaneous

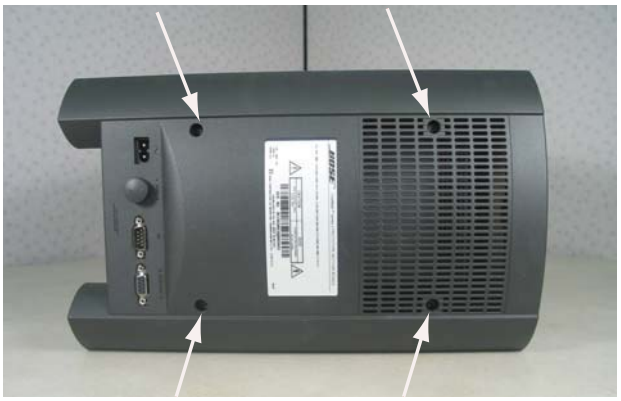
Reference Designator	Description	Part Number	Note
F600	FUSE, TIME LAG, 4A, 250V	310538-4000A	4,3 ⚠
J600	CONN, HEADER, PC MNT, KEYED	271899-010	
J601	CONN, D-SUB, R/A, 9 PIN, SOCKET	285805-09	
J602	CONN, DUAL ROW, 16-P, 0.1mm, SHRT LATCH	323689-016S	
J603	CONN, D-SUB, R/A, FEMALE, 9 PIN	285818-001	
J604	CONN, HEADER, LOCKING, TOP, KEYED	271897-002	
J605	AC CONN, SINGLE PIECE LEADS	301125-001	

DISASSEMBLY PROCEDURES

Bass Module Procedures

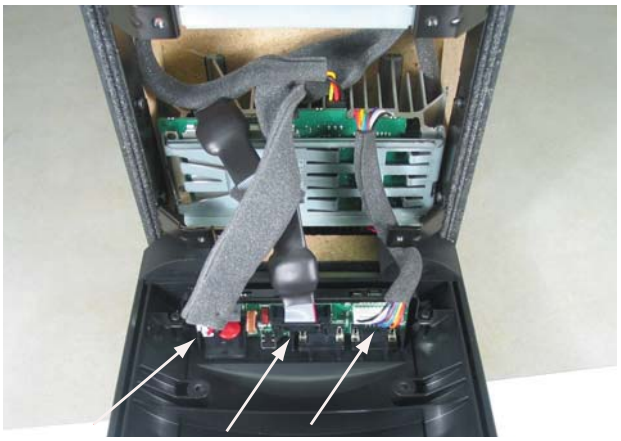
1. Rear Enclosure Removal

1.1 Place the bass module on its side. Using a phillips-head screwdriver, remove the four screws that secure the rear enclosure to the bass module cabinet.



1.2 Lift the rear enclosure partially off of the bass module.

1.3 Unplug the three cables connecting to the I/O board.

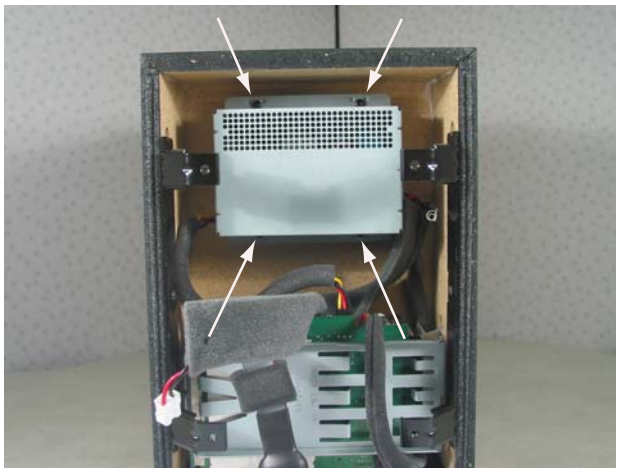


2. I/O PCB Removal

2.1 Remove the two screws securing the I/O PCB and lift the board away from the rear enclosure.

3. Power Supply PCB Removal

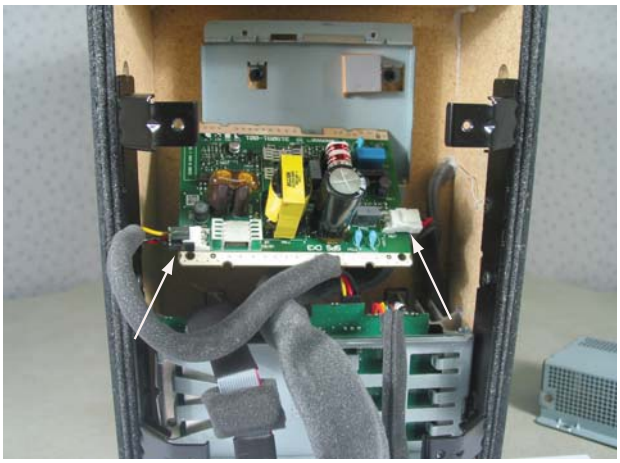
3.1 Remove the four screws securing the power supply PCB and shield, then lift the shield away from the bass module.



DISASSEMBLY PROCEDURES

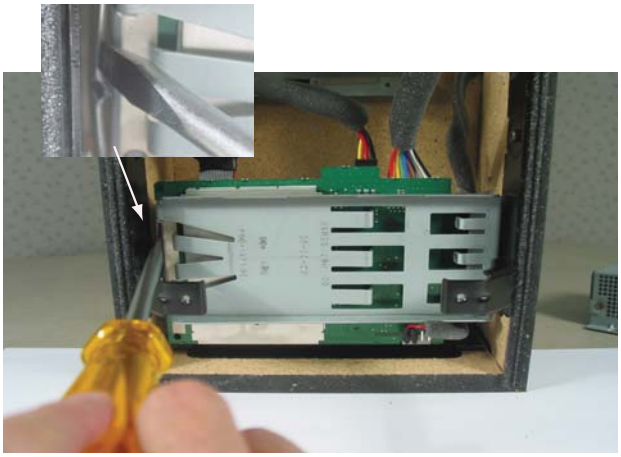
Power Supply PCB Removal Continued

3.2 Remove the two cables connected to the power supply board.



4. DSP PCB Removal

4.1 Release the bracket holding the DSP board by placing a flat blade screw driver into the gap shown in the picture to the right.



4.2 Once the bracket is released, the DSP can be pulled away from the heatsink.

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DISASSEMBLY PROCEDURES

Standard Satellite Array Procedures

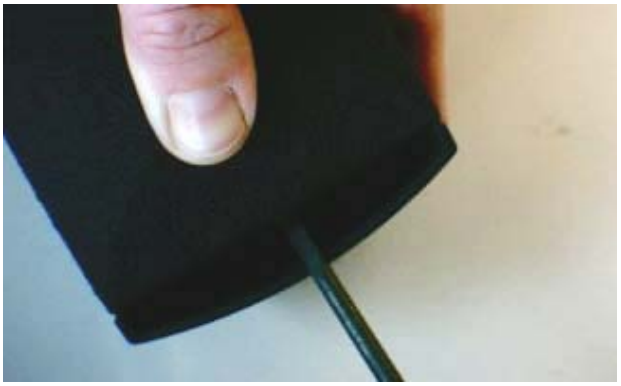
Notes:

• The standard satellite arrays are non-repairable. These arrays have cloth grilles, and are larger than the Gemstone™ arrays.

• The only parts that can be replaced on the standard arrays are the grille and the name-plate.

1. Grille Removal

1.2 Place the satellite array on its back on a bench. Use your thumb to press down on the array grille at the center of the curve near the side. Use a flat tip screwdriver to pry the end of the grille off of the array enclosure. Repeat this at the other end of the grille.



Re-Assembly Note: Align the grille so that the Bose® logo is facing the same direction as the arrows on the front of the array enclosure. Press the grille in place. It should latch to the enclosure at each end.

Gemstone Satellite Array Procedures

1. Grille Removal

1.1 Using a scribe or small flat-tip screwdriver, grasp the edge of the grille. Gently pull the grille away from the enclosure.

2. Driver Removal

2.1 Perform procedure 1.

2.2 Remove the four screws that secure the driver to the enclosure. Lift the driver out of the enclosure and cut the wires as close to the driver as possible.

Functional Test Setup

Equipment required:
CineMate® Series II Interface Module cable
CineMate Series II IR Remote control
CineMate Speaker Array Cable
CineMate Speaker Array, Qty. 2
CineMate Line cord
Digital Multimeter (DMM)
Audio Signal Generator
CD Player with Optical Output
S/PDIF to Optical Converter

1. Bass Module Air Leak Test

1.1 Set up the system for normal operation, connect the speaker cable, speaker arrays, interface cable and power cord.

1.2 Point the CineMate remote control at the interface module and press power. The green LED should turn on.

1.3 Press and hold the volume down button for 10 Seconds to confirm volume is set to zero.

1.4 Apply a 750 mV, 45 Hz signal to the left and right analog inputs on the CineMate interface cable.

1.5 Press and hold the volume + button for 20 seconds. This will ensure the volume is adjusted to Maximum.

1.6 Listen for air leaks around all cabinet seams and joints to a minimum of five seconds. Verify that no leaks can be heard at a distance greater than or equal to 1 foot from the bass module cabinet.

2. System Frequency Sweep Test

2.1 Set up the system for normal operation, connect the speaker cable, speaker arrays, interface cable and power cord.

2.2 Point the CineMate remote control at the interface module and press power. The green LED should turn on.

2.3 Press and hold the volume down button for 10 Seconds to confirm volume is set to zero.

2.4 Apply a 750 mV, 10 Hz signal to the left and right analog inputs on the CineMate interface cable.

2.5 Press and hold the volume + button for 20 seconds. This will ensure the volume is adjusted to Maximum.

2.6 Sweep the input frequency from 10 Hz to 500 Hz while listening for any extraneous noises such as buzzes, rattles, ticks, port noise or distortion.

3. Optical Digital AudioTest

3.1 Connect a CD player with digital optical connection.

3.1 Power on the CineMate system and select the digital optical input.

3.1 Play a familiar audio CD and adjust audio volume to a comfortable listening level.

3.1 Listen for distortion, pops, ticks and confirm audio quality is correct.

TEST PROCEDURES

Satellite Array Procedures

Notes:
The satellite arrays are non-repairable.

The grills can be replaced using the disassembly/assembly procedures.

Each satellite array contains two identical drivers that are wired independently.

You must test each of them separately

1. DC Resistance Test

1.1 Using a DMM, measure the DC resistance of each of the array drivers. Each should measure 3.2 Ohms ± 10%.

2. Phase Test

2.1 Remove the array grille using array disassembly procedure 1.

2.2 Observing polarity, apply a +6 Vdc level to one driver on the array input connector.

2.3 Observe the driver under test. When the DC level is applied, the driver should move outward. If it does, the driver is wired correctly. If not, it is wired incorrectly. Repeat steps 2.2 and 2.3 for the other driver in the array.

3. Air Leak Test

3.1 Apply a 180 Hz, 3 Vrms signal to one of the Twiddler drivers in the satellite array for 5 seconds minimum.

3.2 Listen for air leaks around all enclosure seams, joints and the input connector. Air leaks will be heard as a hissing or sputtering noise. Repair any air leaks. All repairs must be hidden.

3.2 Listen for air leaks around all enclosure seams, joints and the input connector. Air leaks will be heard as a hissing or sputtering noise. Repair any air leaks. All repairs must be hidden.

3.3 Listen for any rubbing or ticking noise from the Twiddler. Replace any driver that is defective.

Note: There is a normal suspension noise. To distinguish between a rub or tick and suspension noise, displace the cone slightly with your finger. If the rubbing can be made to go away or get worse, then it is a rub or tick. If the noise stays the same, it is suspension noise.

3.4 Repeat steps 3.1 to 3.3 for the other driver in the array.

4. Frequency Sweep Test

4.1 Jumper both of the drivers in a single array together. Both center pins of the array connector are negative (-). The two outer pins are the positive (+) pins.

4.2 Apply a 100 Hz, 3.0 Vrms signal to both of the array drivers.

4.3 Slowly sweep the signal generator from 100 Hz to 2.0 kHz. Listen for any extraneous noises such as buzzes, rattles, ticks, port noise or distortion. Replace any array with an extraneous noise that can be heard at a distance greater than 1 foot (0.3m).

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
8/2009	00	Document released at revision 00	Service Manual release	All
12/2009	01	Part number for the Grill Assembly changed to 323211-0010	Original number was not correct	9
12/2009	01	DSP part number change from 318878-001S to 318878-011S	Software change. Original was for prototype boards	8
8/13/2010	01	Added GS carton number	This number was not listed in the original document	6
10/25/2010	02	5ft (60") power cords added	New part number	7
6/13/2011	02	New Interface Module part number	Insertion force on connector	7
1/20/2012	03	New Interface Module part number 318638-1030 and 318638-101. New optical cable 347411-0010	New part number New part number	7 7
8/24/2012	04	Dual voltage bass module part number change From 318830-110S to 361727-110S VR601 part number change From 170189 to 361431-0020	All new SKU's have been created to identify change to VR601 VR601 part number change	6 14
1/2/2013	05	Remote part number change. From 323075-1100 and 323075-1200 To 342835-1210. I/O service board changed From 318892-001S to 361436-001S. VR601 deleted from the part list. VR701 added to part list	US and Euro remote now has same part number with updated codes VR601 is no longer populated on the I/O board. It is now located on the power supply board as VR701 VR601 is no longer populated on the I/O board. It is now located on the power supply board as VR701	7 8 14
2/28/2013	06	I/O board part number change.	Part number changed from 361436-001S to 361719-001S	8
4/22/2013	07	Cable part number changed from 319486-0010 to 319486-1020	Change in production	8
7/19/2013	08	Power Supply part number changed Bass Module part number changed	New number includes the MOV Includes new Power supply board	8 7
12/13/2013	09	Bose Logo part number change from 269981-001 to 319457-0010.		9
11/14/2014	10	Added thermoform part number for GS cubes.	Part of cost reduction	6
11/18/2014	11	10 pin connector part number change from 275179-190 to 275179-0190	New part number	8

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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Kaiser Theory of Operation

1 SCOPE

The operation of the CineMate® Series II (Kaiser) Digital Home Theater Speaker System is described.

Abbreviations Used

FET	Field Effect Transistor
GS	Gemstone® (Bose trademarked loudspeaker design)
IR	Infrared (light below the visible spectrum emitted by the IR remote control)
PC	Personal Computer
PCBA	Printed Circuit Board Assembly
POT	Potentiometer
SMPS	Switch Mode Power Supply
TAP	Test Access Port

1.1 Product Description

CineMate® Series II (Kaiser) is a refresh of the CineMate® Home Theater System (Caesar).

The system includes an Acoustimass® Bass module, an Interface Module with digital and analog audio inputs, two array speakers and an IR remote control.

The new features introduced with Kaiser are

- A single digital audio input (standard for all systems[1)]
- Bass Tone Control
- A simple to operate basic remote
- Switch Mode Power Supply (CineMate had a linear power supply)

([1]Note: CineMate offered dual digital audio inputs for the Japan version only.)

2 System Overview

2.1 System Components

CineMate® Series II is offered in a basic configuration and a premium Gemstone (GS) speaker configuration with the major functional components listed below.

CineMate Series II BASIC system 318842-*

- Bass Module, 318830-*
- Qty 2 Array Speakers, Hotshot 255198-*
- Array Speaker Cable, Hotshot 255123-*
- Interface Module, 318638-001
- BASIC IR remote 318809-001

The BASIC IR remote is a simple stylish design with 4-button basic functionality (On/Off, Volume Up/Down, Mute)

CineMate Series II PREMIUM system 320573-*
- Bass Module, 318830-*
- Qty 2 Array Speakers, Gemstone 320560-*
- Array Speaker Cable, Gemstone, 269984-*
- Interface Module, 318638-001
- Premium (Universal) IR remote 320556-1100

The Premium (Universal) IR remote offers operation of popular DVD players, Set-Top-Boxes and other sources.

* Dash variants indicate color, voltage, and other product variations.

3 System Design

3.1 Block Diagram

The Kaiser Connection Block Diagram illustrates the connections between the major functional components.

3.1.1 CineMate Series II Bass Module Details

The bass module contains all the active audio processing and amplification electronics of the CineMate Series II System. The rear end cap of the bass module provides access to the following components:
- Line cord socket
- Interface Cable Connector (DB9-P or DB15HD-P)
- Array Speaker Connector (DB9-S)

All the above components are mounted on the I/O PCBA, 319143-001, which is, in turn, secured to the end cap via a metal bracket.

The DSP and Audio Amplifiers reside on the DSP PDBA, 318889-0010.
The DSP PCBA is secured to the extruded aluminum heat sink (which is glued to the back baffle of the module enclosure) with a metal bracket. This bracket provides sufficient compression force to the PCA to maintain good thermal contact to the heat sink of the audio power amplifiers.

The power supply PCBA is mounted in a shielded enclosure above the heat sink.

4 Printed Circuit Board Assemblies

The CineMate® Series II bass module contains 3 PCBA's.
- I/O board
- DSP board
- Power Supply

The Interface Module contains a single PCBA.

4.1 PCBA functional descriptions

4.1.1 I/O board

The I/O board is mounted inside the rear panel of the bass module and serves as the connection hub for AC power, satellite speaker arrays and the Interface Module.

The bass tone control potentiometer is mounted on the I/O board and is adjusted via the knob on the rear panel of the bass module.

4.1.2 DSP board

The DSP board does the audio signal processing and amplification.

It takes in either analog or digital audio (S/PDIF) signals via the Interface Module, and converts them to a digital data stream to the DSP controller.
The DSP controller performs the audio limiting, clipping and equalization operations.

The DSP also receives and responds to IR signals from the Interface Module and it senses the position of the bass tone control potentiometer on the I/O board.

4.1.3 Switch Mode Power Supply

The Switch Mode Power Supply (SMPS) is a universal (100-230 VAC), high-efficiency, single-output power converter that supplies a regulated 14 Volts DC to the DSP board.

To minimize power consumption in the OFF state, a STANDBY control signal from the DSP board enables the SMPS to go into pulse skip mode to achieve standby power consumption of less than ½ Watt.

5 PCBA Detailed Theory of Operation

5.1 I/O Board

The I/O PCBA contains the AC input connector (J605) and line fuse (F600).
The line fuse is designed to clear when short circuits are applied to the primary side of the power supply.

Connectors J600 and J602 on the I/O board connect to the DSP board.

The 16-pin connector, J602 carries the S/PDIF and audio inputs and control/power signals to/from the DSP board.

The 10-pin connector, J600, carries the array speaker outputs to the I/O board.

C601, C602 and C603 are DC blocking caps on the quasi-differential audio inputs and associated Audio GND.

R601, R602 and R603 provide DC reference for the audio inputs.

All control and audio input signals described in section 3.1 are routed to the Interface Module via J3 on the I/O board.

5.1.1 Tone Control

The tone control provides bass boost or attenuation to accommodate room acoustics.

Potentiometer, R600, on the I/O board is the adjustment device.
It is accessible via a knob on the rear panel of the bass box.
The potentiometer position is sensed by an RC circuit on the DSP board.

5.2 DSP Printed Circuit Assembly

The DSP PCBA provides the following major functions

- Voltage Regulation (+3.3V and +5V)
- Power Mode Control
- IR command decoding and response
- Digital Audio Reception (S/PDIF receiver CS8415A)
- Analog to Digital Conversion (CODEC CS4228A)
- Audio Digital Signal Processing
- Bass Tone Control Sensing (potentiometer on the I/O board)
- Audio Power Amplification

5.2.1 Voltage Regulation: +3.3V and +5V

A switching regulator is used to provide +3.3V to the DSP circuitry and the Interface Module.
A linear regulator provides +5V to the SPDIF receiver and CODEC.

5.2.1.1 +3.3V switching regulator

Controller, U2 (TPS40200) drives FET Q2 in a buck regulator circuit with L2, D2 and C9.
The switching frequency is set to 300 kHz by R4 (68.1 kOhm) and C3 (470pF).

Load current is sensed as a voltage drop across R9 (0.1 Ohm).
A voltage of 100mV or greater across R9 is declared overcurrent condition and causes the controller to shut down. When shut down, the controller will repeatedly try to start until the overcurrent condition is cleared.

L50 and C59 form a RF low pass circuit to deliver filtered +3.3 Volts (+3.3VF) to power the Interface Module via the I/O board.

5.2.1.2 +5V linear regulator

U3 (LM317MDT), R10 and R24 form a +5V linear regulator circuit.
Series resistor R27 reduces the power dissipated in U3.

5.2.1.3 Power Mode Control

When the system is turned OFF (with IR remote control), the DSP puts peripheral devices in a low power state and then goes into a low power state itself, waiting for an interrupt on the IR input to wake it up again.

In OFF state, the devices listed below are put in a low power state to reduce total system power consumption to less than ½ Watt.

- U7000 ADSP-21065L (self-initiated low power state)
- U4400 CS8415A Digital Audio Receiver (held in RESET state)
- U4000 CS4228A CODEC (held in RESET state)
- Power Supply Pulse Skip Mode enabled (PS_STANDBY signal)
- U150, U250 and U350 Power Amps held in STANDBY state (see MODE signal below)
- Interface Module LED and Optical Receiver power turned OFF

5.2.1.4 Audio Power amplification

Dual power amplifiers U150 and U250 (TDA8566TH) drive the external speaker arrays via J150 on the DSP board to the I/O board.

U350 (TDA8566TH) drives the woofer transducer in the bass module via J350.
The inputs of dual amplifier U350 are wired in parallel.
Both differential outputs are brought routed to connector J350, but only one pair is used to drive the woofer.

All three power amplifiers U150, U250 and U350 are thermally coupled to an aluminum heat sink, which is secured with glue to the rear baffle of the bass box.
The DSP PCBA is mounted on this heat sink and secured with a snap-on clamp.

Each amplifier output is terminated to ground with an R-C circuit (3.32 Ohms in series with .01uF), which creates phase compensation near 4.7MHz to maintain amplifier stability.

Audio outputs from the CODEC (U4000) are AC coupled to the differential inputs of the power amplifiers thru 1uF electrolytic capacitors, C156, C157 (and similar).

Shunt resistors and capacitors, R151 and C158 (and similar), form the termination of a second-order low-pass filter described later.

5.2.1.5 Power Amplifier control, monitoring

The power amplifiers for the satellite speakers and the internal woofer reside on the DSP board and are controlled by the MODE signal line.

MODE signal

The MODE signal is a three-level signal controlled by two DSP I/O pins, MUTE (pin 137) and /STDBYout (pin 198) through a transistor circuit Q450, Q451, Q452, D450, R450, and R451.

When /STDBYout is asserted low, Q452 turns OFF and the MODE line drifts to ground putting the amplifiers in the “Stand-by” low-power state.

In standby state, the internal bias to the amplifier inputs is turned off allowing their inputs to drift to ground. To avoid pops, the CODEC (U4000), which drives the amplifier inputs, should be reset before asserting /STDBYout.

When the /STDBYout is de-asserted (high), Q452 turns ON delivering current through R451 and the voltage on the MODE line is then controlled by the MUTE signal.

When MUTE is de-asserted (low), Q450 turns OFF and the MODE voltage is pulled up to +15VREG, putting the amplifiers in the active state.

When MUTE is asserted (high), Q450 turns ON, clamping the MODE voltage to approximately 5.4 volts via Zener diode D450. At this level (3.3-6.4 Volts range) the amplifiers are muted.

Pull-up resistor R450 assures the MUTE signal is active when the DSP (U7000) is not driving it.

ARRAYCLIP

The array speaker amplifiers U150 and U250 have internal CLIP detectors that assert when the output voltage approaches the supply voltage. These two CLIP signals are connected as a wire-OR circuit to produce the /ARRAYCLIP signal.
R454 holds the /ARRAYCLIP signal high if neither amplifier IC is asserting the clip signal. If the /ARRAYCLIP signal is asserted (low), the DSP responds by reducing mid-range gain until /ARRAYCLIP de-asserts and then gradually ramps gain back up until it reaches the gain level set by the user or until /ARRAYCLIP asserts again and re-starts the cycle.

BASSCLIP

Amplifier U350 drive the woofer in the bass box. If the CLIP signal from the U350 (/BASSCLIP) is asserted, the DSP responds by reducing low-range gain until /BASSCLIP de-asserts and then ramps back up until it reaches the appropriate gain as set by the user

or until /BASSCLIP asserts again and re-starts the cycle.

Digital-to Analog Signal conversion and conditioning

Digital audio signals are processed by the DSP and converted to analog signals by U4000 (CS4228 CODEC) to drive the amplifier inputs.

The single-ended outputs of U4000 are nominally 1.31 Vrms full-scale.
They also have significant out-of-band noise and sigma-delta conversion noise due the location of U4000 in the digital circuit section.

Resistor arrays R4300, R4301, R4302 bias the negative inputs of the power amplifier and act as source impedance for the first stage of the second-order low-pass filter.

Capacitors C4300-4311 suppress switching noise on the signal lines and provide one pole of the second-order low-pass filter.

Resistor arrays R150, R250, R350 increase the source impedance of the second portion of the filter.
The shunt resistor and capacitor, R151 and C158 and similar, form the second pole.

Analog output gain for a 0dbFS digital signal…

- DAC output 1.3Vrms
- Filter Gain -8dB
- Amplifier Gain 26dB
- Total Gain 18dB (8x)
- Max amplitude 10.4 volts RMS or 14.7 volts peak.
  Note that DSP gain manager limits the signals to avoid clipping, which is likely to occur beyond 11 volts peak.

5.2.1.6 Analog-to Digital Conversion

Analog inputs (J7100, pins 2,3,5,6) are coupled through low-pass filters to the ADC differential input of U4000 through an R-C T-network which takes advantage of the inherent matched values of resistor packs R1001 and R1005 to provide good common-mode rejection at the inputs.

The ADC sample rate for analog inputs is set by the SHARC_CLK providing a 128Fs master clock to the converter (33.8868MHz/6 = 5.64MHz) rate which ultimately yields a sample rate of 44.1kHz.

For S/PDIF inputs, the clock is derived from the phase lock loop in the S/PDIF receiver, U4400.

5.2.1.7 S/PDIF Receiver

Kaiser following formats and sample rates
Dolby Digital 32, 44.1 and 48 kHz
AAC 32, 44.1 and 48 kHz
PCM 32, 44.1 and 48 kHz

U4400 (CS8415A) is the S/PDIF digital audio receiver.
Incoming single-ended S/PDIF signals on SPDIF1 are fed to U4400's RXP1 input through a filter and termination network.

Ferrite bead L73 blocks noise currents above the S/PDIF bandwidth.
The signal is terminated by a back-to-back diode clamp (D4505) and 75ohms (R4506). Clamping the signal to +/-one diode drop improves noise immunity. Reflections caused by impedance mismatch are clamped by the diodes.

The next stage R-C network (C7011, R4500, C4500 and R4505) form a low pass network that limits the bandwidth to just above the fundamental bit rate of the S/PDIF signal (128Fs).

U4400 provides the system MCLK at 128Fs when the S/PDIF input is active.

When the analog audio path is selected, the MCLK is provided by the DSP (U7000) SHARC_CLK output, which is routed through U4400s MCLK output (pin 10) by setting the IC into "Stop" mode via an I2C command from the DSP.

5.2.1.8 Internal audio path

Audio analog and digital input signals are converted to serial digital samples that are clocked at the bit rate established by BITCLK.

Data samples are 32-bits long and alternate in the bit stream between left and right channels in synchrony with the LRCLK signal.

The Codec, U4000, generates BITCLK and LRCLK using MCLK as the timing reference. MCLK is programmed to be 128 times the LRCLK rate (2 times the BITCLK rate).

The LRCLK and BITCLK serve as clocks to both the S/PDIF receiver and the CODEC audio outputs, D/ADATA1-3.

When digital audio input is present, S/PDIF receiver, U4400, generates MCLK from the bit-rate detected on the digital audio input.
When no valid digital audio input is detected or when the receiver is in standby mode, U4400 passes through the SHARC_CLK signal.

The SHARC_CLK from the DSP is the source of MCLK when analog audio inputs are selected.

The selection of Digital or Analog input sources is done automatically by the DSP.
If an active digital input is detected, the DSP will default to Digital input.
Otherwise, it will select analog input. If no activity above the noise threshold is detected on the analog inputs for more than 30 minutes, the DSP will automatically go to OFF mode.
Software continually polls the CS8415A, reading the RECEIVER_ERROR register (0x10) to sample the UNLOCK bit.
If UNLOCK == 0 we know that we have valid S/PDIF data.

If the phase lock loop loses lock, AUDIO_ER- is asserted (low) and the DSP responds by muting the amps and restarting the amp mute state machine.

Any time the S/PDIF receiver makes a transition from locked to unlocked or vice versa (usually because of a source change) the amp mute state machine runs.

The amp mute state machine resets the codec and syncs the DSP with the I2S clocks being generated by the CS4228.

If lockup remains stable, the DSP will release the amp mutes and monitor the system for any state changes.
It takes about 800 mSec from a change of source to release of amp mutes.

If the S/PDIF receiver remains unlocked for > 2 seconds, the DSP will select the analog inputs.

If the S/PDIF receiver regains lock, the DSP will immediately switch to digital input mode.

- Transition from lock to unlock is signaled by AUDIO_ER-
- Transition from unlock to lock is detected by polling the RECEIVER_ERROR UNLOCK bit.

The received S/PDIF digital data is routed to the DR0A input of the DSP (U7000).

The digitized audio data (A/DOUT) from U4000 is routed to the DSP serial input port DR0B.

5.2.1.9 Communications

IR Remote Interface
The demodulated IR signal from the Interface Module enters the DSP board at J7100-12 (IR-COMM). Diode clamp, D4510 and R-C network, R6104 and C6102, protect the input from ESD transients. The resulting signal is routed to the DSP PWM0 input (pin 26).

When the DSP is in the low power “OFF” state, activity on this line wakes it up to decode the command stream and respond to valid commands.

If the command is not recognized as a valid CineMate IR command, the processor goes back to low power mode.

TAP (Test Access Port) Interface

There are two TAP interface paths available.

1. Manufacturing board test TAP access via points TP6 (TAPOUT) and TP7 (TAPIN) on the DSP board.
   This path is also used by software development to via optional circuitry, J6200 and associated components (not populated in production boards), which serves to buffer and invert the TAP signals to provide the proper phase for serial interface to a PC.

2. Final System assembly test accesses TAP via the Interface Module male DB-9 connector, J603 on the I/O board.
   In this case, the IR-COMM input (J603-9) serves as TAPIN and TRI-ST-CTL (J603-4) serves as TAPOUT.

   A TTL to RS232 converter is required to convert the signals to the proper phase.

Each method is described below in detail.

The J6200 TAP interface is implemented using the U7000 DSP serial ports (signals TAPIN and TAPOUT).
Because the TAP output shares the same clock as the digital audio, it only works when the "audio path is running". This means that when a digital source is selected and no valid S/PDIF stream is detected (i.e. because it isn't connected or on), the TAP output will not work (though TAP input commands can still be issued). With the analog input active, TAP output works at all times.
When the system is in standby, the DSP is in an idle mode and the input buffer is only checked once a second for TAP commands, and then flushed. To turn the system on where TAP can be used, enter the command "AU A" (to select the analog source) within this one second to get things going. Several attempts may be needed for this to work.
Special Note for those used to the PS28 bass module (Cobalt 2)… there is no special power up mode required to enable TAP as the interface is entirely different in 3-2-1 Series II.

The terminal setup needs to be 57600 baud, 8 bit, even parity, 2 stop bits and no hardware control. The TAP output does not echo input characters, so enabling the local echo on the terminal emulator is useful. Also, the terminal program needs to insert line feeds after carriage returns for the TAP output.
The connection is made through J6200, the same cable made for Kiwi can be used (PT266603). Q6200, R6200 and similar convert RS-232 level input communication signals to logic level therefore no external RS-232–to–TTL converter is needed. In fact, it won't work if it is connected. Q6201 drives the output line to 0 and 3.3V, which should work on most PC's serial ports. These components are not populated in production.

In final assembly, where there is no direct access to DSP board, the TAP connection is made through the Interface Module DB9 connector (I/O board J603) on the rear panel of the bass module.

J603-9 (IR input) serves as the TAPIN line and J603-4 (TRI-ST-CTL) serves as the TAPOUT line. In order to signal that the system is in manufacturing test, a 5.1 kOhm pull-up resistor must be connected from TRI-ST-CTL (J603-4) to +3.3V (J603-5). At boot-up, the DSP momentarily uses the TRI-ST-CTL line as an input to check for the presence of the pull-up resistor. If not pull-up is detected, the DSP will ignore TAP commands. This feature was added to prevent the system from interpreting signals from other IR devices in the environment as CineMate TAP commands and causing disruption of audio.

The TAP connection via the Interface Module port requires an RS232-to-TTL converter. Terminal must be set to 4800 baud, 8 bits, No parity, 1 stop bit, and no hardware control. The TAP output does not echo input characters, so enabling the local echo on the terminal emulator is useful. Also, the terminal program must NOT insert line feeds after carriage returns.

This TAP interface must be activated by transmitting an RS-232 byte to the bass module anytime after cold boot (power cycle) and BEFORE the reception of the first valid IR command. After a valid IR command is received, the system will NO LONGER respond to TAP through the IR input.

Interface Module LED Status Indicator

The Interface Module has a single green LED to indicate system status as described in the table below.

System State	LED action
Cold Start	Blink at 50% duty cycle, 1 time/sec for 10 seconds
Power On Self Test (POST) failure: FLASH checksum incorrect, SDRAM test failure or failure to initialize audio device (U4000 or U4400)	Blink at 50% duty cycle, 5 times/sec and until watchdog timer cause self-reset and restart
Standby mode	OFF (Press the remote <On/Off> button to turn the system ON)
System is ON and ready to play.	ON
System receives a valid Bose IR remote command	ON, blink OFF momentarily
Software Update: System has detected an update stream at the S/PDIF input and is receiving the update image.	Blink at 50% duty cycle, 3 times/sec
Software Update: System has received a valid and complete update image. FLASH is being written with update information.	Blink at 50% duty cycle, 10 times/sec

Kaiser also supports a diagnostic mode to help PTS determine if there is a problem with digital audio input.

To enter the PTS diagnostic mode
1. Turn the system ON with the remote.
2. Press and hold the ON button for more than 6 seconds

PTS diagnostic System State	LED action
S/PDIF is locked	Double Blink cycle (off, on, off, 250 msec each; on 2 sec)
S/PDIF is unlocked	Quadruple Blink cycle (off, on, off, on, off, on, off, 250 msec each; on 2 sec)

To exit from PTS mode, push any button on the remote.

5.2.1.10 Digital Signal Processor (DSP)

The DSP section is comprised of the SHARC DSP (ADSP-21065L, U7000), the FLASH memory (U7200), and the SDRAM (U7300). The SDRAM operates in CAS latency=2 mode to accommodate the 67.7736 MHz system clock (twice the 33.8868MHz crystal frequency).

There are essentially two main software functional blocks: Framework and DSP functions.

Framework functions are all the microcontroller-like functions such as communications, controlling/monitoring the power amplifiers, and power-up/down.

DSP functions are digital audio signal processing functions such as equalization, array processing, volume control, etc.

The following discussion relates only to hardware interactive DSP functions.

Booting – On a cold start, the supplies come up with the 3.3V supply being the last to achieve regulation.
The reset generator IC, MAX823 (U6000) holds the DSP in RESET until the +3.3V supply voltage has risen above a threshold of about 3.1V.

Upon release of RESET, the DSP boots up from the FLASH IC and enters the STANDBY mode.

STANDBY mode - After a cold start or an off command from the IR remote, the DSP puts the system into a standby mode where the system draws less than 0.5 Watt from the AC mains.

The DSP puts the amplifiers into standby mode (low quiescent draw), and then the DSP enters the “IDLE16” mode (NOT reset) as this is the lowest power drain mode for the DSP.

In this mode, the DSP PWM input monitors activity on the IR-COMM line and the TAP input works as described above.

On every edge transition on the COMM line, the DSP wakes up and checks to determine if a valid IR command was received.

If the command is invalid, the system returns to standby mode.

Once per second, the system must “come alive” briefly to toggle the watchdog timer to prevent it from resetting the system.

Prior to entering standby, the volume parameter is set to the last value, but is bounded in the range of 20 to 80.

Oscillator – The system clock is derived from the oscillator formed by Y7000 and an inverter of U6100. (Note: The SHARC DSP's onboard inverter was found to have insufficient gain to reliably start-up the oscillator.)

R7000 was selected to keep the crystal power dissipation below 0.5 mW. Loading capacitors C7008 and C7009 tune the frequency to 33.8868 MHz.
The SHARC DSP doubles this clock to 67.7736 MHz for use as the system clock.

Programming – The FLASH is programmed with the production software image during the manufacturing process at the ICT station.

Reprogramming – It is possible to update software in the field via the S/PDIF input. The updated binary image file is converted into a stereo PCM format and written to a CD. The file is comprised of a header followed by the software image. The length of this file is about 2 seconds.

To perform a software upgrade, connect a DVD player with optical audio output to the digital audio input, turn the system ON and play the software update CD.

When the header is detected in the incoming S/PDIF stream, the DSP reboots into ERC then looks again for an update header before reading in the actual update image. When the image is read in, the code takes a few seconds to determine the validity with a checksum. If the checksum fails, then no update occurs. (If there are still "updates" being presented, then the process will begin again.) If the checksum passes, the system then writes the image to the FLASH, a process which takes about 45 seconds. The LED blinks rapidly (10 Hz) during this process.
The update disc/file can then be stopped during this time safely. When this has completed, the system then reboots into the new code as if it were a cold start (into standby).

The ERC (Emergency Recovery Code) has been written to a protected area of the FLASH such that in case a software update crashed or anything else that causes the FLASH to be corrupted, the ERC will always be available, and therefore rewriting the FLASH is always possible using the same update procedure.

5.3 Switch Mode Power Supply

The switch mode power supply (SMPS) converts AC voltage in the range of 100V to 240V rms, 50Hz or 60Hz, to a regulated 14 Volts DC.

The power supply employs a flyback converter with active clamping to improve efficiency.

The schematic of the power supply is shown in sheet 7 of Bose document SD319091 (available on Windchill). The schematic can be divided into following sections:

1). AC-DC Rectification
2). DC-DC conversion
3). Control
4). Start-up

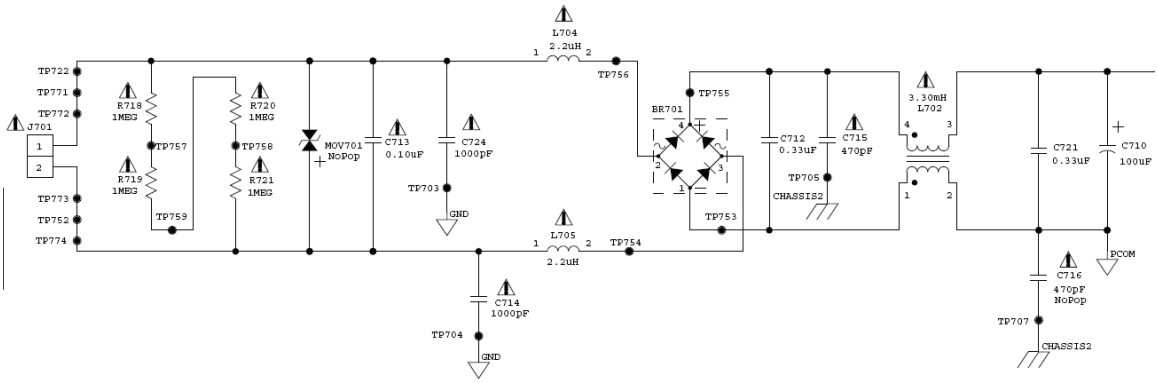
5). Mode control

Details of each section and its operation are explained below.

It should be noted that the power supply receives the mains power in from the I/O board and that the I/O board has the fuse, MOV surge suppressor, and an L-C filter for the power supply (shown in the upper right on sheet 6 of Bose schematic SD319091).

AC-DC rectification

The following schematic shows AC-DC rectification section of the power supply.



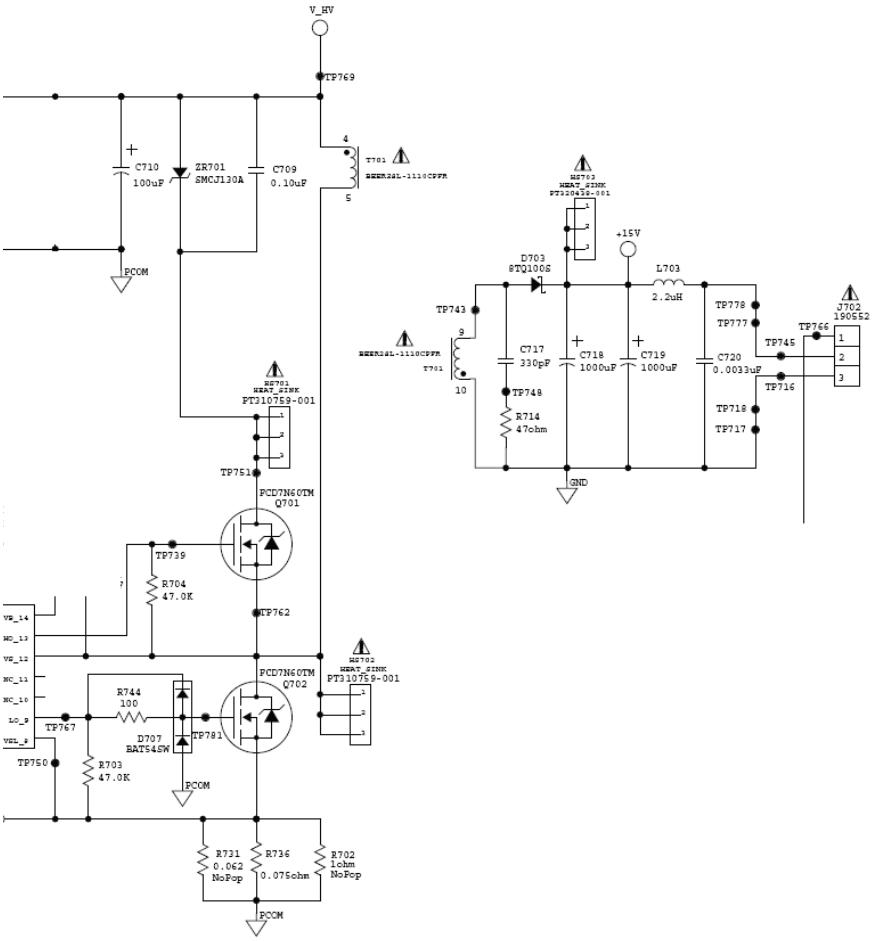
AC input voltage (100 – 240V rms) enters via connecter J701 passes thru L-C filters (L704 / C724 and L705 / C714), which reduce conducted emissions from the power supply.

The AC voltage is rectified by bridge rectifier BR1, goes thru another L-C filter, (C712, L702 and C721) to become high voltage DC (V_HV) on capacitor C710.

For safety, the four 1MΩ resistors R718-R721 bleed charge from capacitors C724 and C714 when the system is un-plugged.

DC-DC conversion

The schematic below shows the DC-DC flyback converter section of the power supply. The DC-DC converter is a flyback converter with active clamping.

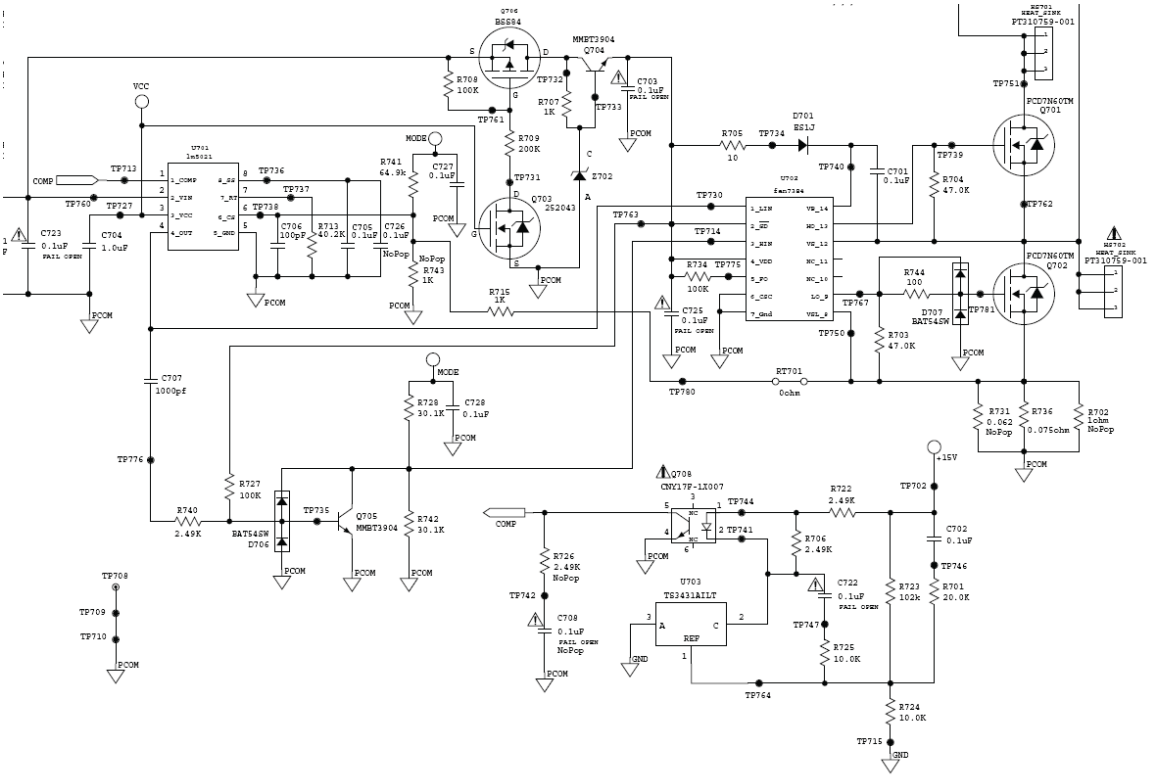


MOSFET Q702 is the main switch, similar to the switch in any conventional flyback converter. MOSFET Q701 is the auxiliary switch that clamps the voltage on the primary winding when Q702 switches off. During normal operation, the two switches are turned on and off in opposite phase at about 166 kHz. When Q702 is turned on and Q701 is turned off, the DC voltage in electrolytic capacitor C710 is applied to the primary winding 4-5 of transformer T701. Energy is stored in the transformer. When Q702 is turned off and Q701 is turned on, the energy stored in the transformer discharges as a current through diode D703 and the energy is transferred to capacitors C718, C719.
The voltage across MOSFET Q702 is clamped to a voltage level that is the sum of the voltage at capacitor C710 and the voltage at capacitor C709.
At maximum line voltage (230 Vrms +20% = 276) the peak voltage on C710 is 390V.
To protect Q702 from overvoltage, ZR701 limits the voltage across C709 to a maximum of 159V for a total of 549V.

The voltage at the cathode of D703 is low-pass filtered by L703 and C720 output at connector J702.

Control

The schematic below shows the control circuit.



The two MOSFETs of the flyback converter are driven by U702, FAN7384. The control signal for the main switch MOSFET Q702 comes from PWM (Pulse Width Modulation) controller U701 (LM5021). The control signal for MOSFET Q701 is an inverted version of the driving signal to MOSFET Q702. The inversion is performed by transistor Q705.

At startup, before the LM5021 PWM controller (U701) has activated, unregulated power to start-up the controller is supplied to U701-2 (Vin) from V_HV through resistors R730, R712 and R711. The LM5021 Vin pin is clamped at 36V by an internal Zener diode.

V_HV varies widely depending on line voltage (100V in Japan, 120V in USA, 240V in Europe). Current thru resistors R730, R712, R711 is relatively high at European line voltage and the power dissipation in these resistors could become a significant part of the allowed 0.5 Watt standby power for the system. Zener diode Z701 (51V) at the base of Q707 limits the current and hence reduces power dissipation at high line voltage.

Q704 and Z702 regulate this voltage to approximately 14.4 V to power to the driver IC, U702. The supply voltage to the Q704 and U702 is switched on by Q706 which is turned on by the presence of the bias supply voltage from the LM5021 (nominally 8.5V).

PWM controller LM5021 is a current mode controller. Current sensing resistor R236 feeds MOSFET current information to CS pin of controller IC LM5021. The controller IC compares the voltage at CS pin with a voltage level set by COMP pin. It turns off MOSFET Q702 when CS pin voltage reaches a preset level determined by COMP pin.

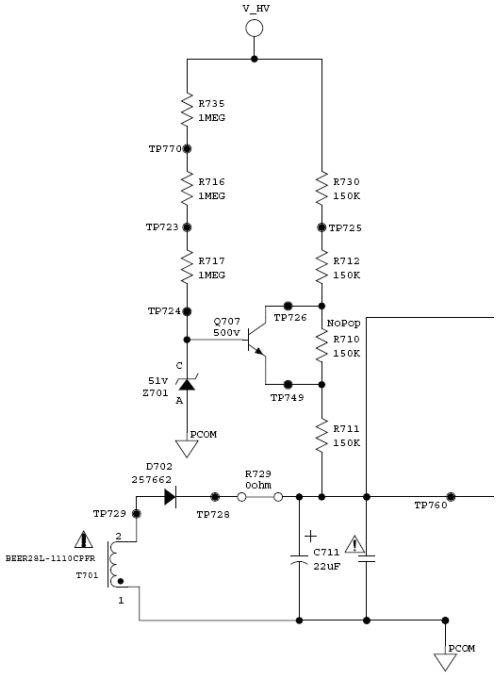
If the voltage at CS pin reaches 0.5V, controller LM5021 turns off the MOSFET switch Q702 immediately regardless COMP pin voltage. If the voltage at CS pin reaches 0.5V every switching cycle for a number of cycles consecutively, which could happen in case of overload or short circuit at the output of the power supply, LM5021 shuts down the converter for protection. It restarts within a pre-determined period of time.

The 40.2 kΩ resistor R713 that is connected to the RT pin of LM5021 sets the switching frequency to 166 kHz.

The node marked as +15V reflects the output voltage of the power supply. The level of the output voltage is actually set to 14V (NOT 15V) by resistors R723, R724 and the 1.24V reference voltage of shunt regulator TS3431, U703. If the output voltage is higher than 14V, the voltage at pin 1 of U703 is higher than the reference voltage 1.24V, driving cathode pin 3 of TS3431, U703 to a lower impedance. More current flows thru the diode of optocoupler Q708, pulling the COMP voltage lower. The PMW controller IC reduces the ON time of MOSFET Q702. Therefore the output voltage is pulled back down to 14V. If the output voltage is lower than 14V, this closed loop control pulls the output voltage up to 14V.

Start-up

The following is the schematic of start-up circuit:

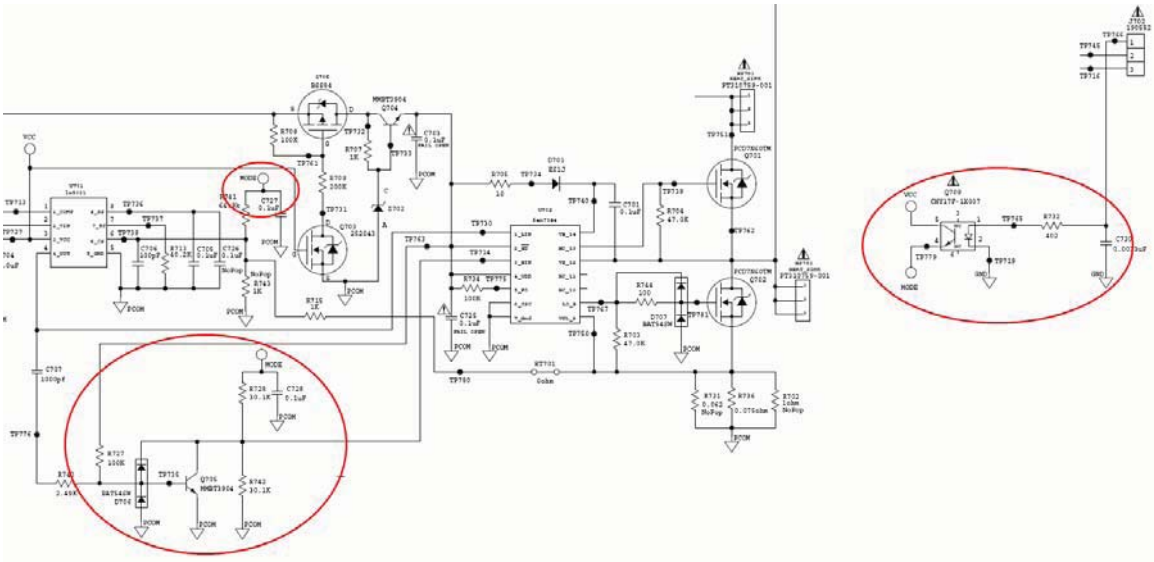


When AC mains voltage is applied to the power supply, node V_HV charges to a high voltage. Transistor Q707 starts conduction, charging capacitor C711 up which powers PWM controller LM5021, U701.

As soon as the voltage at C711 reaches turn-on threshold of LM5021, the IC starts its operation. LM5021 provides a regulated voltage at its Vcc pin which turns on transistors Q703 and Q706, providing power to the driver IC U702 and the flyback converter starts to work. Winding 2-1 of the flyback transformer T701 continues to supply power to the controller IC, keeping IC to work continuously.

Mode Control

The mode control circuit is highlighted in schematic below.



During normal operation, a 3.3V signal is applied to pin 1 of connector J702, turning on optocoupler Q709, delivering the MODE supply voltage to inverter circuit (Q705 and R728). The inverter drives the HIN pin of the MOSFET driver turn on MOSFET Q701. In this mode, the DC-DC converter works as a flyback converter with active clamping. The MODE voltage also provides additional bias to CS pin of LM5021 via R741, to keep it operating normally without pulse skipping.

During standby mode, a 0V signal is applied to pin 1 of connector J702, turning off optocoupler Q709 and thereby turning off the MODE voltage supplied to inverter Q705 and R728. Without the inverter OFF, U702 stops driving MOSFET Q701. In this case, Q701 is OFF, disabling the active clamp.
With MODE voltage low, the CS pin is no longer biased and the PWM controller LM5021 skips pulses if the load of the converter is very light.
This pulse skip mode of operation lowers power dissipation of the flyback converter.

Summary of Power Supply Operation

The power supply is a flyback converter which provides a 14V regulated voltage. In normal mode, it works at 166 kHz as a flyback converter with active clamping. In standby mode, it works just as regular flyback converter (without active clamping) at a much lower switching frequency.

5.4 Interface Module

5.4.1 The pins/signals for the Interface Module (285396-001) are as follows:

DSUB Pin #	Signal
1	Right
2	AGND
3	GND
4	Tri-State-Ctl
5	+3.3VF
6	Left
7	GND
8	SPDIF1
9	IR

5.4.1.1 Right Analog Input –
The analog audio inputs are quasi-differential with respect to the Audio GND.
The input impedance is approximately 20k ohms.
Full Scale input is 2.0Vrms.

5.4.1.2 AGND - Analog Input Ground

5.4.1.3 GND – Digital Ground

5.4.1.4 Tri-State-Ctl

The Tri-State-Ctl is driven by the DSP to control the green LED indicator and also control power to the Fiber Optic Receiver (Digital Audio Input) as follows.

DSP I/O state	Voltage	Optical Receiver	Green LED
High	+3.3V	Power -ON	ON
Tri-State	+0.75 V	Power -ON	OFF
Low	0.0 V	Power -OFF	OFF

In **ON mode**, the DSP sets the Tri-State-Ctl line High

In **MUTE mode**, the DSP toggles from High to Tri-State to flash the Green LED On/Off while maintaining power to all components.

In **OFF mode**, the DSP sets the Tri-State-Ctl line Low to cut power to the Fiber Optic Receiver for minimal power consumption in OFF (STANDBY) mode.

Note: At boot-up, DSP senses the Tri-State-Ctl voltage to determine if an Interface Module is connected (+0.75V = logic low) or if a TAP interface is connected (pulled up to a logic high). If a logic low is sensed (indicating an Interface Module connection) the system will

respond ONLY to valid IR remote commands and will ignore TAP commands. This functionality prevents the system from responding to extraneous IR signals in the environment that may resemble TAP commands.

5.4.1.5 +3.3VF

This is Filtered +3.3V from the switching regulator on the DSP board used to power all circuitry on the Interface Module PCB.

5.4.1.6 Left Analog Input –

The analog audio inputs are quasi-differential with respect to the Audio GND.
The input impedance is approximately 20k ohms.
Full Scale input is 2.0Vrms.

5.4.1.7 GND - Digital GND reference

5.4.1.8 SPDIF1

This signal comes from a Fiber Optic Receiver in the Interface Module.
It is a single-ended, 75ohm S/PDIF digital audio signal, buffered by a 74HC04 to drive the coaxial cable. PCM, AC3 and AAC formats at 44.1 kHz and 48kHz sample rates are supported.

5.4.1.9 IR

The IR receiver in the Interface Module receives and demodulates 38kHz IR commands from the remote and sends them to the bass module as a 3.3V logic-level signal.
For debugging, repair, and manufacturing, this input pin also serves as the serial input to the bass module for TAP communications.

5.4.1.10 Bass Tone Control Sensor

The center tap of the potentiometer connects to capacitor C7304 on the DSP board through current limit resistor R7209.

The DSP alternately drives the A-side leg (POT-A signal) or B-side leg (POT-B signal) of the potentiometer to charge C7304 and measures the charge time required to reach a logic high voltage level in each case.
The pot position is computed as a function of the two charge times.
After measuring each charge time, C2 is discharged by setting both the A and B side drivers low and allowing adequate time to reach a steady state near ground.

CLASS FM	DWG NO.

REVISIONS			
REV	DESCRIPTION	ENG	DATE
00	INITIAL RELEASE	PETE CORTESE/ PAUL COLLINS	4/09
02	ADDED SAFETY BULLETIN	PAUL COLLINS	
05	DENDRITE GROWTH	PAUL COLLINS	12/14

SIGNATURES REQUIRED		PRINT NAME	SIGNATURE
TSG REPRESENTATIVE		PAUL COLLINS	
CELL LEAD		DAVID MIKEL	
REPAIR SUPERVISOR		KEVIN KING	
OTHER(_____)			

TSG TECHNICIAN	DATE	
Paul Collins	4/09	BOSE® FRAMINGHAM, MA 01701-9168

APPLICABLE DOCUMENTS:

SERVICE MANUAL: 285831-SM

DESCRIPTION

CineMate™ Series II System
Troubleshooting Tips

SIZE	FSCM	CLASS	DWG NO.	REV
A	**32108**	**FM**	318842-TT	**05**

Troubleshooting Tips

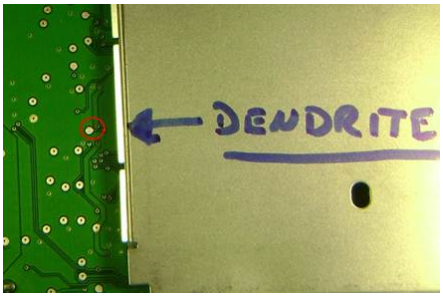
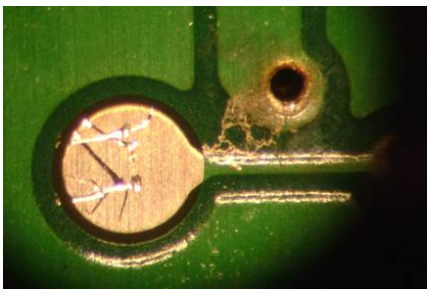
CineMate™ Digital Home Theater Speaker System

Refer to the CineMate™ Digital Home Theater Speaker System service manual reference number 285831-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
CineMate II Module	Potential safety issue on 220V, 230V, 240V and Dual CineMate Series II Digital Home Theater Systems built prior to DOM 2228.	Perform the Safety Bulletin 378842-SB1
	Connector J602 on the I/O board.	Apply hot melt to connector J602 on all units returned with a DOM range between 9236 and 9258, or all units with the non locking J602 connector on the IO PCB. Service Bulletin: **318842-B1**
	PCB snap bracket	On all units that require removal of the DSP board, refer to service bulletin **318842-B2** for proper reassembly procedure.
	Check FB70 for damage on CineMate II systems built between DOM 1299 and 1321. This may causes no power or intermittent power	Replace ferrite FB70. See Service Bulletin 318842-B3
	I/O board is replaced	When replacing the I/O board, Service bulletin 318842-B3 must be followed.
	Inspect the 10 pin ribbon cable going between the DSP and I/O board in all bass boxes, regardless of complaint for oily residue on the connectors.	Replace the 10 pin cable with PN# 275179-0190 and clean the connectors and surrounding areas on both boards with isopropyl alcohol and a brush.

Troubleshooting Tips

Product	Symptom	Check	Action
CineMate II Module	No power	Connectors J602 and J7100	Connector J602 on the I/O board, or J7100 on the DSP board may be unseated. Refer to service bulletin 318842-B1.
	No remote response	Remote	Replace remote if defective.
	Distorted audio, one channel distorted or no audio	U4000	Codec IC U4000 may be defective.
	No Power	Connectors J604, J701 and J5	Check for unseated connectors J604, J701 and J5 on the SPS board.
	No Power, no DC out of SPS	U701 and ZR701	Switching IC U701and diode ZR701 may be defective.
	Intermittent power Reboots constantly Loses sound on all sources Garbled audio with artifacts (squealing, data noises, etc..)	Inspect the 10 pin ribbon cable going between the DSP and I/O board in all bass boxes for oily residue on the connectors.	Replace the 10 pin cable with PN# 275179-0190 and clean the connectors and surrounding areas on both boards with isopropyl alcohol and a brush.
	No audio, popping sound.	Check for corrosion (dendrite growth) on the DSP board.	Replace DSP board. Part # 318878-011S  

SAFETY BULLETIN

Bulletin Part Number: 378842-SB1

Reminder: This document is considered Bose Confidential and is considered under your Confidentiality Agreements with Bose Corporation.

Products Affected: CineMate® Series II Digital Home Theater Speaker System (220V, 230V, 240V and Dual Voltage only).

Product Code	Material P/N	Product Description
051361	318842-2100	CNMT II HT SPKR SYS 220V EU BLK
052921	318842-210R	CNMT II HT SPKR SYS 220V EU BLK, remanufactured
051363	318842-4100	CNMT II HT SPKR SYS 230V UK BLK
052751	318842-410R	CNMT II HT SPKR SYS 230V UK BLK remanufactured
051364	318842-5100	CNMT II HT SPKR SYS 240V AP BLK
056673	318842-510R	CNMT II HT SPKR SYS 240V AP BLK remanufactured
051365	318842-6100	CNMT II HT SPKR SYS DUAL BLK
051466	320573-2100	CNMT II GS HT SPKR SYS 220V EU BLK
052752	320573-210R	CNMT II GS HT SPKR SYS 220V EU BLK, remanufactured
055303	320573-2300	CNMT II GS HT SPKR SYS 220V EU SLV
055371	320573-230R	CNMT II GS HT SPKR SYS 220V EU SLV, remanufactured
051468	320573-4100	CNMT II GS HT SPKR SYS 230V UK BLK
052753	320573-410R	CNMT II GS HT SPKR SYS 230V UK BLK remanufactured
055481	320573-4300	CNMT II GS HT SPKR SYS 230V UK SLV
051469	320573-5100	CNMT II GS HT SPKR SYS 240V AP BLK
056671	320573-510R	CNMT II GS HT SPKR SYS 240V AP BLK remanufactured
051470	320573-6100	CNMT II GS HT SPKR SYS DUAL BLK
057971	318830-110S	Bass Module CNMT II dual voltage, Service

Note: The product code is the first six digits of the serial number and can be found on the product label.

Subject: Potential safety issue on 220V, 230V, 240V and Dual CineMate Series II Digital Home Theater Systems.

Disposition: This rework procedure shall be performed free of charge on all products listed above built prior to 8/15/2012 (DOM 2228) that are returned for repair/service for any reason.

Reason: Under certain power conditions, the MOV (VR601) in the Acoustimass module may fail and could present a fire hazard when operated in countries where the voltage from the wall outlet is 220 volts or higher.

Solution: Perform the Rework procedure described on page two of this document that includes:

1. Replacing VR601 with a new part
2. Install a fiberglass component cover
3. Securing VR601 by applying hot melt
4. Removing two inches of foam and excess foam from the primary PWR cable
5. Add a zip tie to the primary PWR cable securing it to the I/O board bracket
6. Performing Hi-Pot and functional test

See pages two and three of this document for detailed instructions.

PH: 200123119
Date Issued: 9/12

REWORK PROCEDURE CINEMATE SERIES II

1. Rear Enclosure Removal

1.1 Place the bass module on its side and remove the bass control knob.

1.2 Using a phillips-head screwdriver, remove the four screws that secure the rear enclosure to the bass module cabinet.

1.3 Lift the rear enclosure partially away from the bass module.

1.4 Unplug connector J604.

1.5 Remove the two screws from the I/O board bracket and remove the board from the back cover.

2. Rework

2.1 Replace VR601 with part number 361431-0020.
Note: part number 361431-0010 and 361431-0030 are also acceptable replacement parts.

2.2 Install a fiberglass component cover, Bose part number 362882-0010 over the new MOV at location VR402. This cover is required for safety purposes.

2.3 Secure VR601 by applying hot melt to prevent the part from buzzing against surrounding components at low frequencies. The hot melt should lock VR601 to the black and gray components.

2.4 Remove two inches of foam from the Primary PWR Cable.
See figure 1.

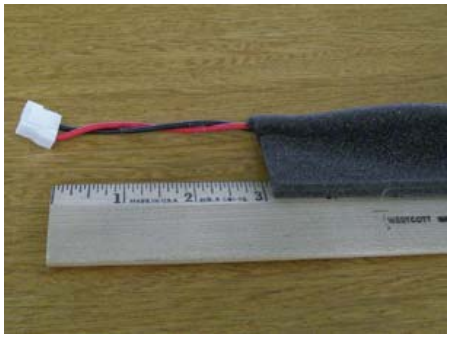


Figure 1.

2.5 Remove excess foam from the full length of the Primary PWR Cable .
See figure 2.

Figure 2.

Continued on next page

REWORK PROCEDURE CINEMATE SERIES II CONTINUED

2.6 Zip tie the primary PWR cable to the I/O board bracket and route the cable behind the coated flat cable as shown in figure 3.

a. Place the zip through the bracket slot.

b. Capture the harness and tighten the zip tie so it is still loose (between a 1 and 1.5 inch loop) around the foam and the zip tie block (lock) is away from the bracket.

c. Cut the excess zip tie.

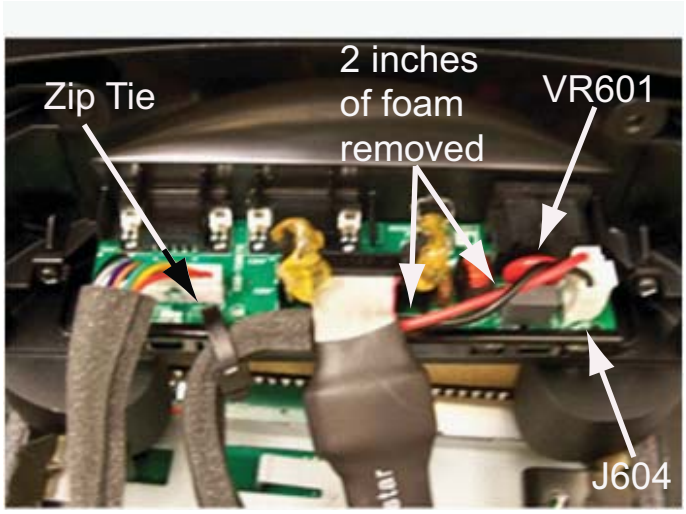


Figure 3.

2.7 Route the Primary PWR Cable to the inside of the coated flex cable. See figure 4.

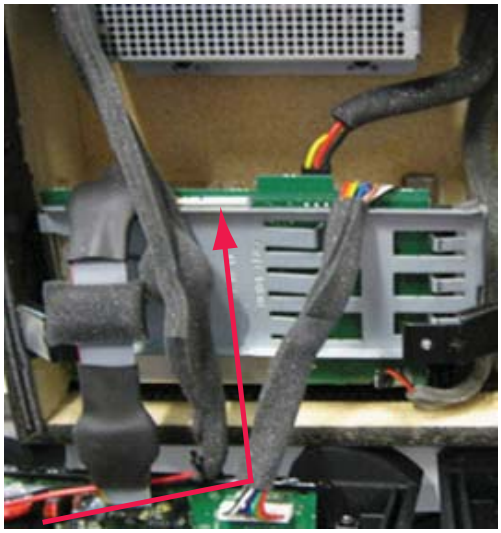


Figure 4.

REWORK PROCEDURE CINEMATE SERIES II CONTINUED

2.8 Inspect the J602 connector on the IO PCB to ensure it is fully seated and the hot melt is on the locking tab. Apply hot melt, if needed, to keep the locking tabs locked. See figure 5.

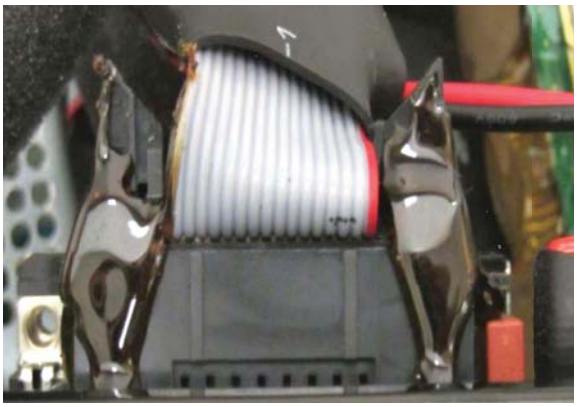


Figure 5.

2.9 Inspect the J7100 Connector on the DSP PCB to ensure the hot melt is attached to BOTH the connector and ribbon cable. Apply hot melt, if needed, to make sure the cable does not come loose from the connector. See figure 6.

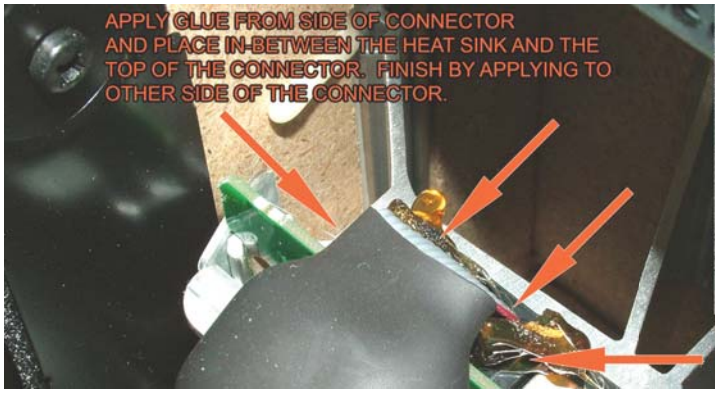


Figure 6.

3. Reassembly

3.1 Reassemble the I/O board and install the bracket.

3.2 Install the two screws to secure the bracket to the back cover.

3.3 Place the cover back on the module and install the 4 screws securing the back cover to the bass module and install the bass control knob.

Continued on next page

REWORK PROCEDURE CINEMATE SERIES II CONTINUED

4. Hi-Pot testing

4.1 Perform a Hi-Pot (High Potential Leakage Test) in accordance with the Technical Service Group Website.

The instructions to perform Hi-Pot are located on the Technical Service Group Website.

Internal website = http://intranet.bose.com/tsg/
External website = http://serviceops.bose.com/

To locate these instructions, go to the service website above and select Service Manuals/Bulletins, Powered Speakers, CineMate Series II Digital Home Theater Speaker System, Hi-Pot Testing Information Page.

5. Functional test

5.1 Set up the system for a functional test by:

a. Connecting the satellite speakers to the Acoustimass module
b. Connect the interface module to the Acoustimass module
c. Connect an audio source to the interface module via the analog or digital input.
d. Apply power

5.2 Using the remote, press the power button.

5.3 Once the system is turned on, adjust the volume with the remote and listen to program material such as music to confirm proper operation.

6. Mark the product label

6.1 Using a Black Sharpie, mark the prodcut label with an "X" in the location shown in figure 7 to indicate the rework is complete.

Figure 7.

SAFETY BULLETIN

Bulletin Part Number: 318842-SB2

Reminder: This document is considered Bose Confidential and is considered under your Confidentiality Agreements with Bose Corporation

Product: CineMate® Series II and GS Series II bass modules

Subject: Possible loose AC wiring harness connection.

Disposition: Perform this bulletin on all CineMate Series II and GS Series II bass modules that have the below symptom or are opened for repair.

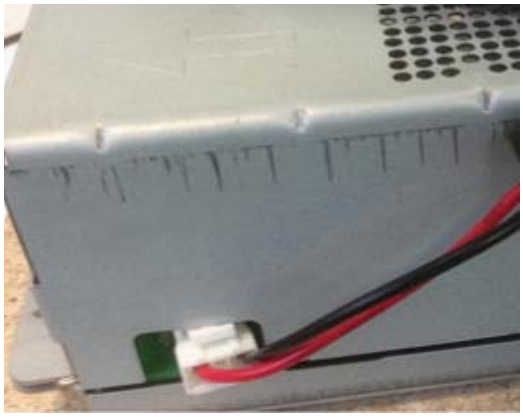
Symptom: Intermittent power or dead unit / no power.

Reason: The AC power wiring harness from J504 on the I/O PCB may not be fully seated at the J701 connector on the power supply PCB.

Solution: On all CineMate Series II and GS Series II bass modules that are opened for repair and/or have the above symptom, ensure that the AC power wiring harness is properly seated and latched at the J701 connector on the power supply PCB. Ensure that the tie-wrap on the AC power cable at the I/O PCB is not too tight. there should be about 1.5 inches of slack. See below right. The AC power cable connector should be straight and the latch locked. The below examples are not properly seated and latched.

Harness Disconnected

Loose But Still Connected



Loose Connection Side View

I/O PCB Tie-Wrap Loop

Date Issued: 12/14

Bose Corporation; The Mountain, Framingham, Ma. 01701-9168
For Technical Assistance Call 1-800-233-4408
Service documentation available online at http://serviceops.bose.com

SERVICE BULLETIN

Bulletin Part Number: 318842-B1

Product: CineMate® Series II Digital Home Theater Speaker System

Subject: Connector J602 on the I/O board may be unseated

Symptom: No power

Reason: Unseated connector J602

Solution: : Apply hot melt to connector J602 on the IOPCB (see FIG.1) and connector J7100 on the DSP PCB (see FIG. 2). Ensure connectors are fully seated before applying hot melt

Disposition: Perform on all units returned with a DOM range between 9236 and 9258, or all units with the non locking J602 connector on the IO PCB

Bond Plug to Receptacle on I/O board

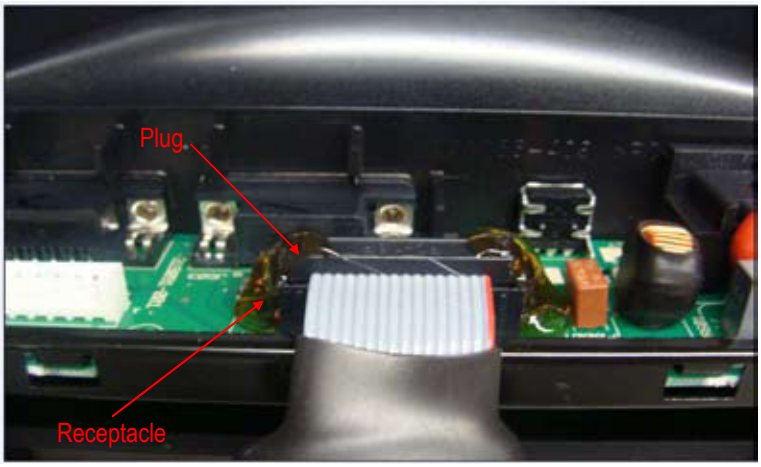
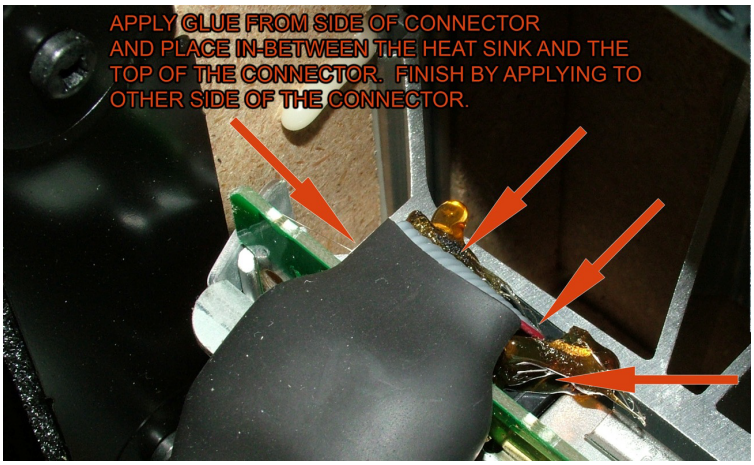


FIG. 1

Bond Plug & Cable to Receptacle on DSP board



Note - DSP board should **NOT** be removed to apply hot melt.

FIG. 2

Date Issued: 10/09

SERVICE BULLETIN

Bulletin Part Number: 318842-B2

Product: CineMate®, CineMate Series II, CineMate GS Series II, 321 Series III, 321GS Series III, 321GSX Series III.

Subject: When the DSP board is removed during repair, the PCB snap bracket must be fully engaged with the bass module heat sink during reassembly.

Disposition: Any systems that have been disassembled down to the DSP board.

Symptom: The snap bracket is loose inside the bass module after a repair. This procedure should be performed anytime the snap bracket has been removed and reinstalled.

Solution: After the snap bracket has been reinstalled, use a large flat head screwdriver to bend the tab under the heat sink as shown in Figure 1. This will assure the snap bracket is fully engaged with the heat sink.

Note: The old bracket must not be reused. Upon removal, the old bracket should be marked “SCRAP” with permanent red marker and then scrapped. A new bracket PN 304144-001 must be installed.

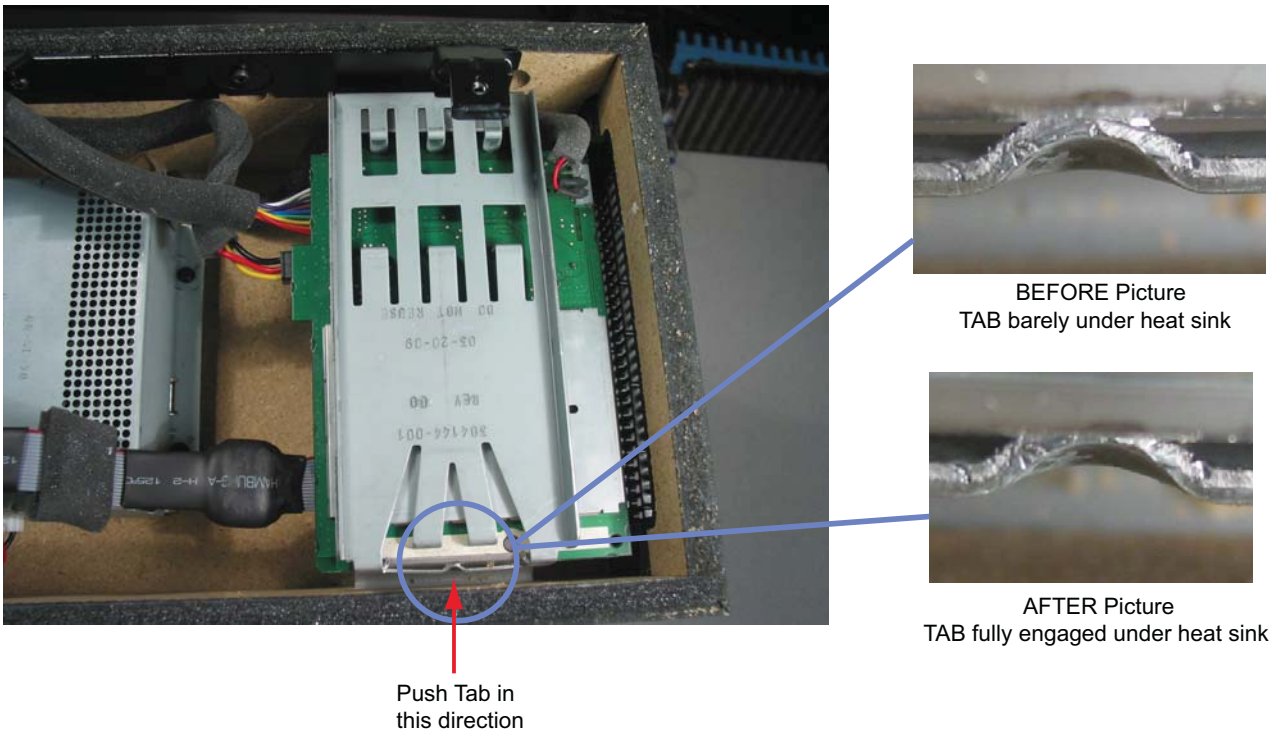


Figure 1.

Date Issued: 12/11/09

SERVICE BULLETIN

Bulletin Part Number: 318842-B3

Product: CineMate® Series II Digital Home Theater Speaker System.

Subject: Damage to ferrite FB70 causing no power or intermittent power.

Disposition: Possible damage to ferrite FB70 on all main boards showing the number 1 and built between DOM 1299 and 1321 .

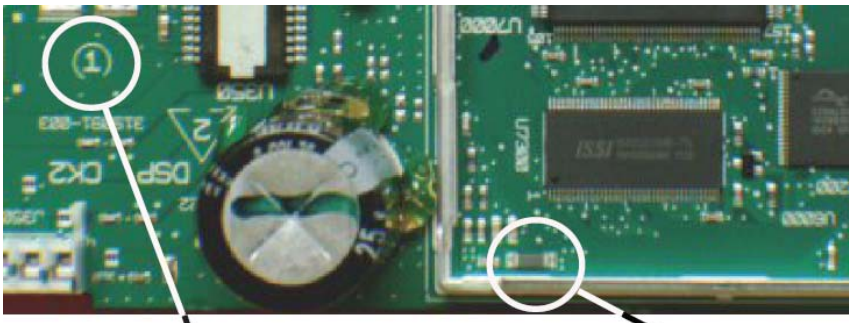


Figure 1.

DOM (date of Manufacture)

To determine the DOM, look at the serial number located on the back of the bass Module.

Example -

0513539129905 91AS

The first 6 characters identify the product code - 051353

Characters 8 to 11 identify the DOM - 1299
1299 = the 299th day of 2011

Symptom: No power or intermittent power. FB70 should be replaced regardless of symptom if the main board has the number 1 and falls within the DOM range.

Solution: Replace ferrite FB70 on all CineMate II product if the product DOM is within 1299 to 1321 and the main board has the number 1 as shown in figures 1 and 3.

Reference Designator	Description	Part Number
FB70	BEAD, FERRITE, CHIP, 1806	256116-181

Date Issued: 01/18/12
ZF = 200105819

See next page for Schematic and Board Layout

Schematic

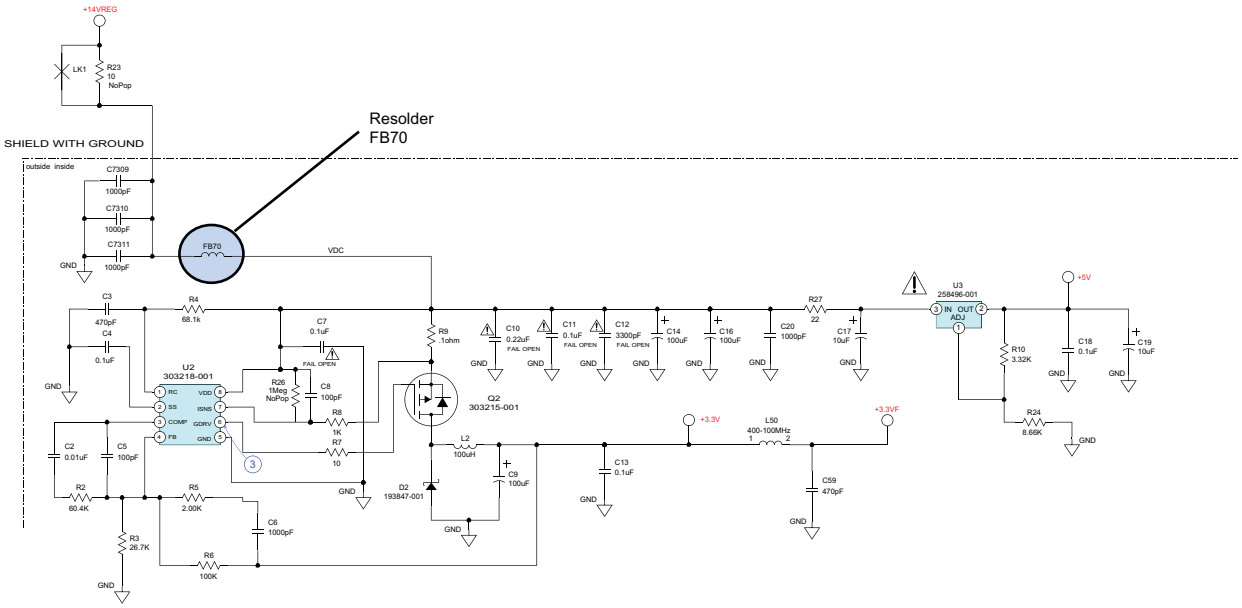
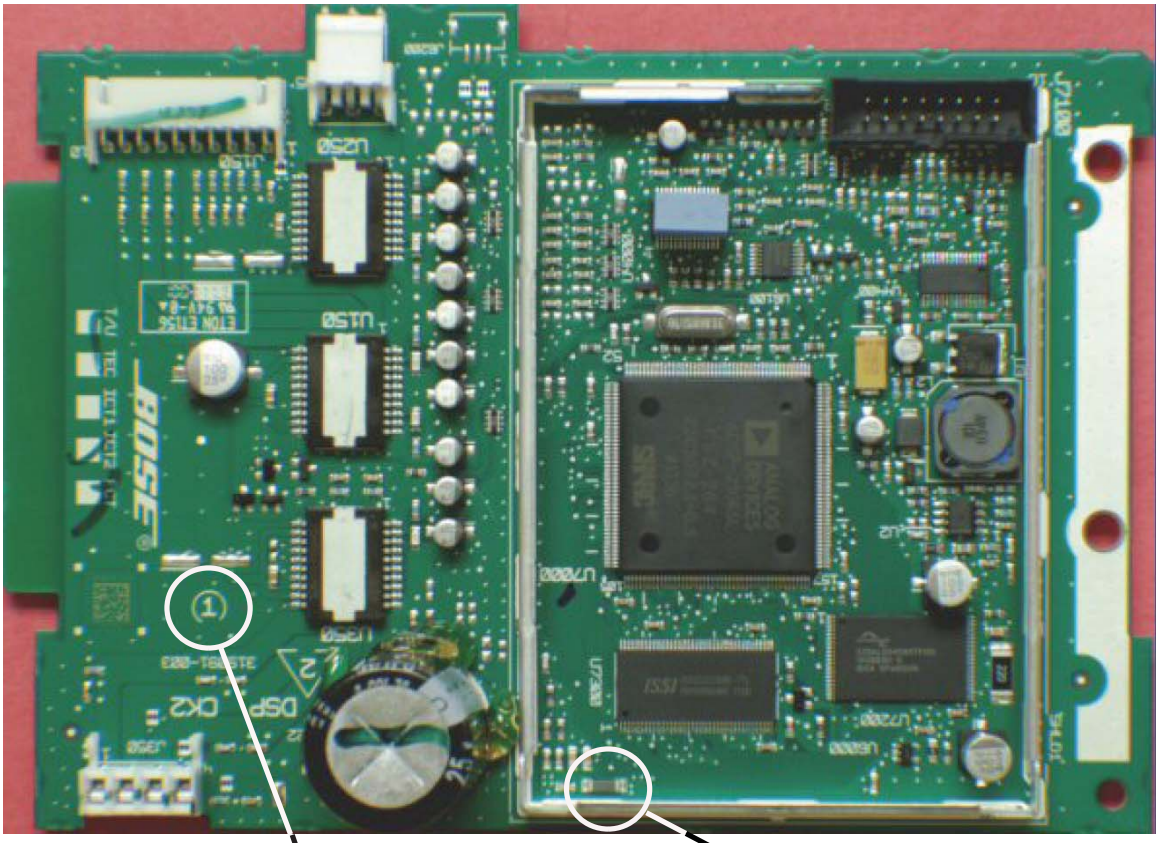


Figure 2.

CineMate® II Main Board



FB70 should be replaced if the product DOM is within 1299 to 1321 and the board has the number 1 as shown.

Note: Boards with the number 2 do not need FB70 replaced.

Figure 3.

SERVICE BULLETIN

Bulletin Part Number: 318842-B4

Product: CineMate® Series II Digital Home Theater Speaker System.

Subject: The service I/O board will no longer have MOV (VR601) populated. The MOV has been relocated from the I/O board to the Power Supply board in location VR701.

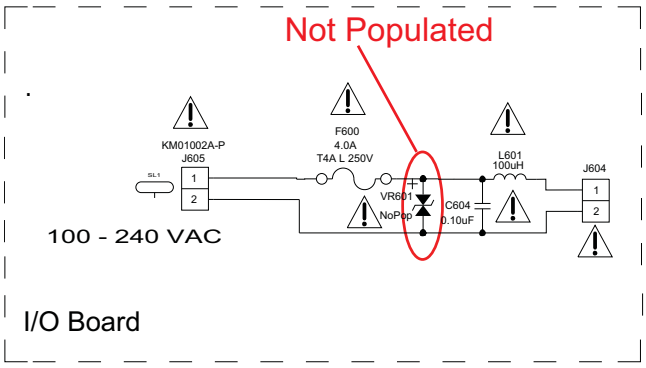


Figure 1.

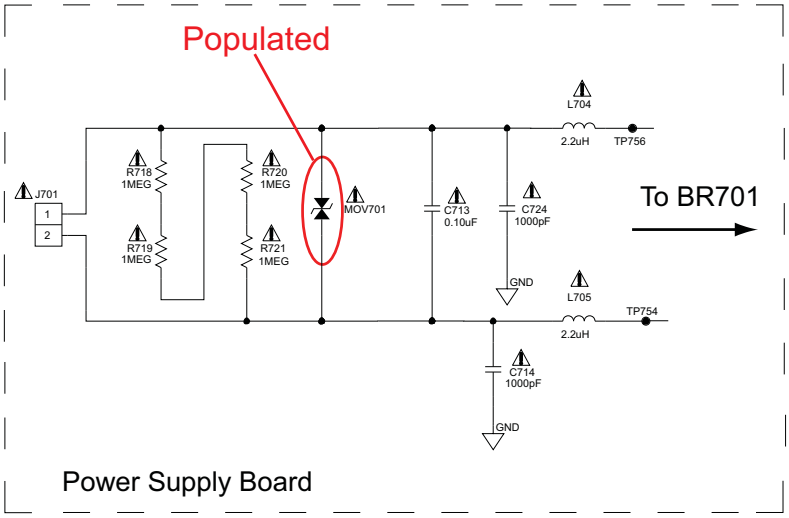


Figure 2.

Disposition: When replacing the I/O board on any CineMate Series II product, inspect the new board and the product to determine the location of the MOV.

Symptom: This service bulletin shall be followed regardless of symptom when replacing the I/O board.

Reason: VR601 on the new I/O board is not populated and the MOV is needed to protect the power supply circuit.

Solution: A visual inspection is necessary when replacing the I/O board to verify the location of the MOV. See matrix below to determine what action to needed:

Replacement I/O board	Location of MOV within the product	Action
Use replacement I/O board 361719-001S. The MOV VR601 will not be populated. DO NOT USE OLD I/O BOARD part # 318892-001S as the replacement.	MOV is located on the I/O board	Install MOV part number 361431-0020 into location VR701 on the power supply board
	MOV is located on the power supply board	No action needed

⚠ Important: Safety bulletin 318842-SB1 should always be followed unless the I/O board is defective and replaced with part # 361719-001S.

Date Issued: 2/13
ECN = 53876

SERVICE BULLETIN

Bulletin Part Number: 318842-B5

Product: CineMate® Series II Digital Home Theater Speaker System.

Subject: Primary power cable terminal may not be correctly seated into the connector housing.

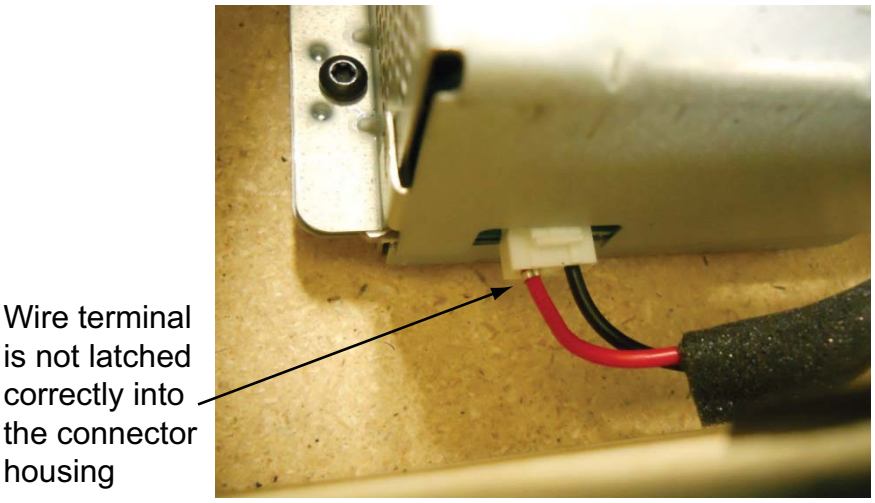


Figure 1.

Disposition: Confirm wire terminal is seated correctly on product that requires repair built prior to DOM 3071 (March 12th, 2013).

Symptom: Intermittent or no power. The wire terminal should be checked on product built before DOM 3071 regardless of the symptom.

Reason: The primary power cable was not assembled correctly.

Solution: If the wire terminal is not seated correctly, replace the primary power cable. Part number 319486-1020.

Date Issued: 4/13
PH: 200123199

LEGEND
DIGITAL AUDIO PATH
ANALOG AUDIO PATH
ON VOLTAGES
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All components under shielding

DSP

U6100 258464-004 (1/6)

L71 400-100MHz

U6000 256123-001
C6000 0.047uF
R6001 1K
R6000 3.3K

U7000 254191-003
76_FLAG11
78_FLAG10
79_FLAG9
80_FLAG8
134_FLAG7
136_FLAG6
137_FLAG5
138_FLAG4
201_FLAG3
199_FLAG2
198_FLAG1
197_FLAG0
205_IRQ0
206_IRQ1
207_IRQ2
143_ID1
144_ID0
2_RFS0
4_RCLK0
5_DR0A
6_DR0B
7_TFS0
8_TCLK0
11_DT0A
12_DT0B
CLKIN_30
RFS1_13
RCLK1_15
DR1A_16
DR1B_17
TFS1_18
TCLK1_19
DT1A_22
DT1B_23
RESET_157
PWM1_24
PWM0_26
EMU_145
TD0_146
TRST_147
TDI_148
TMS_149
TCK_151
21065
XTAL_31

U4400 267616-002 CS8415A

U4000 254192-003 CS4228A

J7101 NoPop

Y7000 HC-49/S

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DSP

U7000
254191-003

21065

SW_64
CPA_65
SBTS_56
BMSTR_53
BR1_27
BR2_28
MS0_70
MS1_71
MS2_74
MS3_75
BMS_153
BSEL_152
NC_102
NC_103
NC_115
NC_142
NC_202
NC_203
NC_208
43_CAS
46_DQM
42_RAS
48_SDA10
34_SDCLK1
37_SDCLK0
47_SDCKE
44_SDWE
38_DMAR1
39_DMAR2
50_DMAG1
51_DMAG2
55_CS
40_HBR
52_HBG
63_REDY
59_RD
58_WR
69_ACK

+3.3V
R7204 47
R7203 4.7K

U7300
254182-010

1_Vcc
2_DQ0
3_Vcc
4_DQ1
5_DQ2
6_VssQ
7_DQ3
8_DQ4
9_VccQ
10_DQ5
11_DQ6
12_VssQ
13_DQ7
14_Nc
15_Vcc
16_DQM0
17_WE
18_CAS
19_RAS
20_CS
21_NC
22_BS0
23_BS1
24_A10_AP
25_A0
26_A1
27_A2
28_DQM2
29_Vcc
30_NC
31_DQ16
32_VssQ
33_DQ17
34_DQ18
35_VccQ
36_DQ19
37_DQ20
38_VssQ
39_DQ21
40_DQ22
41_VccQ
42_DQ23
43_Vcc
Vss_86
DQ15_85
VssQ_84
DQ14_83
DQ13_82
VccQ_81
DQ12_80
DQ11_79
VssQ_78
DQ10_77
DQ9_76
VccQ_75
DQ8_74
NC_73
Vss_72
DQM1_71
NC_70
NC_69
CLK_68
CKE_67
A9_66
A8_65
A7_64
A6_63
A5_62
A4_61
A3_60
DQM3_59
Vss_58
NC_57
DQ31_56
VccQ_55
DQ30_54
DQ29_53
VssQ_52
DQ28_51
DQ27_50
VccQ_49
DQ26_48
DQ25_47
VssQ_46
DQ24_45
Vss_44

C7300 0.047uF
C7303 0.047uF
C7302 0.047uF
C7301 0.047uF
GND

U7000
254191-003

21065

160_ADDR23
161_ADDR22
162_ADDR21
164_ADDR20
165_ADDR19
166_ADDR18
169_ADDR17
170_ADDR16
171_ADDR15
173_ADDR14
174_ADDR13
175_ADDR12
178_ADDR11
179_ADDR10
180_ADDR9
183_ADDR8
184_ADDR7
185_ADDR6
188_ADDR5
189_ADDR4
190_ADDR3
193_ADDR2
194_ADDR1
195_ADDR0
DATA31_133
DATA30_132
DATA29_128
DATA28_127
DATA27_126
DATA26_123
DATA25_122
DATA24_121
DATA23_118
DATA22_117
DATA21_116
DATA20_113
DATA19_112
DATA18_111
DATA17_109
DATA16_108
DATA15_107
DATA14_104
DATA13_101
DATA12_100
DATA11_98
DATA10_97
DATA9_96
DATA8_92
DATA7_91
DATA6_90
DATA5_88
DATA4_87
DATA3_86
DATA2_84
DATA1_83
DATA0_82

U7200
M29W400BB

37_VCC
45_DQ15/A-1
43_DQ14
41_DQ13
39_DQ12
36_DQ11
34_DQ10
32_DQ9
30_DQ8
44_DQ7
42_DQ6
40_DQ5
38_DQ4
35_DQ3
33_DQ2
31_DQ1
29_DQ0
11_WE
26_CE
28_OE
15_RY/BY
12_RESET
47_BYTE
46_VSS
27_VSS
A17_17
A16_48
A15_1
A14_2
A13_3
A12_4
A11_5
A10_6
A9_7
A8_8
A7_18
A6_19
A5_20
A4_21
A3_22
A2_23
A1_24
A0_25
NC_9
NC_10
NC_13
NC_14
A18_16

C7200 0.047uF
R7200 100K
R7201 10K
R7202 4.7K
Q7200 146817
RP
RST

D[0-31]
A[0-20]
A[0] A[1] A[2] A[3] A[4] A[5] A[6] A[7] A[8] A[9] A[10] A[11] A[12] A[13] A[16] A[17] A[18] A[19] A[20]
D[0] D[1] D[2] D[3] D[4] D[5] D[6] D[7] D[8] D[9] D[10] D[11] D[12] D[13] D[14] D[15] D[16] D[17] D[18] D[19] D[20] D[21] D[22] D[23] D[24] D[25] D[26] D[27] D[28] D[29] D[30] D[31]

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DIGITAL AUDIO PATH
ANALOG AUDIO PATH
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All components under shielding

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DIGITAL AUDIO PATH
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R1006 100K
510ohm R1001 8 1 C1001 1000pF SG1001 GND GND
510ohm R1001 4 5 510ohm R+ PG1 C/3
510ohm R1001 7 2 C1002 1000pF SG1002 GND GND
510ohm R1001 3 6 510ohm R- PG1 C/3

R1007 100K
510ohm R1005 1 8 C1000 1000pF SG1000 GND GND
510ohm R1005 5 4 510ohm L+ PG1 D/3
510ohm R1005 2 7 C1003 1000pF SG1003 GND GND
510ohm R1005 6 3 510ohm L- PG1 D/3

270584-016 J7100
GND 1
R+ 2
R- 3
GND 4
L+ 5
L- 6
GND 7
SPDIF1 8
GND 9
POT-A 10
POT-B 11
IR-COMM 12
SPKR_SENSE 13
POT-C 14
TRI-ST-CTL 15
+3.3VF 16

L73 400-100MHz
D4505 147239
R4506 75
C7011 150pF
C4500 68pF
R4500 100
R4505 100
SP1

R7211 75
C7305 0.0047uF
D4511 147239
POT-A PG1 D/6

R4502 75
C4502 0.0047uF
D4501 147239
POT-B PG1 D/6

R6104 75
C6102 1000pF
D4510 147239
IR-COMM PG1 B/4

R6105 75
C6101 0.0047uF
D4503 147239
SPKR_SENSE PG1 C/6

R4501 75
C4501 0.0047uF
D4500 147239
POT-C PG1 C/3

R6501 75
C6501 0.0047uF
D4509 147239
3CTL PG1 D/5

+3.3V

U7000
1_VDD 9_VDD 20_VDD 21_VDD 29_VDD 32_VDD 36_VDD 45_VDD 54_VDD 61_VDD 66_VDD 67_VDD 77_VDD 85_VDD 93_VDD 95_VDD 105_VDD 110_VDD 120_VDD 124_VDD 130_VDD 131_VDD 140_VDD 141_VDD 156_VDD 158_VDD 163_VDD 172_VDD 176_VDD 182_VDD 191_VDD 192_VDD 200_VDD
GND_3 GND_10 GND_14 GND_25 GND_33 GND_35 GND_41 GND_49 GND_57 GND_60 GND_62 GND_68 GND_72 GND_73 GND_81 GND_89 GND_94 GND_99 GND_106 GND_114 GND_119 GND_125 GND_129 GND_135 GND_139 GND_150 GND_154 GND_155 GND_159 GND_167 GND_168 GND_177 GND_181 GND_186 GND_187 GND_196 GND_204
21065

C7000 0.047uF C7001 0.047uF C7002 0.047uF C7003 0.047uF C7004 0.047uF C7005 0.047uF C7006 0.047uF C7007 0.047uF

SHLD1 PT268777-001

+3.3VF
C7308 0.0047uF
SG4502
SG4500 SG4501 SG6202 SG6203 SG6204 SG6100 SG4503

outside inside
D4504 BAV99 NoPop
R6200 4.7K NoPop
R6202 75 NoPop TAPIN
R6204 10K NoPOp
Q6200 MMBT3904 NoPop
C6202 470pF NoPop
J6200 255125-003 NoPop
R6201 1K NoPop
Q6201 MMBT3904 NoPop
R6203 2.2K NoPop TAPOUT
SG6200 SG6201
C6203 470pF NoPop

DSP

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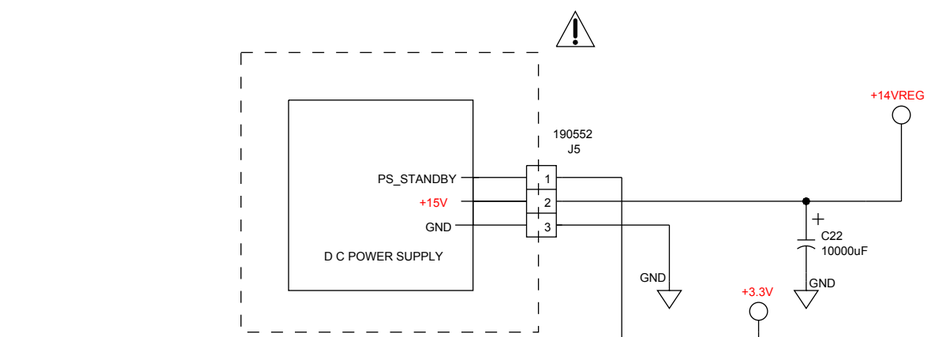

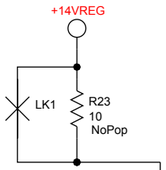

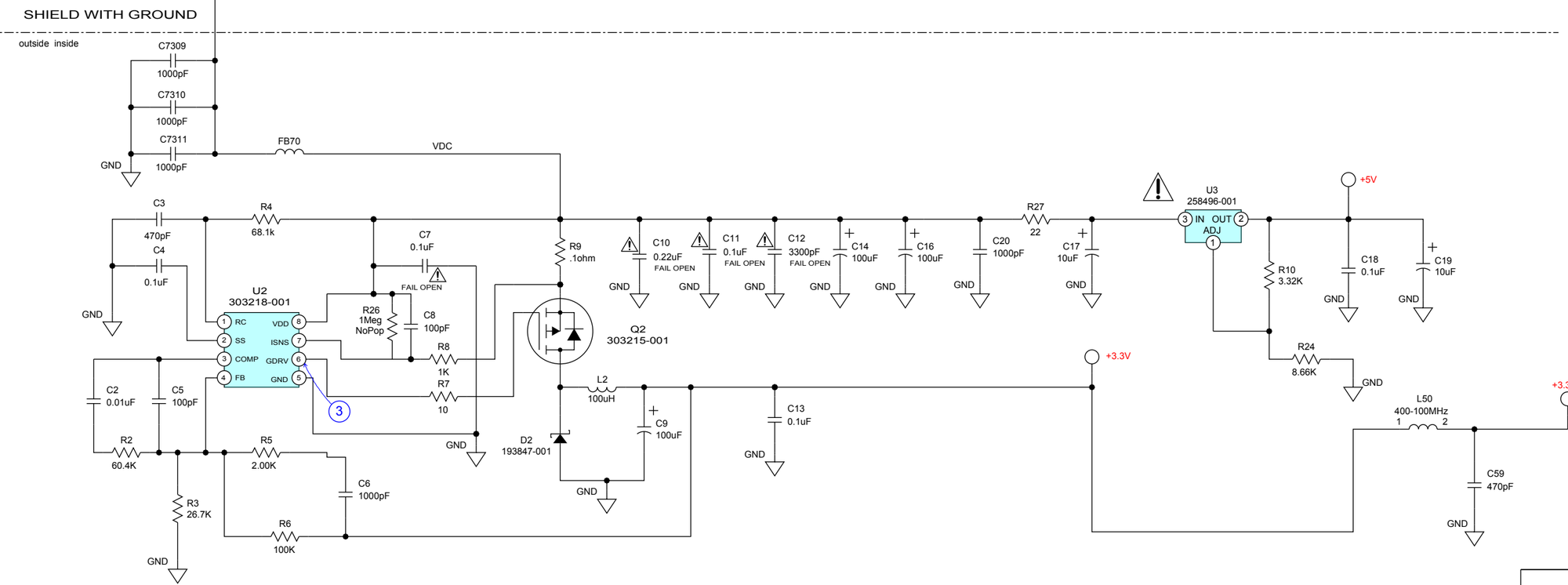

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DIGITAL AUDIO PATH
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DSP

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+3.3VF R453 22 NoPop RT1 NoPop
DIAG R457 22 NoPop R456 22 NoPop C365 0.047uF NoPop R7207 3.32K NoPop GND

R350 3.9K
BASS+ BASS- SIX+ SIX-
C356 1uF R351 7.87K C358 0.001uF C357 1uF

U350 257975
+14VREG C350 100uF NoPop C351 0.047uF FAIL OPEN GND
VCC1 VCC2 In1+ In1- In2+ In2- Out1+ Out1- Out2+ Out2- Diag Clip Mode SGnd PGnd1 PGnd2
C363 470pf R362 3.32 C352 0.01uF SG352 GND
R452 4.7K +3.3VF BASSCLIP
R363 3.32 C353 0.01uF SG353
C360 470pf
C361 470pf R364 3.32 C354 0.01uF SG354
C362 470pf R365 3.32 C355 0.01uF SG355
MODE 12.5 0

266952-04 J350
BASSD+ BASSD- SIXD+ SIXD- BASS

+14VREG Q452 189290-001 14 0 14 0
STDBYout 3.3 0 Q451 146817 R451 47K 12.5 0 GND
+3.3VF D450 135247-5231 R450 10K 10 0
MUTE 3.3 0 Q450 146817 GND

R150 3.9K
LC+ LC- LS+ LS-

U150 257975
+14VREG C150 100uF C151 0.047uF FAIL OPEN GND
VCC1 VCC2 In1+ In1- In2+ In2- Out1+ Out1- Out2+ Out2- Diag Clip Mode SGnd PGnd1 PGnd2
C156 1uF R151 7.87K C158 0.001uF C157 1uF
C159 1uF R152 7.87K C161 0.001uF C160 1uF
MODE 12.5 0
R454 4.7K +3.3VF ARRAYCLIP
R162 3.32 C152 0.01uF SG152
R163 3.32 C153 0.01uF SG153
R164 3.32 C154 0.01uF SG154
R165 3.32 C155 0.01uF SG155

PT145402-10 J150
RSD- RSD+ RCD- RCD+ LCD+ LCD- LSD+ LSD-

R250 3.9K
RC+ RC- RS+ RS-

U250 257975
+14VREG C250 100uF NoPop C251 0.047uF FAIL OPEN GND
VCC1 VCC2 In1+ In1- In2+ In2- Out1+ Out1- Out2+ Out2- Diag Clip Mode SGnd PGnd1 PGnd2
C256 1uF R251 7.87K C258 0.001uF C257 1uF
C259 1uF R252 7.87K C261 0.001uF C260 1uF
MODE 12.5 0
ARRAYCLIP
R262 3.32 C252 0.01uF SG252
R263 3.32 C253 0.01uF SG253
R264 3.32 C254 0.01uF SG254
R265 3.32 C255 0.01uF SG255

All components outside of shielding

DSP

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CINEMATE SERIES II
SYSTEM, PCB, MULTI
PCB P/N: 319091
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J600 PLUGS TO DSP J150

271899-010
J600

1	GND	
2	LS-	
3	LS+	
4	LC-	
5	LC+	
6	RC+	
7	RC-	
8	RS+	
9	RS-	
10	GND	

J601 TO SPEAKER CABLE

DS34-09S1BJ
J601

LC-	1	
LC+	2	
SPKR_SENSE	3	
RC+	4	
RC-	5	
LS+	6	
LS-	7	
RS-	8	
RS+	9	
	10	
GND	11	

KM01002A-P
J605

SL1	1
	2

100 - 240 VAC

F600
4.0A
T4A L 250V

VR601

C604
0.10uF

L601
100uH

J604
271897-002

1	+14V
2	GND

SWITCH POWER SUPPLY

J602 PLUGS TO DSP J7100

J602
HP30-C16SF

16	R+	
15	R-	
14		
13	L+	
12	L-	
11	SPDIF_GND	
10	SPDIF1	
9		
8	POT-A	
7	POT-B	
6	IR	
5		
4	POT-C	
3	TRI-ST-CTL	
2	+3.3V	
1		

C602
2.2uF

C601
4.7uF

JP601
0ohm

LK1

C600
2.2uF
NoPop

C603
2.2uF

R600
10K

C605
0.0047uF

GND

R603
470K

R601
470K

R602
470K

285818-001
J603

Right	1	
AGND	2	
	3	
TRI-ST-CTL	4	
+3.3V	5	
Left	6	
SPDIF_GND	7	
SPDIF1	8	
IR	9	
	10	MTH
	11	MTH

SG7 SG6 SG2 SG1 SG3 SG5 SG4

GND

LEGEND
DIGITAL AUDIO PATH
ANALOG AUDIO PATH
ON VOLTAGES
OFF VOLTAGES

I/O PCB

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CINEMATE SERIES II
SYSTEM, PCB, MULTI
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POWER SUPPLY

LEGEND
DIGITAL AUDIO PATH
ANALOG AUDIO PATH
ON VOLTAGES
OFF VOLTAGES

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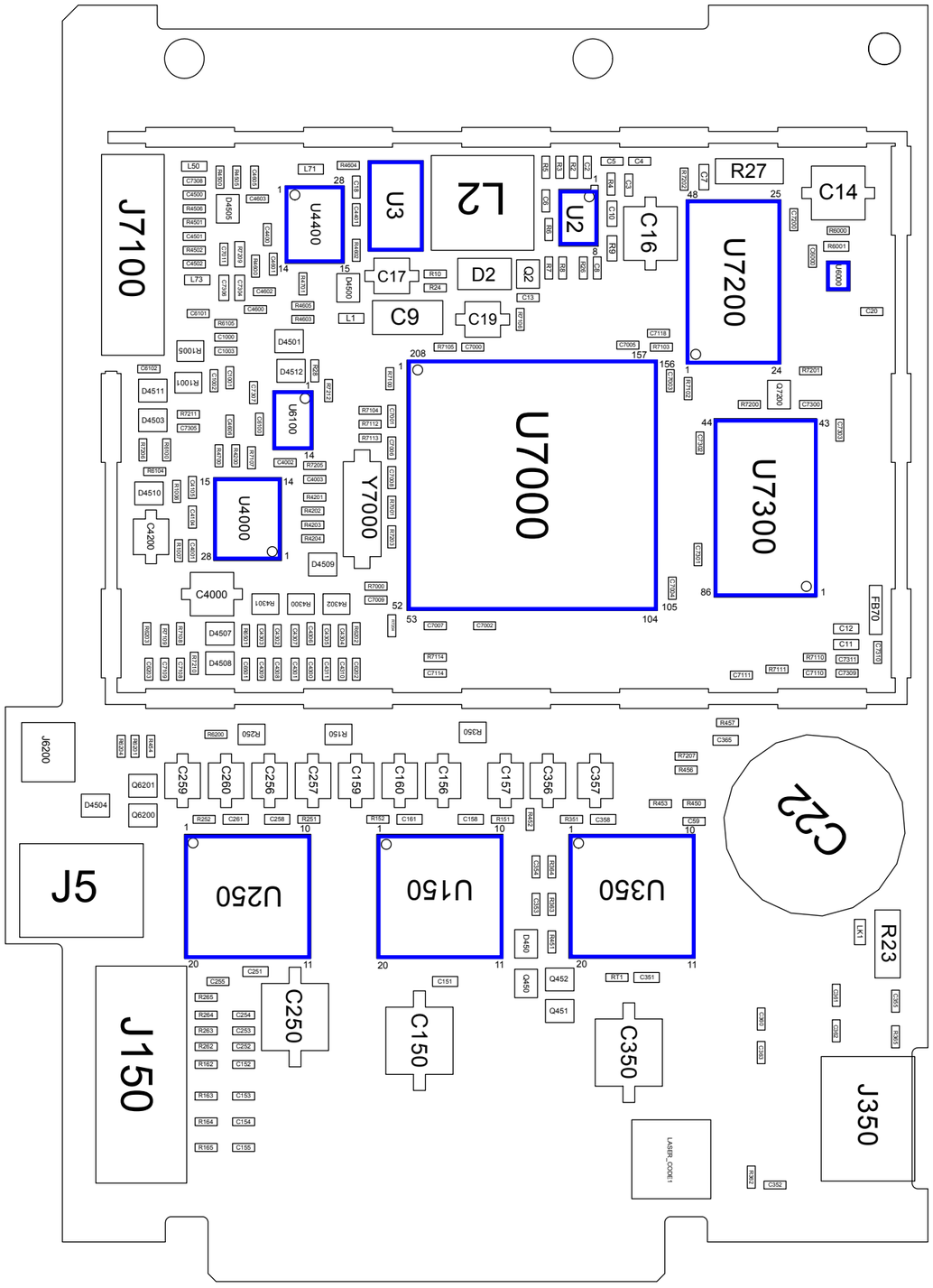
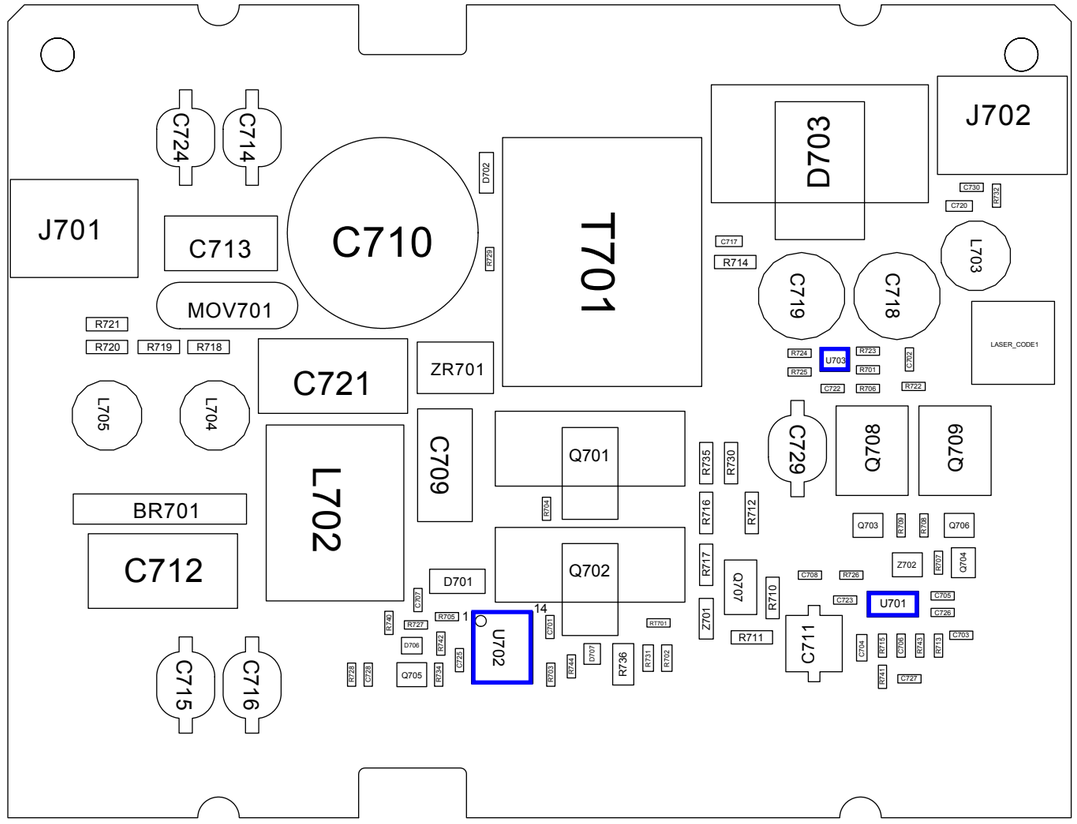
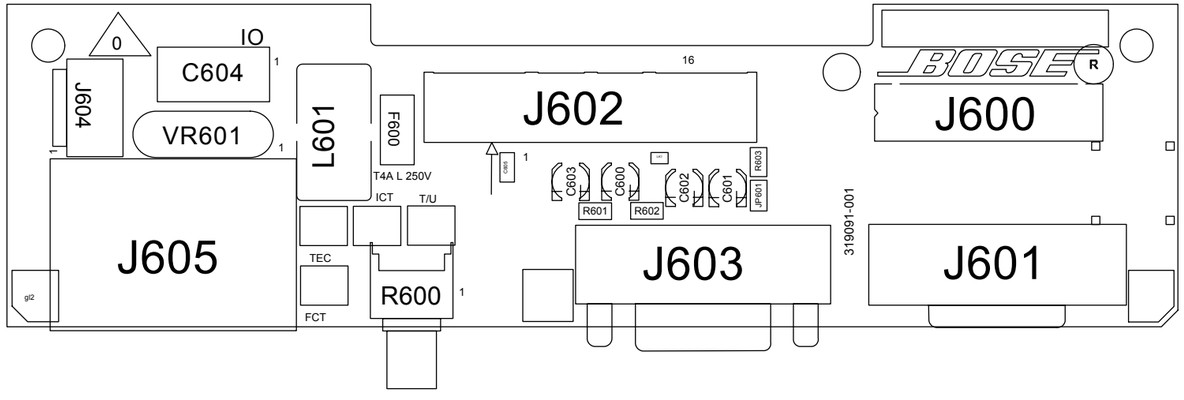
CINEMATE SERIES II
SYSTEM, PCB, MULTI
PCB P/N: 319091
Sheet 7 of 7



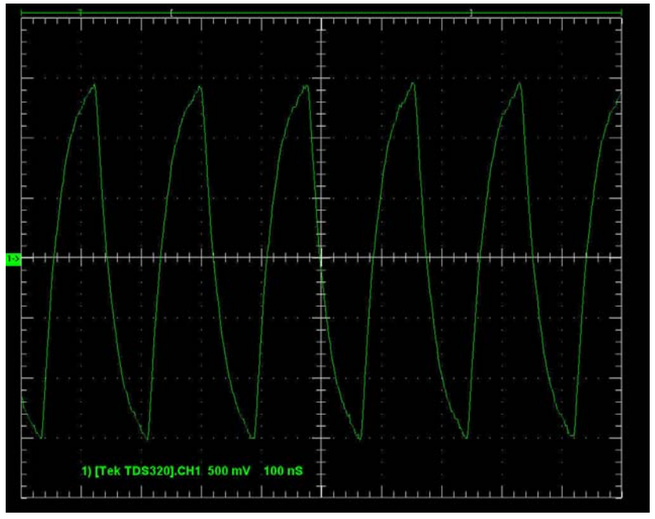
PCB ASSY, DSP, PRIMARY
PART NUMBER 318878-001S



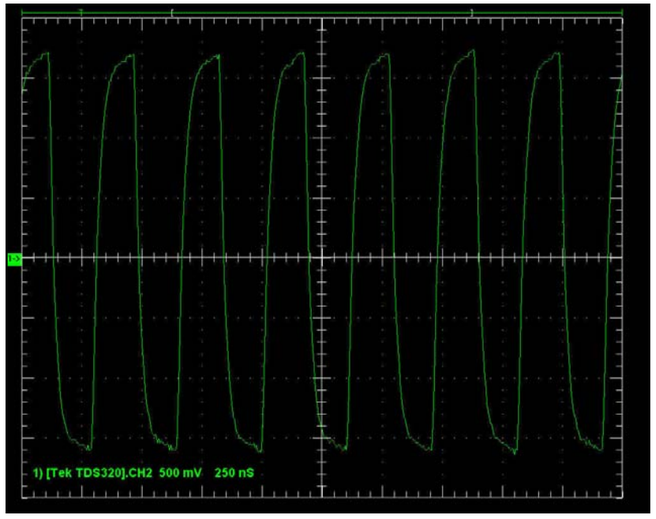
PCB ASSY, SPS, PRIMARY
PART NUMBER 319746-001S



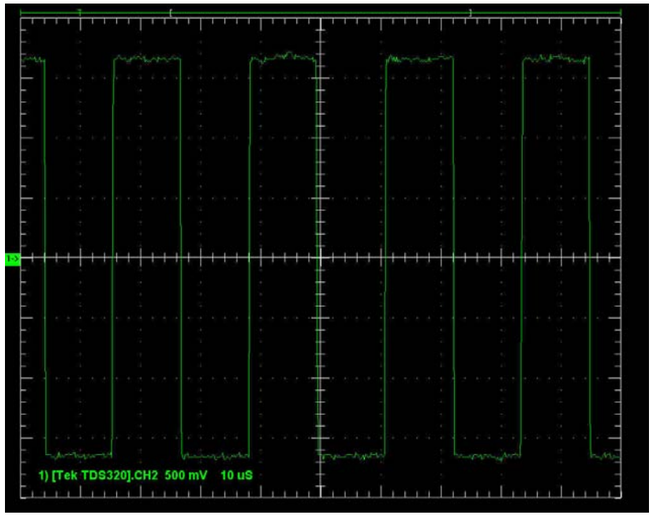
PCB ASSY, I/O, PRIMARY
PART NUMBER 318892-001S



(1) U4400 PIN 10 (MCLK)



(2) U7000 PIN 24 (SHARC_CLK)



(3) U2 PIN 6