Companion® 5 Multimedia Speaker System

CONTENTS

CAUTION: The Companion 5 Multimedia Speaker System contains no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

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.

Product Description Companion® 5

The Companion 5 is a multi-channel multimedia speaker system connecting to personal computers via a USB 2.0 interface. No additional sound card is required to enjoy 5.1-channel audio
content from the host PC. The two speaker arrays combined with advanced audio processing algorithms provide a spacious presentation of stereo content and a compelling experience with multi-channel content. A control module brings the master volume control, simple touch mute control and jacks for an auxiliary analog stereo input and headphones.

The Companion 5 system consisting of the following major components:

1. Bass speaker enclosure with Woofer
2. Control Module with an 8-foot (2.4M) cable.
3. Two two-element speaker arrays with integrated cables, uniquely keyed and identified for left and right locations.

The speaker arrays are mounted on removable speaker stands that are engineered to position the speakers at the correct height and angle on either side of a computer monitor. The transducers contained in the speaker enclosures may not be replaced. The speaker grills are glued in to prevent movement during shipping.

The integrated speaker cable is hard wired into the speaker enclosure and is not removable.

Specifications

Mechanical

Dimensions:	Bass Module:	8 5/8 "H x 7 1/8" W x 16 3/4" D (21.8 x 18 x 42.5 cm)
	Satellite Speaker:	9" H x 5 3/4" W x 4" D (22.86 x 14.60 x 10.16 cm)
	Control Pod:	2 1/2 "D x 1 1/8" H (6.35 x 2.79 cm)
Weight:	Bass Module:	18.1 lbs (8.2 kg) unpacked
	Satellite Speaker (stand included):	1.8 lbs (.816 kg) each
	Packaged System	27 lb (12.3 kg) packed
Finish:	Bass Module:	Scratch-resistant, satin-finish vinyl
	Satellites:	Painted polymer finish
Bass Box:		Ported
Bass Box Port Tuning:		50 Hz

Electrical

Power Rating:	USA/Canada:	115 VAC 60 Hz
	Japan:	100 VAC 50/60 Hz
	Euro:	230 VAC 50/60 Hz
Nominal System Bandwidth:		48 Hz to 18 kHz
Maximum SPL:		102 dBSPL (at normal listening distance)
Output:	Bass:	48Hz – 250Hz
	Satellites:	250Hz – 18Khz
USB:		USB 2.0 full-speed device with B-receptacle
		Supports 6-channel USB Audio Device and volume control and mute USB HID (Human Interface Device) controls
		Audio device and HID controls are all supported by standard USB host firmware

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 available as finished goods. Order this part using the product code listed.

5. This part is referenced for informational purposes only. It is not stocked as a repair part.

6. RoHS compliant part - Restriction of Hazardous Substances (RoHS) is a directive of the European Union which took effect July 1, 2006. The directive is aimed at protecting the health and environment and mandates that electronics products sold in the European Union must be essentially void of six hazardous substances: lead, mercury, cadmium, hexavalent chromium, PBB and PBDE flame retardants.
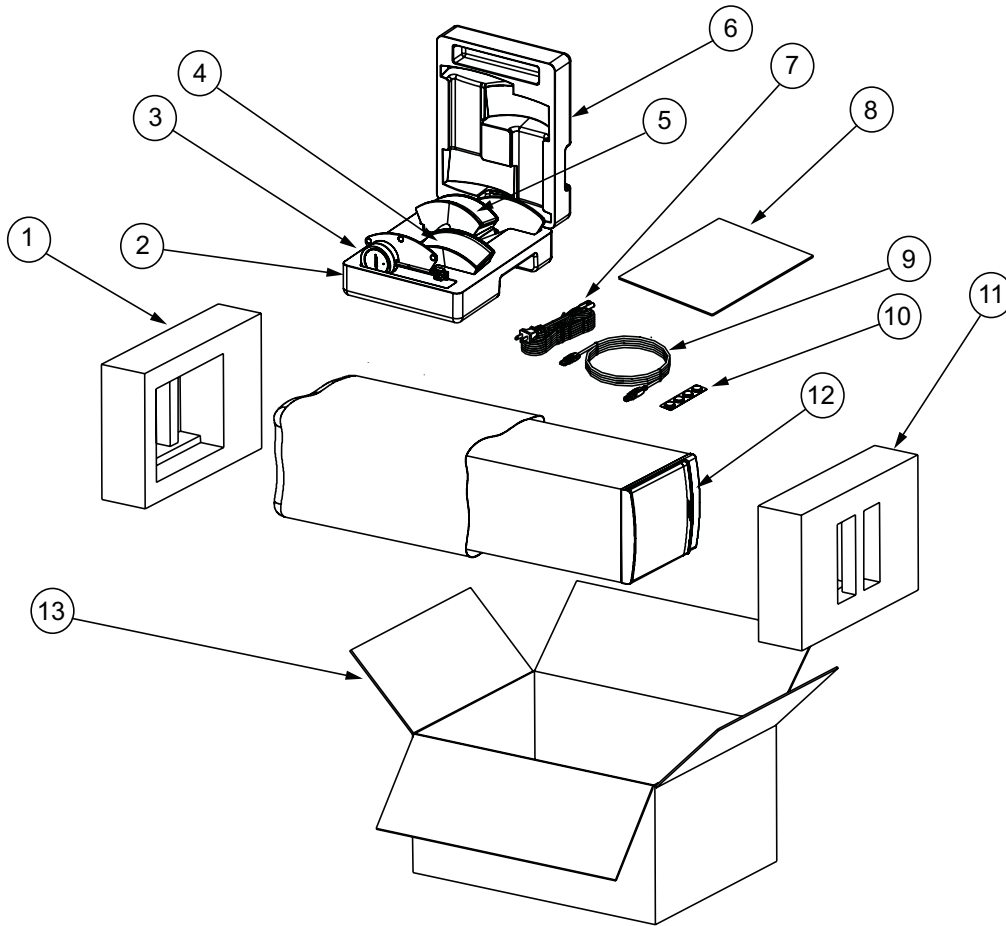
COMPANION® 5 PACKAGING VIEW

Figure 1. Companion 5 Multimedia Speaker System Packaging View

Item	Description	Part number	Note
1	PACKING, FOAM, EPS, RS, BB	298097	
2	PACKING, FOAM, EPS	295570	
3	REMOTE CONTROL ASSY	295974-001	
4	ARRAY/STAND ASSY, RIGHT	300634-001	
5	ARRAY/STAND ASSY, LEFT	300635-001	
6	PACKING, FOAM, EPS	295570	
7	LINE CORD, 120V, PDL DET, BLK LINE CORD, 100V, DET, NONPVC, BLK LINE CORD, 230V, UKS, DET, BLK LINE CORD, 240V, AUS, DET, BLK LINE CORD, 220V, EUR, DET, BLK	262814-001 286080-001 280138-001 284243-001 280135-001	3 ⚠
8	GUIDE, OWNERS, COMP5, 3L	295925	
9	CABLE, USB 2.0, TYPE A TO B, 6FT CABLE, USB 2.0, TYPE A TO B, 10FT	292477-001 292477-002	
10	FOOT, RUBBER, PSA BACKED, 4 PACK	297482-001	
11	PACKING, FOAM, EPS, BB	300269	
12	ASSY, BBOX, COMP 5, 120V ASSY, BBOX, COMP 5, 230V	290172-S139 290172-S239	
13	CARTON, RSC	295572	
-	CARTON, KIT	300267-K	

BASS MODULE EXPLODED VIEW

Note: The Transformer and Woofer are note replaceable. The cabinet is glued together preventing access to these parts.
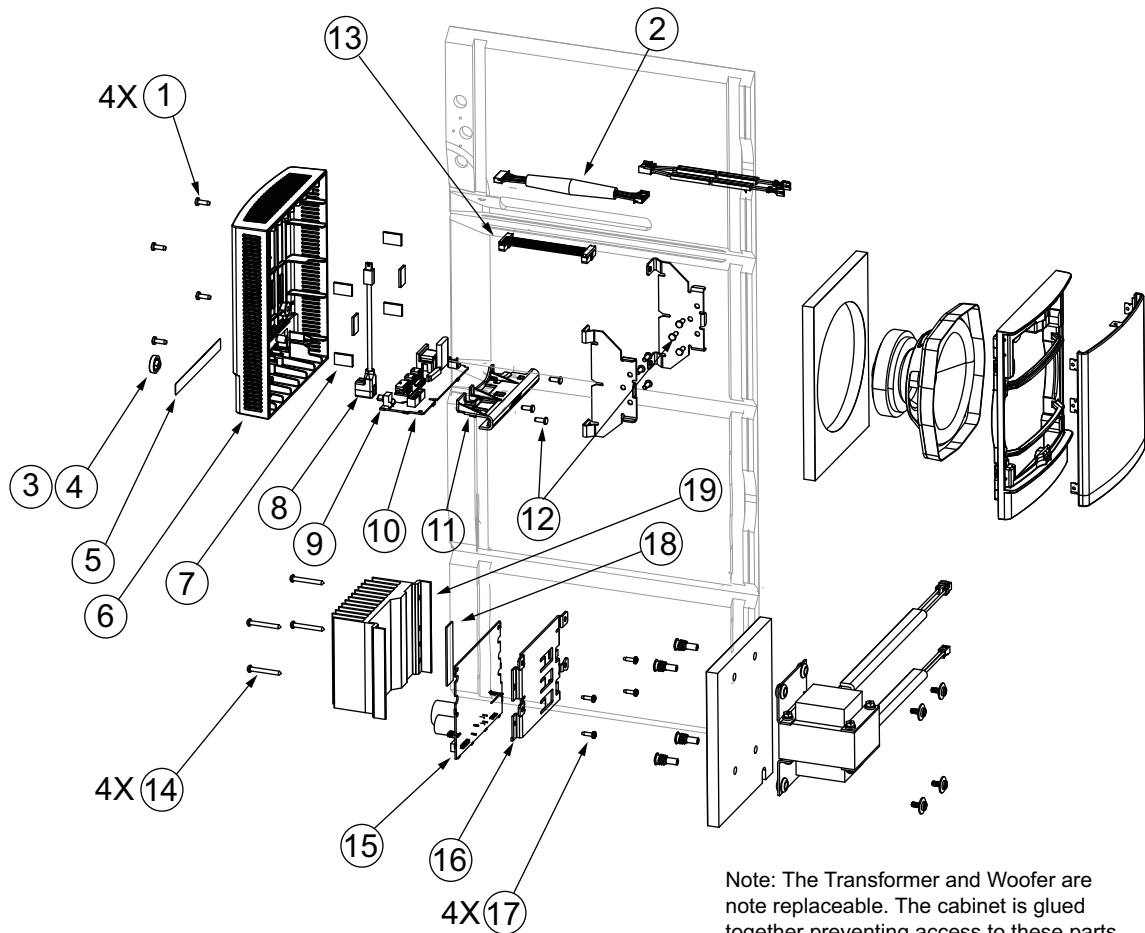
Figure 2. Bass Module Exploded veiw

Item	Description	Part number	Qty.	Note
1	SCREW, TT, 8-32X0.5, PAN, XREC/SQ	289393-008	4	5
2	CABLE, 8 CONDUCTOR	291574-150	1	
3	KNOB, VOLUME CONTROL, BLACK	294599-001	1	
4	CLIP, SPRING, KNOB	262542	1	
5	LABEL, I/O,BASS MODULE	295923-001	1	
6	COVER REAR BASS MODULE	296122-002	1	5
7	FOAM, GRILLE, ARRAY,.125"	272036-002	6	
8	HARNESS, USB, TYPE B TO MINI B	296603-001	1	
9	PAD, FOAM, .25" X .75" X .06	278144-001	2	
10	PCB ASSY, INPUT/OUTPUT, US/JAPAN PCB ASY, INPUT/OUTPUT, ROHS, EURO	299764-001 299765-002	1	
11	BRACKET, INPUT/OUTPUT, PCB	292181-002	1	5
12	SCREW, TAPP, 8-11x.437, PAN, XRC/S	289388-007	9	5
13	HARNESS, IDC, FLAT CABLE	291575-088	1	
14	SCREW, TAPP, 8-11x1.5, PAN, XRC/SQ	289388-024	4	5
15	ASSY, PCB, DSP, US/JAPAN ASSY, PCB, DSP, ROHS, EURO	299766-201 303250-202	1	
16	BRACKET HEATSINK	296120-001	1	5
17	SCREW, TAPP, 6-32, PAN, TORX	279948-08	4	5
18	PAD, THERMAL, DIODE	295975-001	1	5
19	HEATSINK, COMPANION 5	296119-001	1	5

ELECTRICAL PART LIST

Bass Module DSP PCB

Resistors

Reference Designator	Description	Part Number	Note
R0010	5.9k, 0603, .1W, 1%	191465-5901	
R0011	750 OHM, 0603, .1W, 1%	191465-7500	
R0012	12.1K, 0603, .1W, 1%	191465-1212	
R0013	19.6K, 0603, .1W, 1%	191465-1962	
R0014	9.09 OHM, 0603, .1W, 1%	191465-9091	
R0015	20K, 0603, .1W, 5%	199403-203	
R0016	5.9K, 0603, .1W, 1%	191465-5901	
R0018	392K, 0603, 1W, 1%	191465-3923	
R0019	31.6K, 0603, .1W, 1%	191465-3162	
R0020	1K, 0603, .1W, 1%	191465-1001	
R0021	3.09K, 0603, .1W, 1%	191465-3091	
R0022	1K, 0603, .1W, 1%	191465-1001	
R0023	7.15K, 0603, .1W, 1%	191465-7151	
R0025	47K, 0603, .1W, 5%	199403-473	
R0026	4.7K, 0603, .1W, 5%	199403-472	
R0050	150K, 0603, .1W, 1%	191465-1503	
R0052	365K, 0603, 1W, 1%	191465-3653	
R0054	100 OHM, 0603, .1W, 5%	199403-101	
R0055	10 OHM, 0603, .1W, 5%	199403-100	
R0056	365 OHM, 0603, .1W, 1%	191465-3650	
R0057	11K, 0603, .1W, 1%	191465-1102	
R0059	2K, 0603, .1W, 1%	191465-2001	
R0060	7.87K, 0603, .1W, 1%	191465-7871	
R0150	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	
R0151	8.25K, 0603, 1W, 1%	191465-8251	
R0152	8.25K, 0603, 1W, 1%	191465-8251	
R0162	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0163	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0164	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0165	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0250	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	
R0251	8.25K, 0603, 1W, 1%	191465-8251	
R0252	8.25K, 0603, 1W, 1%	191465-8251	
R0262	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0263	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0264	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0265	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0350	3.9K, ARRAY, SMT, 4 POS, 5%	186433-3924	
R0351	8.25K, 0603, 1W, 1%	191465-8251	
R0362	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0363	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0364	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0365	3.32 OHM, 0603, 1W, 1%	191465-3R32	
R0451	47K, 0603, .1W, 5%	199403-473	

ELECTRICAL PART LIST

Bass Module DSP PCB

Resistors (continued)

Reference Designator	Description	Part Number	Note
R0452	4.7K, 0603, .1W, 5%	199403-472	
R0453	150K, 0603, .1W, 1%	191465-1503	
R0454	4.7K, 0603, .1W, 5%	199403-472	
R1000	4.3K, 0603, .1W, 5%	199403-432	
R1001	4.3K, 0603, .1W, 5%	199403-432	
R1002	100 OHM, 0603, .1W, 5%	199403-101	
R1003	100 OHM, 0603, .1W, 5%	199403-101	
R1004	6.8K, 0603, .1W, 5%	199403-682	
R1005	6.8K, 0603, .1W, 5%	199403-682	
R1006	3.09K, 0603, .1W, 1%	191465-3091	
R1007	10K, 0603, .1W, 1%	191465-1002	
R1008	3.09K, 0603, .1W, 1%	191465-3091	
R1009	10K, 0603, .1W, 1%	191465-1002	
R1010	4.7K, 0603, .1W, 5%	199403-472	
R1011	4.7K, 0603, .1W, 5%	199403-472	
R4000	4.7 OHM, 0603, .1W, 5%	199403-4R7	
R4001	100 OHM, 0603, .1W, 5%	199403-101	
R4300	1.8K, ARRAY,SMT, 4 POS, 5%	186433-1824	
R4301	1.8K, ARRAY,SMT, 4 POS, 5%	186433-1824	
R4302	1.8K, ARRAY,SMT, 4 POS, 5%	186433-1824	
R6000	3.09K, 0603, .1W, 1%	191465-3091	
R6001	10 OHM, 0603, .1W, 5%	199403-100	
R6002	2K, 0603, .1W, 1%	191465-2001	
R6003	2K, 0603, .1W, 1%	191465-2001	
R6005	4.7K, 0603, .1W, 5%	199403-472	
R6006	100 OHM, ARRAY, SMT, 4 POS, 5%	186433-1014	
R6008	100 OHM, ARRAY, SMT, 4 POS, 5%	186433-1014	
R6009	15 OHM, 0603, .1W, 5%	199403-150	
R6010	100 OHM, 0603, .1W, 5%	199403-101	
R6011	5.11K, 0603, .1W, 1%	191465-5111	
R6012	100 OHM, 0603, .1W, 5%	199403-101	
R6013	5.11K, 0603, .1W, 1%	191465-5111	
R6101	100 OHM, 0603, .1W, 5%	199403-101	
R6102	2K, 0603, .1W, 1%	191465-2001	
R6103	10K, 0603, .1W, 5%	199403-103	
R6200	100 OHM, 0603, .1W, 5%	199403-101	
R6201	7.87K, 0603, .1W, 1%	191465-7871	
R6203	3.09K, 0603, .1W, 1%	191465-3091	
R6204	3.09K, 0603, .1W, 1%	191465-3091	
R6207	9.3K, 0603, .1W, 1%	191465-9311	
R6208	4.7K, ARRAY, SMT, 4 POS, 5%	186433-4724	
R6209	4.7K, 0603, .1W, 5%	199403-472	
R6210	8.25K, 0603, 1W, 1%	191465-8251	
R6211	4.7K, 0603, .1W, 5%	199403-472	

ELECTRICAL PART LIST

Bass Module DSP PCB

Resistors (continued)

Reference Designator	Description	Part Number	Note
R0452	4.7K, 0603, .1W, 5%	199403-472	
R6222	8.25K, 0603, 100MW, 1%	191465-8251	
R7000	2K, 0603, .1W, 1%	191465-2001	
R7001	2K, 0603, .1W, 1%	191465-2001	
R7002	JUMPER,CHIP, 0805	133627	
R7004	100 OHM, 0603, .1W, 5%	199403-101	
R7005	100 OHM, 0603, .1W, 5%	199403-101	
R7100	100 OHM, 0603, .1W, 5%	199403-101	
R8000	27.4 OHM, 0603, .1W, 1%	191465-27R4	
R8001	27.4 OHM, 0603, .1W, 1%	191465-27R4	
R8002	1.5K, 0603, SMD, 100MW, 5%	199403-152	
R9232	39K, 0603, SMD, 100MW, 5%	199403-393	
R9233	4.7K, 0603, .1W, 5%	199403-472	
R9235	23.7K, 0603, .1W, 1%	191465-2372	
R9236	7.15K, 0603, .1W, 1%	191465-7151	
R9237	16.5K, 0603, .1W, 1%	191465-1652	
R9238	1.82K, 0603, 1/10W, 1%	191465-1821	
R9240	10K, 0603, .1W, 5%	199403-103	
RQ1	1M, 1206, 1/4W, 5%	124895-1055	
RQ2	1M, 1206, 1/4W, 5%	124895-1055	
RQ3	1M, 1206, 1/4W, 5%	124895-1055	
RT6206	PTC, TEMP SENSE, 105C, 20%	258497-105	3 ⚠
RT6307	PTC, TEMP SENSE, 105C, 20%	258497-105	3 ⚠

ELECTRICAL PART LIST

Bass Module DSP PCB

Capacitors

Reference Designator	Description	Part Number	Note
C0010	15000uF, EL, SNP, 105C, 25V, 20%	261614-153EB3	
C0015	.022uF, 0603, X7R, 50V, 10%	191470-223	
C0019	.047uF, 0805, X7R, 50V, 10%	286499-473	
C0024	.047uF, 0805, X7R, 50V, 10%	286499-473	
C0025	.047uF, 0805, X7R, 50V, 10%	286499-473	
C0028	2.2uF, EL, 85C, 35V, 20%	177902-2R2H	
C0029	.047uF, 0805, X7R, 50V, 10%	133623-473	
C0048	4700uF, EL, SNAP, 105C, 50V, 10%	261614-472HB3	
C0049	2.2uF, EL, 85C, 35V, 20%	177902-2R2H	
C0050	22uF, EL, 85C, 50V, 20%	177902-220HA	
C0051	.047uF, 0805, X7R, 50V, 10%	286499-473	
C0054	0.1, X7R, 0603, 10%, 50V	191470-104	
C0055	2200PF, 0603, X7R, 50V, 10%	191470-222	
C0060	100uF, 7343, LO-R, TANT, 10V, 10%	275411-107	
C0061	100uF, 7343, LO-R, TANT, 10V, 10%	275411-107	
C0062	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0063	470pF, 0603, COG, 50V, 5%	188454-471	
C0064	.033uF, 0603, X7R, 50V, 10%	191470-333	
C0099	100pF, 0805, COG, 50V, 5%	133622-101	
C0151	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C0152	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0153	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0154	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0155	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0156	1uF, EL, 85C, 50V, 20%	177902-010H	
C0157	1uF, EL, 85C, 50V, 20%	177902-010H	
C0158	560pF, 0603, X7R, 50V, 10%	191470-561	
C0159	1uF, EL, 85C, 50V, 20%	177902-010H	
C0160	1uF, EL, 85C, 50V, 20%	177902-010H	
C0161	560pF, 0603, X7R, 50V, 10%	191470-561	
C0251	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C0252	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0253	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0254	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0255	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0256	1uF, EL, 85C, 50V, 20%	177902-010H	
C0257	1uF, EL, 85C, 50V, 20%	177902-010H	
C0258	560pF, 0603, X7R, 50V, 10%	191470-561	
C0259	1uF, EL, 85C, 50V, 20%	177902-010H	
C0260	1uF, EL, 85C, 50V, 20%	177902-010H	
C0261	560pF, 0603, X7R, 50V, 10%	191470-561	
C0351	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C0352	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0353	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0354	.01uF, 0603, X7R, 50V, 1%	191470-103	

ELECTRICAL PART LIST

Bass Module DSP PCB

Capacitors (continued)

Reference Designator	Description	Part Number	Note
C0355	.01uF, 0603, X7R, 50V, 1%	191470-103	
C0356	1uF, EL, 85C, 50V, 20%	177902-010H	
C0357	1uF, EL, 85C, 50V, 20%	177902-010H	
C0358	560pF, 0603, X7R, 50V, 10%	191470-561	
C1000	2.2uF, EL, 85C, 35V, 20%	177902-2R2H	
C1001	2.2uF, EL, 85C, 35V, 20%	177902-2R2H	
C1002	100pF, 0805, COG, 50V, 5%	133622-101	
C1003	100pF, 0805, COG, 50V, 5%	133622-101	
C1004	100pF, 0805, COG, 50V, 5%	133622-101	
C1005	100pF, 0805, COG, 50V, 5%	133622-101	
C1006	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C1007	470uF, EL, 85C, 16V, 20%	296512-471C	
C1008	470uF, EL, 85C, 16V, 20%	296512-471C	
C1009	100pF, 0603, COG, 50V, 5%	188454-101	
C1010	470pF, 0805, COG, 50V, 5%	133622-471	
C1011	470pF, 0805, COG, 50V, 5%	133622-471	
C4000	10uF, EL, 85C, 16V, 20%	177902-100C	
C4001	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C4002	10uF, EL, 85C, 16V, 20%	177902-100C	
C4003	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C4004	2.2uF, EL, 85C, 35V, 20%	177902-2R2H	
C4005	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C4006	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C4300	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4301	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4302	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4303	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4304	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4305	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4306	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4307	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4308	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4309	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4310	1000pF, 0603, X7R, 50V, 10%	191470-102	
C4311	1000pF, 0603, X7R, 50V, 10%	191470-102	
C6000	.047uF, 0805, X7R, 50V, 10%	133623-473	
C6001	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C6002	100pF, 0603, X7R, 50V, 10%	191470-101	
C6003	1000pF, 0603, X7R, 50V, 10%	191470-102	
C6004	27pF, 0603, COG, 50V, 5%	188454-270	
C6005	27pF, 0603, COG, 50V, 5%	188454-270	
C6006	33000pF, X7R SMD, 0603, 25V, 10%	257154-333K25	
C6007	.047uF, 0805, X7R, 50V, 10%	133623-473	
C6008	.047uF, 0805, X7R, 50V, 10%	133623-473	
C6100	100pF, 0805, COG, 50V, 5%	133622-101	

ELECTRICAL PART LIST

Bass Module DSP PCB

Capacitors (continued)

Reference Designator	Description	Part Number	Note
C0355	.01uF, 0603, X7R, 50V, 1%	191470-103	
C6101	100pF, 0805, COG, 50V, 5%	133622-101	
C6200	100pF, 0805, COG, 50V, 5%	133622-101	
C6201	.047uF, 0603, X7R, 25V, 5%	196999-473	
C6202	33000pF, X7R SMD, 0603, 25V, 10%	257154-333K25	
C6220	.033uF, 0603, X7R, 50V, 10%	191470-333	
C7000	33000pF, X7R SMD, 0603, 25V, 10%	257154-333K25	
C7001	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7002	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7003	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7004	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7005	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7006	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C7100	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C8000	47pF, 0805, COG, 50V, 5%	133622-470	
C8001	47pF, 0805, COG, 50V, 5%	133622-470	
C9209	33000pF, X7R SMD, 0603, 25V	257154-333K25	
C9211	.01uF, 0603, X7R, 50V 10%	191470-103	
C9212	.015uF, 0603, X7R, 50V, 10%	191470-153	
C9213	100uF, EL, 85, 10V, 20%	177902-101A	
C9219	.047uF, 0805, X7R, 50V, 10%	133623-473	
C9220	10pF, 0603, COG, 50V, 5%	188454-100	

Inductors

Reference Designator	Description	Part Number	Note
L0050	22uH, 0.86A, SMT, 20%	290997-220T	
L0902	560uH, 0.22A, SMT, 560uH, 20%	289382-561T	
L4000	330 OHM, FERRITE BD, IND0603, 200MA	268373-331	
L4001	330 OHM, FERRITE BD, IND0603, 200MA	268373-331	
L6000	330 OHM, FERRITE BD, IND0603, 200MA	268373-331	
L7000	330 OHM, FERRITE BD, IND0603, 200MA	268373-331	
L7002	330 OHM, FERRITE BD, IND0603, 200MA	268373-331	

ELECTRICAL PART LIST

Bass Module DSP PCB

Diodes

Reference Designator	Description	Part Number	Note
D0010	DIODE, SMD, 10A, 200V, S10D	256405-200	⚠ 3
D0011	DIODE, SMD, 10A, 200V, S10D	256405-200	⚠ 3
D0012	DIODE, SMD, 10A, 200V, S10D	256405-200	⚠ 3
D0013	DIODE, SMD, 10A, 200V, S10D	256405-200	⚠ 3
D0016	DIODE, SMD, 10A, 200V, S10D	256405-200	
D0450	DIODE, ZEN, SOT-23, 5.1V, 225MW, 5%,	135247-5231	
D0901	DIODE, SWTCHING, SCHOTTKY, 1A/40V	195637-3	
D1000	DIODE, SOT-23, BAV 99	147239	
D1001	DIODE, SOT-23, BAV 99	147239	
D1002	DIODE, SOT-23, BAV 99	147239	
D1003	DIODE, SOT-23, BAV 99	147239	
D6200	DIODE, SOT-23, BAV 99	147239	
D6201	DIODE, SOT-23, BAV 99	147239	
D9200	DIODE, SOT-23, BAV 99	147239	
ZR10	DIODE, ZEN, SOD-123, 6V, .5W, 5%	174265-5233	
ZR6220	DIODE, ZEN, SOT-23, 9.1V, 225MW, 5%	135247-5239	

Transistors

Reference Designator	Description	Part Number	Note
Q0010	MFET,60V,27A,NON-ISOLAT	271765-002	
Q0011	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q0012	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q0024	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q0030	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	
Q0030	XSISTOR, BPLR, P, 40V, 200mA, SOT23 (RoHS)	287939-001	6
Q0031	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	
Q0031	XSISTOR, BPLR, N, 50V, 100mA, SOT23 (RoHS)	287935-001	6
Q0450	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q6001	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	
Q6001	XSISTOR, BPLR, P, 40V, 200mA, SOT23 (RoHS)	287939-001	6
Q6101	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	
Q6101	XSISTOR, BPLR, P, 40V, 200mA, SOT23 (RoHS)	287939-001	6
Q6102	XSISTOR, P, 50V, 2SA1341	146818	
Q6200	XSISTOR, BPLR, N, 50V, 100mA, SOT23	146817	
Q6200	XSISTOR, BPLR, N, 50V, 100mA, SOT23 (RoHS)	287935-001	6
Q6201	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	
Q6201	XSISTOR, BPLR, P, 40V, 200mA, SOT23 (RoHS)	287939-001	6

ELECTRICAL PART LIST

Bass Module DSP PCB

Transistors (continued)

Reference Designator	Description	Part Number	Note
Q6202	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q6203	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	
Q7100	XSISTOR, BPLR, P, 40V, 200mA, SOT23	148596	
Q7100	XSISTOR, BPLR, P, 40V, 200mA, SOT23 (RoHS)	287939-001	6
Q9031	XSISTOR, PNP, SOT-223, 60V, 800mA	269870-001	
Q9032	XSISTOR, BPLR, N, 40V, 200mA, SOT23	146819	

Integrated Circuits

Reference Designator	Description	Part Number	Note
U11	IC, VOLT REG, ADJ., 500MA, DPAK	258496-001	
U20	IC, VOLT-REG, SOIC-8, LM317LM	173795-1	
U50	IC, SWITCHING, 1MHz, BUCK CONV	288281-001	
U51	XSISTOR, MOSFET, DUAL N, 50V, 3A	289259-001	
U150	IC, POWER AMP, PSO-20, TDA8566TH	257975	
U150	IC, POWER AMP, PSO-20, TDA8566 (RoHS)	289447-001	
U250	IC, POWER AMP, PSO-20, TDA8566TH	257975	
U250	IC, POWER AMP, PSO-20, TDA8566 (RoHS)	289447-001	
U350	IC, POWER AMP, PSO-20, TDA8566TH	257975	
U350	IC, POWER AMP, PSO-20, TDA8566 (RoHS)	289447-001	
U902	BUCKCTLR, SO-8, PWM, 500kH, 40V, 5%	275415-004	
U1000	IC, OP AMP, DUAL, RAIL TO RAIL	277563-001	
U4000	IC, CODEC AUDIO, 24-bit	289863-001	
U6000	IC,MICRO CONTROLLER, 8-BIT	289864-001	
U6001	IC, ET, SOT-23, MAX809, 2.63V	191158-06	
U6002	IC, EEPROM, 64K, 2.7V, 2-WIRE	293549-064D	
U6200	IC, VOLTAGE COMPARATOR, LM339	187618-001	
U7000	IC DSP TMS320DA7051, 144RFP	289857-7051	
U7001	IC, EEPROM, 512K, Serial, 2-WIRE	289858-0512B	

Miscellaneous

Reference Designator	Description	Part Number	Note
J0010	CONN, HEADER, INLINE, PCB MNT, 2P	133220-02	
J0150	CONN, LOCKNG,2.5MM, 8POS,LOC PIN	283142-010108	
J0350	CONN, HEADER, INLINE, PCB MNT, 4P	133220-04	
J1000	CONN, HEADER, 2.5MM, THRU, 16 POS	270584-016	
J8000	CONN, HEADER, TYPE 2, USB MINI-B	296441-001	
X6000	CRYSTAL, 6.0MHz,	291429-001	

ELECTRICAL PART LIST

Bass Module I/O PCB

Resistors

Reference Designator	Description	Part Number	Note
R20	10K, POTENTIOMETER, 1B, 20%	273741-001	
R24	RES, CF, 1/4W, 5%, 10K	120968-1035	

Miscellaneous

Reference Designator	Description	Part Number	Note
F1	FUSE, 2.0 AMPS, AXIAL, US/JAPAN FUSE, SLO-BLO, 1.0A, EURO/UK/AUS	269855-02000 298780-1000	⚠ 3
J1	AC CONNECTOR	273692-001	
J2	CONN, HEADER, LOCKING, TOP, KEYED	271897-002	⚠ 3
J3	CONN, HEADER, DUAL ROW, R/A	278156-04	
J4	CONN, HDR, DUAL ROW, R/A,RED	278156-204	
J5	CONN,HDR, DUAL ROW, R/A, BLK	278156-110	
J21	CONN, LOCKNG, 2.5MM, 8POS, LOC PIN	283142-010108	
J22	CONN, HEADER, 2.5MM, THRU, 16 POS	270584-016	

DISASSEMBLY PROCEDURES

Disassembly

The following procedure shows the disassembly of the bass module to allow access to the DSP and I/O boards.

Note: The cabinet is glued together preventing any type of internal repair beyond the boards. The woofer and the transformer are both inside the cabinet and cannot be replaced.
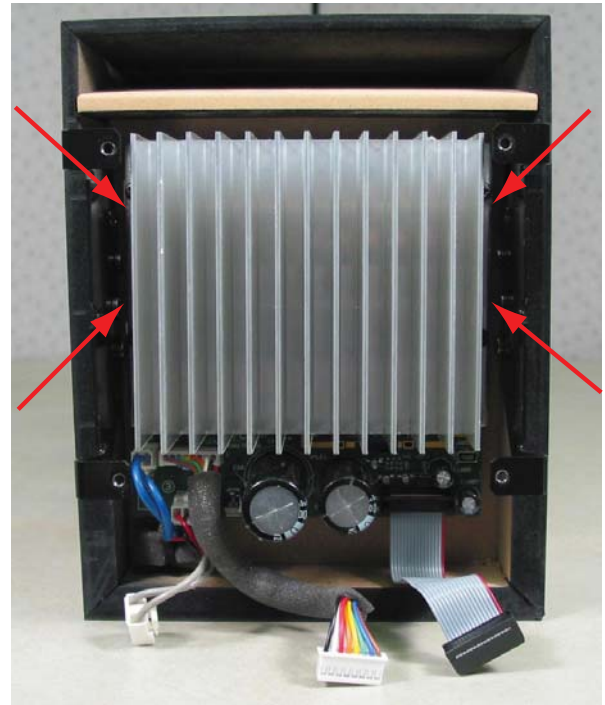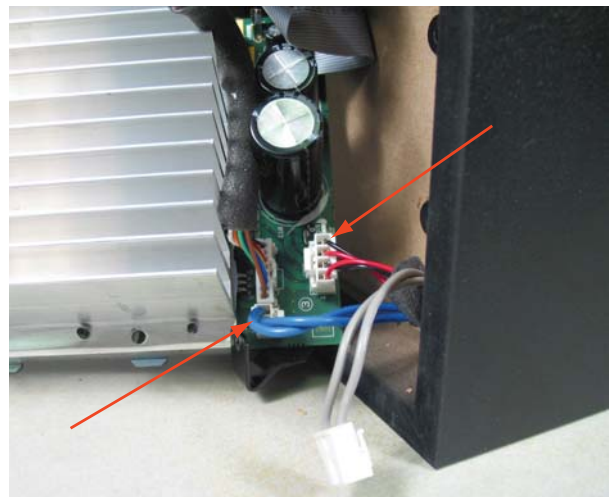
1. DSP board removal

1.1 Remove the four phillips-head screws from the rear cover.
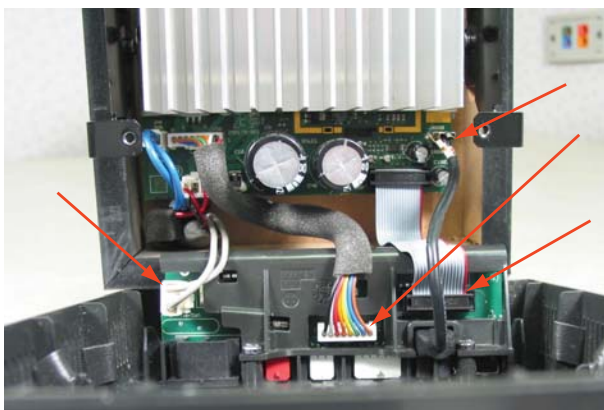
1.2 Pull the rear cover down and remove the cables connected to J2, J21 and J22 on the I/O board and J8000 from the DSP board.

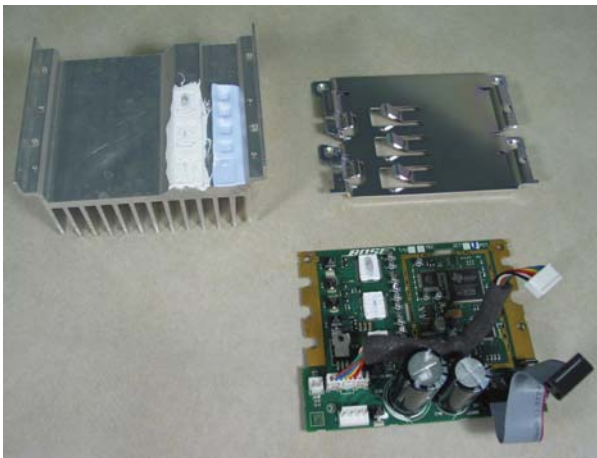**1.3** Remove the four Phillips-head screws located to the left and right of the heatsink.

1.4 Remove the cables connected to J350 and J10, this allows the heatsink and DSP board to pull away from the bass module cabinet.

DISASSEMBLY PROCEDURES
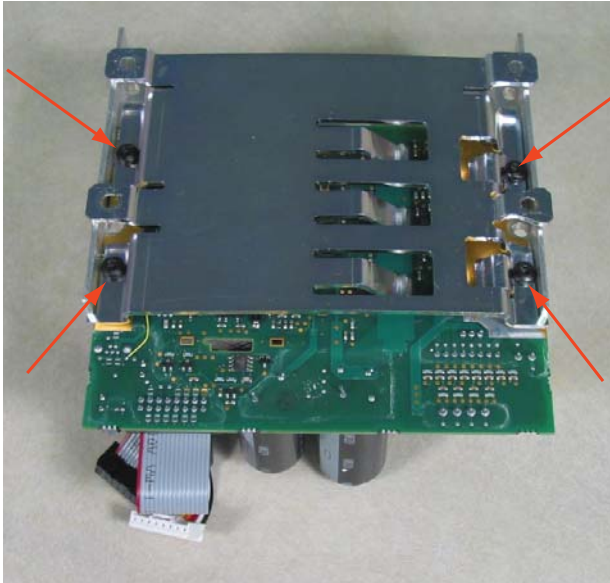
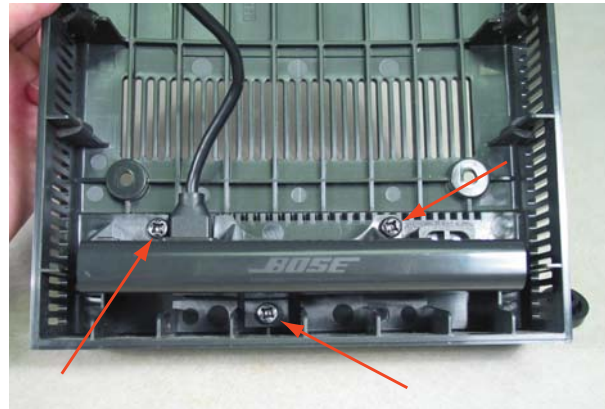**1.5** Remove the four 6-32 TORX screws that holds the heatsink bracket in place.

1.6 Separate the heatsink, heatsink bracket and DSP board.

2. I/O Board Removal

2.1 Use a small flat-head screw driver to pull the Bass control off of the rear cabinet.

2.2 Remove the three Phillips-head screws that secure the I/O board in place.

2.3 Remove the plastic bracket that secures the I/O board in place.

Audio Test Procedures

Note: There are two different test procedures for the Companion 5.

1. Audio test
2. USB light up and play test

Audio test
Equipment required:

1. Audio Signal Generator
2. Oscilloscope
3. Digital Multimeter

Test Set up

1. Connect the satellites to the output jacks on the bass module.
2. Connect the control pod to the 10 pin input connector on the bass module (the control pod must be connected before power is applied).
3. Connect the power cord to an AC outlet.
4. Connect a signal generator to the audio input cable and connect the cable to the input jack on the control pod.

1. Bass Module Air Leak test

1.1 Apply a 100 mVrms, 55 Hz signal to the input of the bass module.

1.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass compensation control to it's center detent (flat) position.

1.3 Listen carefully for air leaks along all glued joints, around the heat sink, connectors and at the woofer mounting location.

PASS if no audible air leaks can be heard at a distance > 1 ft from any exterior surface of the Bass module.
FAIL if air leaks can be heard at a distance > 1 ft from any exterior surface of the Bass module.

1.4 Repair any air leaks around the heat sink and connectors. Replace any bass module that has air leaks around the bass box or woofer mounting location.

2. Bass Module Sweep Test

2.1 Apply a 100 mVrms, 10 Hz signal to the input of the bass module.

2.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass compensation control to it's center detent (flat) position.

2.3 Listen carefully as you sweep the bass module from 10 Hz to 500 Hz, then from 500 Hz to 10 Hz.

2.4 Listen carefully for buzzes, rattles, or other extraneous noises from the woofer, cabinet, plastic trim parts, or heat sink. A slight whooshing sound from the port (at approximately 45 Hz) is acceptable.

2.5 Repair any noise heard from around the heat sink and connectors. Replace the bass module if it has noises from the woofer or cabinet area.

Audio Test Procedures (continued)

3. Bass Module, Bass Compensation Test

3.1 Apply a 90 mVrms, 100 Hz signal to the input of the bass module.

3.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass compensation control to it's center detent (flat) position.

3.3 Rotate the bass compensation control fully clockwise and counter clockwise.

3.4 Verify that the bass level cleanly increases and decreases in level.

4. Satellite Sweep Test

4.1 Apply a 100 mVrms, 100 Hz signal to the input of the bass module.

4.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass compensation control to it's center detent (flat) position.

4.3 Use the list below to sweep the frequency to the input. Listen carefully for buzzes, rattles, or other extraneous noises from the Twiddler™ speakers, plastic satellite enclosure, grille, or internal wires.

Sweep Range	Input Signal
100Hz to 500Hz	100mVrms
500Hz to 2kHz	50mVrms
2kHz to 5kHz	25mVrms

4.4 Replace any satellite that is found to be defective.

5. Satellite Air Leak Test

5.1 Apply a 60 mVrms, 300 Hz signal to the input of the bass module.

5.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass control to it's center detent (flat) position.

5.3 Listen carefully for air leaks along edges of the satellite and near the grille where the Twiddler speaker is installed.

5.4 Replace any satellite that is defective.

6. Control Pod Functional Test

6.1 With the system completely set up, connect power.

6.2 Set the volume knob on the control pod to maximum (fully clockwise), and set the bass control to it's center detent (flat) position.

6.3 Touch the center of the control pod . Verify that the LED turns from green to orange and orange to green with each touch.

6.4 Verify that the sound is muted and un-muted when the LED changes color and that there is no audible pop when switching from mute to un-mute.

6.5 Rotate the control pod ring, verify that the volume increases and decreases and that the ring moves smoothly.

**6.6** Replace any control pod that is defective.

USB Light up and play test

Equipment required:

1. IBM Compatible or Macintosh computer with USB 2.0 or above

2. USB 2.0 Cable, type A to B (part number 292477-001)

Test Set up

1. Connect the satellites to the output jacks on the bass module.
2. Connect the control pod to the 10 pin input connector on the bass module (the control pod must be connected before power is applied).
3. Adjust the control pod to minimum.
4. Connect the power cord to an AC outlet.
5. Connect the USB cable from a computer with USB 2.0 to the USB input on the bass module.

1. Adjust the Windows® volume and wave controls to maximum.
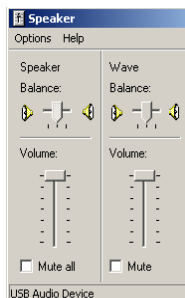
1.1 Use Windows media player or equivalent to play an musical audio track.

1.2 Adjust volume on the control pod to one quarter

1.3 Confirm audio can be heard and no distortion is present.

1.4 Adjust audio on the control pod to one half.

1.5 Confirm audio can be heard and no distortion is present.

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
06/16/06	00	Document released at revision 00	Service Manual release	All
09/21/06	01	Fuse part numbers changed	Part number corrections	15
		Added notes to multiple parts on the bass module exploded view	Additional Information	6
12/12/06	02	Changed part number for R19.	Change R19 from 191465-2942 to 191465-3162	7
		Service part number for Bass Module changed	Old number 290172-0139CS 290172-0239CS New number 290172-S139 290172-S239	5
		Changed part number for the Carton, RSC	Old number 295572 New part number 300267	5
11/27/07	03	Part number change for DSP board From 299766-001 to 299766-201 From 299767-002 to 303250-102	Software change	6
02/29/08		Changed the Euro DSP part number again, this time to 303250-202	Software change	6
06/03/09		Added packing pad part number	Missing number	5
1/18/09		Updated part numbers for U7000, C28, C49, C50, C1000, C1001 and C4004 per ECN 45737.		11, 12, 15

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE