Panaray® MA12EX Modular Line Array Loudspeaker System

Service Manual
Reference Number 317302-SM Rev. 00
Electronic Copy Only

Contents

**CAUTION: The Bose® Panaray MA12EX Modular Line Array Loudspeaker System
contains no user-serviceable parts. To prevent warranty infractions,
refer servicing to warranty service stations or factory service.**

Warranty

The Bose Panaray MA12EX Modular Line Array Loudspeaker System is covered by a 5-year transferable limited warranty.

Specifications

External Dimensions:	38.75 x 4.125 x 5.5 in. (978 x 107 x 130 mm)	
Weight:	Single Speaker:	21.5 lb. (10 kg)
	Packed System:	24 lb. (11 kg)
Sensitivity:	87dB SPL, 75 Hz - 15 kHz (1W/1m free space)	
System Protection:	None	
Impedance:	8 Ohms nominal, 7.5 Ohms minimum	
Power Handling:	150 Watts continuous per IEC-268-5, 75 Hz high pass, 96 hours. Recommended amplifier power 150-300 Watts	

Product Description

The Bose® Panaray® MA12EX Modular Line Array Loudspeaker System is a modular system used for full range sound reproduction. It is a vented enclosure design using 12 full range 2.25" drivers housed in a closely spaced line.

The loudspeaker provides a means for mechanical attachment of two units to form a rigid single line source by using the CB-MA12EX coupling bracket (see table below). Each loudspeaker has two Neutrik® connectors and two barrier style terminals so that multiple units can be connected as a system in series and parallel.

The Bose Panaray MA12EX Loudspeaker can be used with the Bose Panaray MB4 Modular Bass Loudspeaker for dynamic full range reproduction.

Accessories Used with the MA12EX Loudspeaker System

Description	Part Number
CVT-MA12EX, TRANSFORMER, 70/100V, BLACK	315338-0100
CVT-MA12EX, TRANSFORMER, 70/100V, WHITE	315338-0200
CB-MA12EX, COUPLING BRACKET, BLACK	317088-0100
CB-MA12EX, COUPLING BRACKET, WHITE	317088-0200
WMB2-MA12/MA12EX PITCH LOCK UPPER BRACKET, BLACK	318337-0100
WMB2-MA12/MA12EX PITCH LOCK UPPER BRACKET, WHITE	318337-0200
WMB-MA12/MA12EX, BI-PIVOT BRACKET, BLACK	318338-0100
WMB-MA12/MA12EX, BI-PIVOT BRACKET, WHITE	318338-0200
WB- MA12/MA12EX, PITCH ONLY BRACKET, BLACK	318418-0100
WB- MA12/MA12EX, PITCH ONLY BRACKET, WHITE	318418-0200

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.

Packaging Part List

Panaray® MA12EX Loudspeaker System (see Figure 1)

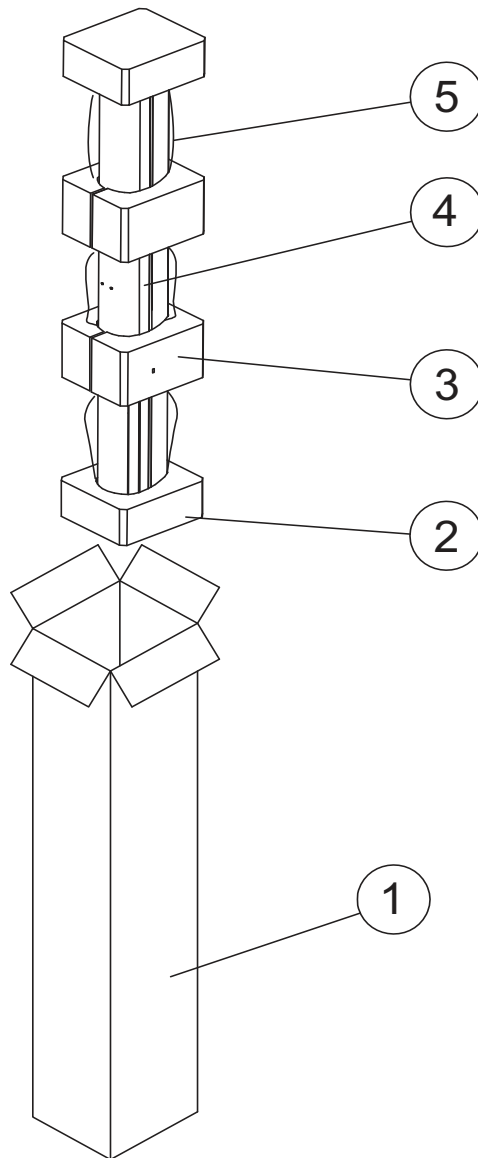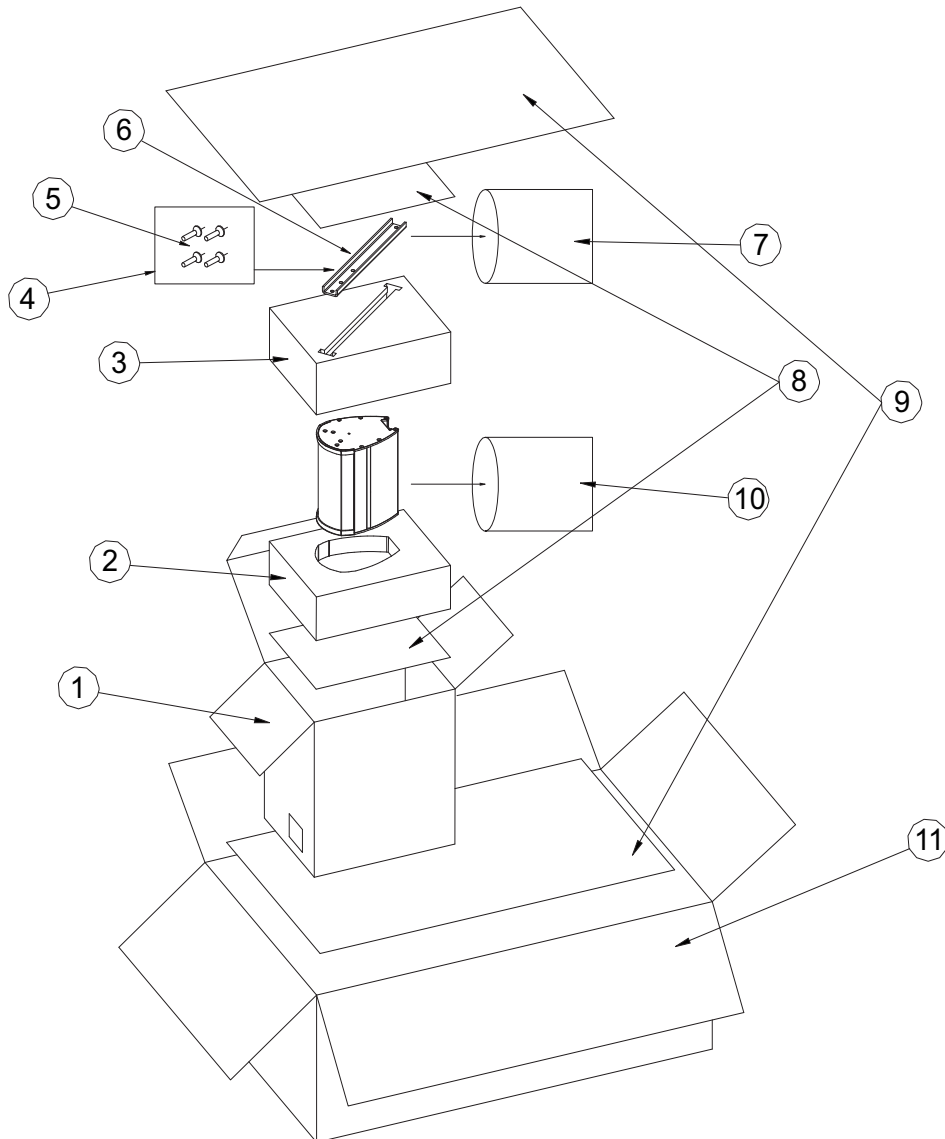| Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	CARTON	317410-000S	145B-4090+0	1	
2	PACKING END CAP, ARRAY	318051-000S	1491-7441+0	2	
3	PACKING CENTER, ARRAY	318052-000S	1491-7431+0	2	
4	MA12EX SYSTEM BLACK WHITE	317302-0100 317302-0200	BSSPTENOR+07CS11 BSSPTENOR+07CS12	1	
5	POLY BAG, 1350x240x0.05MM	-	1497-7592+0	1	4

Figure 1. Panaray MA12EX Loudspeaker Packaging View

Packaging Part List

Panaray® MA12EX Transformer Accessory (see Figure 2)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	XFMR CARTON, INNER	319178-000S	1438-6801+0-1	1	
2	XFMR PACKING, BOTTOM	319179-000S	1493-2071	1	
3	XFMR PACKING, TOP	318303-000S	1493-2061	1	
4	POLY BAG, 80x60x0.06MM	-	1497-7502+0	1	
5	SCREW, SS, M6x12, HEX SOCKET	-	2908-6012+D400	4	
6	XFMR MTG BRACKET, BLACK	317445-010S	4135-8841	1	
	XFMR MTG BRACKET, WHITE	317445-020S	4135-8842		
7	POLY BAG, 300x100MM	-	1497-0082+0	1	
8	CARTON SHEET, 250x200MM	-	1451-0280+0	2	
9	CARTON SHEET, 530x300MM	-	1451-0290+0	2	
10	POLY BAG, 360x360MM	-	1497-1542+1	1	
11	XFMR CARTON, K=A, 850x535x310MM	318302-000S	1438-6901+0-2	1	

Figure 2. Panaray® MA12EX 70/100V Transformer Accessory Packing View

Main Part List

Panaray® MA12EX Loudspeaker System (see Figure 3)

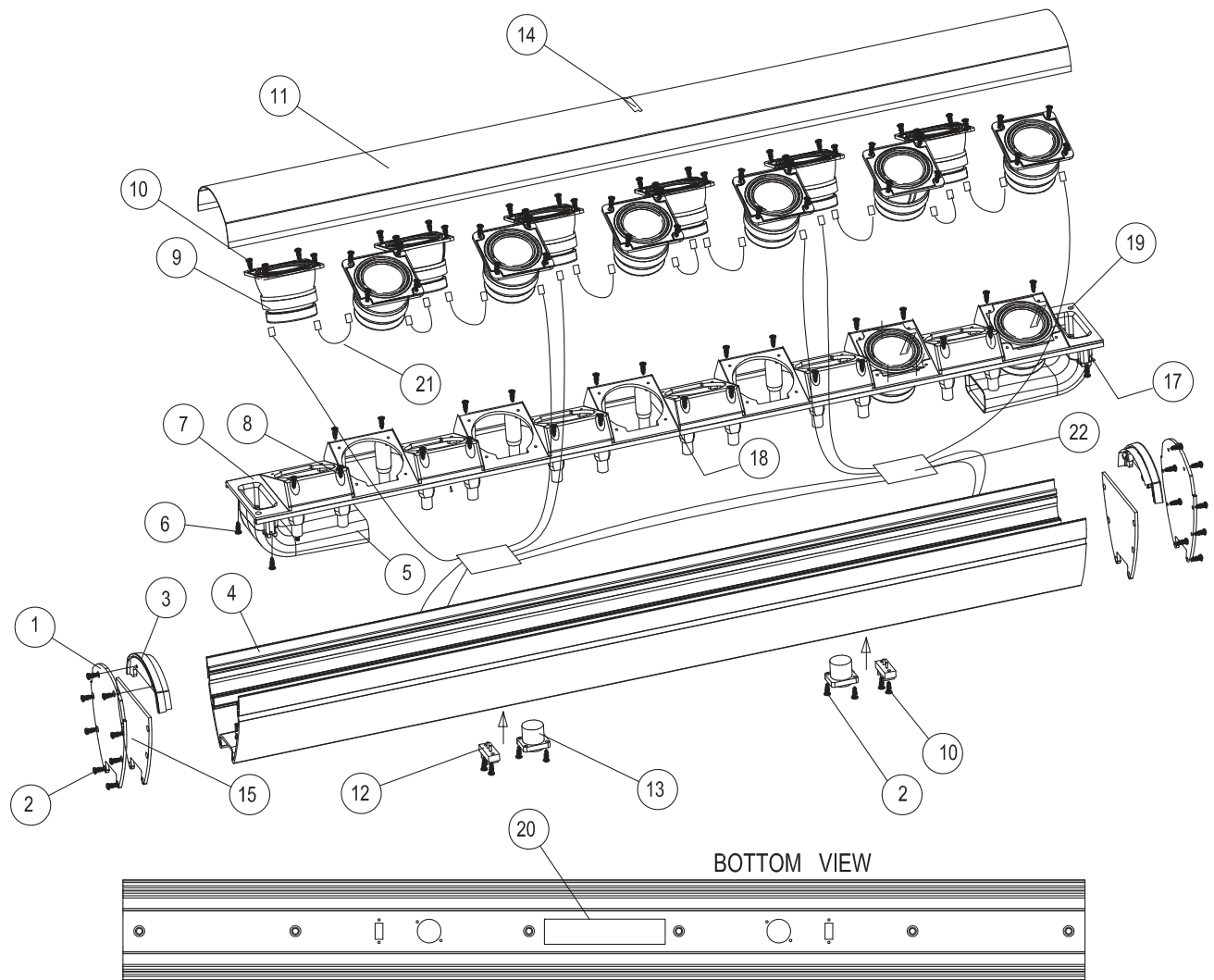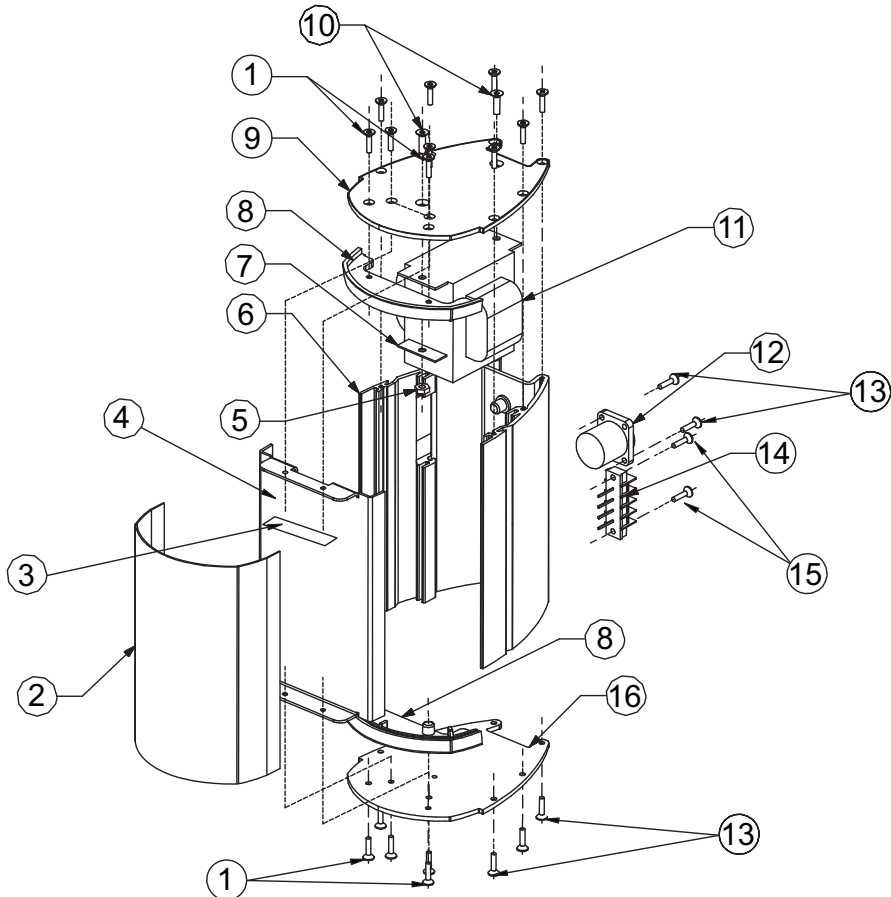| Item Number	Description	Bose® Part Number	Vendor Part Number	Qty	Note
1	END CAP, STEEL			2	
	WHITE	320837-020S	4135-8862		
	BLACK	320837-010S	4135-8861		
2	SCREW, SS, M3X16			20	4
	WHITE	-	2951-3016+H000		
	BLACK	-	2951-3016+Q000		
3	COVER, GRILLE			2	
	WHITE	317426-020S	4160-1050+0		
	BLACK	317426-010S	4060-1051+0		
4	HOUSING, ALUMINUM			1	4
	WHITE	-	1422-3321+0		
	BLACK	-	1422-3320+0		
5	PORT TUBE	-	4158-9230+0	2	4
6	SCREW, BT, PH, M3x12, W/WASHER	-	2950-3012+U020	4	4
7	BAFFLE	-	4158-4830+0	2	4
8	SCREW, SS, M3.5x25	-	2950-3525+H000	24	4
9	DRIVER, 2.25", 5 OHM	318828-000S	8900-3920+0	12	
10	SCREW, SS, M3x12	-	2954-3012+H000	52	4
11	GRILLE, MESH			1	
	WHITE	317423-020S	4124-0691+0		
	BLACK	317423-010S	4124-0690+0		
12	TERM STRIP, 2 POLE	317421-000S	4124-0680+0	2	
	TERM STRIP, 4 POLE	317450-000S	2133-3330+0	2	
13	NEUTRIK CONNECTOR	318841-000S	2113-3140+0	2	
14	BOSE® LOGO			1	
	WHITE	317418-020S	2150-5814+0		
	BLACK	317418-010S	2150-5813+0		
15	GASKET, END CAP	-	4149-7621+0	2	4
16	GASKET, EVA, 5x500	-	4153-3331+0	6	4
17	GASKET, EVA, 3x515	-	4153-3381+0	2	4
18	GASKET, GRILLE	-	4153-3431+0	2	4
19	FOAM, D12, L=8	-	4149-1171+0	2	4
20	PRODUCT LABEL	-	3004-0121+0	1	4
21	WIRE, BLUE, 150MM	-	7012-0570+0	8	4
22	WIRING HARNESS	-	WIRING+TENOR	1	4

BOTTOM VIEW

Figure 3. Panaray® MA12EX Loudspeaker System Exploded View

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Main Part List

Panaray® CVT-MA12EX Transformer Accessory (see Figure 4)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	SCREW, SS, M3x10	-	2951-3010-H000	4	4
2	XFMR GRILLE, BLACK	317446-010S	4135-8831	1	
	XFMR GRILLE, WHITE	317446-020S	4135-8832		
3	GASKET, PE, 600x10x1MM	-	4149-7221+0	.042	4
4	XFMR BRACKET, BLACK	317449-010S	1407-1101	1	
5	NUT, SS, M4	-	2640-4030+068Q	2	4
6	XFMR HOUSING, BLACK	317447-010S	1407-2401	1	
	XFMR HOUSING, WHITE	317447-020S	1407-2402		
7	BRACKET, SPCC, T=1	-	4135-9081+0	2	4
8	GRILLE TRIM	-	4160-1051+0	2	4
9	HOUSING END CAP, TOP			1	
	BLACK	317448-010S	4135-8851+0		
	WHITE	317448-020S	4135-8852+0		
10	SCREW, SS, M4x12	-	2901-4012+H000	2	4
11	TRANSFORMER, 70/100V	317574-000S	1806-4063+0000	1	
12	SPEAKON CONNECTOR	318841-000S	2113-3140	1	
13	SCREW, SS, M3x14	-	2951-3016+H000	18	4
14	TERM STRIP, 4 POLE	317450-000S	2133-3330	1	
15	SCREW, SS, M3x12	-	2954-3012+H000	2	4
16	HOUSING END CAP, BOTTOM			1	4
	BLACK	320837-010S	4135-8861		
	WHITE	320837-020S	4135-8862		

Figure 4. Panaray® CVT-MA12EX 70/100V Transformer Accessory Exploded View

Disassembly Procedures

MA-12EX Loudspeaker System

Refer to the figure below for the following procedures.

1. End Cap Removal

1.1 Remove the eight screws (2) that secure the steel end cap (1) to the housing and grille cover (3).

1.2 Gently pull the end cap away from the housing.
Re-assembly Note: When replacing the end cap, ensure that it is fully seated against the housing for an airtight seal. Replace all of the screws to prevent air leaks.

2. Grille Assembly Removal

2.1 Remove the eight screws (2) that secure each of the steel end caps (1) to the housing and grille trim.

2.2 Gently pull the grille assembly away from the housing. Be careful not to mark the surface of the grille or the housing.
Re-assembly Note: Be sure to use an appropriate sealing agent when replacing the grille into the housing to prevent rattles.

3. Driver Removal

3.1 Perform procedure 2.

3.2 Using a Phillips-head screwdriver, remove the four screws (10) that secure the driver to the baffle.

3.3 Unplug the wires from the driver. Lift out the driver.
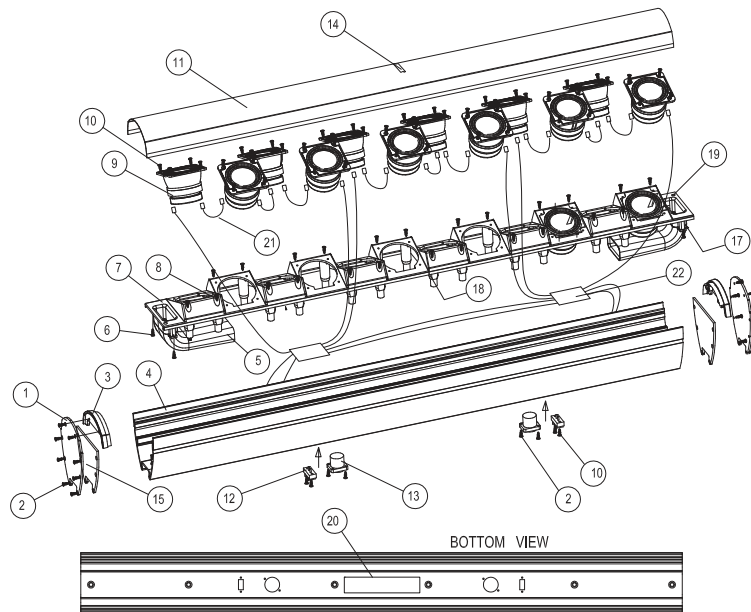
4. Baffle Removal

4.1 Perform procedure 2.

4.2 Remove the 14 screws (10) that secure the baffle to the housing (4). Lift off the baffle.

5. Barrier Terminal Strip or Neutrik® Speakon® Connector Removal

5.1 Perform procedure 4 for the connector you wish to remove.

5.2 Make a note of the wiring configuration, and unsolder the wires from the connector you wish to replace.

5.3 Remove the two screws that secure the connector to the speaker housing. Lift off the connector.

BOTTOM VIEW

Disassembly Procedures

CVT-MA12EX Transformer Accessory

Refer to the figure below for the following procedures.

1. End Cap Removal

1.1 Remove the six screws (13) that secure the end cap housing (9) to the transformer housing (6).

1.2 Remove the four screws (1) that secure the grill trim (8) and the transformer bracket (4).
Note: Do not remove the two larger screws (10). These screws secure the transformer (11) to the end cap and have nuts (5) and a bracket (7) on the other end.

1.3 Lift off the end cap.

2. Grille Removal

2.1 Perform procedure 1. Lift off the grille (2).

3. Transformer Removal

3.1 Perform procedure 1.

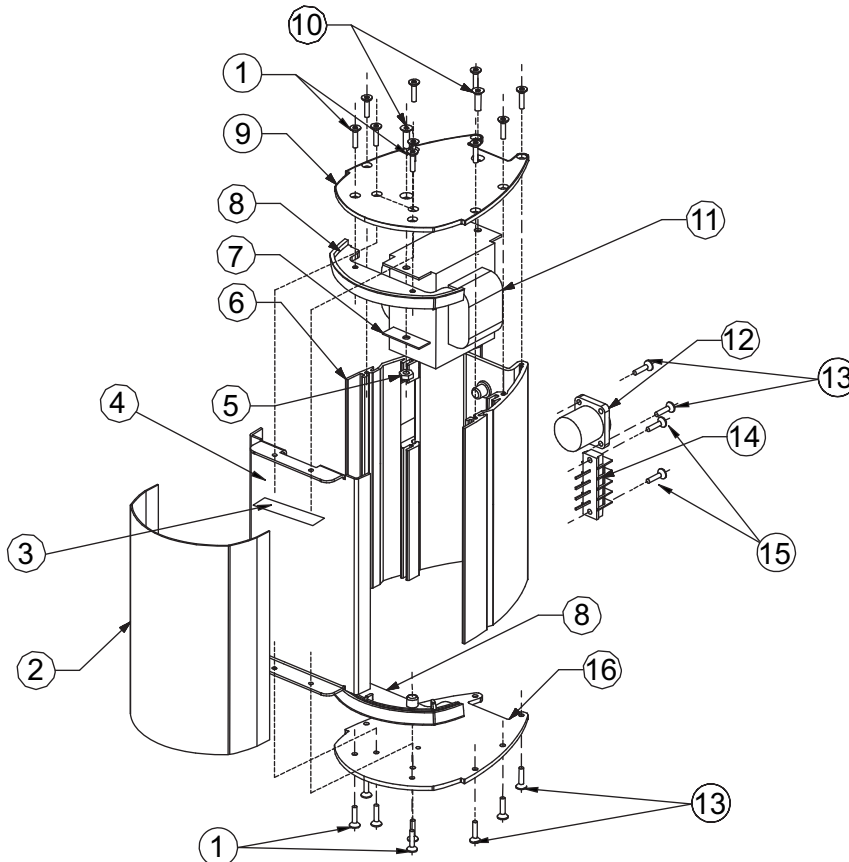**3.2** Remove the two screws (10) and nuts (5) that secure the transformer to the end cap.

3.3 Make a note of the wiring configuration, and unsolder the wires from the barrier terminal strip and the Neutrik connector. Lift off the transformer.

4. Barrier Terminal Strip or Neutrik® Speakon® Connector Removal

4.1 Perform procedure 1.

4.2 Make a note of the wiring configuration and unsolder the wires from the connector (12 or 14) you wish to remove.

4.3 Remove the screws (13 or 15) that secure the connector to the transformer housing (6). Lift off the connector.
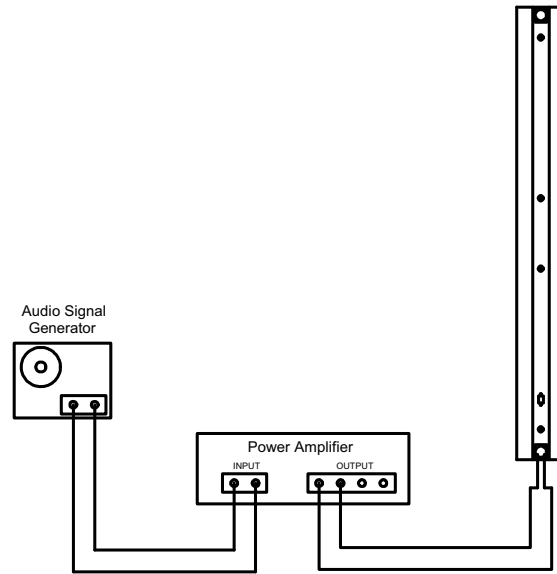
Test Procedures

Figure 5. Panaray® MA12EX Test Setup Diagram

1. Air Leak Test

1.1 Set up the system for test as shown in Figure 5 above.

1.2 Apply a 100 Hz, 10 Vrms sine wave to the loudspeaker input connector.

1.3 Listen carefully for any air leaks from around the end cap, drivers and the baffle. Air leaks will be heard as a hissing or sputtering sound. All repairs must be hidden. Test duration should be 5 seconds minimum.

2. Rub and Tick Test

2.1 Perform loudspeaker disassembly procedure 3. It is not necessary to unplug the wires at the driver assembly terminals.

2.2 Connect a signal generator directly to the terminals of the driver under test.

2.3 Apply a 20 Hz, 5 Vrms sine wave to the driver assembly.

2.4 Listen carefully for any extraneous noises, such as rubbing, scraping or ticking. **Note:** To distinguish between normal suspension noise and rubs or ticks, displace the cone slightly with your fingers.

If the noise stays the same, it is normal suspension noise and the driver is fine. Suspension noise will not be heard with program material.

3. Phase Test

3.1 Momentarily apply 10 VDC to the loudspeaker input connector. Apply the positive to pin "1+" and the negative to pin "1-" of the Neutrik® connector.

3.2 When applying the DC voltage level, observe the driver cones. They should all move outward when the DC level is applied.

3.3 Rewire any incorrectly wired driver.

4. System Sweep Test

4.1 Set up the system for test as shown in Figure 5.

4.2 Apply a 10 Hz, 10 Vrms sine wave to the loudspeaker input connector.

4.3 While listening to the output of the system, sweep the input frequency slowly from 10 Hz to 20 kHz.

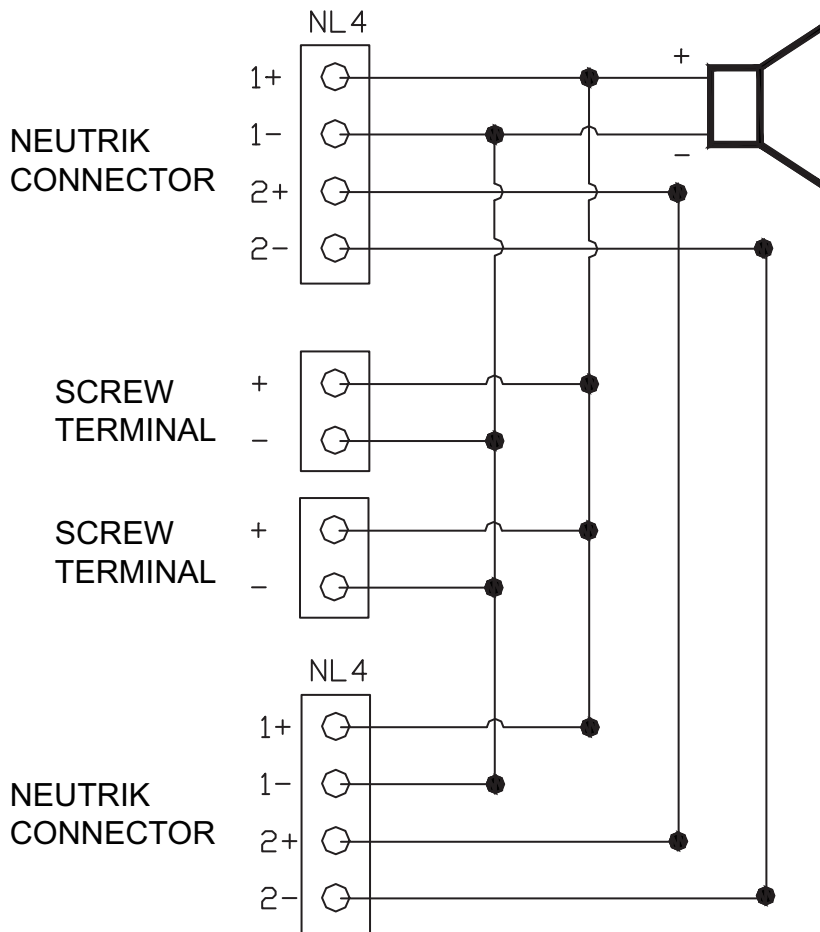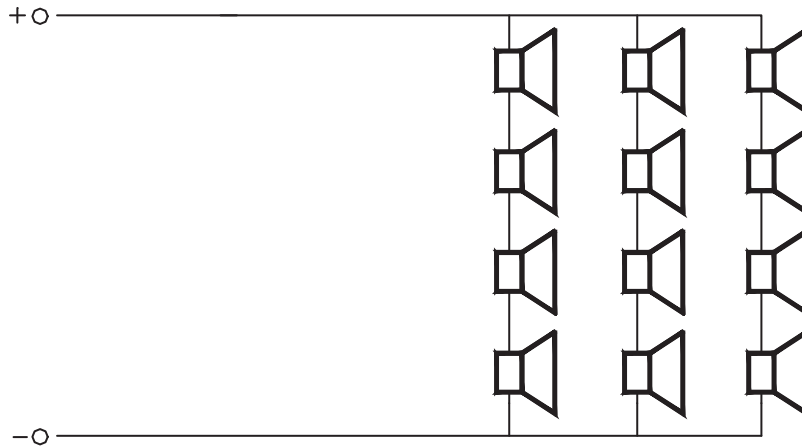**4.4** Listen carefully for any extraneous noises such as buzzing or ticking.

Figure 6. Panaray® MA12EX Loudspeaker Wiring Diagram

Service Manual Revision History

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
5/09	00	Document released at revision 00.	Service manual release	All

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE