Panaray® 402® Series IV Loudspeaker

Installed Sound-Reinforcement Loudspeaker

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Reference Number 739706-SM Rev 01
Service Manual

Contents

Part List Notes

1. The individual parts located on the PCBs are listed in the Electrical Part List.

2. 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.

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.

Specifications

System Performance

Frequency Range	(–10 dB)[1] 73 Hz - 15 kHz	
Recommended High-Pass Protection Filter	75 Hz with minimum 12 dB / octave filter	
Nominal Coverage Pattern	120° H x 60° V	
Loudspeaker EQ	Active EQ required for optimal performance	
Overload Protection	Power limiting circuit (non-fused; automatic reset)	
	Bose® extended-lifecycle test[2]	AES component test[3]
Power Handling, long-term continuous	120 W	150 W
Power Handling, peak	480 W	600 W
	Free field	Free field
Sensitivity (SPL/ 1W @ 1 m)[4]	91 dB	91 dB
Calculated Maximum SPL @ 1 m[5]	112 dB	113 dB
Calculated Maximum SPL @ 1 m, peak	118 dB	119 dB

Transducers

Full-range drivers	4 x Bose 4.5” (114 mm) full-range cone transducers
Nominal Impedance	8 ohms

Physical

Enclosure Material	Mineral-reinforced HDPE
Grille	Powder-coated steel grille
Environmental	Outdoor per IEC 529 IP55
Connectors	2 x Neutrik® NL4 wired parallel
Suspension / Mounting	7 x M8 threaded inserts (4 back, 2 bottom, 1 top)
Dimensions (H x W x D)	592 mm x 206 mm x 202 mm (23.3” x 8.1” x 8.0”)
Net Weight	16 pounds (7.3 kg)
Shipping Weight	20 pounds (9.1 kg)
Material Number (Product Code)	Black 739706-0110 White 739706-0210

Footnotes
1. Frequency range measured on-axis with recommended EQ in an anechoic environment.
2. Bose extended-lifecycle test: pink noise, IEC268-5 filtered, 6-dB crest factor, 100-hour duration, with recommended EQ.
3. AES component test: pink noise, IEC268-5 filtered, 6-dB crest factor, 2-hour duration, with recommended EQ.
4. Sensitivity measured in anechoic acoustic boundary conditions with recommended EQ, referenced to 1W/m.
5. Maximum SPL calculated from sensitivity and power handling specifications, exclusive of power compression.

PRODUCT DESCRIPTION

Key Features

- Full-Range-Driver Array eliminates tweeters and crossovers for unsurpassed reliability in harsh environments and vocal clarity
- 4 x Bose® 4.5-inch full-range drivers for legendary reliability
- 120° x 60° Articulated Array® design covers a very wide area, which can reduce the number of loudspeakers required
- 73 Hz - 15 kHz frequency range eliminates need for subwoofers for moderate full-range music levels
- 119 dB peak SPL for sound-reinforcement and foreground music
- Rugged, lighweight enclosure with threaded inserts for easy installations
- Weather-Rated design for indoor or outdoor installations
- Requires active equalization

Product Overview

The Panaray® 402® Series IV installed sound-reinforcement loudspeaker features a full-range-driver array, eliminating the need for tweeters and crossovers, to provide unsurpassed reliability and vocal clarity. The Articulated Array® design, with wide 120° x 60° coverage, can reduce the number of required loudspeakers, while the 73-Hz low-frequency range can eliminate the need for subwoofers, providing a cost-effective solution for many indoor or outdoor installed sound-reinforecement applications.

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.

WARRANTY

The Bose Panaray® 402 Series IV Loudspeaker is covered by a 5-year limited warranty.

PROPRIETARY INFORMATION

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

PACKAGING LIST

Item Number	Description	Part Number	Qty.	Note
1	PACKING, FOAM, EPS, 402-II	258908	1	
2	PACKING, FOAM, P/U, RIGHT, 402-II	258927	2	
3	PACKING, FOAM, P/U, LEFT, 402-II	258928	2	
4	OWNER'S MANUAL	747960-0010	1	
5	BAG, POLY, HDPE 13.5X35X9.5X1MIL	114522	1	
6	CARTON, RSC, 350DW, 25.75X11.75X11.88IN	753301-0010	1	

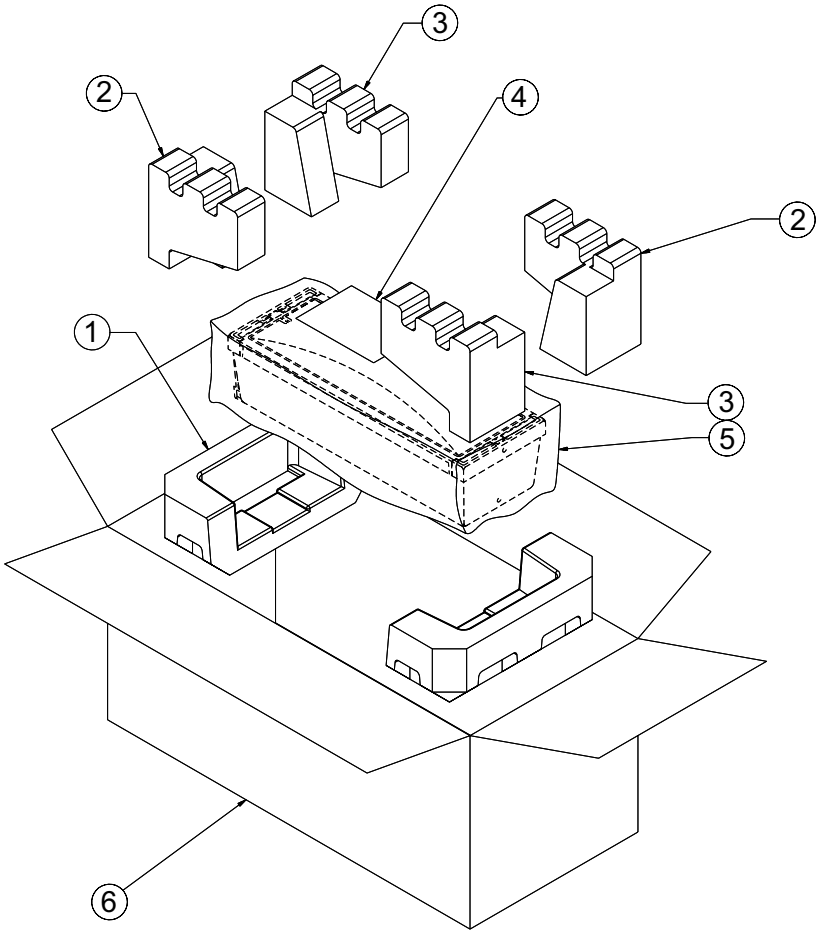


Figure 1. Packaging View

MAIN PART LIST

Item Number	Description	Part Number	Qty.	Note
1	NAMEPLATE, LOGO, BLK, 402III	254458-001	1	
	NAMEPLATE, LOGO, WHT, 402III	254458-002	1	
2	GRILLE, 402II, BLACK	792238-0110	1	
	GRILLE, 402II, WHITE	252380-002	1	
3	SCREW, TAPP, 8-15, HEXW, SLOT	290290-12	16	
4	DRIVER ASSY, 4.5IN, 402 W/CLAMP RING	291020-002	4	
5	FOAM, ACOUSTIC, 19.75x7x1	120357	1	
6	CLIP, TINNERMAN	187943	2	
7	CROSSOVER ASSY, 402 IV	758636-001	1	
8	CONN, SPEAKON, PNL MNT, WIRE WRAP	258213-002	2	
9	COVER, NEUTRIK, SEALING	252384	2	
10	LABEL, INPUT - 402 IV	758609-0010	1	
11	NUT, J-TYPE, 8-32	109481	12	
12	DEFLECTOR	126973-1	1	
13	SCREW, TAPP, 6-13X.625, PAN, XRC/S	290294-10	4	

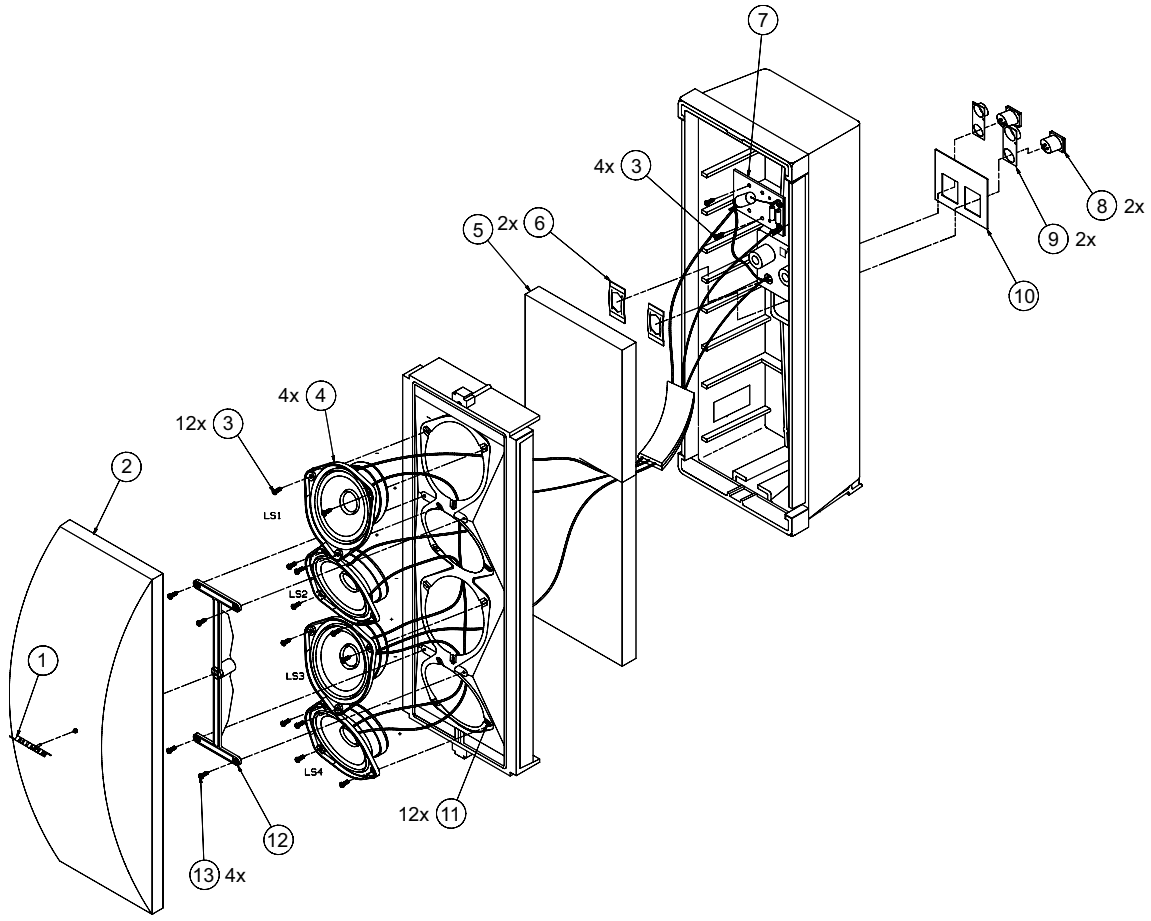


Figure 2. Exploded View

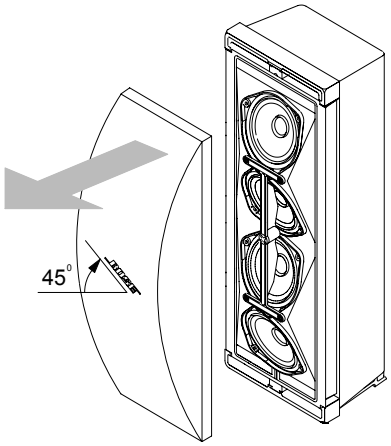
DISASSEMBLY PROCEDURE

Note: Numbers in parenthesis correspond to call-outs in Figure 2.

1. Grille Removal

1.1 Rotate the Bose® logo (1) 45 degrees to release the grille (2).

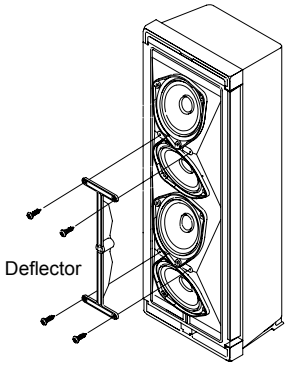
1.2 Grasp the edge of the grill and pull it off.



2. Driver Removal

2.1 Perform procedure 1.

2.2 Remove the four screws (13) securing the deflector (12) to the cabinet. Lift off the deflector.



2.3 Remove the three screws (3) securing the driver (4) to the cabinet. Lift out the driver.

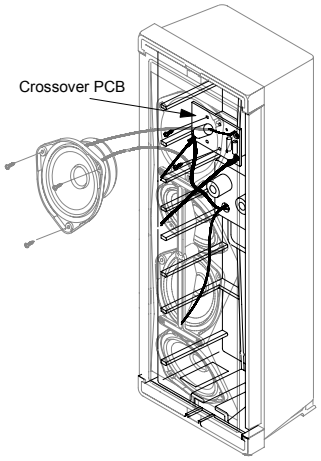
2.4 Cut the wires as close as possible to the driver's wire terminal.

3. Crossover Removal

3.1 Remove the three screws (3) securing the top driver (4) to the cabinet. Lift out the driver.

3.2 Remove the four screws (3) securing the crossover PCB (7) to the cabinet.

3.3 Pull the crossover PCB through the driver opening in the cabinet.



4. Neutrik® Speakon® Connector Removal

4.1 Perform procedure 2.1 to 2.3 to remove the two center drivers (4).

4.2 Using a flat-blade screwdriver, pry out the tinnerman clip (6) securing the Speakon connector (8) to the cabinet.

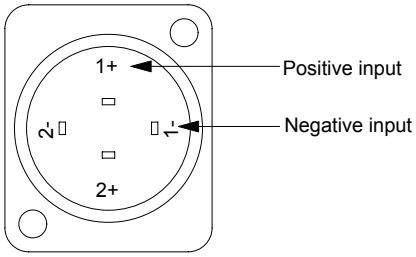
4.3 Pull out the Speakon connector and remove the wires.

TEST PROCEDURE

1. Phase Test

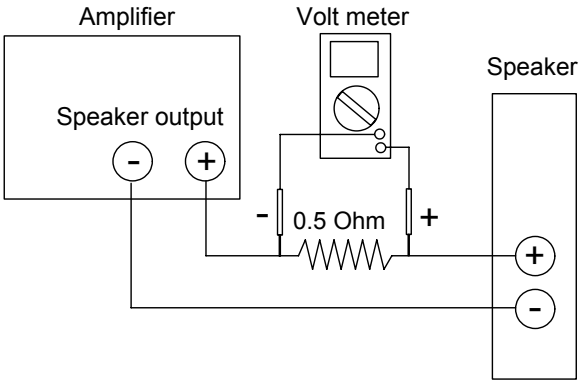
1.1 Observing polarity, apply 9 VDC to the input connector. Refer to the figure below.

1.2 All driver cones should move outward. Referring to figure 4, rewire any driver that moves inward.



2. Crossover Test

2.1 Connect a 0.5 Ohm resistor and amplifier to the speaker input connector as shown in the diagram below.



2.2 Apply a 2 Vrms, 8 kHz signal to the speaker input connector.

2.3 Measure the voltage across the 0.5 Ohm resistor. It should be 68-90 mVrms. If the voltage is out of range, check the crossover components and wiring.

3. Rub and Tick Test

3.1 Apply a 9 Vrms, 10 Hz signal to the speaker input connector.

3.2 No extraneous noises such as rubbing, scraping or ticking should be heard.

Note: To distinguish between normal suspension noise and rubs or ticks, slightly displace the cone of the driver with your fingers. If the noise can be made to go away or get worse, it is a rub or tick and the driver should be replaced. If the noise stays the same, it is normal suspension noise and the driver is fine. Suspension noises will not be heard with program material.

4. Air Leak Test

4.1 Apply a 15 Vrms, 65 Hz signal to the speaker input connector.

4.2 Listen for air leaks around the drivers and cabinet seam. Reposition or replace any gasket that is found to leak. Repairs made to the cabinet seam should not be visible from the exterior of the speaker.

5. Sweep Test

5.1 Apply a 9 Vrms, 10 Hz signal to the speaker input connector.

5.2 Sweep the signal generator from 10 Hz to 500 Hz.

5.3 Apply a 500 Hz, 2 Vrms signal to the speaker input connector.

5.4 Sweep the signal generator from 500 Hz to 5 kHz.

5.5 Listen for buzzes, rattles or other noises. Redress any wire that buzzes; replace any driver that is found to be defective.

Note: A whooshing noise from the port at its resonance frequency of approximately 90 Hz is acceptable.

CROSSOVER PCB PART LIST

Item Number	Description	Part Number	Qty
1	LAMP, AXIAL LEAD	114462	2
2	20uF, CAP, FILM, 75V, 10%	119026	1

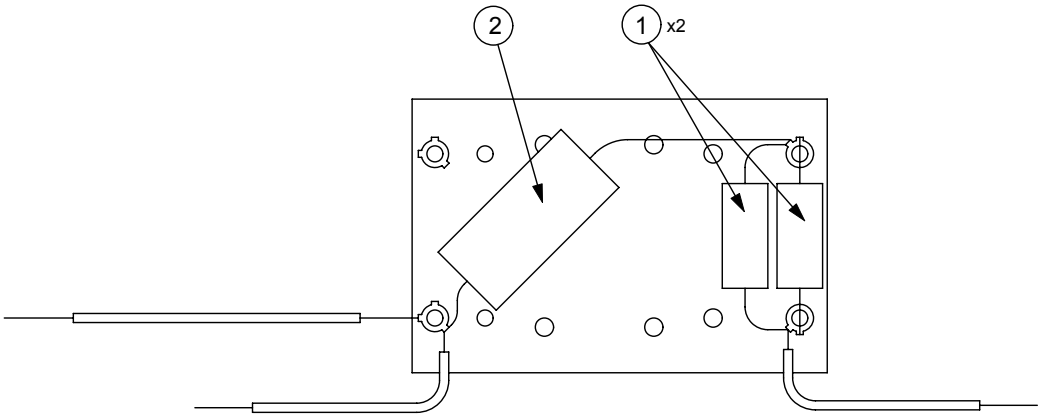


Figure 3. Crossover PCB Component Layout Diagram

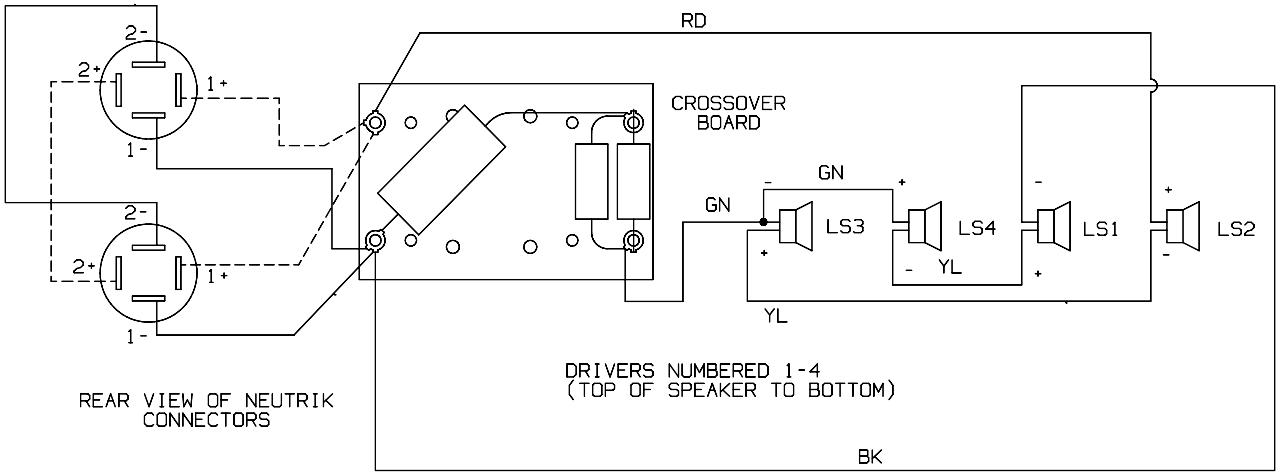


Figure 4. Crossover PCB Wiring Diagram

SERVICE MANUAL REVISION HISTORY

DATE	REV	ECN	DESCRIPTION
12/2015	00		Intial Release
12/2022	01		Update Grille PN

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