BOSE®
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Panaray® LT 6403 and LT 9403 Full Range Loudspeakers

Panaray LT 6400 and LT 9400 Mid/High Frequency Loudspeakers

Service Manual

Reference Number 285327-SM Rev. 02

Contents

CAUTION: The Bose® Panaray LT 6403 and LT 9403 Full Range loudspeakers and LT 6400 and LT 9400 Mid/High Frequency Loudspeakers contain no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

Warranty Information

The Bose Panaray LT 6403, LT 9403, LT 6400 and LT 9400 Loudspeakers are covered by a 5-year transferable limited warranty.

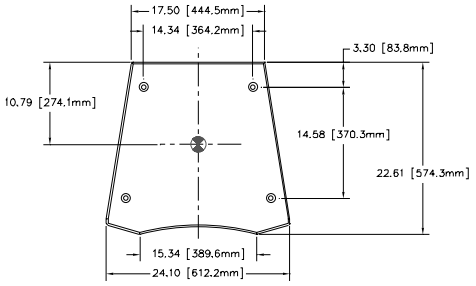
Specifications

LT 6403 Full Range Loudspeaker

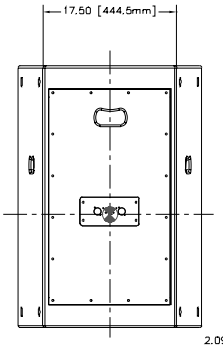
Dimensions:
22.2" D x 24.10" W x 34.4" H
(612mm x 564mm x 873mm)

Weight:
Unpacked: 135lb (61kg)
Packaged: 160lb (73kg)

Top/Bottom



Rear



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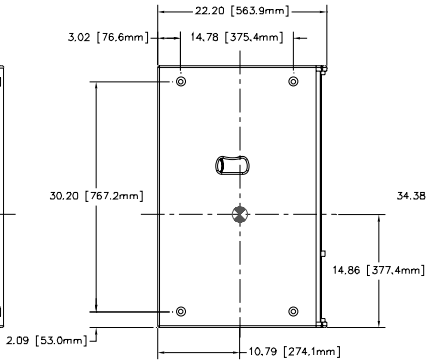

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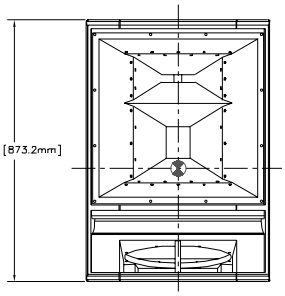
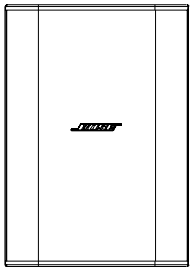


Front (with Grille)

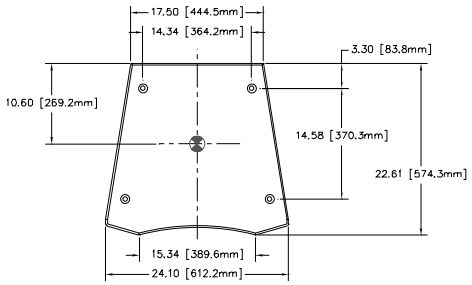


LT 9403 Full Range Loudspeaker

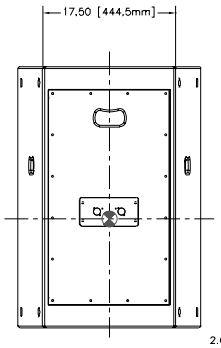
Dimensions:
22.2" D x 24.10" W x 34.4" H
(612mm x 564mm x 873mm)

Weight:
Unpacked: 135lb (61kg)
Packaged: 160lb (73kg)

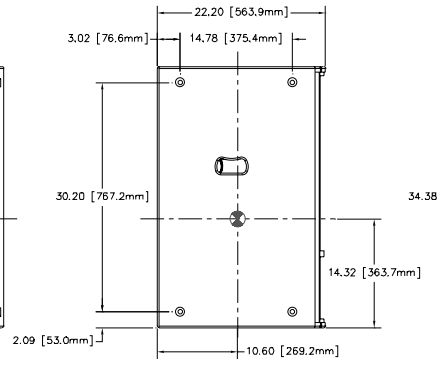
Top/Bottom



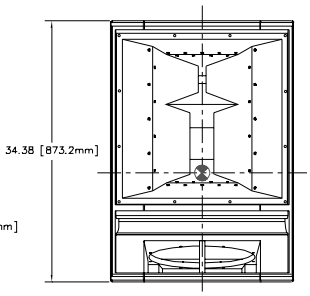
Rear



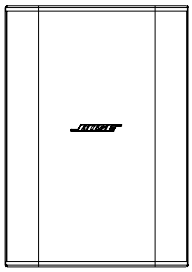
Side



Front



Front (with grille)

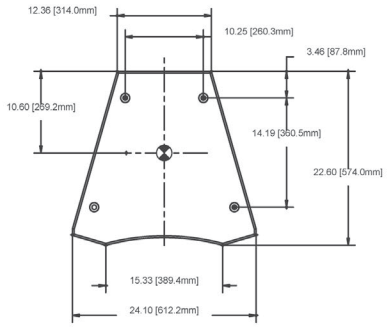


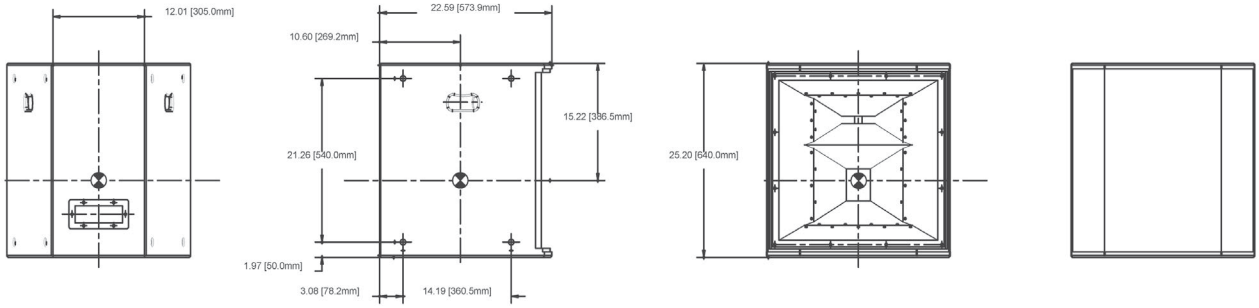
Specifications

LT 6400 Mid/High Frequency Loudspeaker

Dimensions:
22.6" D x 24.10" W x 25.2" H
(574mm x 612mm x 640mm)

Weight:
Unpacked: 80 lb (36.29 kg)
Packaged: 102 lb (46.27 kg)

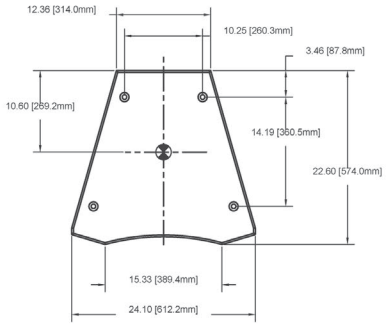


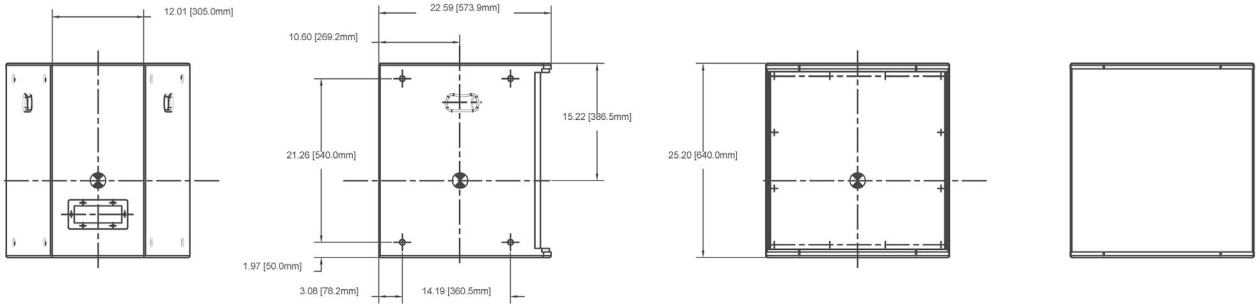


LT 9400 Mid/High Frequency Loudspeaker

Dimensions:
22.6" D x 24.10" W x 25.2" H
(574mm x 612mm x 640mm)

Weight:
Unpacked: 80 lb (36.29 kg)
Packaged: 102 lb (46.27 kg)



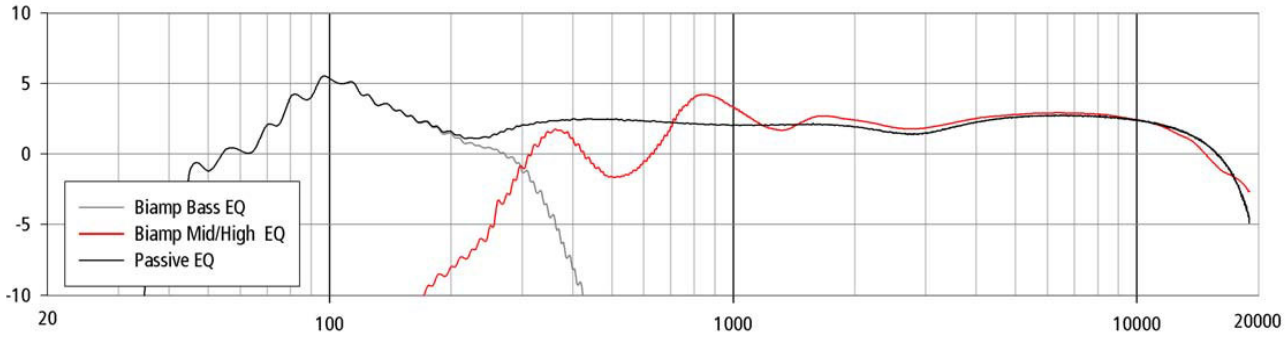


Specifications

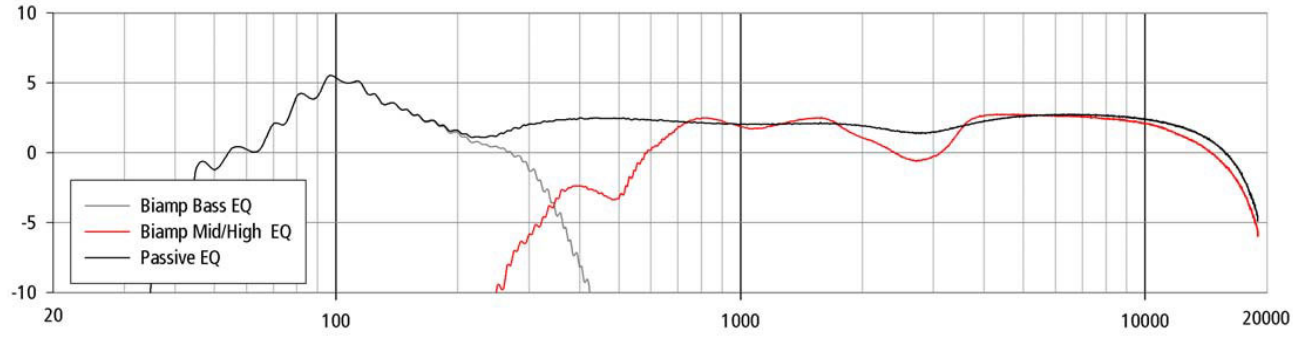
Acoustical Specifications

LT 6403 and LT 9403 Full-Range Speakers	Passive (Full Range)	Bi-Amped	
		Low	Mid/High
Power Handling	500W	300W	100W
Impedance	8 Ohms	8 Ohms	8 Ohms
Sensitivity (1W/1M)	94 dB SPL	93 dB SPL	100 dB SPL
Maximum SPL (pink noise @ 1M @ rated power)	121 dB SPL 127 dB SPL (peak)	118 dB SPL 124 dB SPL (peak)	120 dB SPL 126 dB SPL (peak)
Recommended Crossover	Internal Crossover: Low Frequency @ 300Hz Mid/High @ 1.8kHz	Low Frequency HPF: 50 Hz, 4th order or better LPF: 300Hz, 2nd order or better	
		Mid/High Frequency HPF: 300Hz, 2nd order or better	
Frequency Range (±3 dB)	50 Hz - 16 kHz		
Beamwidth (-6dB point, average 800 - 5 kHz)	6403 Speaker: Horizontal: 65 degrees, Vertical: 52 degrees 9403 Speaker: Horizontal: 93 degrees, Vertical: 49 degrees		

LT 6403 Active Equalization Curve



LT 9403 Active Equalization Curve

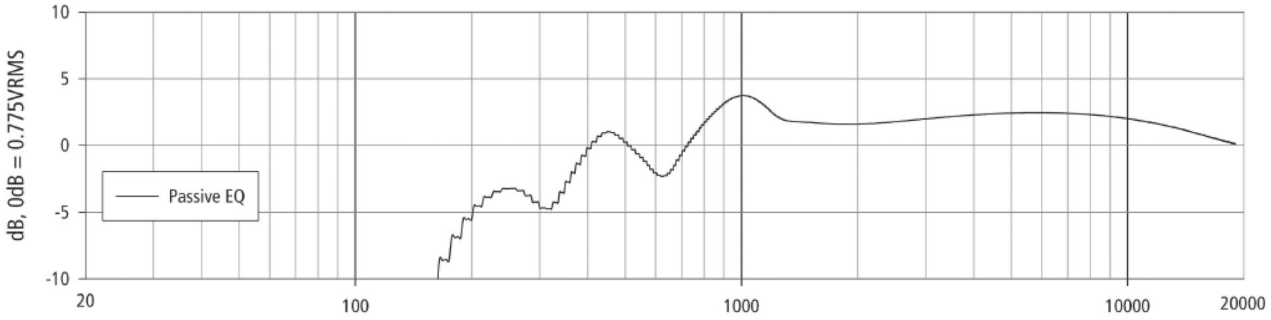


Specifications

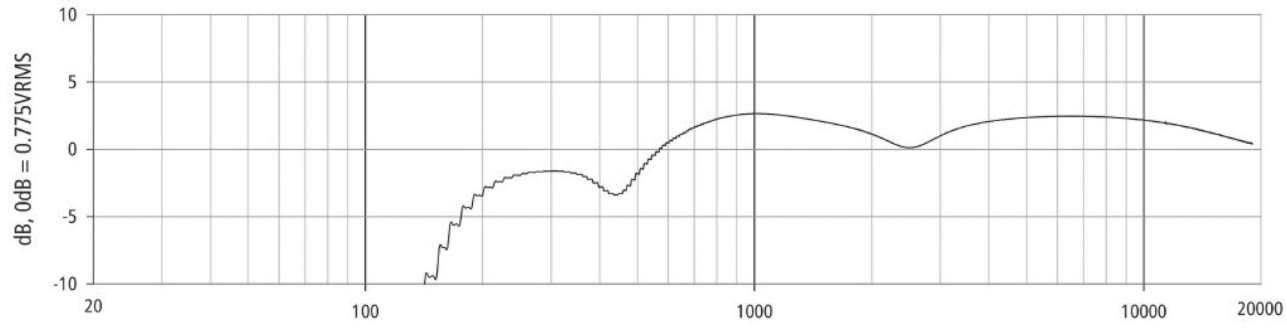
Acoustical Specifications

LT 6400 and LT 9400 Mid/High Frequency Speakers	LT 6400	LT 9400
Power Handling	100W	100W
Impedance	8 Ohms	8 Ohms
Sensitivity (1W/1M)	100 dB SPL	101 dB SPL
Maximum SPL (pink noise @ 1M @ rated power)	120 dB SPL 126 dB SPL (peak)	121 dB SPL 127 dB SPL (peak)
Internal Crossover	Mid/High Frequency @ 1.8kHz	Mid/High Frequency @ 1.8kHz
Frequency Range (±3 dB)	200 Hz - 16 kHz	200 Hz - 16 kHz
Beamwidth (-6dB point, average 800 - 5 kHz)	Horizontal: 65 degrees, Vertical: 52 degrees	Horizontal: 93 degrees, Vertical: 52 degrees

LT 6400 Active Equalization Curve



LT 9400 Active Equalization Curve



Product Descriptions

Panaray® LT 6403 and LT 9403 Full-Range Loudspeakers

The Bose® Panaray LT 6403 and LT 9403 Full-Range loudspeakers are full range, three way devices. They use a 15" woofer, a V2 mid-frequency driver and a 1.0" compression driver mounted on a 60 x 40 (LT 6403) or a 90 x 40 (LT 9403) constant directivity horn assembly. This horn assembly can be rotated 90 degrees to allow sideways placement of the speakers.

These loudspeakers can be operated in passive or bi-amplified mode.

- In passive mode, the internal passive crossover network is utilized and a single amplified signal is connected to the loudspeaker.

- In bi-amplified mode, the low-frequency and mid/high-frequency drivers are accessed through separate pins on the NL4 connectors.

Panaray LT 6400 and LT 9400 Mid/High Frequency Loudspeakers

The Panaray LT 6400 and LT 9400 Mid/High Frequency Loudspeakers are essentially the same as the LT 6403 and LT 9403 full range versions, but without the 15" woofer. They use a V2 mid-frequency driver and a 1.0" compression driver mounted on a 60 x 40 (LT 6400) or a 90 x 40 (LT 9400) constant directivity horn. The horn assembly in the LT 6400 and LT 9400 can be rotated 90 degrees as in the LT 6403 and LT 9403.

Active equalization of all four loudspeakers can be provided by using the ControlSpace™ ESP-88 or the Panaray Digital System controller which has presets for each Panaray speaker and combination of speakers. A parametric equalizer can also replicate the active equalization curves on the previous pages, along with high-pass and low-pass filters as shown.

All of these speakers have sixteen steel threaded inserts - four top, four bottom and four on each side. Threaded inserts are SAE 3/8 - 16 thread, with at least 18 usable threads.

Hanging hardware for these speakers can be purchased from ATM Flyware at http://www.atmflyware.com.

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.

Packing List

Panaray® LT 6403 Full-Range Loudspeaker

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.
	KIT, CARTON, 6403FR, CONSISTS OF:	286539	-	
1	EPE COVER	-	LT6403-5-111	2
2	CUSHIONING MATERIAL	-	LT6403-5-106	1
3	PE BAG	-	LT9702-III-5-108	1
4	OWNER'S MANUAL	286541	BOSE/LT6403	1
5	PE BAG	-	LT6403-5-109	1
6	TRIANGLE PAPER	-	LT6403-5-103	4
7	CARTON, LT6403	-	LT6403-5-107	1

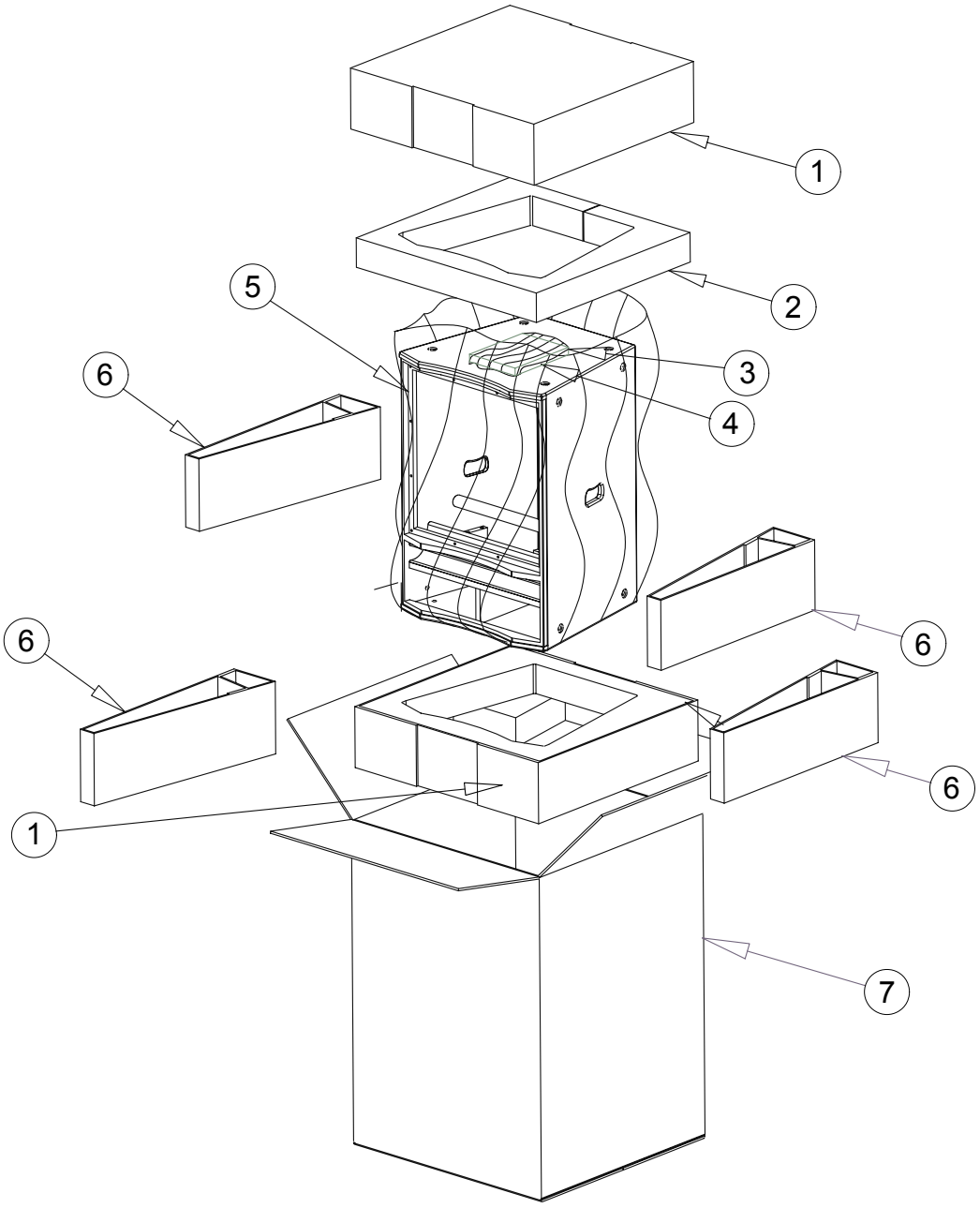


Figure 1. Panaray LT 6403 Packaging View

Packing List

Panaray® LT 6400 Mid/High Frequency Loudspeaker

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.
1	PAPER, LT6400, 674X712X120MM	-	LT6400-5-101	2
2	CUSHIONING MATERIAL, LT6400, 674X712X120MM	-	LT6400-5-102	2
3	PE BAG, 1425X1100X0.04MM	-	LT6400-5-103	1
4	TRIANGLE PAPER, LT6403, 618X575X0.3MM	-	LT6400-5	2
5	USER MANUAL	276859	-	1
6	PE BAG, 310X220X0.04MM	-	LT6400-5	1
7	CARTON, LT6400, 698X726X774MM	-	LT6400-5-104	1

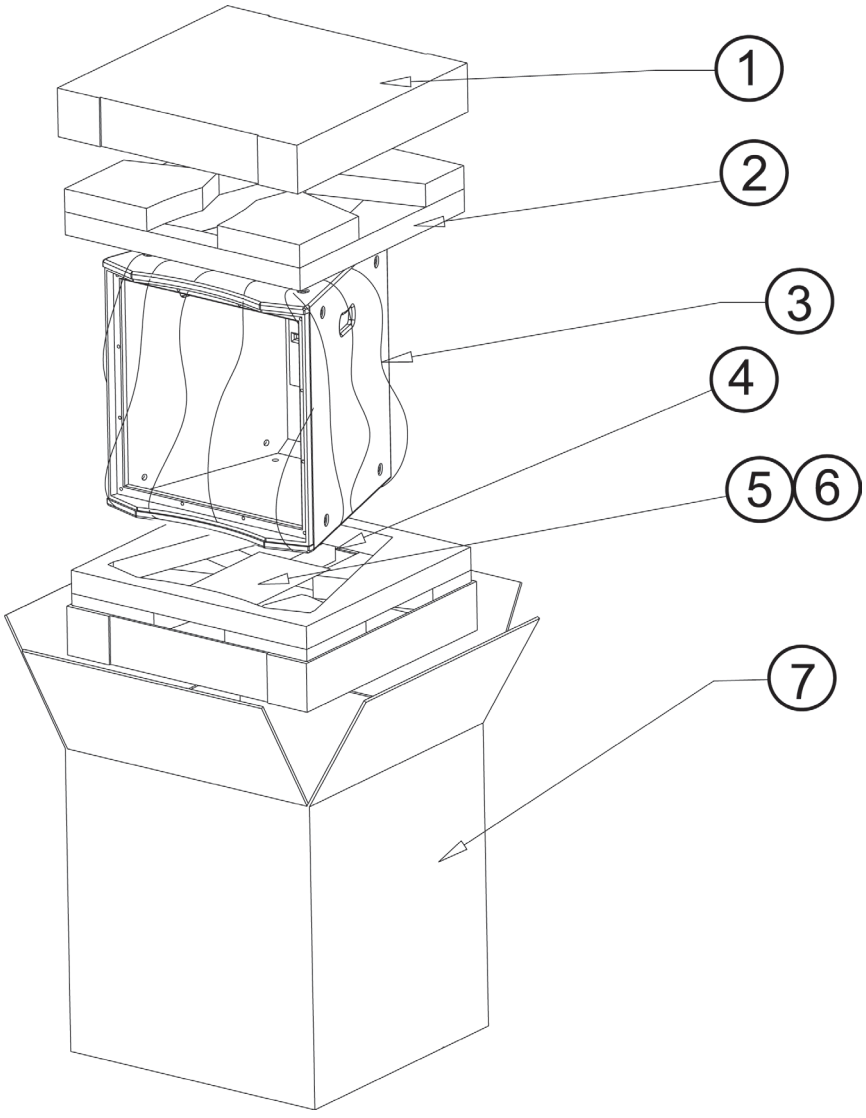


Figure 2. Panaray LT 6400 Packaging View

Packing List

Panaray® LT 9403 Full-Range Loudspeaker

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.
	KIT, CARTON, 9403FR, CONSISTS OF:	286540	-	
1	EPE COVER	-	LT6403-5-111	2
2	CUSHIONING MATERIAL	-	LT6403-5-106	1
3	PE BAG	-	LT9702-III-5-108	1
4	OWNER'S MANUAL	286541	BOSE/LT9403	1
5	PE BAG	-	LT6403-5-109	1
6	TRIANGLE PAPER	-	LT6403-5-103	4
7	CARTON, LT6403	-	LT6403-5-107	1

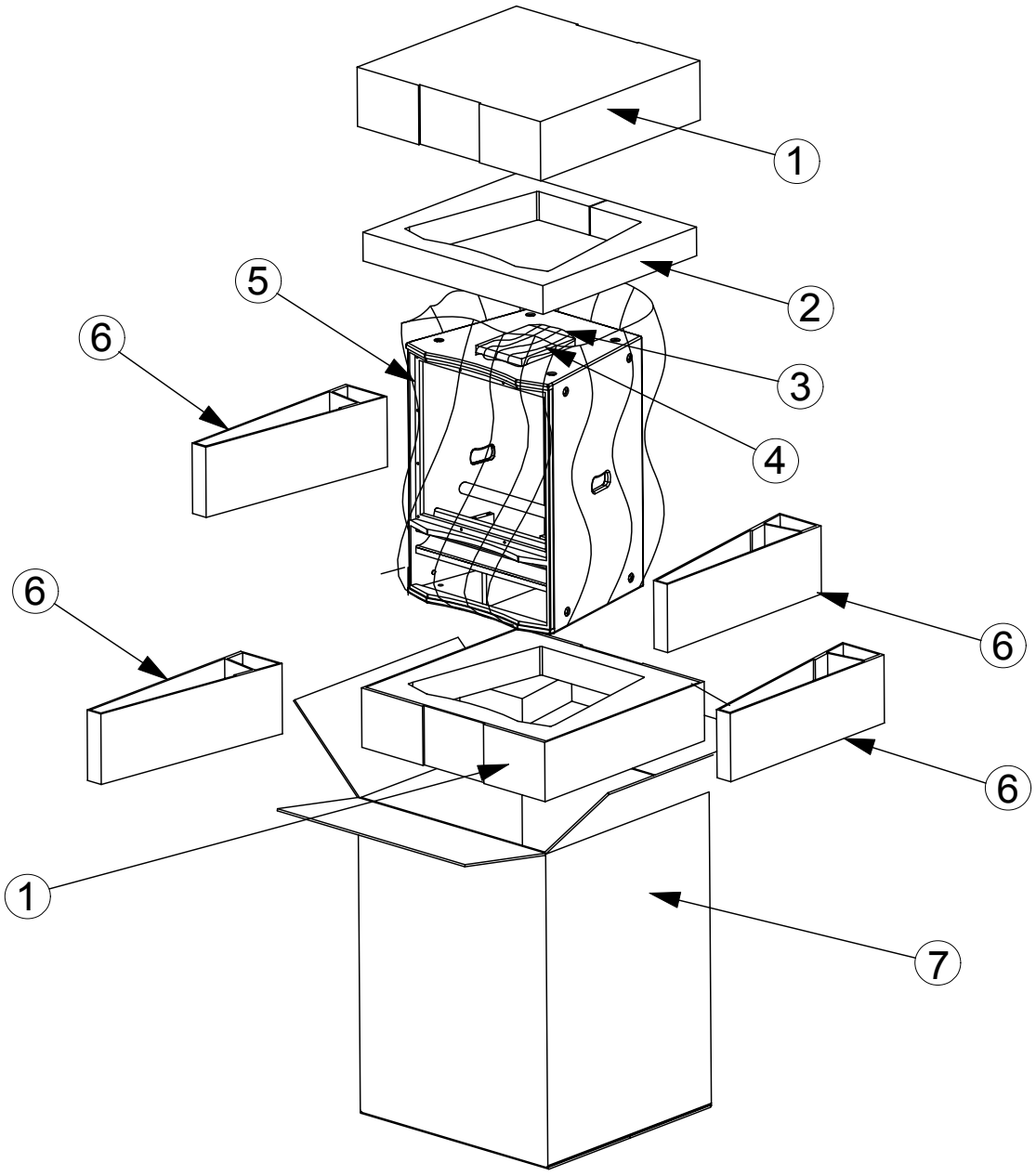


Figure 3. Panaray LT 9403 Packaging View

Packing List

Panaray® LT 9400 Mid/High Frequency Loudspeaker

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.
1	PAPER, LT6400, 674X712X120MM		LT6400-5-101	2
2	CUSHIONING MATERIAL, LT6400, 674X712X120MM		LT6400-5-102	2
3	PE BAG, 1425X1100X0.04MM		LT6400-5-103	1
4	TRIANGLE PAPER, LT6403, 618X575X0.3MM		LT6400-5	2
5	USER MANUAL	276859	-	1
6	PE BAG, 310X220X0.04MM		LT6400-5	1
7	CARTON, LT6400, 698X726X774MM		LT6400-5-104	1

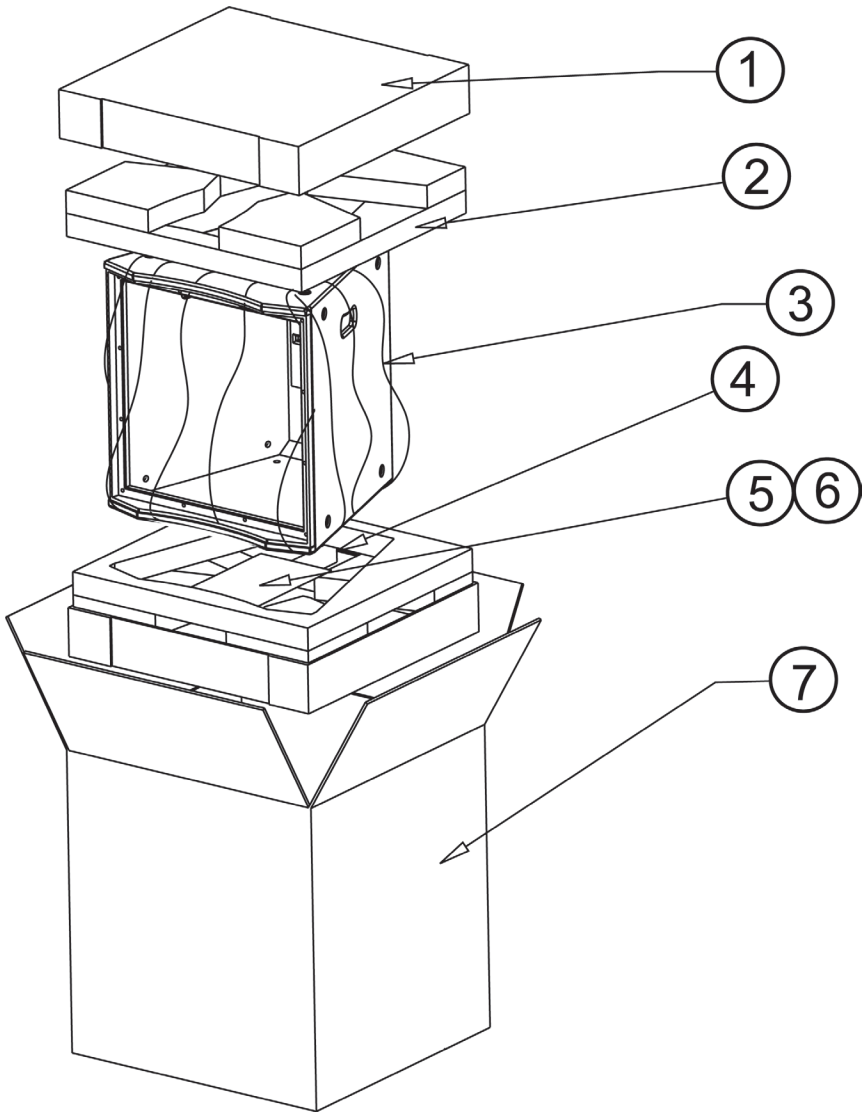


Figure 4. Panaray LT 9400 Packaging View

Main Part List

Panaray® LT 6403 Full-Range Loudspeaker (see Figure 5)

Item Number	Description	Part Number for Product Code 037830 and 037831	Part Number for Product Code 040180 and 040181	Qty.	Note
1	GRILLE ASSY, LTFR, BLACK GRILLE ASSY, LTFR, WHITE (INCLUDES SCREWS, TAPE, LOGO, FASTENER & SPRING)	286533 291903	297530 298590	1	
2	SCREWS, GRILLE, BLACK SCREWS, GRILLE, WHITE	276847 291904	276847 291904	24	
3	GASKET, INPUT PANEL	-	-	1	4
4	INPUT PANEL ASSY, BLACK INPUT PANEL ASSY, WHITE	286534 291906	297531 299313	1	
5	SCREW, INPUT PANEL	-	-	6	4
6	CROSSOVER BOARD ASSY	286536	297508	1	
7	TRANSFORMER, AUDIO	285256	298547	1	
8	1 INCH COMPRESSION DRIVER	286543	286543	1	
9	V2 SPEAKER ASSY, BLACK V2 SPEAKER ASSY, SILVER	276850 292117	298172 298559	1	
10	WOOFER, 15 INCH, LTFR	286542	286542	1	
11	SCREW, WOOFER	286538	297532	8	4
-	LOGO ASSY, LT FR, BLACK LOGO ASSY, LT FR, WHITE (INCLUDES LOGO, TAPE, FASTENER & SPRING)	276848 291905	276848 291905	1	
-	KIT, DIAPHRAGM, 1 INCH COMPRESSION DRIVER, LTFR	286544	286544	1	
-	SCREW, 3/8 X 16, LT-III	289971	289971	16	

Note: Product codes 040180 and 040181 are RoHS compliant versions of the Model 6403 loudspeaker. Only the RoHS compliant parts listed in the above table can be used. The Model 6403 loudspeaker, product codes 037830 and 037831 can use both part numbers listed above.

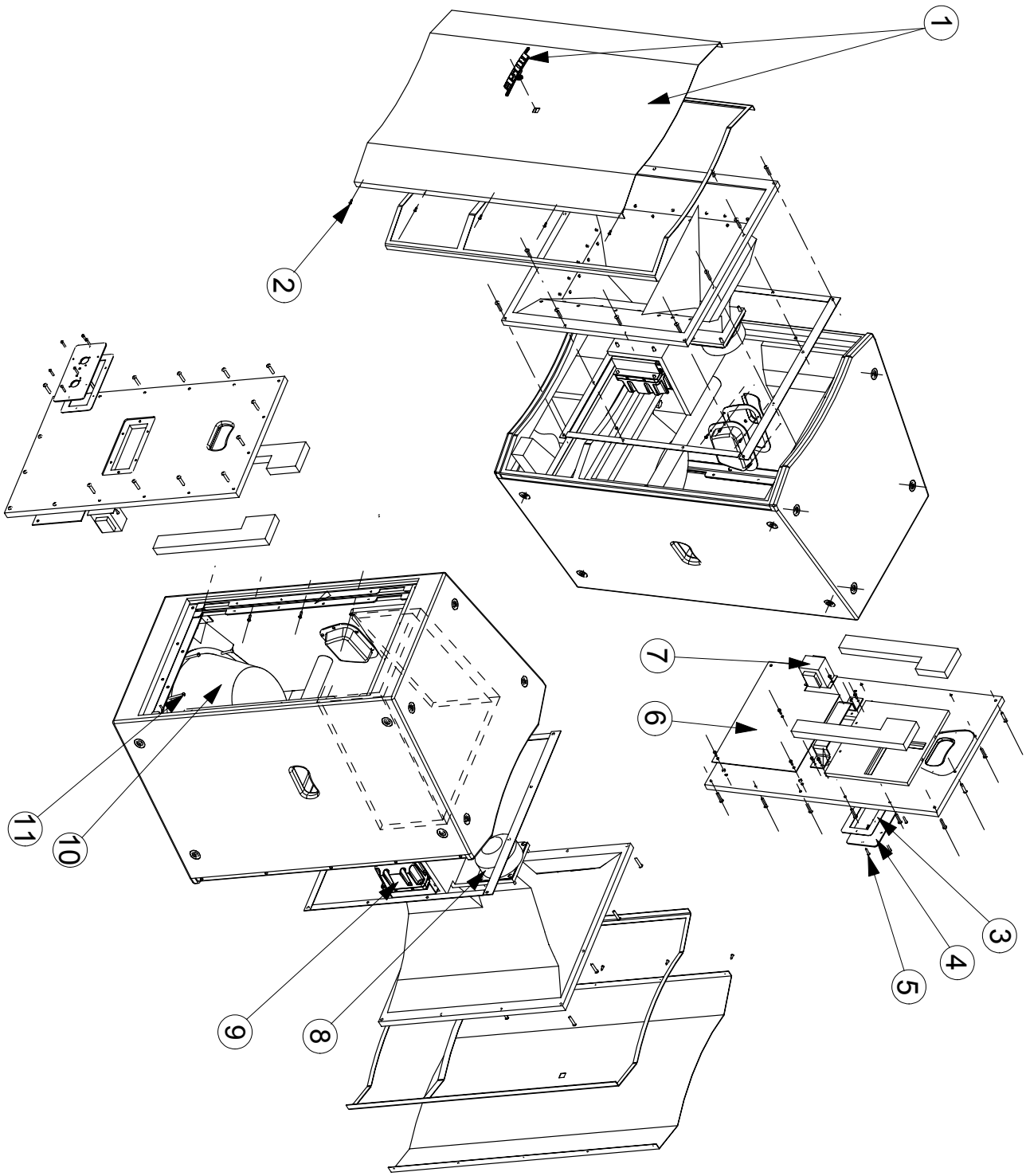


Figure 5. Panaray LT 6403 Loudspeaker Exploded View

Main Part List

Panaray® LT 6400 Mid/High Frequency Loudspeaker (see Figure 6)

Item Number	Description	Part Number for Product Code 039887 and 039888	Part Number for Product Code 040184 and 040185	Qty.	Note
1	LOGO ASSY, BLACK LOGO ASSY, WHITE	276848 291905	276848 291905	1	
2	GRILLE ASSEMBLY, BLACK GRILLE ASSEMBLY, WHITE (INCLUDES SCREWS, TAPE, LOGO, FASTENER AND SPRING)	291908-001 291908-002	297501-001 297501-002	1	
3	GASKET, GRILLE, 587X12X1.5MM	-	-	2	4
4	GASKET, GRILLE, 604X29X1.5MM	-	-	2	4
5	WAVEGUIDE ASSY, BLACK WAVEGUIDE ASSY, WHITE	- -	-	1	4
6	GASKET, WAVGD, 535X18X1.5MM	-	-	2	
7	GASKET, WAVGD, 574X19X1.5MM	-	-	2	
8	SCREW, 9.5X20MM, BLACK	-	-	16	4
9	GASKET, INPUT PANEL	-	-	1	
10	INPUT PANEL ASSEMBLY, BLACK INPUT PANEL ASSEMBLY, WHITE	291910-001 291910-002	297509-001 297509-002	1	
11	SCREW, 4X18MM, BLACK	-	-	6	4
12	WASHER, NYLON	-	-	7	4
13	CROSSOVER PCB ASSEMBLY	-	299314	1	
14	SCREW, 4X15MM, BLACK	-	-	7	4
15	1 INCH COMP DRIVER, LTFR	286543	286543	1	
16	VEE TWO SPEAKER ASSY, BLK VEE TWO SPEAKER ASSY, WHT	276850 292117	298172 298559	1	
17	SCREW, 4X12MM, BLACK	-	-	3	4
18	SCREW, 6X40MM, BLACK	-	-	12	4
19	LOCK WASHER, 11.3X6.3X1.6MM	-	-	12	4
20	WASHER, 16X6.5X1.2MM	-	-	12	4
21	SCREW, 4X12MM, BLACK	-	-	22	4
-	TRANSFORMER, AUDIO	285256	298547	1	
-	REPAIR KIT, 1" COMP DRIVER	286544	286544	1	

Note: Product codes 040184 and 040185 are RoHS compliant versions of the Model 6400 loudspeaker. Only the RoHS compliant parts listed in the above table can be used. The Model 6400 loudspeaker, product codes 039887 and 039888 can use both part numbers listed above.

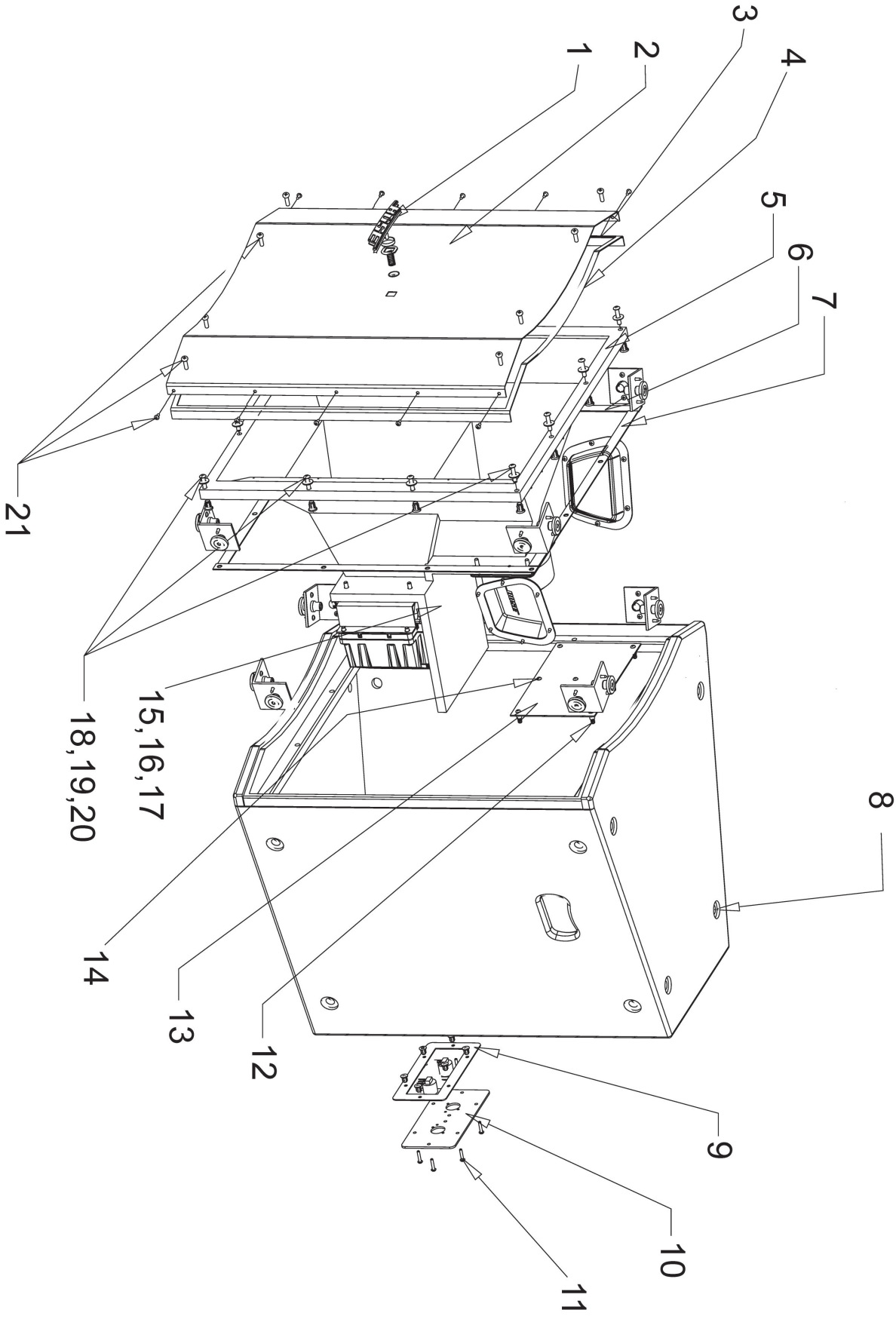


Figure 6. Panaray LT 6400 Loudspeaker Exploded View

Main Part List

Panaray® LT 9403 Full-Range Loudspeaker (see Figure 7)

Item Number	Description	Part Number for Product Code 037828 and 037829	Part Number for Product Code 40182 and 40183	Qty.	Note
1	GRILLE ASSY, LT FR, BLACK GRILLE ASSY, LT FR, WHITE (INCLUDES SCREWS, TAPE, LOGO, FASTENER & SPRING)	286533 291903	297530 298590	1	
2	SCREWS, GRILLE, BLACK SCREWS, GRILLE, WHITE	276847 291904	276847 291904	24	
3	GASKET, INPUT PANEL	-	-	1	4
4	INPUT PANEL ASSY, BLACK INPUT PANEL ASSY, WHITE	286535 291907	297533 298592	1	
5	SCREW, INPUT PANEL	-	-	6	4
6	CROSSOVER BOARD ASSY, 9403	286537	297534	1	
7	TRANSFORMER, AUDIO	285256	298547	1	
8	1 INCH COMPRESSION DRIVER	286543	286543	1	
9	V2 SPEAKER ASSY, BLACK V2 SPEAKER ASSY, SILVER	276850 292117	298172 298559	1	
10	WOOFER, 15 INCH, LTFR	286542	286542	1	
11	SCREW, WOOFER	286538	297532	8	4
-	LOGO ASSY LT FR, BLACK LOGO ASSY, LT FR, WHITE (INCLUDES LOGO WITH TAPE, FASTENER & SPRING)	276848 291905	276848 291905	1	
-	KIT, DIAPHRAGM, 1 INCH COMPRESSION DRIVER, LTFR	286544	286544	1	
-	SCREW, 3/8 X 16, LT-III	289971	289971	16	

Note: Product codes 040182 and 040183 are RoHS compliant versions of the Model 9403 loudspeaker. Only the RoHS compliant parts listed in the above table can be used. The Model 9403 loudspeaker, product codes 037828 and 037829 can use both part numbers listed above.

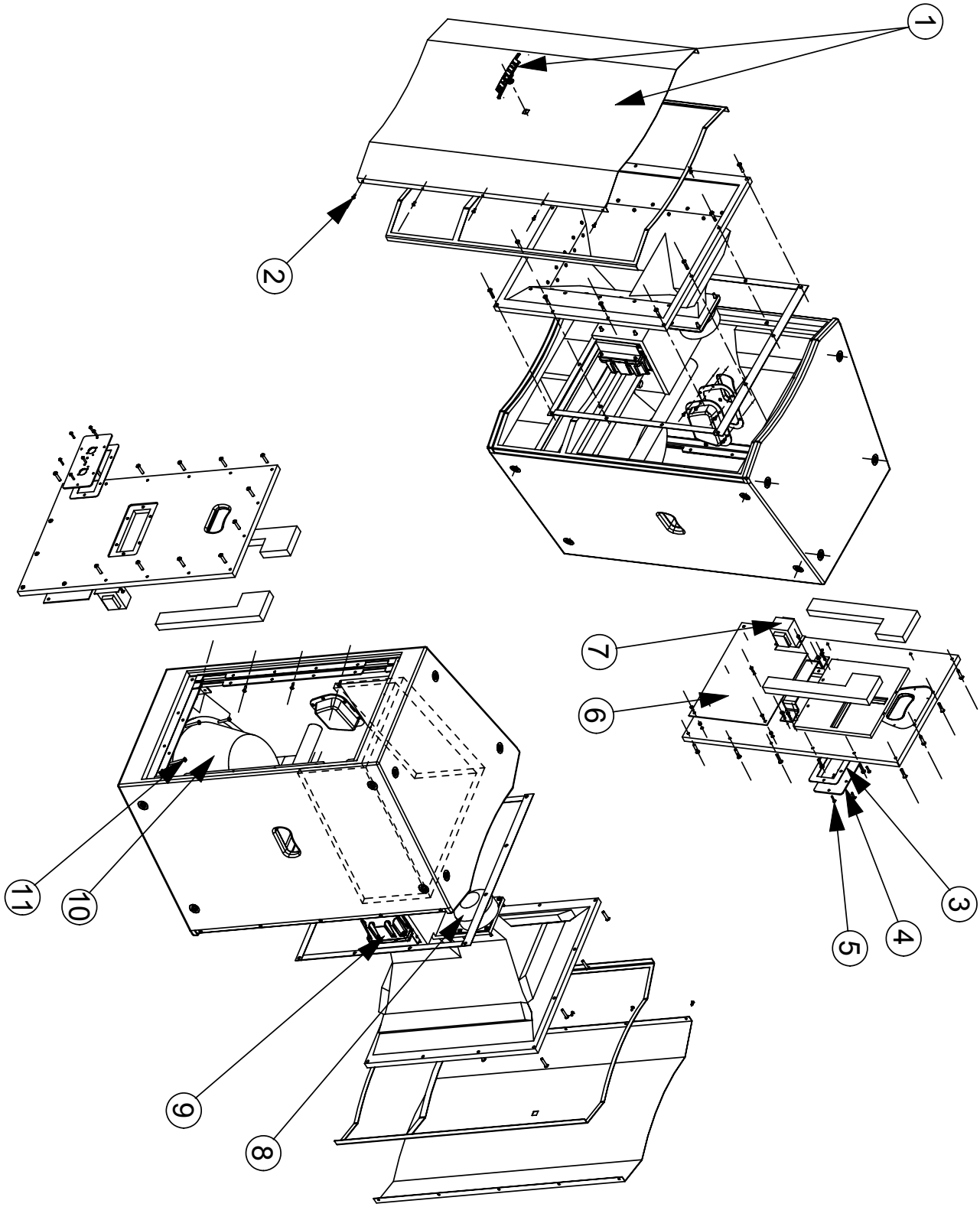


Figure 7. Panaray LT 9403 Loudspeaker Exploded View

Main Part List

Panaray® LT 9400 Mid/High Frequency Loudspeaker (see Figure 8)

Item Number	Description	Part Number for Product Code 039889 and 039890	Part Number for Product Code 040186 and 040187	Qty.	Note
1	LOGO ASSY, BLACK LOGO ASSY, WHITE	276848 291905	276848 291905	1	
2	GRILLE ASSEMBLY, BLACK GRILLE ASSEMBLY, WHITE (INCLUDES SCREWS, TAPE, LOGO, FASTENER AND SPRING)	291908-001 291908-002	297501-001 297501-002	1	
3	GASKET, GRILLE, 587X12X1.5MM	-	-	2	4
4	GASKET, GRILLE, 604X29X1.5MM	-	-	2	4
5	WAVEGUIDE ASSY, BLACK WAVEGUIDE ASSY, WHITE	-	-	1	4
6	GASKET, WAVGD, 535X18X1.5MM	-	-	2	
7	GASKET, WAVGD, 574X19X1.5MM	-	-	2	
8	SCREW, 9.5X20MM, BLACK	-	-	16	4
9	GASKET, INPUT PANEL	-	-	1	
10	INPUT PANEL ASSEMBLY, BLACK INPUT PANEL ASSEMBLY, WHITE	291910-001 291910-002	297506-001 297506-002	1	
11	SCREW, 4X18MM, BLACK	-	-	6	4
12	WASHER, NYLON	-	-	7	4
13	CROSSOVER PCB ASSEMBLY	-	299315	1	
14	SCREW, 4X15MM, BLACK	-	-	7	4
15	1 INCH COMP DRIVER, LTFR	286543	286543	1	
16	VEE TWO SPEAKER ASSY, BLK VEE TWO SPEAKER ASSY, WHT	276850 292117	298172 298559	1	
17	SCREW, 4X12MM, BLACK	-	-	3	4
18	SCREW, 6X40MM, BLACK	-	-	12	4
19	LOCK WASHER, 11.3X6.3X1.6MM	-	-	12	4
20	WASHER, 16X6.5X1.2MM	-	-	12	4
21	SCREW, 4X12MM, BLACK	-	-	22	4
-	TRANSFORMER, AUDIO	285256	298547	1	
-	REPAIR KIT, 1" COMP DRIVER	286544	286544	1	

Note: Product codes 040186 and 040187 are RoHS compliant versions of the Model 9400 loudspeaker. Only the RoHS compliant parts listed in the above table can be used. The Model 9400 loudspeaker, product codes 039889 and 039890 can use both part numbers listed above.

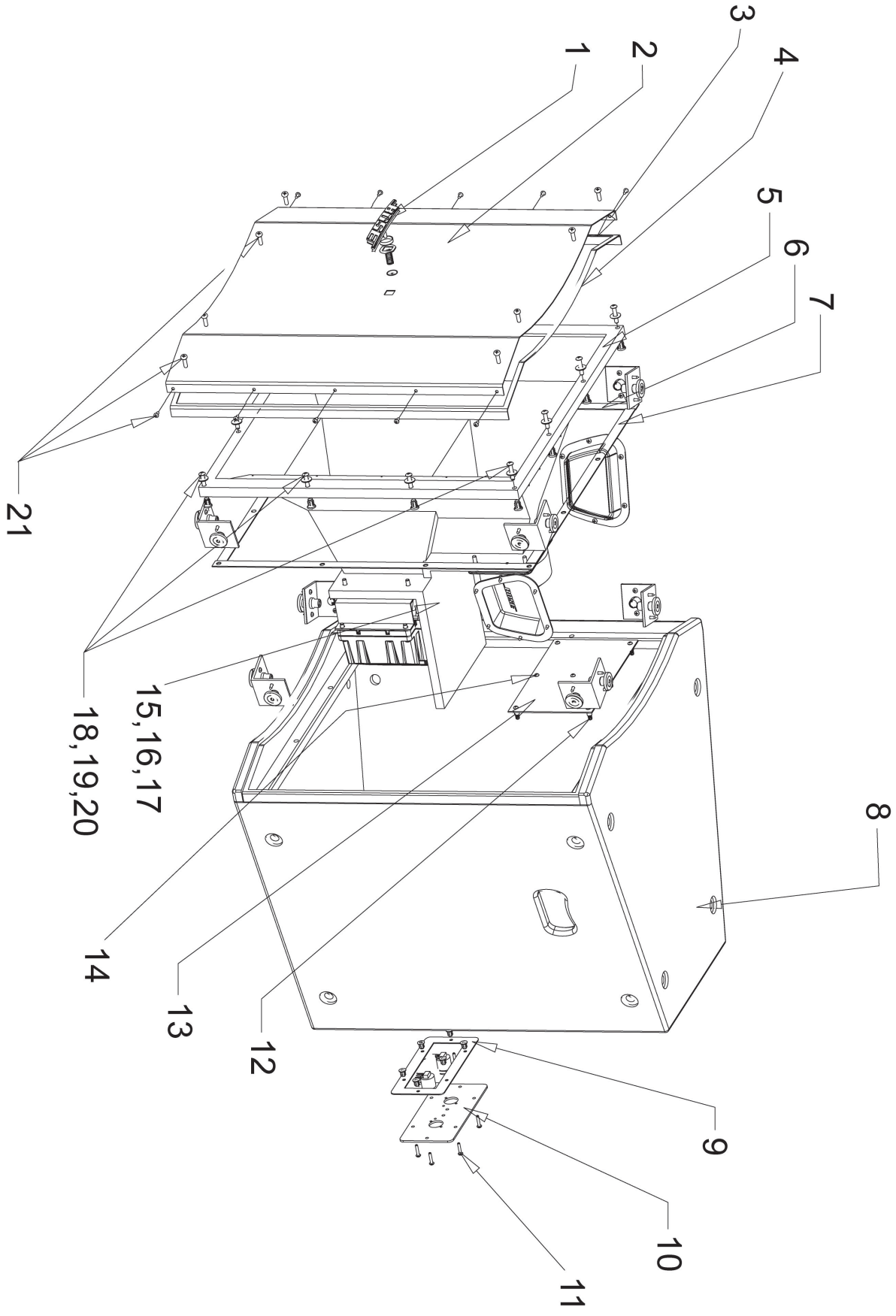


Figure 8. Panaray LT 9400 Loudspeaker Exploded View

Disassembly Procedures

CAUTION: The rear of the Panaray® LT 6403 and LT 9403 loudspeakers can become extremely hot during normal use. Do not attempt to service the loudspeakers until they have cooled to room temperature.

Panaray LT 6403 and LT 9403 Full-Range Loudspeakers

Note: Refer to Figures 5 and 7 for the following procedures.

1. Grille Removal

1.1 Remove the screws (2) that secure the grille assembly (1) to the cabinet.

1.2 Lift the grille assembly off of the cabinet.

2. Logo Removal

2.1 Remove the grille using procedure 1 above.

2.2 On the back of the grille, carefully remove the slotted washer that retains the spring and spacer against the back of the grille. Note the direction the spacer faces. Slide the spring and spacer off of the logo post.

3. Input Panel Assembly Removal

3.1 Remove the six screws (5) that secure the input panel assembly (4) to the cabinet. Disconnect the cables that plug into the PCB. Lift out the assembly.

3.2 Unplug the connector at CN3.

4. Crossover PCB Removal

4.1 Remove the sixteen screws that secure the rear panel to the cabinet. Lift off the rear panel. Unplug the cable harnesses at JP1 and X1.

4.2 Remove the nine screws that secure the crossover PCB assembly to the rear panel. Lift off the crossover PCB assembly.

5. Audio Transformer Removal

5.1 Remove the sixteen screws that secure the rear panel to the cabinet. Lift off the rear panel. Unplug the cable harness at X1.

5.2 Remove the two screws that secure the audio transformer to the rear panel. Lift off the audio transformer.

6. High Frequency Compression Driver Removal

6.1 Remove the sixteen screws that secure the rear panel to the cabinet. Lift off the rear panel. Retain the gasket for re-use.

6.2 Remove the four screws that secure the compression driver mounting plate to the cabinet. Lift the compression driver out of the cabinet. Make a note of the wiring configuration, and disconnect the wires from the compression driver.

6.3 Remove the four screws that secure the compression driver to the mounting plate. Lift off the driver.

7. V2 Mid Frequency Driver Assembly Removal

7.1 Remove the 16 screws securing the rear panel to the enclosure. Remove the rear panel.
Re-assembly Note: When re-installing the rear panel, be sure to torque the screws to 11 to 21 inch lbs.

7.2 Make a note of the wiring connections, and disconnect the RED (+) and BLUE (-) wires connected to the V2 driver assembly.

7.3 Remove the four screws that secure the assembly to the cabinet. These screws are located at the four corners of the V2 assembly. Do not remove the other screws around the casting. Carefully lift the assembly out of the cabinet.

Disassembly Procedures

8. 15 Inch Woofer Removal

Note: The LT 6400 and LT 9400 speakers do not have a woofer.

8.1 Remove the 16 screws securing the rear panel to the enclosure. Remove the rear panel.
Re-assembly Note: When re-installing the rear panel, be sure to torque the screws to 11 to 21 inch lbs.

8.2 Make a note of the wiring connections, and disconnect the RED (+) and BLACK (-) wires connected to the woofer.

8.3 Remove the 8 screws (11) securing the woofer (10) to the enclosure.

8.4 Lift the woofer out of the enclosure.
Re-assembly Note: When re-installing the woofer, be sure to torque the screws to 11 to 21 inch lbs.

Panaray® LT 6400 and LT 9400 Mid/High Frequency Loudspeakers

CAUTION: The rear of the Panaray® LT 6400 and LT 9400 loudspeakers can become extremely hot during normal use. Do not attempt to service the loudspeakers until they have cooled to room temperature.

Note: Refer to Figures 6 and 8 for the following procedures.

1. Grille Removal

1.1 Remove the eighteen screws (21) that secure the grille assembly (2) to the cabinet.

1.2 Lift the grille assembly off of the cabinet.

2. Logo Removal

2.1 Remove the grille using procedure 1 above.

2.2 On the back of the grille, carefully remove the slotted washer that retains the spring and spacer against the back of the grille. Note the direction the spacer faces. Slide the spring and spacer off of the logo post.

3. Input Panel Assembly Removal

3.1 Remove the six screws (11) that secure the input panel assembly (10) to the cabinet. Disconnect the cables that plug into the PCB. Lift out the assembly.

3.2 Unplug the wiring harness at X1.

4. Crossover PCB Removal

4.1 Remove the eighteen screws (21) that secure the grille assembly to the loudspeaker. Lift off the grille.

4.2 Remove the twelve screws (18) that secure the waveguide assembly to the loudspeaker cabinet. Slowly slide out the waveguide assembly and unplug the cable wiring harness at X1.

4.3 Remove the screws (14) that secure the crossover PCB assembly to the rear panel. Lift off the crossover PCB assembly.

5. Audio Transformer Removal

5.1 Remove the eighteen screws (21) that secure the grille assembly to the loudspeaker. Lift off the grille.

5.2 Remove the twelve screws (18) that secure the waveguide assembly to the loudspeaker cabinet. Slowly slide out the waveguide assembly and unplug the cable wiring harness at X1.

5.3 Remove the two screws that secure the audio transformer to the rear panel. Lift off the audio transformer.

Disassembly / Test Procedures

6. High Frequency Compression Driver Removal

6.1 Remove the eighteen screws (21) that secure the grille assembly to the loudspeaker. Lift off the grille.

6.2 Remove the twelve screws (18) that secure the waveguide assembly to the loudspeaker cabinet. Slowly slide out the waveguide assembly and unplug the cable wiring harness at X1.

6.3 Remove the four screws that secure the compression driver mounting plate to the cabinet. Lift the compression driver out of the cabinet. Make a note of the wiring configuration, and disconnect the wires from the compression driver.

6.4 Remove the four screws that secure the compression driver to the mounting plate. Lift off the driver.

7. V2 Mid Frequency Driver Assembly Removal

7.1 Remove the eighteen screws (21) that secure the grille assembly to the loudspeaker. Lift off the grille.

7.2 Remove the twelve screws (18) that secure the waveguide assembly to the loudspeaker cabinet. Slowly slide out the waveguide assembly and unplug the cable wiring harness at X1.

7.3 Make a note of the wiring connections, and disconnect the RED (+) and BLUE (-) wires connected to the V2 driver assembly.

7.4 Remove the four screws that secure the assembly to the cabinet. These screws are located at the four corners of the V2 assembly. Do not remove the other screws around the casting. Carefully lift the assembly out of the cabinet.

Test Procedures

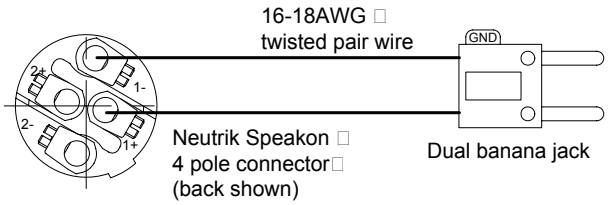
Test Cable for the Panaray® LT 6403, LT 6400, LT 9403 and LT 9400 Loudspeakers

You will need to make up a test cable in order to be able to perform the tests below.

Parts Required:

1 - Neutrik® Speakon® NL4FX connector
1 - Dual banana jack
6 feet of 16-18 AWG twisted pair wire

- Connect one lead of the twisted pair wire to the positive tab of the dual banana jack. Connect the other lead to the GND tab of the dual banana jack.
- Connect the positive lead of the wire to the 1+ position of the Neutrik connector. Connect the negative lead of the wire to the 1- position of the Neutrik connector. Refer to the drawing below.



Speaker Test Cable

Test Notes:

1. The Panaray LT 6400 and LT 9400 do not have a woofer. You will not be able to perform the woofer related tests on these speakers.

2. When testing the LT 6403 and LT 9403, ensure that the speaker under test is in BI-AMP mode for the following tests. You can verify that the speaker is set up to operate in BI-AMP mode by checking the window on the input panel. Refer to the procedure in the back of this manual to change from PASSIVE to BI-AMP mode.

Test Procedures

1. Woofer Phase Test

1.1 Remove the back panel of the speaker using the disassembly procedures.

1.2 Disconnect the connectors at the woofer input terminals. Momentarily apply 8 Vdc ± 1 Vdc to the terminals, observing polarity when connecting the DC P/S. The woofer should move outward when the DC level is applied.

2. V2 Assembly Drivers Phase Test

2.1 Remove the back panel of the speaker using the disassembly procedures.

2.1 Disconnect the connectors at the V2 driver assembly input terminals. Momentarily apply 8 Vdc ± 1 Vdc to the terminals, observing polarity when connecting the DC power supply. The V2 drivers should move outward when the DC level is applied.

2. Rub and Tick Test

2.1 Apply a 20 Vrms, 10 Hz signal to the input terminals of the speaker.

2.2 No extraneous noise such as rubbing, scraping or ticking should be heard. Ensure that there is no buzz from the loudspeaker grille.

3. Low Frequency Power Sweep Test

3.1 Apply an 8 Vrms, 10 Hz signal to the speaker input terminals.

3.2 Sweep the input frequency from 10 Hz to 2 kHz.

3.3 Lower the applied input to 3 Vrms, and sweep the input frequency from 2 kHz to 5 kHz.

3.4 Listen for any buzzes, rattles or other extraneous noises from the loudspeaker.

4. High Frequency Power Sweep Test

4.1 Apply a 3 Vrms, 1.0 kHz signal to the speaker input terminals.

4.2 Sweep the input frequency from 1.0 kHz to 5 kHz.

4.3 Listen for any buzzes, rattles or other extraneous noises from the loudspeaker.

5. Passive Operation Rub and Tick Test

Note: This test does not apply to the LT 6400 or LT 9400 speakers.

5.1 Remove the input panel, and move the jumpered connector from the BI-AMP to the PASSIVE position. Re-install the input panel.

5.2 Apply a 20 Vrms, 10 Hz signal to the speaker input terminals.

5.3 Sweep the input frequency from 10 Hz to 2 kHz.

5.4 Lower the applied input to 3 Vrms, and sweep the input frequency from 2 kHz to 5 kHz.

5.5 Listen for any buzzes, rattles or other extraneous noises from the loudspeaker.

6. Air Leak Test

6.1 Apply a 20 Vrms, 50 Hz signal to the speaker input terminals.

6.2 Listen for any air leaks around the rear panel, input panel, waveguide and handles. Pass any speaker that has no air leaks. Fail any speaker that has air leaks. All repairs must not be visible at a distance of 3 feet.

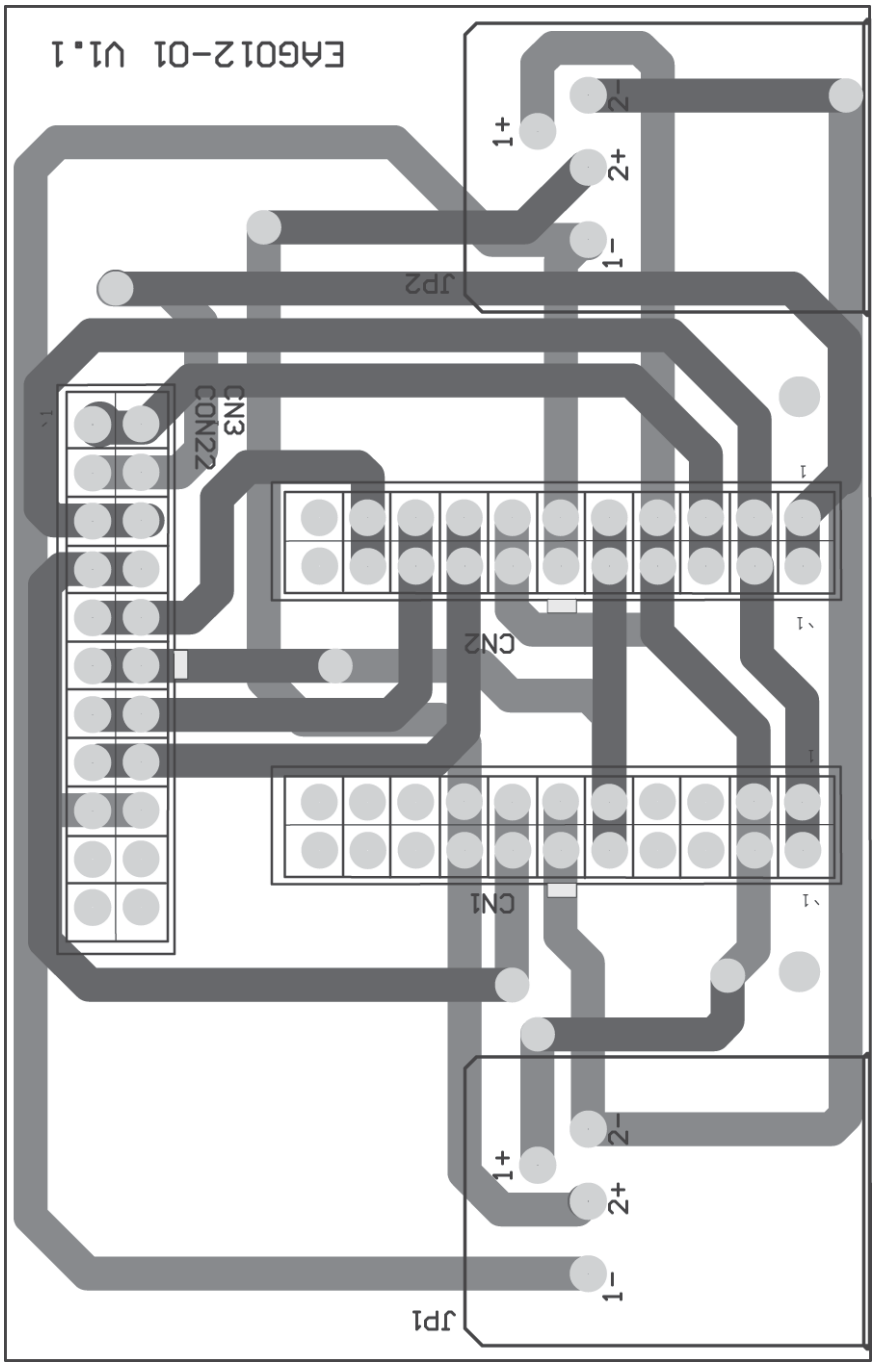
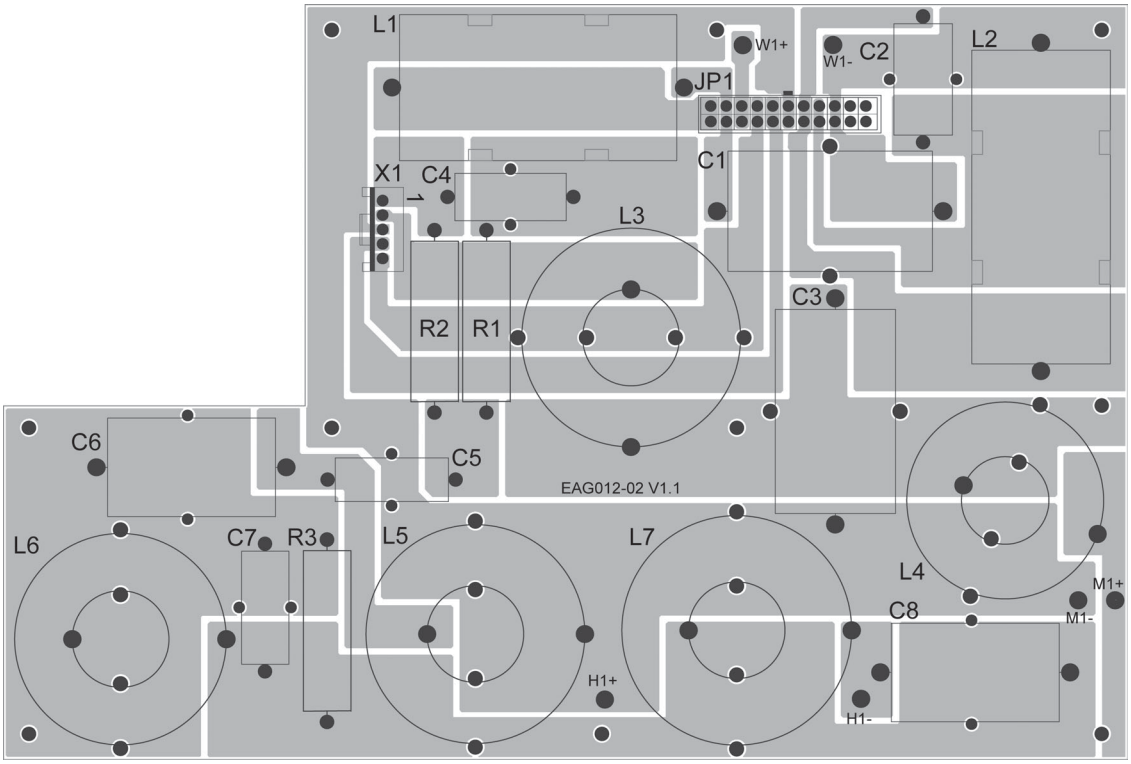


Figure 9. Input Board Layout Diagram

LT 6403 and LT 9403 Crossover Board Layout Diagram

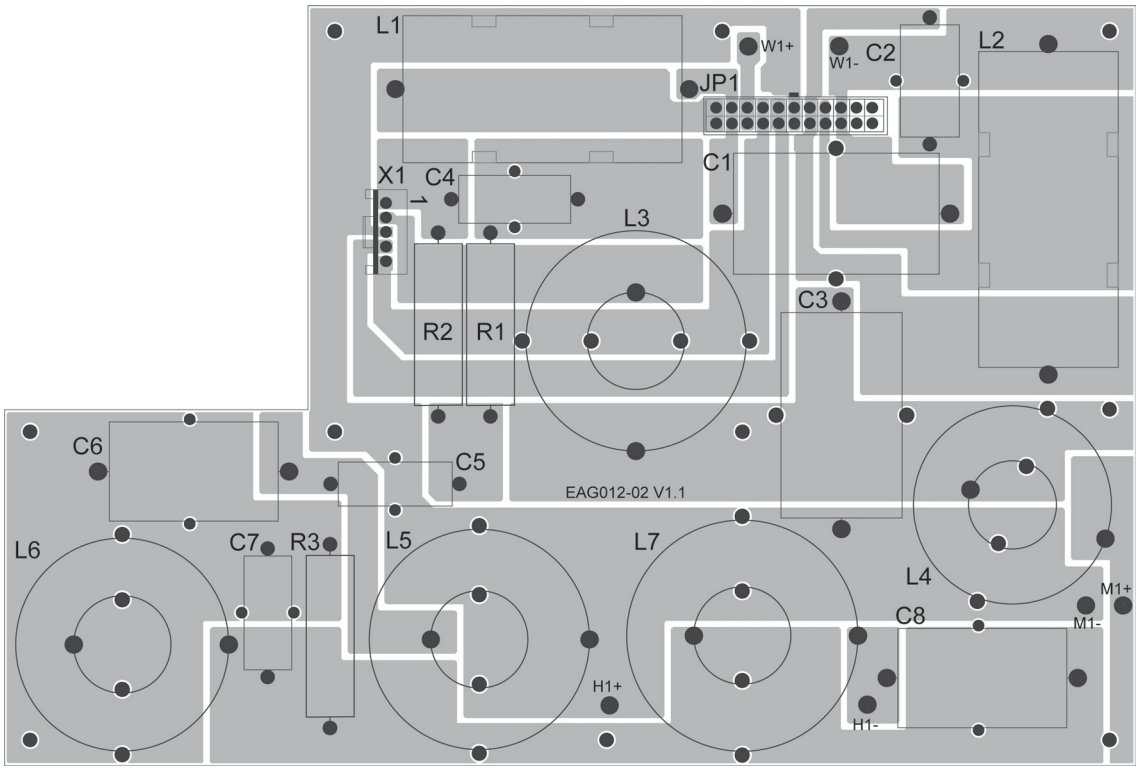
The LT 6403 and LT 9403 loudspeakers both use the same bare board for their crossover assemblies. The only differences are the components populating the board. See the table below.



Reference Designator	LT 6403 Crossover PCB Component Values	LT 9403 Crossover PCB Component Values
Capacitors		
C1	40uF / 250V	40uF / 250V
C2	10uF / 200V	4.7uF / 200V
C3	40uF / 200V	40uF / 200V
C4	60uF / 200V	Jumper
C5	4.7uF / 100V	4.7uF / 100V
C6	3.9uF / 100V	3.9uF / 100V
C7	20uF / 100V	20uF / 100V
C8	20uF / 100V	20uF / 200V
C9	5uF / 100V	5uF / 200V
Inductors		
L1	6mh / 0.8 Ohms	6mh / 0.8 Ohms
L2	9mh / 1.1 Ohms	32mh / 1.6 Ohms
L3	.68mh / 0.7 Ohms	.68mh / 0.7 Ohms
L4	.27mh / 0.4 Ohms	.27mh / 0.4 Ohms
L5	1.2mh / 0.3 Ohms	Jumper
L6	.68mh / 0.6 Ohms	.68mh / 0.6 Ohms
L7	.82mh / 0.7 Ohms	.82mh / 0.7 Ohms
L8	.56mh / 0.6 Ohms	.56mh / 0.6 Ohms
Resistors		
R1	10 Ohm / 15 Watt	Jumper
R2	20 Ohm / 15 Watt	4 Ohm / 15 Watt
R3	10 Ohm / 15 Watt	20 Ohm / 15 Watt

LT 6400 and LT 9400 Crossover Board Layout Diagram

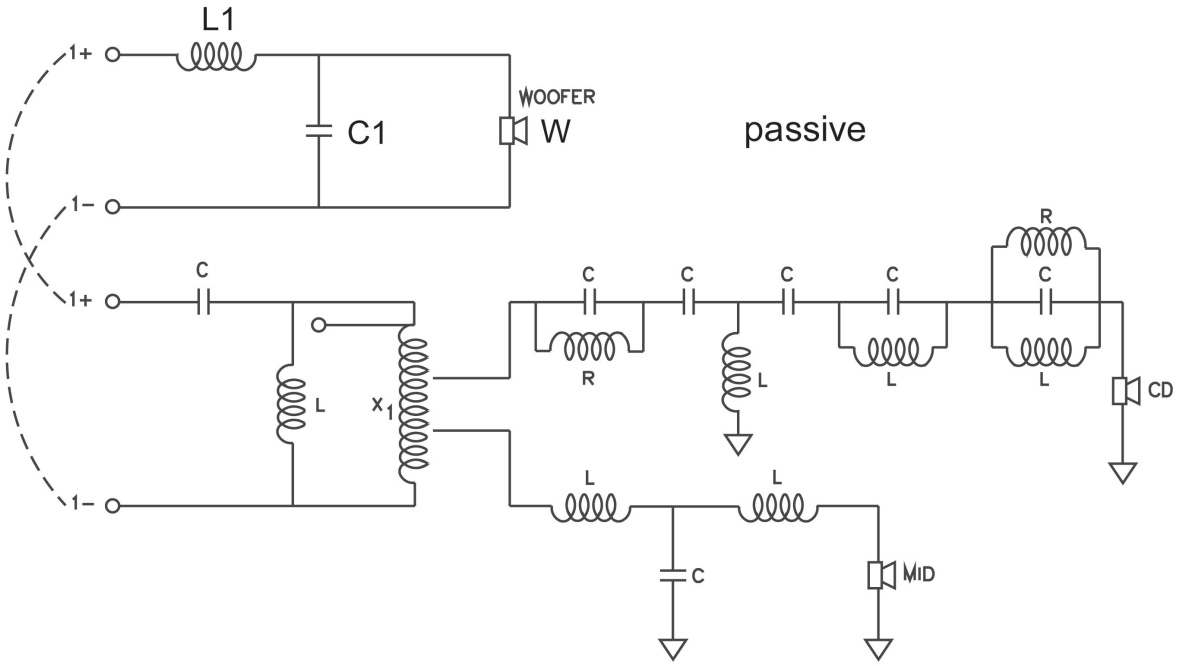
The LT 6400 and LT 9400 loudspeakers both use the same bare board for their crossover assemblies. The only differences are the components populating the board. See the table below.



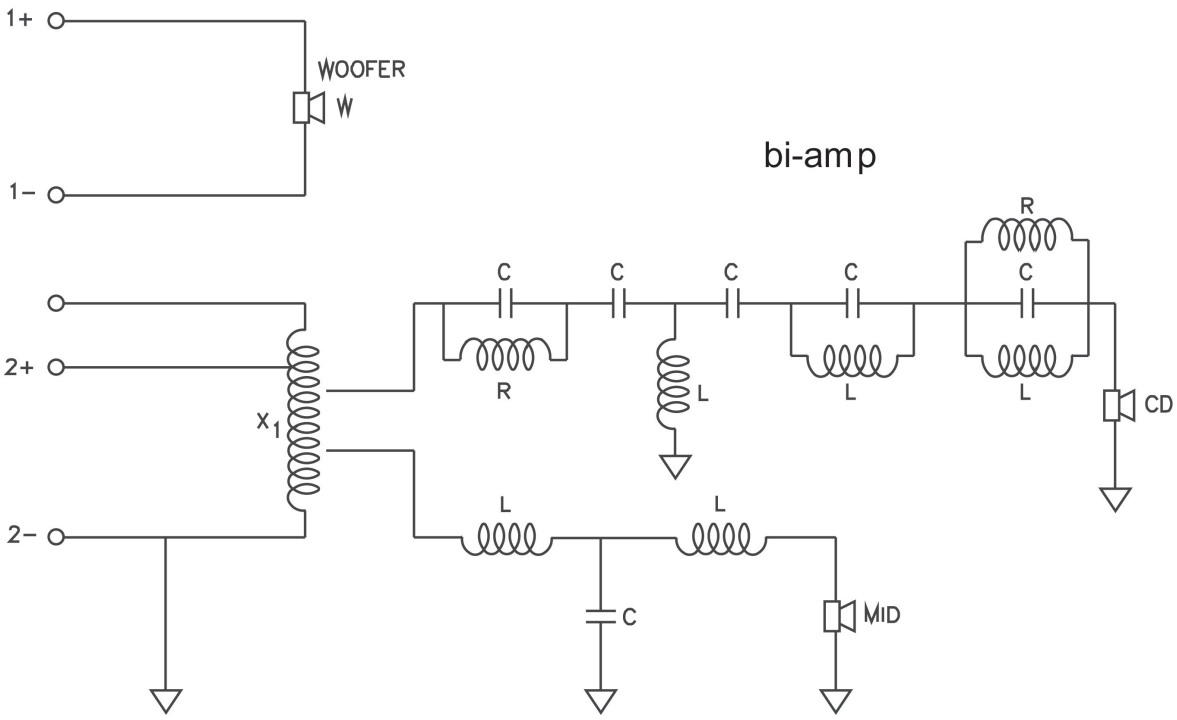
Reference Designator	LT 6400 Crossover PCB Component Values	LT 9400 Crossover PCB Component Values
Capacitors		
C1	Not used	Not used
C2	Not used	Not used
C3	40uF / 200V	40uF / 200V
C4	Not used	Not used
C5	4.7uF / 100V	4.7uF / 100V
C6	3.9uF / 100V	3.9uF / 100V
C7	20uF / 100V	20uF / 100V
C8	20uF / 100V	20uF / 200V
C9	5uF / 100V	5uF / 200V
Inductors		
L1	Not used	Not used
L2	Not used	Not used
L3	.68mh / 0.7 Ohms	.68mh / 0.7 Ohms
L4	.27mh / 0.4 Ohms	.27mh / 0.4 Ohms
L5	Not used	Not used
L6	.68mh / 0.6 Ohms	.68mh / 0.6 Ohms
L7	.82mh / 0.7 Ohms	.82mh / 0.7 Ohms
L8	.56mh / 0.6 Ohms	.56mh / 0.6 Ohms
Resistors		
R1	Not used	Not used
R2	20 Ohm / 15 Watt	4 Ohm / 15 Watt
R3	10 Ohm / 15 Watt	20 Ohm / 15 Watt
R4	1 Ohm / 15 Watt	Not used

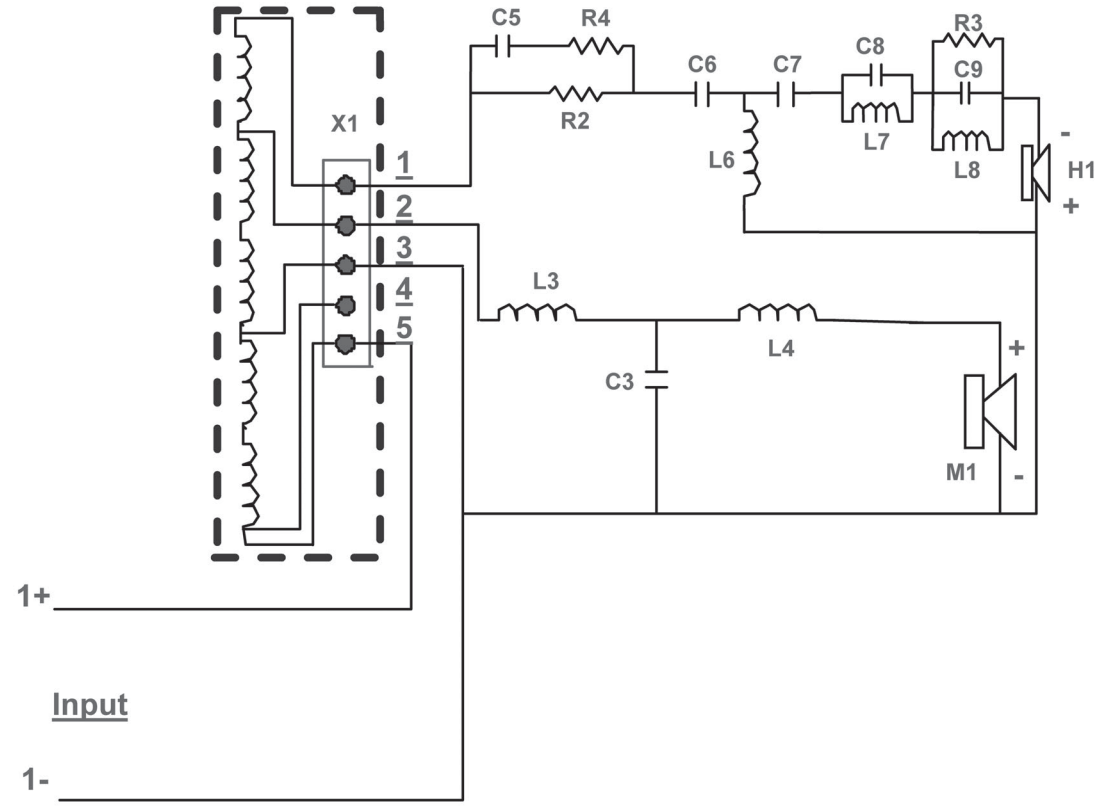
LT 6403 and LT 9403 Crossover Wiring Diagrams

LT 6403 and LT 9403 Full Range Loudspeakers

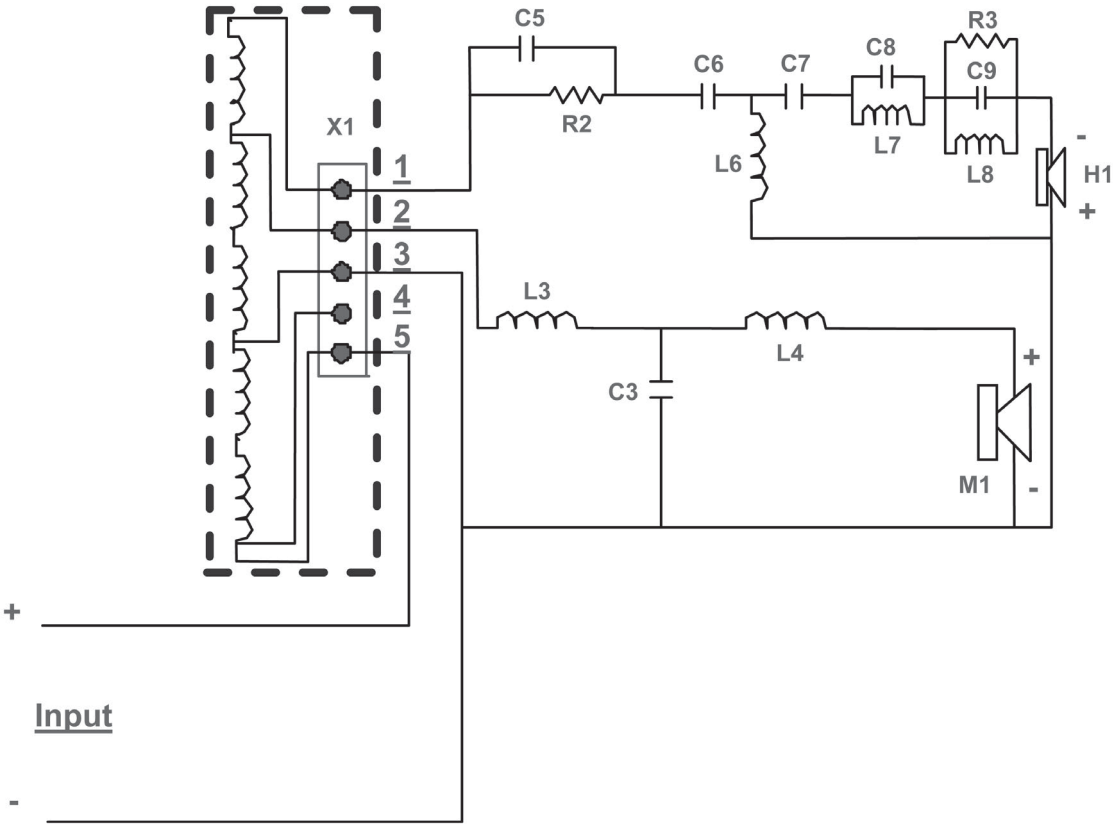


LT 6403 and LT 9403 Full Range Loudspeakers





LT 6400 Mid/High Loudspeaker Crossover Wiring Diagram

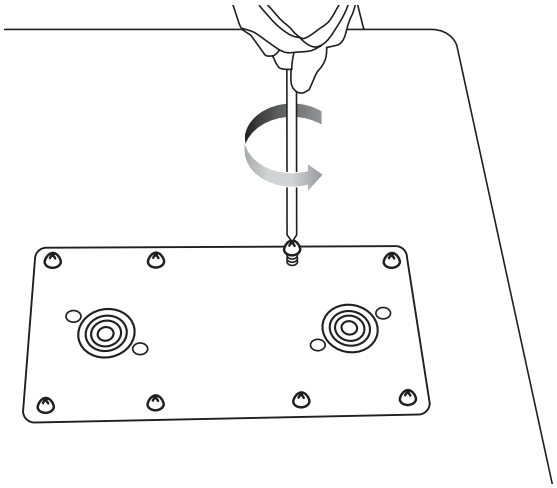


LT 9400 Mid/High Loudspeaker Crossover Wiring Diagram

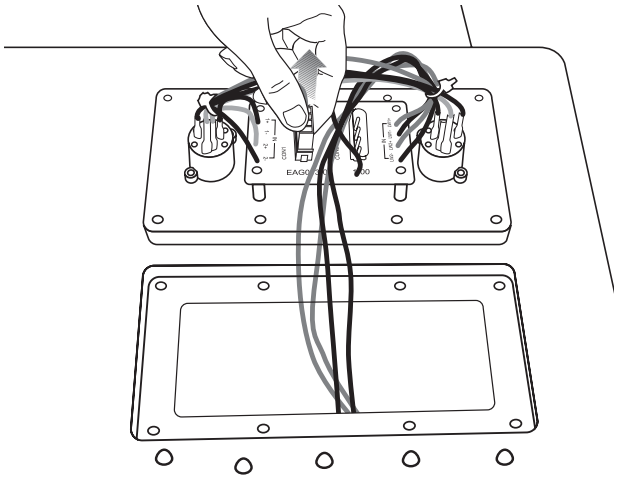
LT 6403 and LT 9403 Passive or Bi-amp Loudspeaker Configuration

Note: The procedure below does not apply to the Panaray® LT 6400 and LT 9400 speakers. The LT 6403 and LT 9403 loudspeaker's configuration can be changed internally to operate in either passive or bi-amped mode by changing the position of a jumpered plug on the input panel PCB. You simply move the jumpered plug from one board connector to another. Refer to the steps below.

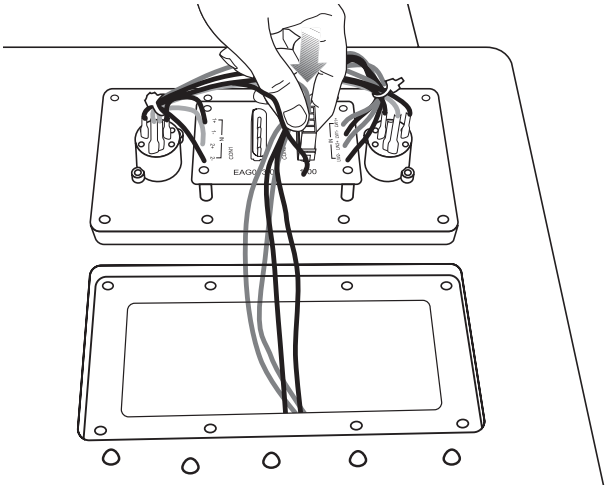
1. Remove the rear connector plate.



2. Remove the connector from the passive position.



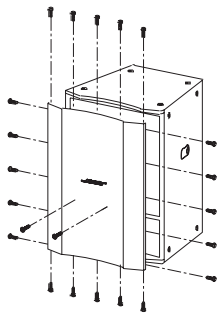
3. Place in the Bi-amped position.



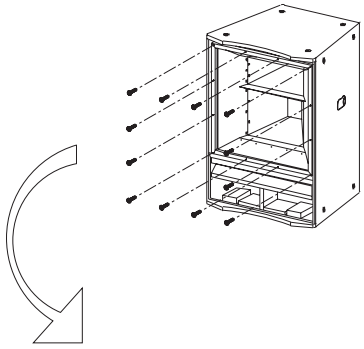
Rotating the Waveguide

The waveguide assemblies on the LT 6403, LT 9403, LT 6400 and LT 9400 loudspeakers can be rotated 90 degrees to allow the speaker to be mounted either vertically or horizontally. Refer to the steps below. **Note:** The LT 6400 and LT 9400 do not have woofer chambers as shown in the diagrams below.

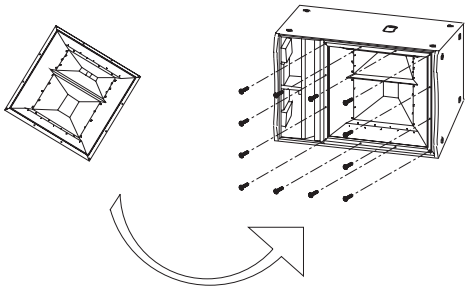
1. Remove the grille



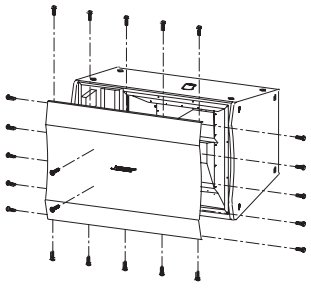
2. Remove the waveguide



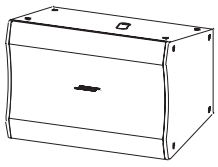
3. Rotate the waveguide



4. Re-install the grille



5. Rotate the logo



High Frequency Compression Driver Replacement Procedure

1. Turn off the amplifier.

2. Disconnect the loudspeaker input connections.

3. Remove the high frequency compression driver from the cabinet using the appropriate disassembly procedures in this service manual for either the Panaray® LT 6403/LT 9403 or LT 6400/ LT 9400 loudspeakers.

4. Once you have accesss to the driver, disconnect the BLUE (+) terminal and the BLACK (-) terminal of the t1.0hp driver.

5. Remove the 4 screws that connect the mounting plate to the compression driver.

6. Remove the 3 screws holding the compression driver assembly to the mounting plate.

7. Connect the new compression driver to the mounting plate using the 3 screws.

8. Insert the compression driver assembly into the rear of the loudspeaker cabinet and secure with 4 screws.

9. Reconnect the BLUE wire to the positive (+) terminal and the BLACK wire to the negative (-) terminal.

10. Re-assemble the loudspeaker.

11. Reconnect the loudspeaker input connections.

12. Turn on the amplifier.

High Frequency Compression Driver Diaphragm Replacement Procedure

To remove the compression driver from the loudspeaker cabinet:

1. Select a clean, well lit work area that is free of magnetic materials that might be attracted to the magnet in the compression driver.

Note: Do not allow any dirt or dust to come into contact with the replacement diaphragm.

2. Carefully clean the outside of the compression driver with a damp cloth.

3. Place the rear of the driver facing up.

4. Remove screws and remove the rear cover of the driver.

5. Gently lift the rear cover straight up. Set it down on its outside to keep the inside clean.

6. Remove the diaphragm assembly by gently lifting and rotating it.

High Frequency Compression Driver Diaphragm Replacement Procedure (cont.)

7. Examine the gap in which the coil of the diaphragm sits by completing the following steps:

A. Gently insert one end of a piece of clean paper (approximately 1" x 1.2") into the gap.

B. Slowly work the paper into the gap.

C. Move the paper around the perimeter of the gap.

Note: You should not feel any debris or obstructions with the paper. If there is debris, use a piece of masking tape to remove. Fold the tape so that both sides have the adhesive backing on the outside. Insert the tape into the gap and work it into and around the gap, removing any debris.

D. When the gap is clean, check once again with a clean piece of paper.

Note: If the gap is still not clean, do not install the replacement diaphragm but instead replace the entire compression driver.

8. Once the gap is clean, make sure that there is no debris on the front plate. The front plate may have some small smudges from fingerprints, but there should be no debris (from a shattered aluminum diaphragm or any other source) and it should feel smooth to the touch with no pits in the metal.

9. Remove the replacement diaphragm from its carton.

10. Grasp the diaphragm assembly around its edges and gently place it onto the front of the compression driver assembly. Do not press down on the diaphragm assembly as this could cause the coil on the underside of the diaphragm assembly to be crushed against the front of the compression driver assembly.

11. Slowly and gently rotate the diaphragm assembly so that the coil is worked into the the gap in the front of the compression driver. The screw holes in the diaphragm can be visually lined up with the screw holes in the front of the compression driver assembly to help center the coil into the gap.

12. Align the holes in the diaphragm assembly with the holes in the front of the compression driver assembly.

13. Replace the rear cover by aligning the screws holes and securing it with the screws.

14. Sweep the driver with a sine wave from 300Hz to 1kHz and listen for buzzing. If you hear any buzzing, readjust the diaphragm or clean the gap again. Dirt and/or misalignment of the diaphragm causes buzzing. Once you have cleaned and/or adjusted the gap, continue sweeping the driver until you do not hear any buzzing. Once you no longer hear any buzzing, the driver is ready to be installed and used.

Accessories Used With the Panaray® LT Loudspeakers

Panaray Digital Controller

The Panaray System Digital Controller has a universal power suppy for worldwide use. Variants of the product refer to the AC cord included with the product. There are five variations.

Region Variation	Product Code
North America	028021
Europe	028022
United Kingdom	028023
Australia	028024
Japan	028025

Panaray EQ Cards

Active equalization for the Panaray LT loudspeakers can be provided by using the active EQ card for that loudspeaker as listed in the table below, or the Panaray system digital controller with presets for each Panaray speaker and combination of speakers.

Note: There are no discrete EQ cards available for the Panaray LT 6403 / LT 9403 or LT 6400 / LT 9400 Loudspeakers. You would use either a Panaray Digital Controller or a parametric equalizer with the appropriate high-pass and low-pass filters. Refer to the EQ curves in the specifications section of this manual.

Speaker	Product Code
Panaray LT 3202® III EQ Card	011502
Panaray LT 4402® III EQ Card	011504
Panaray LT 9402™ III EQ Card	035325
Panaray LT 9702® III EQ Card	017929
Panaray LT MB24 III	028666

Service Manual Revision History

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
6/05	00	Document released at revision 00.	Service manual release	All
4/06	01	- Added LT 6400 and LT 9400 loudspeaker information - Added LT 6403 and LT 9403 white variant information	New product release	Various
9/06	02	Added RoHS compliant parts information	RoHS initiative	Main part lists

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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