F1 Model 812P
Flexible Array Loudspeaker

Service Manual

Reference Number 374847-SM Rev. 00

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CAUTION: The Bose® F1 Model 812P Flexible Array Loudspeaker contains no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

WARRANTY

The Bose F1 Model 812P Flexible Array Loudspeaker is covered by a limited 5-year warranty.

Product Description

Overview

The Bose® F1 Model 812 Passive Flexible Array Loudspeaker is a small-format full range sound reinforcement loudspeaker with a flexible array that lets you control its vertical coverage pattern. Simply push or pull the flexible array into position to create “Straight,” “C”, “J”, or “Reverse-J” coverage patterns, letting you tailor the loudspeaker’s vertical coverage to a variety of environments and mounting locations.

Engineered with a flexible array of eight high-output mid/high drivers, a high-powered 12-inch woofer, 47 Hz low frequency range and a lower crossover point, the loudspeaker delivers high SPL performance while maintaining vocal and midrange clarity. The F1 Model 812 Passive is intended for use in small to medium sized indoor installations and can also be used in portable applications.

Key Features

- FLEX array: Bose exclusive flexible baffle can be configured into four unique shapes, allowing you to choose the best possible coverage pattern for the application
- Eight-driver mid/high line array: Eight vertically mounted drivers, each mounted on a custom waveguide, help deliver wide, consistent coverage
- 12-inch LF driver: High-performance woofer provides strong low-frequency output
- 127 dB peak SPL: For sound-reinforcement and foreground music
- 47 Hz - 20 kHz frequency range: Eliminates need for subwoofers for moderate full-range music levels
- Rugged enclosure: With six M8 threaded insert points that can be combined with a full suite of optional mounting accessories.
- Integrated pole mount: For use with standard tripod speaker stands
- Requires active equalization

Carton Contents

Each F1 Model 812 Passive Flexible Array loudspeaker carton contains the following parts:

- F1 Model 812 Passive Flexible Array loudspeaker
- Installation guide

Using the Flexible Array

Shape the coverage pattern by moving the position of the top and bottom array.

Pushing the array in

Pulling the array out

Accessories

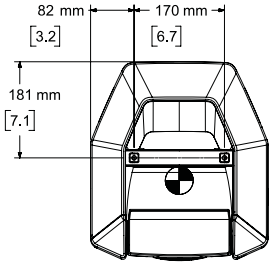
Description	Material Master Number
RMUBKT1 Pan-and-Tilt Bracket	738453-0110
F1 Loudspeaker U-Bracket Mounting Kit	736453-0110
F1 Loudspeaker Yoke Mounting Kit	736451-0110

Product Description

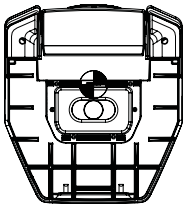
Using the F1 Model 812 Passive on a Tripod Stand

The bottom of the F1 Model 812 Passive loudspeaker includes pole cup for mounting the loudspeaker on a tripod speaker stand. The pole cup fits a standard 35 mm post.
WARNING: The F1 Model 812 Passive loudspeaker is not compatible with the stand provided with the F1 Subwoofer.
WARNING: Do not use the F1 Model 812 Passive loudspeaker with a tripod stand that is unstable. The loudspeaker is only designed for use on a 35 mm pole, and the tripod stand must be capable of supporting a loudspeaker with a minimum weight of 47 lb (21.31 Kg) lbs and an overall size of 26.2” H x 13.2” W x 14.8” D inches (665 mm H x 334 mm W x 373 mm). Using a tripod stand that is not designed to support the size and mass of the F1 Model 812 Passive loudspeaker may lead to an unstable and hazardous condition that could result in injury.

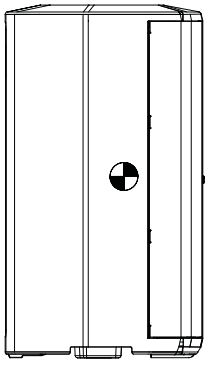
Loudspeaker Dimensions



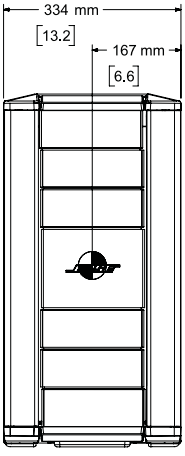
Top View



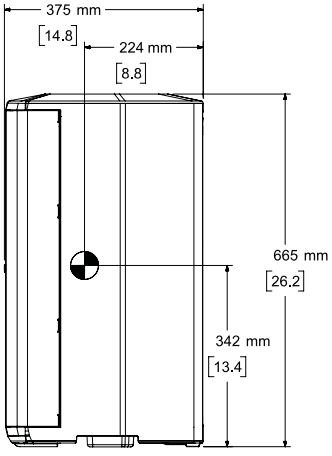
Bottom View



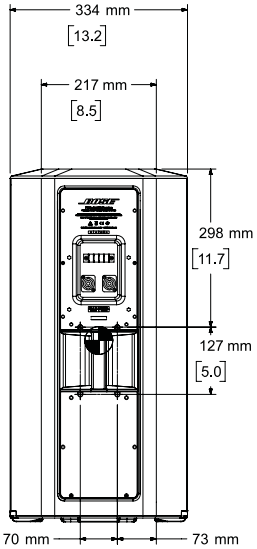
Left View



Front View



Right View



Back View

Product Description

Recommended Amplifier

Selecting the proper amplifier size for a given loudspeaker requires analysis of the transducer long-term (or RMS) power rating, dynamic range of the input-source material (crest factor), desired sound pressure levels, and other factors. As a general guideline, the following table provides recommended power amplifier ranges.

Model	Nominal Impedance	Required Channels	Amp Power Rating
F1 Model 812 Passive	8 Ω	1	400 - 1600 W

CAUTION: Failure to follow these guidelines may result in damage to the loudspeaker.
The Bose® PowerMatch™ configurable power amplifiers offer optimal amplification and DSP for the F1 Model 812 Passive Flexible Array loudspeaker. Please refer to the specifications listed on the **pro.bose.com** website for amplifiers and compare with the table above to determine which model is best for your particular system design.

Recommended Signal Processing

Digital signal processing (DSP) equipment is required for infrasonic protection and amplifier power limiting functions. This processing is available in optional products from Bose such as the PowerMatch amplifiers and/or ControlSpace® DSP hardware.
The following table lists the recommended infrasonic bandpass protection and amplifier limiter settings.

	Bandpass				Limiter					
	High Pass		Low Pass		V Peak			V RMS		
Speaker	Type	Freq.	Type	Freq.	Threshold	Attack	Release	Threshold	Attack	Release
F1 Model 812 Passive	BW24	40	-	-	98.0	1.5	100.00	49.0	1000.00	2000.00

Recommended EQ Settings

The F1 Model 812 Passive loudspeaker requires active equalization. Visit **pro.Bose.com** for recommended EQ settings for each of the four coverage patterns.

Input Panel Diagram

1. Four-terminal barrier strip:
For use with up to 12 gauge speaker wire

2. (2) NL4 Neutrik® Speakon® connectors

Specifications

Technical Specifications

System Performance	
System Type	Two-way
Frequency Response (-3 dB)	56 Hz - 16 kHz
Frequency Range (-10 dB)	47 Hz - 20 kHz
Nominal Dispersion	100° H x 40° V (C-position)
Maximum SPL @ 1 m	121 dB SPL (127 dB SPL peak)
Sensitivity (SPL / 1 W @ 1 m)	95 dB SPL
Long-term Power Handling	400 W (1600 W peak)
Nominal Impedance	8Ω
Tranducers	
Driver Compliment	8 x 2.25” mid-high drivers; 1 x 12” LF driver
Physical	
Connectors	(2) parallel-wired NL4 Neutrik® Speakon® connectors, four-terminal barrier strip up to 12 gauge speaker wire
Suspension/Mounting	6 x M8 threaded inserts, 1 x 1-3/8” (35 mm) pole mount
Enclosure	High impact composite materials
Grille	Powder-coated perforated steel grille
Dimensions (H x W x D)	664.66 mm x 334.3 mm x 372.5 mm (26.1” x 13.1” x 14.6”)
Net Weight	21.31 kg (47 lbs)

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.

PACKAGING PART LIST

F1 Model 812P Loudspeaker

Item Number	Description	Part Number	Qty.	Note
1	GUIDE, OWNERS, F1 SPEAKER, PASSIVE, SVC	740742-001S	1	
2	CARTON ENDCAP, MH, SVCE	744264-001S	2	
3	BAG, PACKING, PE, F1	744265-001S	1	
4	CARTON, MH PASSIVE, SVCE	745849-0010	1	

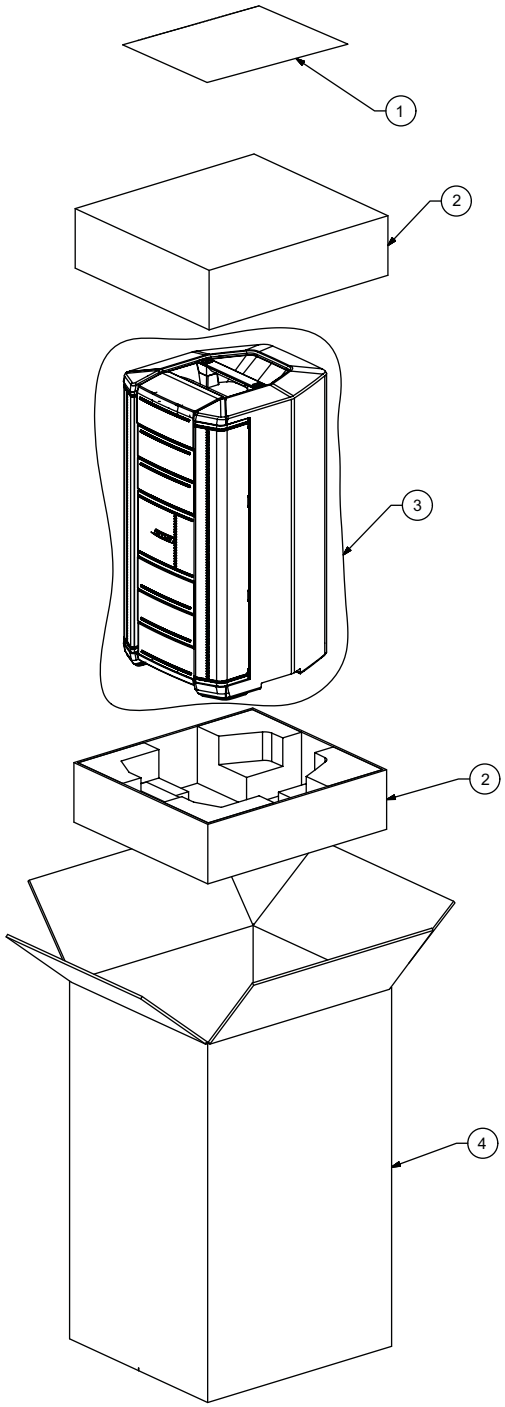


Figure 1. F1 Model 812 Packing View

MAIN PART LIST

F1 Model 812P Loudspeaker (refer to Figure 2)

Item Number	Description	Part Number	Qty.	Note
11	SCREW, M4x25, PH, BLK (FOOT, WOOFER, TWID ARRAY PLASTIC)	721717-001S	16	
44	SCREW, M4x20, FH, BLK	-	6	
45	GASKET, STAND MOUNT INTERFACE, SVCE	628346-001S	1	
46	POLE MOUNT INTERFACE, PASSIVE, MH, SVCE	757437-011S	1	
47	FOOT, FRONT LEFT, MH, SERV	625288-011S	1	
48	FOOT, FRONT RIGHT, MH, SERV	625288-012S	1	
50	KIT, LOGO, ASSY, MH, BLK, SVCE	720197-011S	1	
51	GRILLE, ARRAY, CENTER , SERV (NO LOGO, ORDER ITEM 50 IF NEEDED)	625267-011S	1	
52	GRILLE, SIDE, MH, SERV	625268-011S	2	

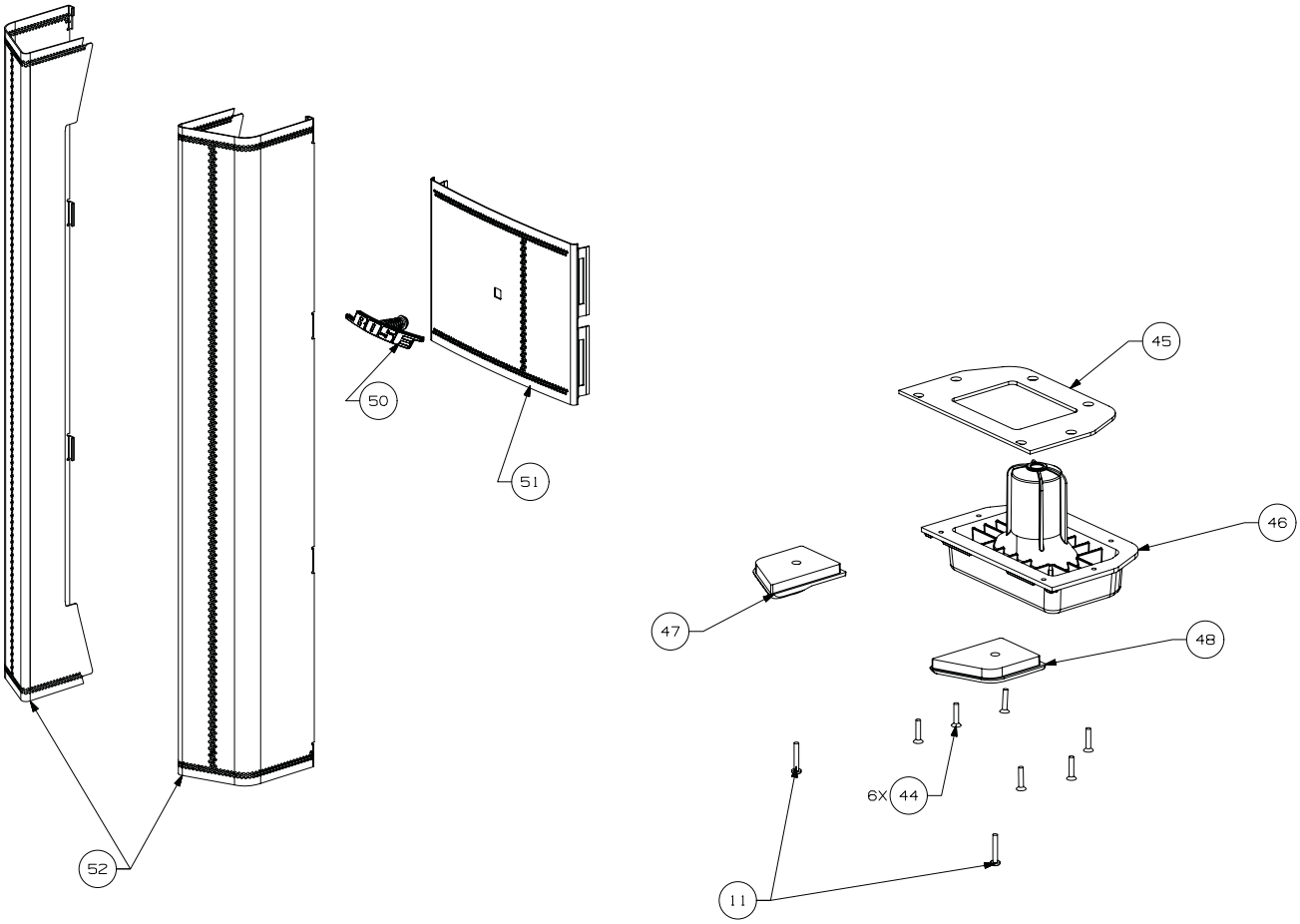


Figure 2. F1 Model 812P Loudspeaker - Side Grilles and Mount Interface

MAIN PART LIST (CONT.)

F1 Model 812P Loudspeaker (refer to Figure 3)

Item Number	Description	Part Number	Qty.	Note
1	BAFFLE, WOOFER	-	1	
2	NUT, M4	-	14	
3	LENS, LED, SVCE	720413-001S	1	
4	LIGHT GUIDE, LED, SVCE	720414-001S	3	
5	SCREW, TAPPING, M3x5.84, PH	-	2	
6	M4 INSERT	-	8	
7	ASSY, POSITIONING MAGNET, SERV	628066-001S	2	
8	SCREW, TAPPING, M3x7.5, PH, BLK	-	4	
9	ASSY, ARRAY, FLEX, PASSIVE (REFER TO ITEMS 54 TO 60 FOR INDIVIDUAL PARTS)	-	2	
10	WOOFER, 12IN, MH, PASSIVE, SERV	745847-001S	1	
11	SCREW, M4x25, PH, BLK (FOOT, WOOFER, TWID ARRAY PLASTIC)	721717-001S	16	
31	SCREW, PARTICLE BOARD, M4x30, PH	-	8	
42	SCREW, M4x15, PH, BLK	-	8	
53	SCREW, M4x1.5x11.5L, PH, TAPPING, BLK	757326-011S	2	

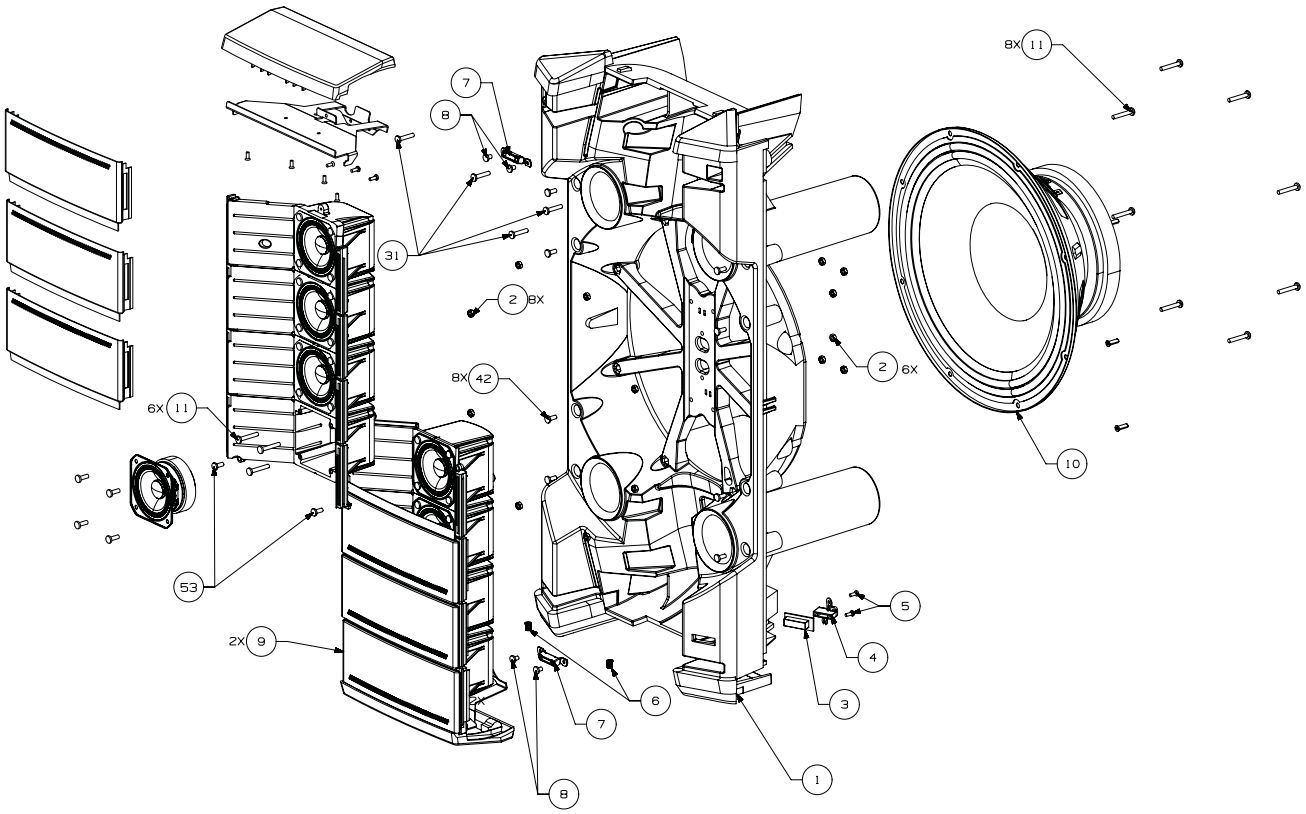


Figure 3. F1 Model 812P Loudspeaker - Baffle and Drivers

MAIN PART LIST (CONT.)

F1 Model 812P Loudspeaker (refer to Figure 4)

Item Number	Description	Part Number	Qty.	Note
6	M4 INSERT	-	8	
12	ENCLOSURE, REAR, MH	-	1	
15	HANDLE, REAR, MH	-	1	
16	SCREW, M6-1.0x25, SHCS	-	2	
17	M6 FLAT WASHER	-	2	
18	M6 LOCK WASHER	-	2	
19	M6 NUT	-	2	
20	M3 INSERTS, 5.6MM, L	-	6	
21	M3 INSTERS, 10.4MM, L	-	6	
22	GASKET, ENCLOSURE, UPPER, REAR	-	1	
23	GASKET, ENCLOSURE, LEFT	-	1	
24	GASKET, ENCLOSURE, RIGHT	-	1	
25	HANDLE RECESS	-	1	
26	HANDLE, UPPER, MH	-	1	
27	INSERT, UPPER HANDLE	-	2	
28	M8 FLAT WASHER	-	2	
29	M8 LOCK WASHER	-	2	
30	M8 NUT	-	1	
31	SCREW, PARTICLE BOARD, M4x30, PH	-	8	
32	BRACKET, INTERNAL, MH	-	4	
33	SCREW, M4x8, FH, BLK	-	8	
37	GASKET, ENCLOSURE, MAIN, SERV	625294-011S	1	
38	ASSY, CROSSOVER, MH PASSIVE, SVCE	757848-011S	1	
39	LOWER PANEL, MH PASSIVE	745838-011S	1	
40	SCREW, M3x14, FH, BLK	-	12	
41	SCREW, M3xxx, TAPPING, FH, BLK	-	2	

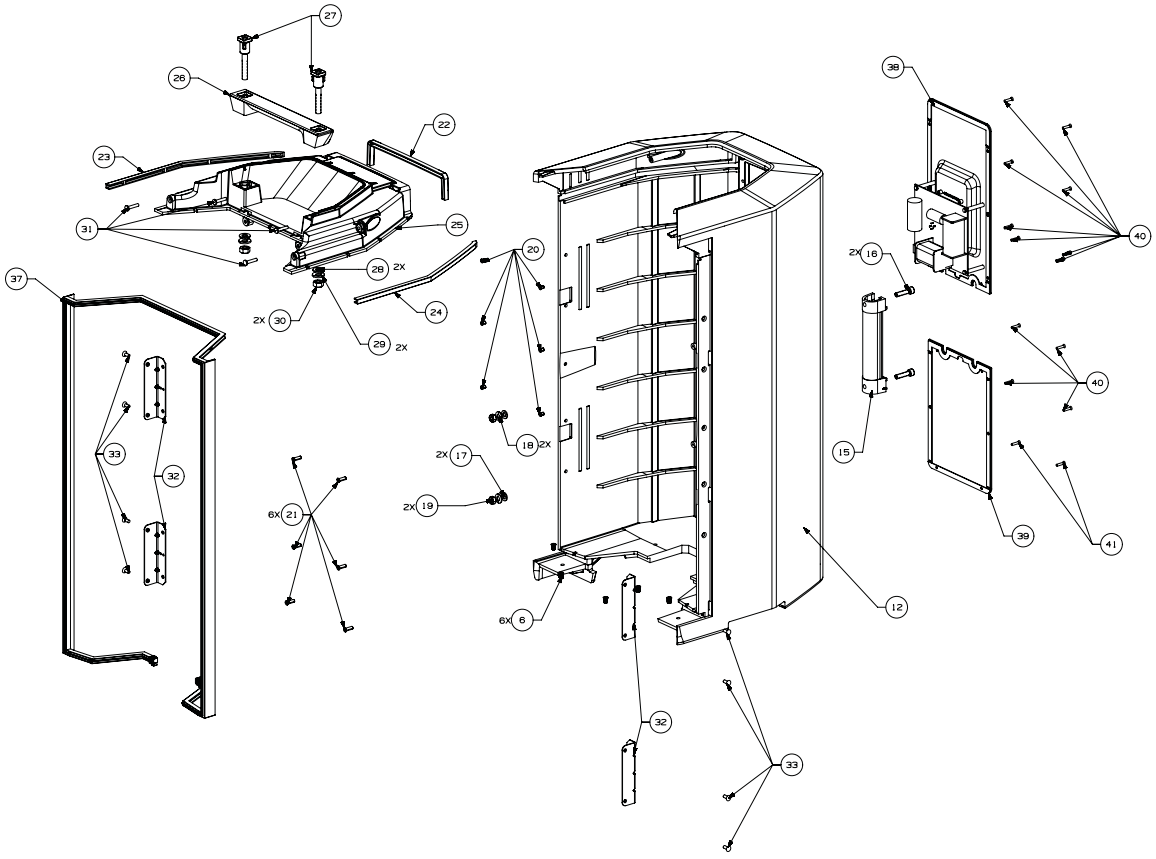


Figure 4. F1 Model 812P Loudspeaker - Cabinet

MAIN PART LIST (CONT.)

F1 Model 812P Loudspeaker (refer to Figure 5)

Item Number	Description	Part Number	Qty.	Note
53	SCREW, M4x1.5x11.5L, PH, TAPPING, BLK	757326-011S	2	
54	GRILLE, ARRAY, SERV	625266-011S	6	
55	TWIDDLER 2.5IN NEO TXX SERV	625262-001S	8	
56	BAFFLE, ARRAY	-	2	
57	COVER, ARRAY, MH, SERV	625273-011S	2	
58	BRACKET, ARRAY COVER	-	2	
59	SCREW, ARRAY COVER	766497-011S	8	
60	SCREW, TWIDDLER, MH	757326-011S	32	

Note: Part quantities are for two array sections. There are two sections used per loudspeaker.

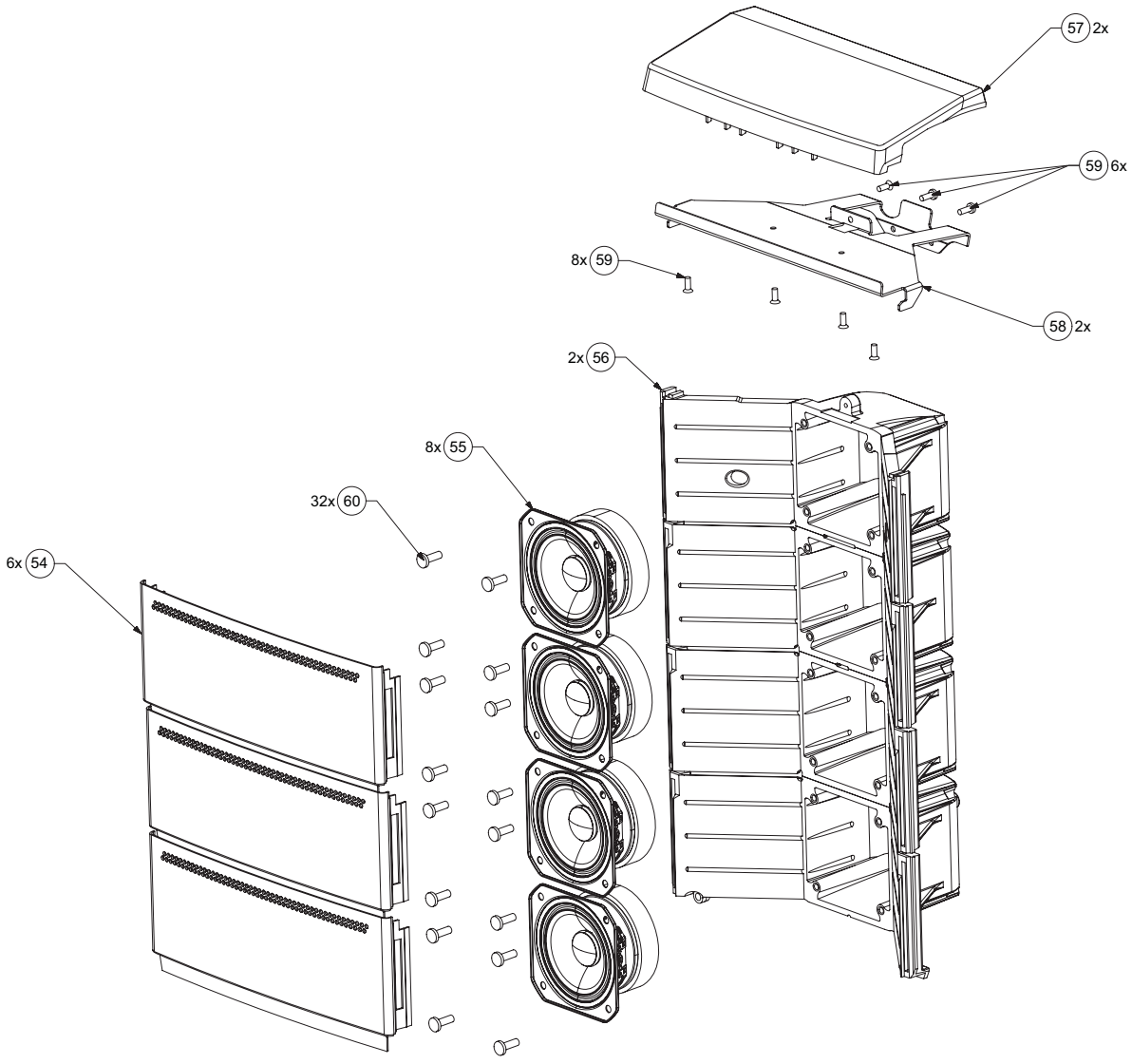
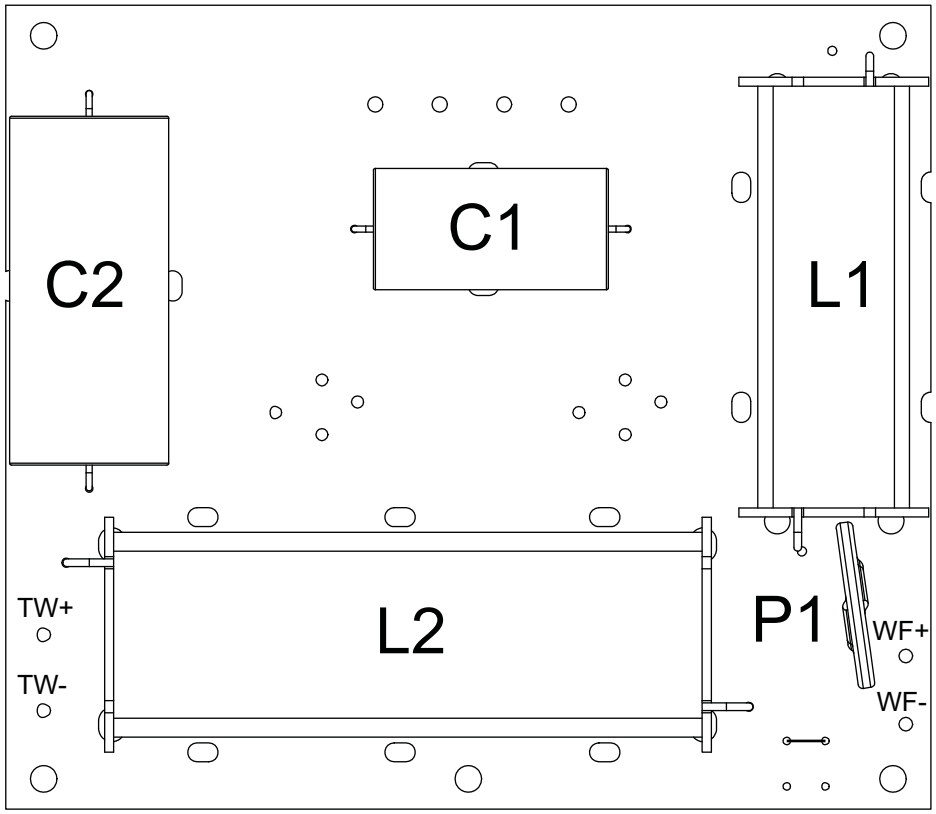


Figure 5. F1 Model 812P Loudspeaker - Array Section

ELECTRICAL PART LIST

Crossover PCB Assembly

Reference Designator	Description	Qty.	Vendor Part Number	Note
C1	MKT Polyester Film CAP 6.2UF 160V +-5%	1	-	
C2	MKT Polyester Film CAP 22UF 100V +-5%	1	-	
L1	2.2MH N/A 1KHZ DIP Laminated Core Inductor	1	-	
L2	2.7MH N/A 1KHZ DIP Laminated Core Inductor	1	-	
P1	RXE 250 PTC MAX 0.08OHM 40A G	1	-	
-	WIRE JUMPER	1	-	
-	NEUTRIK SPEAKON CNT. NL4MD-V M	2	-	
-	BARRIER STRIP 4P H=18MM P=9.5MM FM	1	-	



DISASSEMBLY PROCEDURES

F1 Model 812P Loudspeaker

Important Note: The top and rear handles and their inserts are not replaceable for safety reasons. Do not attempt to remove them. They are not stocked as repair parts.

Some components internal to the loudspeaker enclosure, such as the internal brackets are not replaceable.

1. Foot Removal

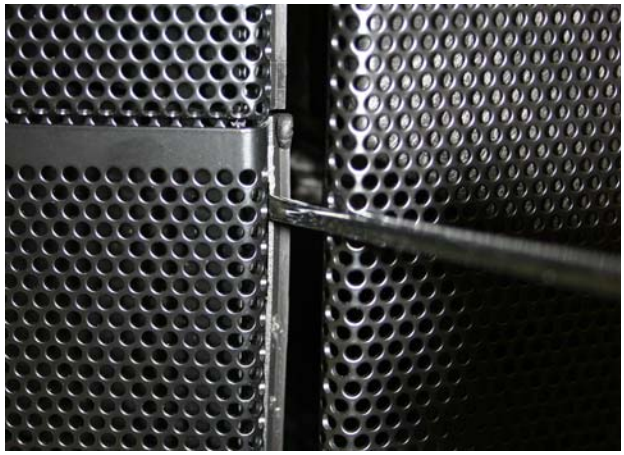
1.1 Remove the one screw that secures the foot to the loudspeaker enclosure.

1.2 Lift off the foot.

2. Front Grille Removal

Note: The front center and upper and lower grilles are simply press-fit into slots in the Twiddler® baffle.

2.1 Using a heavy duty straight pick or thin screwdriver, press the tool in between the side of the grille and the array baffle plastic.



2.2 Gently pry the grille forward toward the front of the speaker to be able to grasp it.

2.3 Grasp the grille section you wish to remove. Carefully pull the grille straight off toward you, one side at a time until it is clear of the array baffle. Lift off the grille.

Re-assembly Note: When re-installing the grilles, use an angle tool to support the slot of the array baffle that the grille seats into. This will make it easier to replace the grille.

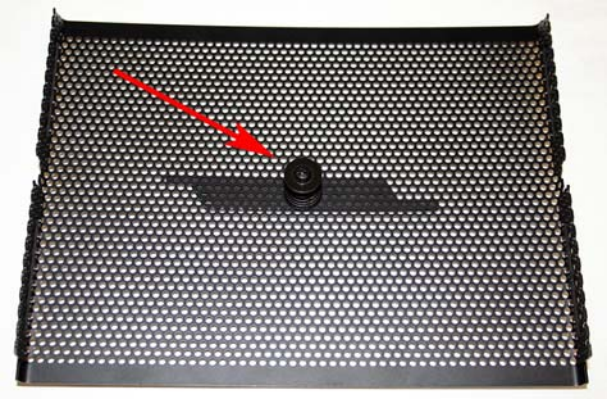
DISASSEMBLY PROCEDURES

Note: The Bose® logo is attached to the center grille. Replacement center grilles DO NOT come with the logo attached. You will need to either re-use the old logo or order a new one.

3. Logo Removal

3.1 Remove the center grille section using procedure 1.

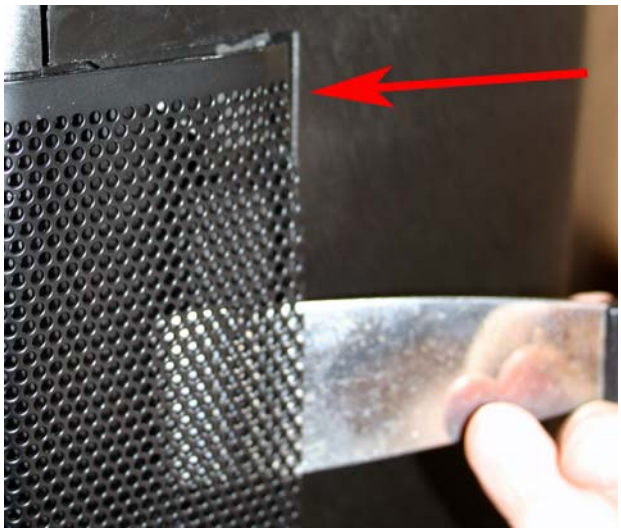
3.2 Remove the screw, washer and spring that secure the logo to the center grille section. Lift off the logo.



4. Side Grille Removal

4.1 Using a flat plastic tool, move the grille sides away from the loudspeaker enclosure until the retaining tabs are clear of the enclosure. There are four retaining tabs per grille. **Note:** Take care to not damage the loudspeaker enclosure or the side grille.

4.2 Once the retaining tabs are clear, pull the side grille straight off from the front of the enclosure.



5. Twiddler® Removal

5.1 Remove the front grilles using procedure 2.

5.2 Remove the 4 screws that secure the driver you wish to remove. Lift the driver out of the baffle.

5.3 Remove the two Faston connectors from the driver. Lift out the driver. **Note:** Be sure to observe polarity when connecting the new driver.

DISASSEMBLY PROCEDURES

6. Stand Mount Interface Removal

6.1 Remove the six screws that secure the stand mount to the bottom of the loud-speaker enclosure.

6.2 Carefully lift the stand mount interface away from the loudspeaker enclosure. Take care to not damage the mount interface gasket. **Note:** If you damage the gasket, you can order a replacement.

6.3 Lift off the stand mount interface.

Note: After replacement, ensure that there are no air leaks using the test procedures in this service manual.

7. Woofer Removal

Notes:
- The woofer is located behind the woofer baffle and the Twiddler array. You must remove the woofer baffle to access the woofer.
- There is no need to remove the Twiddler baffles or drivers to remove the woofer baffle.

7.1 Remove the center and side grilles using procedures 2 and 3. Remove the feet using procedure 1.

7.2 Locate and remove the baffle retention screws. There are a total of twelve on the baffle. Also remove the two silver colored screws located in the middle of the sides of the enclosure. Do not remove the four black screws along the sides of the enclosure.
I**mportant Note:** There are 2 screws located behind the top two holes in the upper Twiddler baffle. You will need a long Phillips-head screwdriver to reach them. There are no screws located behind the two holes in the lower Twiddler baffle.
Re-assembly Note: The four self-tapping screws go in the holes at the top of the enclosure and the eight machine screws are used along the sides.

DISASSEMBLY PROCEDURES

7.3 Place the loudspeaker onto its back. Remove the stand mount interface using procedure 6.

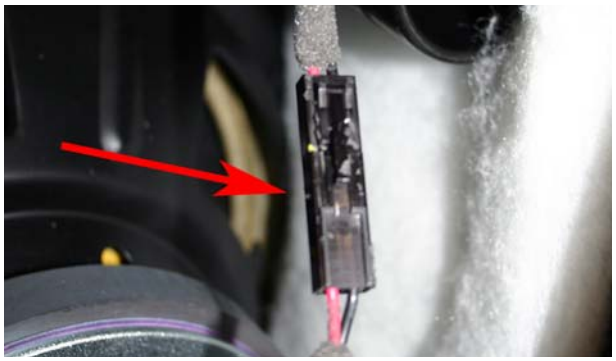
7.4 Once the screws are removed, you are ready to separate the woofer baffle from the loudspeaker enclosure.

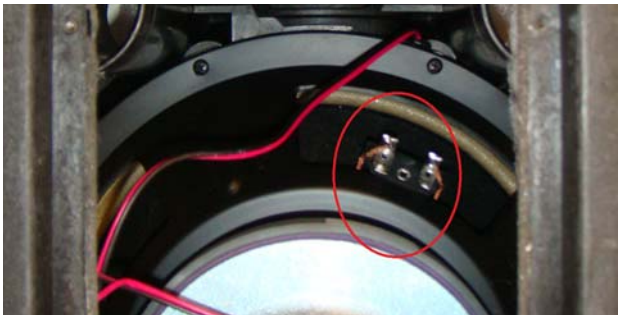
Separate the front section of the enclosure from the rear section by pulling them apart at the opening left by the removal of the stand mount interface. Refer to the photo at right.

Lift off the front enclosure section. Once the front section has come loose, you can rest the ports on the internal brackets to allow disconnecting the wiring harnesses.
Note: Take care to not damage the large main enclosure gasket. You will need to re-use it. If you do damage it, you can order a replacement.

7.5 Disconnect the two Faston connectors from the woofer. Disconnect the Twiddler array connector, which is in-line with the wiring harness from the crossover PCB to the Twiddler array (see photos at right). Lift off the front enclosure section.

7.6 Place the front enclosure section face down on the bench. Remove the eight screws that secure the woofer to the woofer baffle. Lift off the woofer.
Re-assembly Notes:
- Make sure the woofer terminals face the same way as the removed woofer, near the port, to allow terminal access when re-connecting the wiring harness. See photo bottom right.
- Be sure to correctly place the main enclosure gasket in the groove along the edge of the enclosure to ensure there are no air leaks after the woofer baffle is replaced.
- After woofer baffle replacement, ensure that there are no air leaks using the test procedures in this service manual.





DISASSEMBLY PROCEDURES

8. Input Panel / Crossover PCB Assembly Removal

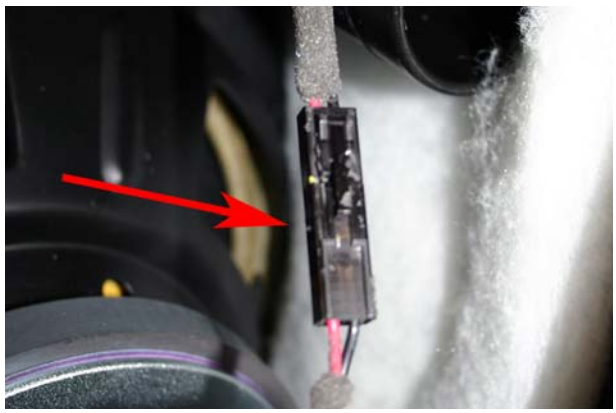
8.1 Remove the six screws that secure the Crossover PCB assembly to the loudspeaker enclosure.
Re-assembly Note: The two longer screws should be reinstalled in the bottom two holes.

8.2 Carefully lift the Crossover PCB assembly away from the enclosure. Take care to not damage the gasket.
Note: The crossover PCB assembly includes the rear panel sheetmetal and the wiring harnesses. See photo below.

Note: The blank panel on the back of the unit below the input panel has no components behind it. There is no need to remove this panel for repair.

8.3 Disconnect the two Faston connectors from the woofer (see photo at right).
Re-assembly Note: Be sure to observe polarity when re-connecting the woofer harness.

8.4 Disconnect the Twiddler array connector, which is in-line with the wiring harness from the crossover PCB to the Twiddler array (see photo at bottom right).



TEST PROCEDURES

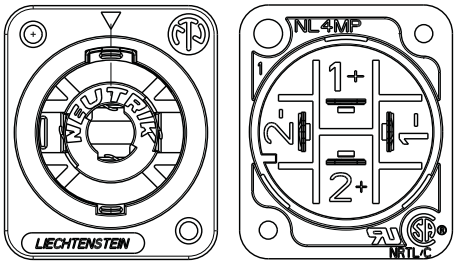
F1 Model 812P Loudspeaker

Equipment Required:
- Audio signal generator
- Neutrik NL4 cable or Spade Lug cable
- Audio amplifier

Test Cable Connection Information

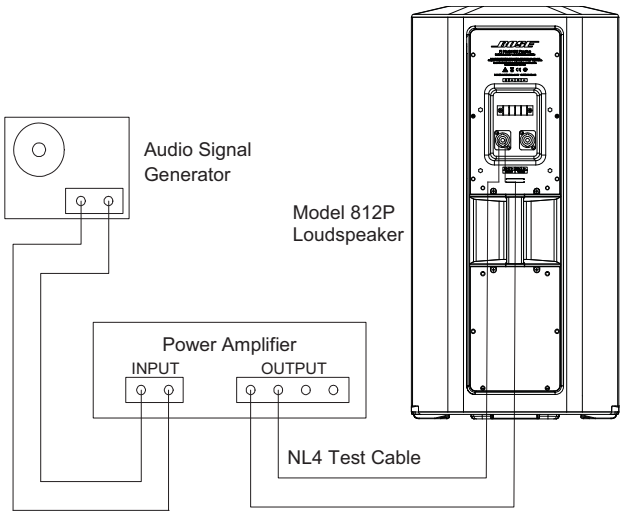
Note: The NL4 connections and the barrier strip connections are in parallel with each other, so you can use either during these tests. Be sure to test all connections before returning the unit to the customer.

When using the NL4 connection, the input signal should be applied to the 1+ and 1- connections. The 2+ and 2- connections are used for the THRU connections from the loudspeaker to allow connection to other speakers.



FRONT VIEW REAR VIEW

Test Setup



Note: You can measure the AC input voltage levels for the following tests at the loudspeaker barrier strip terminals.

1. Air Leak Test

1.1 Apply a 22 Vrms, 48 Hz sine wave to the Channel 1 input.

1.2 Sweep the input frequency from 48 Hz to 60 Hz.

1.3 Listen carefully around all gaskets for air leaks at all gaskets and joints. Replace any driver that has a rubbing or ticking noise.

2. Rub and Tick Test

2.1 Apply a 22 Vrms, 10 Hz sine wave to the Channel 1 input.

2.2 Listen carefully for buzzes, rattles, or other extraneous noises from the drivers or from the internal parts.

3. Power Sweep

3.1 Apply a 22 Vrms, 20 Hz sine wave to the Channel 1 input.

3.2 Perform a slow sweep: 4 seconds up, 4 seconds down, from 20 to 200 Hz. The whooshing noise from the port from 40 to 50 Hz is acceptable.

3.3 Reduce the input signal from 22 Vrms to 6 Vrms. Continue the slow sweep from 200 Hz to 5 kHz. Listen carefully for buzzes, rattles, or other extraneous noises from the driver or from the internal parts.

3.4 Change the input frequency back to 20 Hz. Apply a 22 Vrms input signal to the Channel 1 input. Perform a fast sweep: 1.5 seconds up, 1.5 seconds down, from 20 Hz to 200 Hz.

3.5 Reduce the input level to 6 Vrms. Continue the fast sweep from 200 Hz to 1 kHz.

Replace any transducer that has a buzzing noise, or is defective. There must not be any buzzes, ticks, rubs, bottoming sounds, air leaks or other unwanted acoustic noises.

TEST PROCEDURES

	Noise type
Tick	Periodic impulse noise audible when within 2ft of source
vibe	extraneous humming sound at fundamental caused by vibration. Often from a low level grille or panel vibration
buzz low level	low level buzz heard within 5ft and not audible with music as not heard during a "fast" sweep
ring	harmonic ring heard within 5ft and not audible with music as not heard during a "fast" sweep
buzz	audible buzz with steady state sine tone but not with music.
	Noise level
low level	low level sounds heard within 5ft and not audible during a "fast" sweep. Likely not audible with music
-	audible within 5ft and not audible during a "fast" sweep or music
loud	approximately the same level or louder than the fundamental, easily heard.
	Signal type
slow sweep	standard 4 sec up and 4 sec down sweep with operator allowed to zero in any potential noise
fast sweep	1.5 sec up/down sweep on decade oscillator
music test	not audible within x meters. from any location around speaker when using music source *portable 1m* *installed 2m* *engineered sound (array) 3m*

Service Manual Revision History

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
5/16	00	Document released at revision 00.	Service manual release	All

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

Better sound through research®

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