BOSE®
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102 COMMERCIAL SOUND SYSTEM

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Service Manual

Reference Number 130105-SM Rev. 04
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CONTENTS

ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICE HANDLING

This unit contains ESDS devices. We recommend the following precautions when repairing, replacing, or transporting ESDS devices:

- Perform work at an electrically grounded work station.
- Wear wrist straps that connect to the station or heel straps that connect to conductive floor mats.
- Avoid touching the leads or contacts of ESDS devices or PC boards even if properly grounded. Handle boards by the edges only.
- Transport or store ESDS devices in ESD protective bags, bins, or totes. Do not insert unprotected devices into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap, or plastic trays.

CAUTION: THE 102® SYSTEM CONTROLLER CONTAINS NO USER-SERVICEABLE PARTS. TO PREVENT WARRANTY INFRACTIONS, REFER SERVICING TO WARRANTY SERVICE STATIONS OR FACTORY SERVICE.

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 OR OWNER OF THE BOSE PRODUCT, AND SHALL NOT BE REPRODUCED OR USED FOR ANY OTHER PURPOSE.

SAFETY INFORMATION

1. 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.

2. Make leakage current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the unit to the customer. Use the following checks to perform these measurements:

A. Leakage Current Hot Check

(1) With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. Do not use an isolation transformer during this test. Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) 1492 (71).
(2) With the unit AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the unit (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis.
(3) Any current measured must not exceed 0.5 milliamp.
(4) Reverse the unit power cord plug in the outlet and repeat test.

ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

B. Insulation Resistance Test Cold Check

(1) Unplug the power supply and connect a jumper wire between the two prongs of the plug.
(2) Turn on the power switch of the unit.
(3) Measure the resistance with an ohmmeter between the jumpered AC plug and each exposed metallic cabinet part on the unit. When the exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 megohms. When there is no return path to the chassis, the reading must be "infinite". If it is not within the limits specified, there is the possibility of a shock hazard, and the unit must be repaired and rechecked before it is returned to the customer.

SPECIFICATIONS

102® System Controller:

Input Level:	Music - 100mV or 1V selectable Voice - Mic or line, selectable, variable (AGC calibration)
Output Level:	1V nominal
Input Impedance:	Music - 2k ohms, balanced, differential Voice - 600 ohms, balanced, differential
Bass Cut Switch:	6 dB
Distortion:	Less than 0.1% THD
CMRR:	Greater than 40 dB, all inputs
AGC:	Attack level - variable Attack time - < 5 ms Release time - 200 ms
Mute:	Mute level - -30 dB (with defeat switch on ch. B) Attack time - < 5 ms Release time - 2 seconds
Accessories:	4 rack-mount screws, supplied
Dimensions:	1 3/4" H x 18 31/32" W x 4 1/4" D (44 mm x 482 mm x 107 mm)

102 Flush-Mount and 102 Surface-Mount Loudspeakers:

Frequency Response:	80 Hz - 18 kHz, ± 3 dB
Distortion:	<1% @ 10% rated power input
Driver:	Single, 4 1/2" Helical Voice Coil
Enclosure:	Dual port, bass reflex type
Volume:	200 cubic inches
Port Resonance:	80Hz
Sensitivity:	95 dB SPL, 1W, 1m @ 1 kHz
Weight:	5 lbs. (2.3 kg)
Temperature:	Minimum - 0° C Maximum - 60° C
Humidity:	Minimum - 0 % Maximum - 98 %

DISASSEMBLY/ASSEMBLY PROCEDURES

102® Flush-Mount Loudspeaker

1. Grille Removal

1.1 The optional Bose® grille is held in place via a tooth/groove-type design. To remove the grille, grasp the edges of the grille with your fingers and place your thumbs toward the center of the grille.

1.2 As you press inward with your thumbs, pull outward with your fingers. This will release the teeth from the grooves, allowing the grille to be removed from the loudspeaker enclosure. **(See Figure 1)**

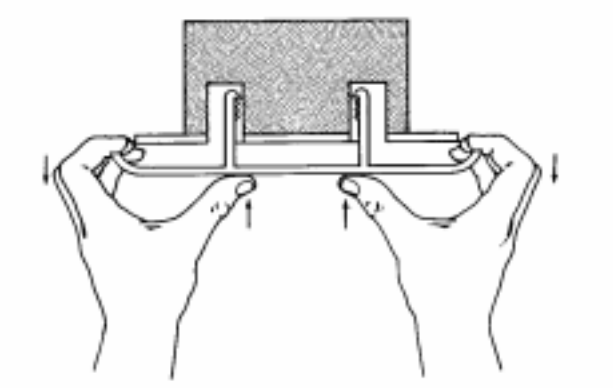

Figure 1. 102 Flush-Mount Grille Removal

2. Grille Replacement

2.1 Align the legs on the grille with the openings in the speaker enclosure.

2.2 Press the grille upward so that the teeth on the grille legs engage the teeth in the speaker enclosure.

2.3 Push the grille upward until the grille is flush with the mounting surface.

3. Driver Removal

3.1 Using a flat-blade screwdriver or a 1/4" socket, remove the three screws holding the driver in place.

3.2 Carefully lift the driver out of the enclosure and cut the wires as close to the driver terminals as possible.

4. Driver Replacement

4.1 Strip the wires and connect them to the replacement driver. Make sure that the red wire is connected to the positive (+) terminal and the black wire is connected to the negative (-) terminal of the driver.

4.2 Align the driver and gasket to the enclosure. Make certain the gasket is correctly positioned to provide an airtight seal.

4.3 Secure the driver to the enclosure with the three screws. Do not overtighten. **(See Figure 2)**

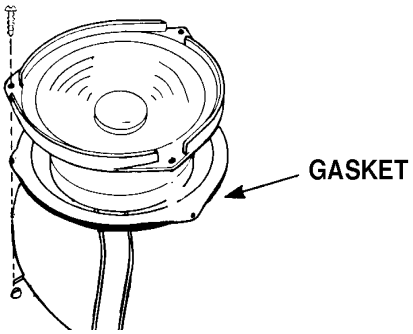

Figure 2. 102 Flush-Mount Driver Replacement

DISASSEMBLY/ASSEMBLY PROCEDURES

Note: The following procedures are for the transformered units only. The passive versions do not have a tap selection switch, transformer, or capacitor within the enclosure.

5. Wiring-Well Cover:
(Transformer and Capacitor Access)

5.1 To remove the wiring-well cover located in the back of the enclosure, use a flat-blade screwdriver or a 1/4" socket to loosen the two screws that hold the metal cover in place.

5.2 Swing the cover free to gain access to the transformer and capacitor.

6. Front plate removal
(Access to tap selection switch)

6.1 Using a flat-blade screwdriver or a 1/4" socket, remove the two screws that hold the plastic front plate in position.

6.2 Lift the plate out to gain access to the tap selection switch and wiring.

102® Surface-Mount Loudspeaker

1. Grille Removal

1.1 To remove the grille, take a small flat-blade screwdriver or scribe and grasp the edge of the grille at one of the corners.

1.2 Gently work the grille out of the retaining slot.

Note: There is no grille frame exposed. You must grasp the grille on the metal portion of the grille and not on the polystyrene, which is part of the speaker enclosure.

2. Grille Replacement

2.1 To install the grille, first be sure that the Bose® logo is facing the same way as the print on the back of the enclosure.

2.2 Fit the grille to two adjacent corners of the enclosure.

2.3 Gently apply pressure to the two remaining corners to fit the grille into the enclosure.

3. Driver Removal

3.1 Using a cross-head screwdriver, remove the three screws that hold the driver in place.

3.2 Carefully lift the driver out of the enclosure and cut the wires as close to the driver terminals as possible.

4. Driver Replacement

4.1 Strip the wires and connect them to the replacement driver.

Note: Make certain that the red wire is connected to the positive (+) terminal and the black wire is connected to the negative (-) terminal of the driver.

4.2 Align the driver and gasket to the J-clips. Make sure the gasket is correctly positioned behind the driver to provide an airtight seal.

4.3 Secure the driver to the J-clips with the three screws. Do not overtighten. **(See Figure 3)**

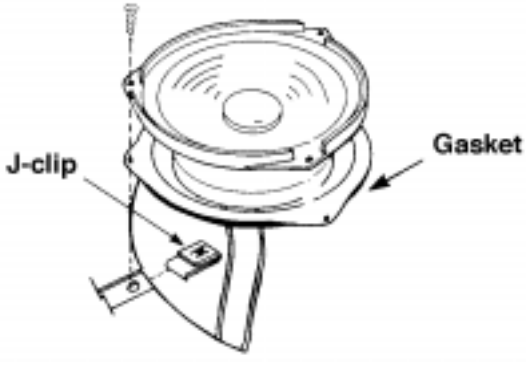

Figure 3. 102 Surface-Mount Driver Replacement

DISASSEMBLY/ASSEMBLY PROCEDURES

Note: The following procedures are for the transformered units only. The passive versions do not have a tap selection switch or transformer within the enclosure.

5. Baffle Removal

5.1 Remove the six screws **(1)** that hold the baffle in place. Do not remove the three screws holding the driver in place. **(See Figure 4)**

5.2 Pry the baffle away from the enclosure body. This can be accomplished by inserting the hook portion of a scribe or your fingers into the ports and using this as a grasping area to pry the two sections apart. This will expose the tap selection switch and transformer.

6. Baffle Replacement

6.1 Align the port side of the baffle to the side of the enclosure that has the input terminals.

6.2 Secure the baffle with the six screws.

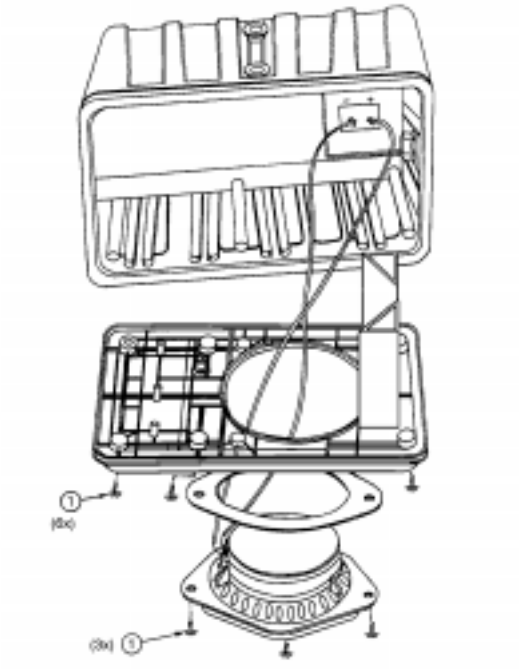

Figure 4. 102® Surface-Mount Baffle Assembly

102 System Controller Procedures

1. Top Cover Removal

Note: Refer to **Figure 5**, 102 System Controller Exploded View.

1.1 Using a cross-tip screwdriver, remove the six screws **(1)** securing the top cover, **(2)** of the unit. There is one located on top, two on the sides, and three on the back panel.

1.2 Slide the top cover toward the rear of the unit until it clears the ribs on the front panel **(3)**, then lift it straight off.

2. Top Cover Replacement

2.1 Align the top cover **(2)** with the rear panel, and slide it down and forward until it is in place against the front panel **(3)**.

2.2 Secure the top cover using the six screws **(1)** removed in procedure **1.1.**

3. Front Panel Removal

3.1 Remove the top cover **(2)** using procedures **1.1** and **1.2.**

3.2 Turn the unit over, and remove the three screws **(4)** that secure the front panel **(3)** to the chassis **(5)**.

3.3 Slide the front panel off of the chassis.

4. Front Panel Replacement

4.1 Slide the front panel **(3)** onto the chassis **(5)**, aligning the holes for the LEDs and push-switch.

4.2 Secure the front panel to the chassis using the three screws **(4)** removed in procedure **3.2.**

4.3 Replace the top cover **(2)** using procedures **2.1** and **2.2.**

DISASSEMBLY/ASSEMBLY PROCEDURES

5. Main Circuit Board Removal

5.1 Remove the top cover **(2)** using procedures **1.1** and **1.2.**

5.2 Unplug the four cables from the connectors on the circuit board **(6)** at **JE02, JE01, JE51,** and **JG01.**

Note: You must first lift the tab on the connector to release the wire.

5.3 Remove the front panel **(3)** using procedures **3.1** through **3.3.**

5.4 Remove the five screws **(7)** that secure the circuit board to the chassis **(5)**.

5.5 Slide the circuit board forward out of the chassis.

6. Main Circuit Board Replacement

6.1 Align the circuit board **(6)** with the tabs located on the chassis **(5)**.

6.2 Replace the front panel **(3)** using procedures **4.1** through **4.3.**

6.3 Plug the four cables removed in procedure **5.2** back into their respective connectors.

6.4 Replace the top cover **(2)** using procedures **2.1** and **2.2.**

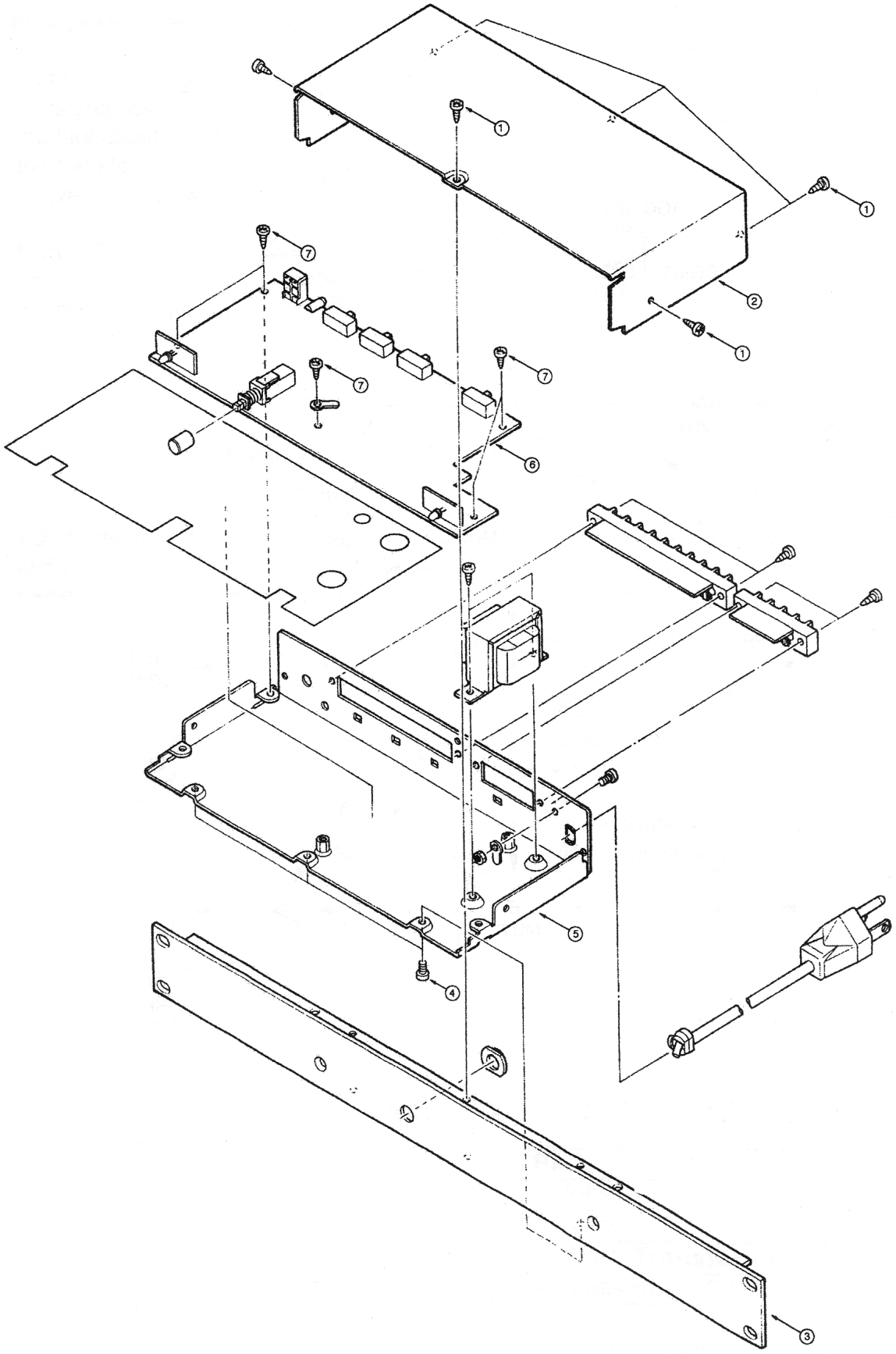

Figure 5. 102® System Controller Exploded View

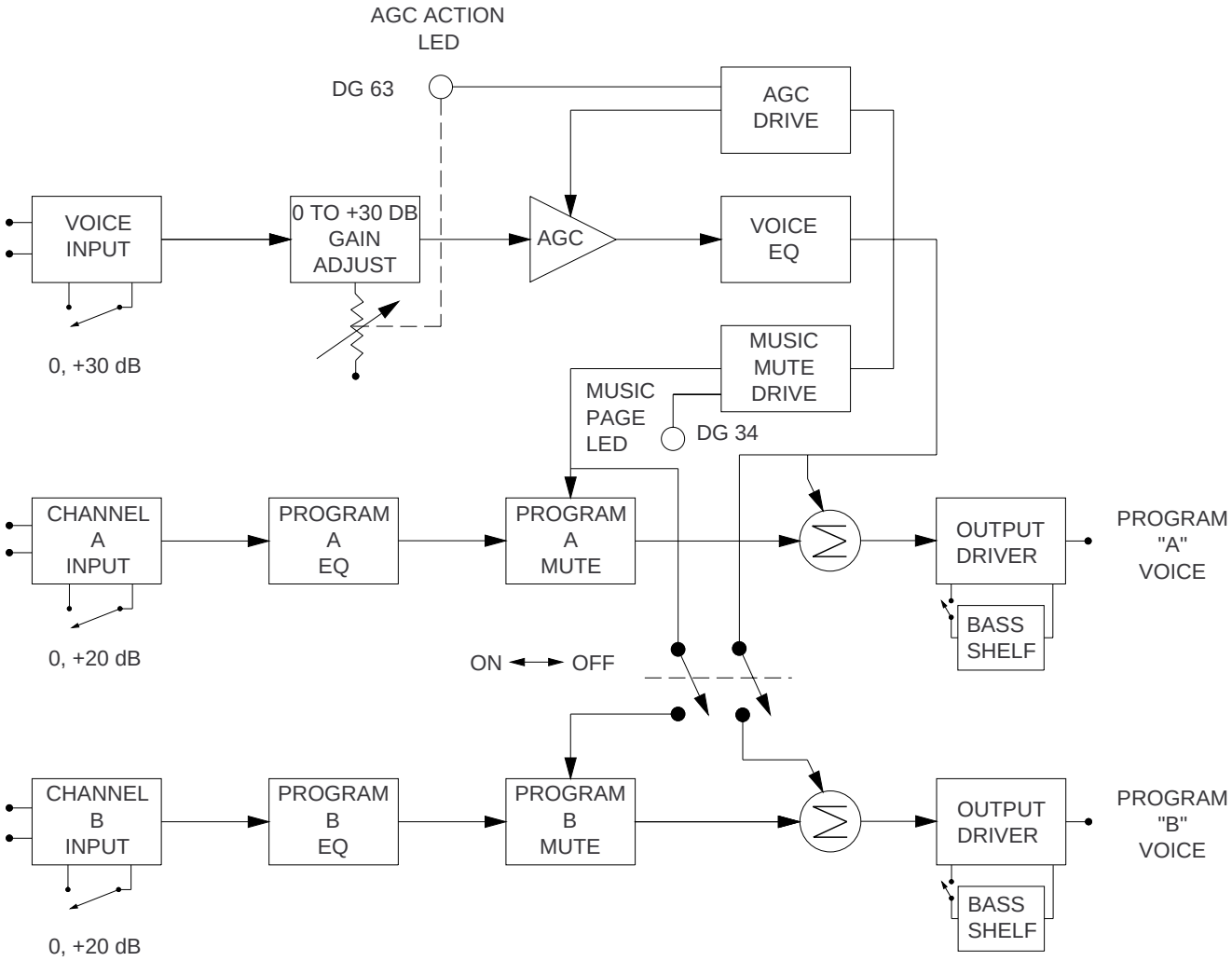

Figure 6. 102® System Controller Block Diagram

TEST PROCEDURES

102® Flush-Mount and 102 Surface-Mount Loudspeaker Test Procedures

Note: All testing for transformer variation units shall be done with the tap switch in the high position. The high impedance of the transformer allows testing with any conventional power amplifier.

Note: The 102 Flush-Mount Loudspeakers have input wires with the white wire being the positive, while the 102 Surface-Mount has input terminals that are clearly marked.

1. Rub and Tick Test

1.1 Connect the test setup as shown in **Figure 7.**

1.2 Apply an **8 Volt rms, 80 Hz** signal for 4 and 8 ohm units; **30 Volt rms, 80 Hz** for transformer units, to the speaker input terminals.

1.3 Replace any driver that has a rubbing or ticking noise. Quiet ticks are acceptable if they cannot be heard at a distance of 1 foot.

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

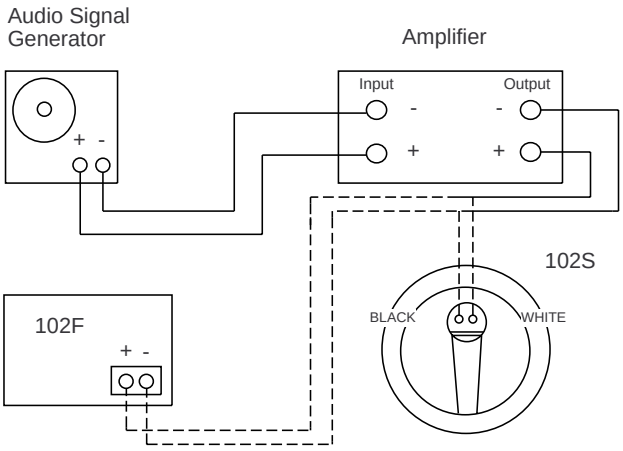

Figure 7. Test Connections for 102F or 102S Loudspeaker

2. Sweep Test

2.1 Sweep the oscillator from **10 Hz to 3 kHz**, using the appropriate voltage found in the 102 Loudspeaker test signals table below.

2.2 Reduce the output of the amplifier to the appropriate voltage listed in the table below and continue sweeping from **3 kHz to 15 kHz**.

2.3 If there are any loud buzzes or distortion, replace the driver.

2.4 If there are any buzzes or rattles from inside the 102 cabinet, redress the wire or component causing the noise.

Note: The whooshing noise from the port around **80 Hz** is normal.

102 Loudspeaker Test Signals

Passive Units
8 Volts rms, 10 Hz to 3 kHz
4 Volts rms, 3 kHz to 15 kHz
8 Watt Transformer units
25 Volts rms, 10 Hz to 3 kHz
12 Volts rms, 3 kHz to 15 kHz
25 Watt Transformer units
20 Volts rms, 10 Hz to 3 kHz
16 Volts rms, 3 kHz to 15 kHz

TEST PROCEDURES

3. Transformer Tap Select Test. (transformer units only)

3.1 Be sure that the tap selection switch is in the high position.

3.2 Apply a **25 Volt rms, 100 Hz** signal to the input of the speaker.

3.3 Slowly change the tap selection switch on the unit from the high position to the off position.

3.4 A decrease in output level should be heard for each descending switch position.

Note: Upon completion of testing, be sure to switch the unit back to the high position, or where the customer had preset the control.

4. Phase Test

4.1 Check the wiring with that of **Figure 8** to assure that the speaker is wired in phase.

102® System Controller Test Procedures

Note: The 102 System Controller has two independent channels of full bandwidth equalization for music sources; an Opti-Voice® circuit with separate equalization for voice input, a bass shelf and various sensitivity and muting features. You must test all modes of the 102 System Controller to assure proper operation.

Note: The 102 System Controller input(s) must be loaded properly in order to get the correct test output voltage levels.

Equipment Required:

Dual-trace oscilloscope
Audio signal generator
Distortion analyzer
dB meter
Digital voltmeter
Two 10k ohm,1/4W load resistors
Small screwdriver

102 System Controller Initial Switch Positions

Switch	Position
Bass	Normal (out)
Channel B Mute	On
Channel A Input	1 Volt
Channel B Input	1 Volt
Voice Input	Line
Opti-Voice®	Full counterclockwise
Channel A output	10 k ohm load
Channel B output	10 k ohm load

Note: Unless otherwise specified, all controls will remain in the positions listed in the 102 Controller Initial Switch Positions table above.

1. Music Channel Gain Tests

Note: When connecting the audio signal generator to the controller, do not jumper the minus (-) terminal to the ground terminal.

Note: The music channel inputs must be loaded with a **2k ohm** input impedance in order to get the correct output levels.

1.1 Apply a **1 Volt rms, 1 kHz** signal to both A & B inputs. Reference a dB meter to the applied signal level.

1.2 The output should be **1 Volt rms, (0 dB ± 2 dB).**

1.3 Reduce the input signal to **100 mV rms, 1 kHz.**

102® SYSTEM CONTROLLER TEST PROCEDURES

1.4 Change both input sensitivity switches to the **100 mV** position.

1.5 The output should be **1 Volt rms, (+20 dB ± 2 dB).**

2. Music Channel Response Tests

2.1 Return both input sensitivity switches to the **1 Volt** position.

2.2 Apply a **1 Volt rms, 1 kHz** signal to both A and B inputs.

2.3 Reference a dB meter to the left or right output, and perform the tests listed in the 102 System Controller Frequency Response table below.

102 System Controller Frequency Response

Frequency (Hz)	Bass Switch	Response (dB)
1,000	Normal	0 Reference
40	Normal	0 ± 4 dB
80	Normal	+14 +/- 2 dB
100	Normal	+12 +/- 2 dB
100	Decrease	+7.5 +/- 2 dB
200	Normal	+6 +/- 2 dB
4,000	Normal	+7.5 +/- 2 dB
13,000	Normal	+16 +/- 2 dB
20,000	Normal	+6 +/- 4dB

3. Channel Separation Test

3.1 Apply a **5 Volt rms, 1 kHz** signal to the channel A and B inputs.

3.2 Reference a dB meter to the channel A output.

3.3 Remove the applied signal from channel A.

3.4 The output should be **> 50 dB** down at channel A.

3.5 Sweep the signal generator from **80 Hz to 13 kHz at 1 Volt rms.**

3.6 The output should be **> 50 dB** down at channel A.

3.7 Return the signal to channel A.

3.8 Repeat steps 3.2 thru 3.7 for channel B.

4. Maximum Output Test

4.1 Apply an **8 Volt rms, 1 kHz** signal to the channel A and B inputs.

4.2 The output should be **8 Volts rms** for both channels. **(0 dB ± 2 dB)**

5. Distortion Test

5.1 Apply a **1 Volt rms, 1 kHz** signal to the channel A and B inputs.

5.2 The distortion should be **< .1%** at both the channel A and B outputs.

5.3 Reduce the input signal to **.5 Volt rms** and sweep the generator from **80 Hz to 12 kHz,** measuring the distortion at various frequencies.

5.3 The distortion should be **< .1 %** at both the channel A and B outputs.

6. Mute Test

6.1 Set the Voice Input Switch to the MIC position.

6.2 Apply a **1 Volt rms, 1 kHz** signal to the channel A and B inputs.

6.3 Reference a dB meter to the channel A or B output.

6.4 Take another signal line from the generator, or any other line level output signal, and quickly add and remove the signal to the positive (+) input terminal of the voice channel.

6.5 Both music channels should drop **30 dB ± 3 dB.**

Note: The mute release time is 2 seconds. It may be necessary to repeat **procedure 6.4** several times to check the mute specification on both channels.

6.6 Move the mute switch on channel B to the OFF position.

6.7 Repeat step **6.4.**

6.8 Channel A should drop **30 dB ± 3 dB.** Channel B should not be affected.

6.9 Return the channel B mute switch to the ON position.

7. Voice Channel Test

Note: The voice channel input must be loaded with a **600 ohm** input impedance in order to get the correct output levels.

7.1 Apply a **20 mV rms, 1 kHz** signal to the voice channel input.

7.2 The output should be **20mV rms, (0dB ± 2dB).** Reference a dB meter to the channel A or B output and proceed.

7.3 Move the voice switch to the MIC position.

7.4 The output should be **600 mV rms, (+30dB ± 2 dB).**

7.5 Return the Voice Switch to the LINE position.

7.6 The output should be **20 mV rms, (0 dB ± 2 dB).**

7.7 Turn the Opti-Voice® level fully clockwise. The output should be **600 mV rms, (+ 30 dB ± 2 dB).**

7.8 Turn the Opti-Voice level control fully counterclockwise. The output should be **20 mV rms, (0 dB ± 2 dB).**

8. Voice Channel Response Test

8.1 Apply a **300 mV rms, 1 kHz** to the voice channel input. Reference a dB meter to the channel A and B output.

8.2 Perform the tests listed in the 102 System Controller Voice Channel Response table below.

102 System Controller Voice Channel Response

Frequency (Hz)	Response (dB)
1000	0 Reference
80	-10 +/- 3dB
200	+0.5 +/- 2dB
8000	+3 +/- 2dB
20,000	-5 +/- 2dB

9. Automatic Gain Control Test

9.1 Apply a **2 Volt rms, 1 kHz** signal to the voice channel input.

9.2 The output level should be **900 mV rms, ± 100 mV.**

10. Voice Channel Distortion Test

10.1 Apply a **1 Volt rms, 1 kHz** signal to the voice channel input.

10.2 Measure the distortion at both the channel A and B outputs. It should be less than **.1 %.**

102® LOUDSPEAKER DRIVER WIRING

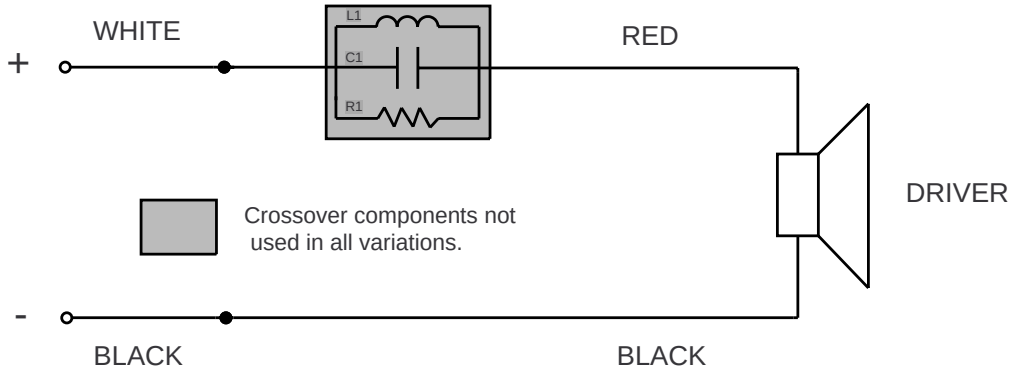

Figure 8. 102 Loudspeaker Schematic Diagram (Passive Units)

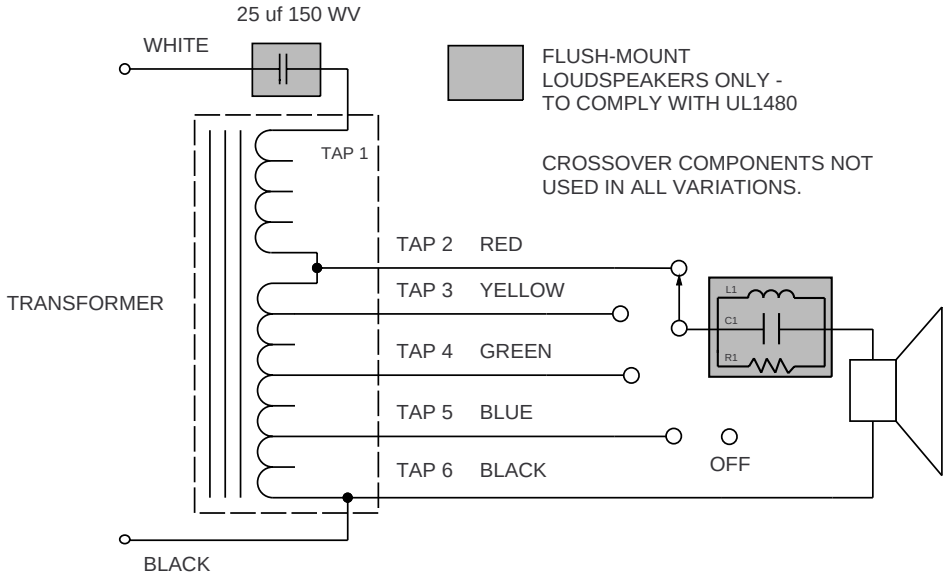

Figure 9. 102 Loudspeaker Schematic Diagram (Transformer Units)

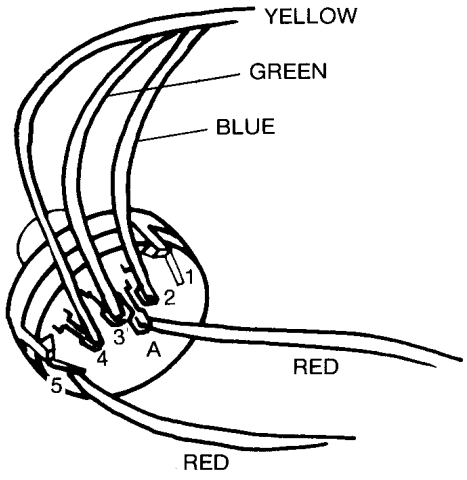

Figure 10. Tap Selection Switch Wiring (Transformer Units)

Tap Selection Switch Wiring

TERMINAL	COLOR	FROM
A	Red	Positive terminal of driver
5	Red	Transformer
4	Yellow	Transformer
3	Green	Transformer
2	Blue	Transformer
1	n/a	Not used (off position)

102® Flush-Mount Loudspeaker Parts Lists (per figures 11a and 11b)

Item Number	Description	*Part Number for Product Code 000889 and 000887	*RoHS Part Number for Product Code 040134 and 040135	Qty	Note
1	TRANSFORMER, AUDIO, 70V, 25W TRANSFORMER, AUDIO, 100V, 25W TRANSFORMER, POWER, 25V, 25W TRANSFORMER, POWER, 100V, 8W	130147 130146 130237 125827	291499-001 291498-001 N/A N/A	1	1
2	SWITCH, ROTARY, SINGLE POLE, 6 POSITION	130196	130196	1	1
3	CAP, 25uF, ELECTROLYTIC, BIPOLAR, 85C, 150V, 20%	125959	N/A	1	1
4	CAP, ELECTROLYTIC, BP, 85C, 50V, 10%, 5.0 uF	125780	N/A	1	1
5	RESISTOR, WIRE WOUND, 5W, 10%, 9.1 OHM	125605-9R1	N/A	1	1
6	INDUCTOR, 1.5mH	134705	N/A	1	1
7	DRIVER ASSY, 4.5", FIP, (8 OHM UNITS) DRIVER ASSY, 4.5", (4 OHM & TRANSFORMER UNITS)	124612-5 123561-5D	N/A 291024-001	1	1
8	GASKET, DRIVER, 4.5"	128407	128407	1	
9	SCREW, MACHINE, 8-32X1.25, HEXW, SLOT	171557-12	N/A	1	2
10	SCREW, HILO, 8-18x.75", HEXW, SLOT	171557-12	290977-12	7	2
11	WASHER, FLAT, .188", #8	143295-05	N/A	2	
-	GRILLE , WHITE (OPTIONAL)	125789	125789	1	
-	LOGO, BOSE®, CIRCULAR	128905	128905	1	
-	TERMINAL, WIRE WRAP	118008	118008		2
-	ADAPTOR, GRILLE	127589	127589		
-	COVER, OCTAGONAL	126786	126786	1	

*Product code 040134 (102F 75V 25 WATT) and 040135 (102F 100V 25 WATT) are a RoHS compliant version of the 102F. Only RoHS compliant parts listed in the above chart can be used in the 102F with product code 040134 (102F 100V 25 WATT) and 040135 (102F 70V 25 WATT). Both part numbers listed above can be used in the 102F product code 000887 and 000889.

Notes: 1. This component is not used in all versions of the 102 F Loudspeaker.
2. Hardware quantities vary according to variation.

102 Flush-Mount Loudspeaker Installation Hardware

Description	*Part Number for Product Code 000889 and 000887	*RoHS Part Number for Product Code 040134 and 040135	Qty
INSTALLATION HARDWARE KIT, QUAD SPEAKER	129036	294289-001	1
INSTALLATION HARDWARE KIT, SINGLE SPEAKER	125993	N/A	1
WB-16 WALL BRACKET KIT	125871	N/A	20 PACK

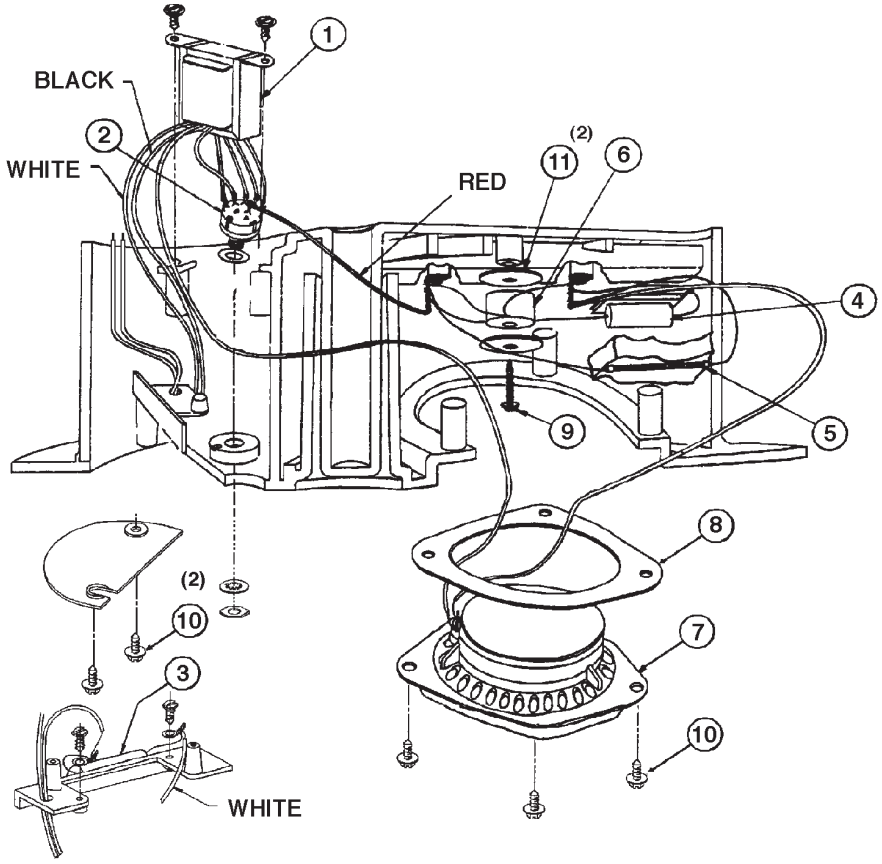

Figure 11a. 102® Flush-Mount Non-RoHS Loudspeaker Exploded View

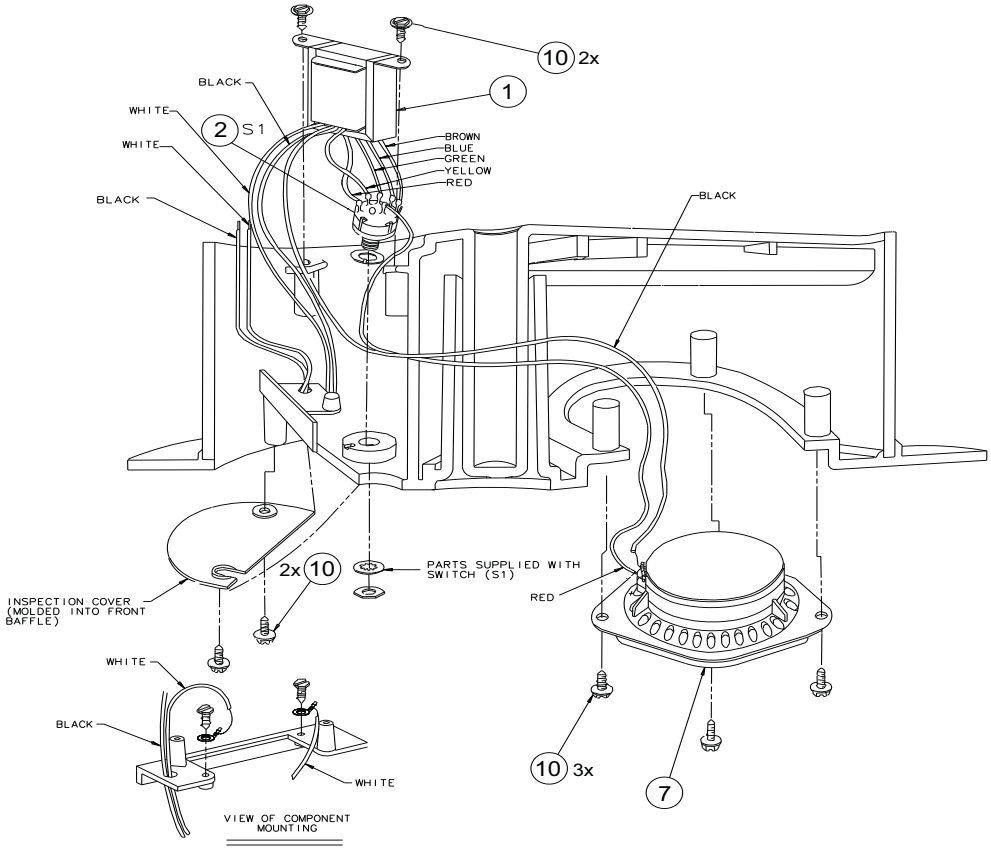

Figure 11b. 102 Flush-Mount RoHS Loudspeaker Exploded View

102® Surface-Mount Loudspeaker Parts Lists (per figure 12)

Item Number	Description	Part Number	Qty	Note
1	SWITCH, ROTARY, SINGLE POLE, 6 POSITION	130196	1	1
2	TRANSFORMER, AUDIO, 70V, 25W TRANSFORMER, AUDIO, 100V, 25W TRANSFORMER, POWER, 25V, 25W TRANSFORMER, POWER, 100V, 8W	130147 130146 130237 125827	1	1
3	INDUCTOR, 1.5mH	134705		
4	RESISTOR, WIRE WOUND, 5W, 10%, 9.1 OHM	125605-9R1		
5	CAP, ELECTROLYTIC, BP, 85, 50V, 10%, 5.0 uF	125780	1	1
6	SCREW, TAPP, 8-11 X .75, PAN, XRC/SQ	172672-12	9	1
7	DRIVER ASSY, 4.5", FIP, (8 OHM UNITS) DRIVER ASSY, 4.5", (4 OHM & TRANSFORMER UNITS)	124612-5 123561-5D	1	1
8	GASKET, DRIVER, 4.5"	128407	1	
9	NUT, PUSH ON, .24 X. 75	125786	2	
10	NAMEPLATE, LOGO	123981-1A1	1	
11	GRILLE, 101® MM/102S, AL., BLACK GRILLE, 101® MM/102S, AL., WHITE	129769 129770	1	
12	INSERT, NUT, DECORATIVE CAP	123991	2	
13	CONNECTOR, BARRIER, 2 POS.	124484-02	1	
14	GASKET, 102	128410	1	
15	INSERT, EXT/INT THREAD	124755	2	
-	CONNECTOR, PHONE JACK, 2 POS, FEMALE	134677	1	
-	CONNECTOR, LUG, WIRE WRAP, 1 POS, FEMALE	118008	2	

Notes: 1. This component is not used in all versions of the 102 F Loudspeaker.
2. Hardware quantities vary according to variantion.

102 Surface-Mount Loudspeaker Installation Hardware

Description	Part Number	Qty
INSTALLATION HARDWARE KIT, QUAD SPEAKER	129036	1
INSTALLATION HARDWARE KIT, SINGLE SPEAKER	125993	1
WB-16 WALL BRACKET KIT	125871	20 PACK

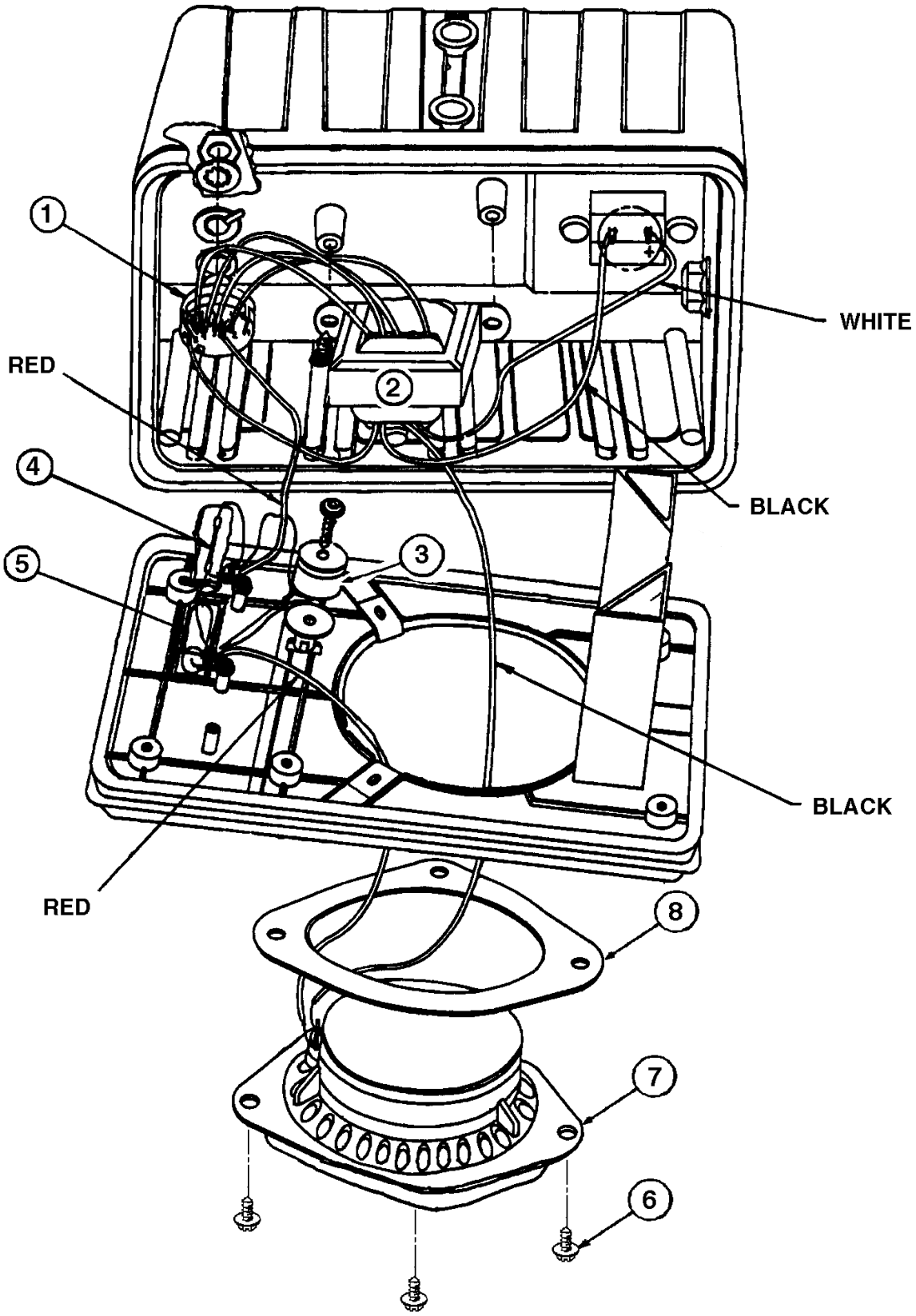

Figure 12. 102® Surface-Mount Loudspeaker Exploded View

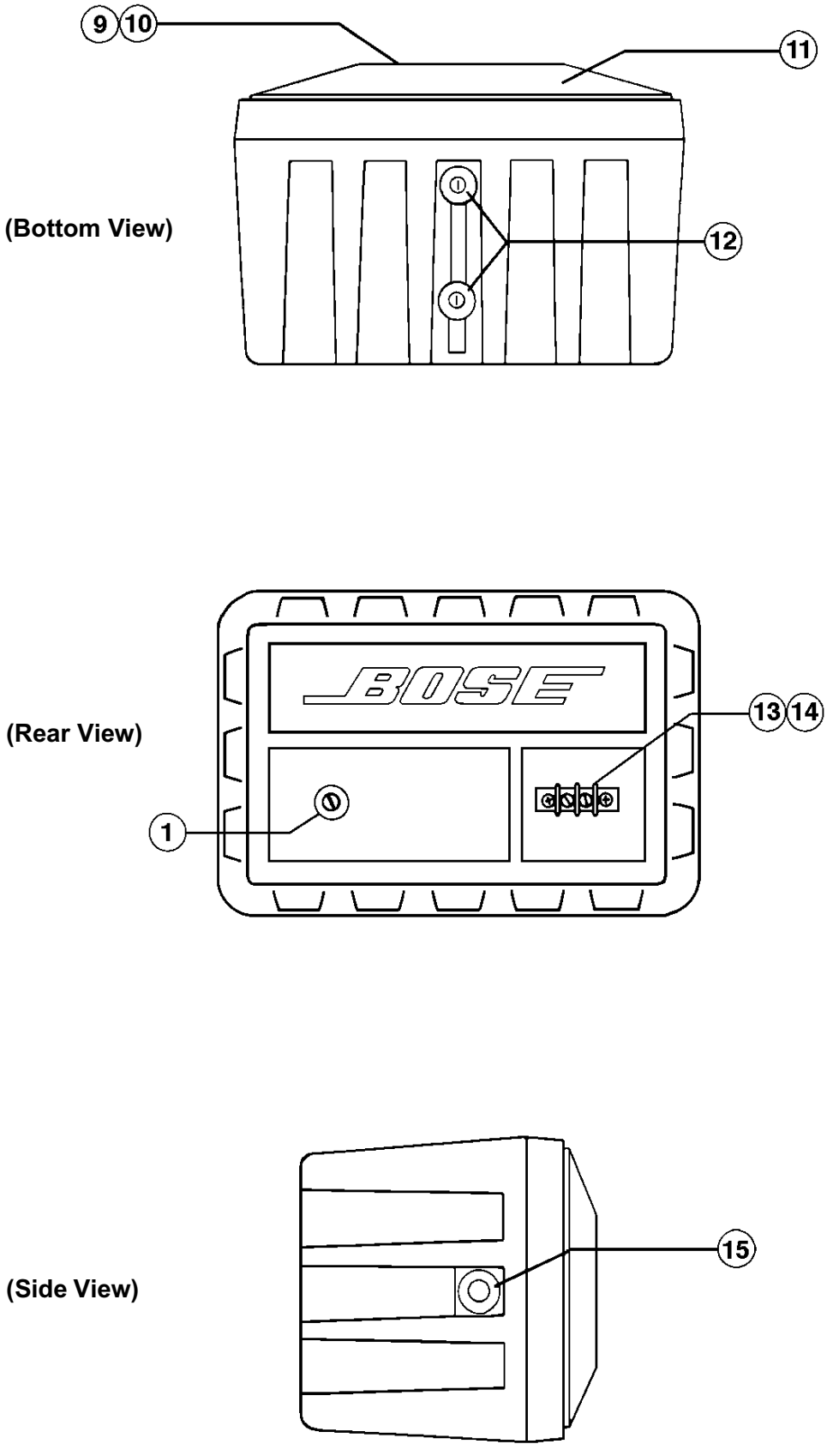

Figure 13. 102® Surface-Mount Loudspeaker

102® System Controller Parts List

Semiconductors

Reference Designator	Description	Part Number	See Note
DE01, DE02, DE03, DE51, DE52, DE53, DE54, DG01, DG02, DG03, DG04, DG32, DG35, DG61, DG62	Diode, ISS133	127376	
D801, D802, D804, D805	Zener, RD16EB1	127378	
DG34	LED, SLP5400, WHT	127382	
DG63	LED, SEL 111OR, RD	127380	
D803	LED, SEL 13103, GRN	127381	
D806 ⚠	Diode, SLVB20	127377	1
QE01, QE02, QE03, QE51, QE52, QG01, QG02, QG05	OP-AMP, 2043DD	127375	
QG03	I.C., CA3080E	127374	
QG04	OP-AMP, 4558	127373	
QG31, QG33, QG34	Transistor, 2SC945	127385	
QG32, QG61, QG62	Transistor, 2SA733	127383	
QG36, QG37	FET, 2SK30	127379	
Q802	Transistor, 2SD313	127386	
Q803	Transistor, 2SB507	127384	

Capacitors

Reference Designator	Description	Part Number	See Note
CE03, CE11, CE53, CE61, CG04	Ceramic, 330 pf	129314	
CE04, CE14, CE54, CE64, CG08	Ceramic, 33 pf	129315	
CE16, CE17, CE66, CE67, CJ01, CJ02, CJ03, CG17	Ceramic, .01 uf	129316	
C808, C809 ⚠	Ceramic, .01 uf	129316	1
CE18, CE68	Ceramic, 1000 pf	130253	
CG03, E68	Ceramic, 3300 pf	129317	
CG05	Ceramic, 220 pf	129318	
CG06	Ceramic, 22 pf	129319	
CG18	Ceramic, 10,000 pf	129320	
CE05, CE06, CE55, CE56	Film, .0056 uf, 5%	129321	
CE07, CE57	Film, .047, uf, 5%	129322	

Note:

1. ⚠ This part is critical for safety purposes. Failure to use a substitute replacement with the same characteristics as the recommended replacement part might create shock, fire, and/or other hazards.

102® System Controller Parts List

Capacitors (cont.)

Reference Designator	Description	Part Number	See Note
CG09, CG10, CG11, CE08, CE09, CE58, CE59	Film, .1 uf, 5%	129323	
CE10, CE60	Film, .0068 uf, 5%	129324	
CE12, CE62	Film, .27 uf, 5%	129325	
CG12	Film, .0022 uf, 5%	129326	
CG13	Film, .0033 uf, 5%	129327	
CG14	Film, .0027 uf, 5%	129328	
CE01, CE02, CE15, CE51, CE52, CE65	Electrolytic, 10 uf, 50V	129329	
CG15, CG16, CG31, CG61	Elec., 4.7 uf, 50V	129330	
CG01, CG02	Elec., 22 uf, 50V	129331	
CG07	Elec., 22 uf, 25V	129332	
CG33	Elec., 220 uf, 16V	129333	
CG35	Elec., 33 uf, 16V, BP	129334	
CG62	Elec., .22 uf, 50V	129335	
C801 ⚠	Elec., 470 uf, 35V	130252	1
C802 ⚠	Elec., 220 uf, 35V	129336	1
C803, C804	Elec., 330 uf, 16V	129337	
C805, C806	Elec., 100 uf, 16V	129338	
C807	Elec., 470 uf, 10V	130251	

Resistors

Reference Designator	Description	Part Number	See Note
RE01, RE02, RE51, RE52	1k ohm, 1/2W, 1%	127368	
RE03, RE05, RE53, RE55	1k ohm, 1/4W, 1%	127370	
RE04, RE56, RE06, RG01, RE54, RG06	9.09 ohm, 1/4W, 1%	127372	
RE07, RE14, RE64, RG12, RG39, RG66	22k ohm, 1/8W, 5%	129340	
RE08, RE09, RE15, RE57, RE58, RE59, RE63, RG13, RG15, RG17	10k ohm, 1/8W, 5%	129341	
RE10, RE11, RE12, RE15, RE21, RE23, RE60, RE61, RE62	4.7k ohm, 1/8W, 5%	129342	

Note:

1. ⚠ This part is critical for safety purposes. Failure to use a substitute replacement with the same characteristics as the recommended replacement part might create shock, fire, and/or other hazards.

102® System Controller Parts List

Resistors (cont.)

Reference Designator	Description	Part Number	See Note
RE16, RE66	82k ohm, 1/8W, 5%	129343	
RE17, RE18, RE67, RE68	8.2k ohm, 1/8W, 5%	129344	
RE19, RE20, RE69, RE70, RE64, RG69, RG73, R807	2.2k ohm, 1/8W, 5%	129345	
RE22, RE72, RG07, RG08, RG10	1.5k ohm, 1/8W, 5%	129346	
RE25, RE75, RG16, RG42, RG47	100k ohm, 1/8W, 5%	129347	
RE26, RE76, R805, R806	470 ohm, 1/8W, 5%	129348	
RE27, RE77	330 ohm, 1/8W, 5%	129349	
RE28, RE29, RE78, RE79, RG27, RG28	330k ohm, 1/6W	129350	
RG01, RG02	301 ohm, 1/2W, 1%	127369	
RG03, RG05	301 ohm, 1/4W, 1%	127371	
RG11, RG61	15k ohm, 1/8W, 5%	129351	
RG14	220 ohm, 1/8W, 5%	129352	
RG19, RG71	6.8 ohm, 1/8W, 5%	129353	
RG22	3.9k ohm, 1/8W, 5%	124354	
RG23, RG24, RG25, RG26, RG33, RG38, RG49, RG51, RG74	3.3k ohm, 1/8W, 5%	129355	
RG31, RG70	150k ohm, 1/8W, 5%	129356	
RG34	330k ohm, 1/8W, 5%	129357	
RG37, RG40, RG72, R803, R804	1k ohm, 1/8W, 5%	129358	
RG45, RG48	680 ohm, 1/8W, 5%	129359	
RG46	100 ohm, 1/8W, 5%	129360	
RG62	33k ohm, 1/8W, 5%	129361	
RG67, RG68	1M ohm, 1/8W, 5%	129362	
RG75, RG76	10 ohm, 1/16W	130254	
R801, R802 ⚠	39 ohm, 1/4W, Fusible	127387	1
R810 ⚠	150 ohm, 1/2W, Metal	127388	1
RG09	50k, Var Res., Voice, Gain	127389	

Note:

1. ⚠ This part is critical for safety purposes. Failure to use a substitute replacement with the same characteristics as the recommended replacement part might create shock, fire, and/or other hazards.

102® System Controller Parts list

Miscellaneous

	Description	Part Number	See Note
T001 ⚠	Transformer - 115 Volt Transformer - 240 Volt	127392 127393	1
W001 ⚠	Power Cord - 115 Volt 220 Volt	127395 127394	1
	PCB Assembly	127364	2
	Chassis - 110 Volt 220/240 Volt	127411 127412	
	Cover, Top	127410	
	Front Panel Assembly	127367	
	Knob	127421	
JE01, JE51, JG01	Jack, 3-pin	127397	
JE01, JE51	Jumper Cable, 3-pin	127401	
JE02	Jack, 4-Pin	127398	
JE02	Jumper Cable, 4-pin	127403	
WE03	Jumper Cable, 3-pin	127402	
SE01, SE51, SG01, SG32	Slide Switch, Gain, Sel.	127391	
SG31	Push Switch, Bass	127390	
	Input Terminal, 4-Pole	127399	
	Output Teminal, 9-Pole	127400	
	Lug, Grounding	127429	
	Nut, Hexagon, Gnd.	127428	
	Screw - Cover, Front Panel, Transformer	127425	
	Screw - Grounding	127427	
	Screw - PCB Hold Down	127422	
	Screw - Rear Terminals	127426	
	Screw - Accessory Kit	127423	
	Screw - Accessory Kit	127324	

102 System Controller Packing List

Description	Part Number
Carton	127415
Filler	127416
Owner's Guide	125966
Registration Card	125967

Note:

1. ⚠ This part is critical for safety purposes. Failure to use a substitute replacement with the same characteristics as the recommended replacement part might create shock, fire, and/or other hazards.

2. This part is not normally available from Customer Service. Approval from the Field Service Manager is required before ordering.

102® Flush-Mount Loudspeaker Packing List

Item Number	Description	Part Number	Quantity
1	SHEET, DECLARATION OF CONFORMITY, 102 F	184846	1
2	MANUAL, OWNER'S, 102F, TRANSFORMER VERSIONS PASSIVE VERSIONS	 130291 134672	 1 1
3	GUIDE, OWNER'S, ADDENDUM, 102F	143369	1
4	PAD, PACKING, 102	129059-01	4
5	CARTON, PACKING, 102	138393	1
6	PACKING, INSERT, 102	126784	1
-	BAG, POLY, 9.38 X6 X 2 MIL	100278	1
-	BAG, POLY, 5.5 X 4 X .004 MIL	175175	2

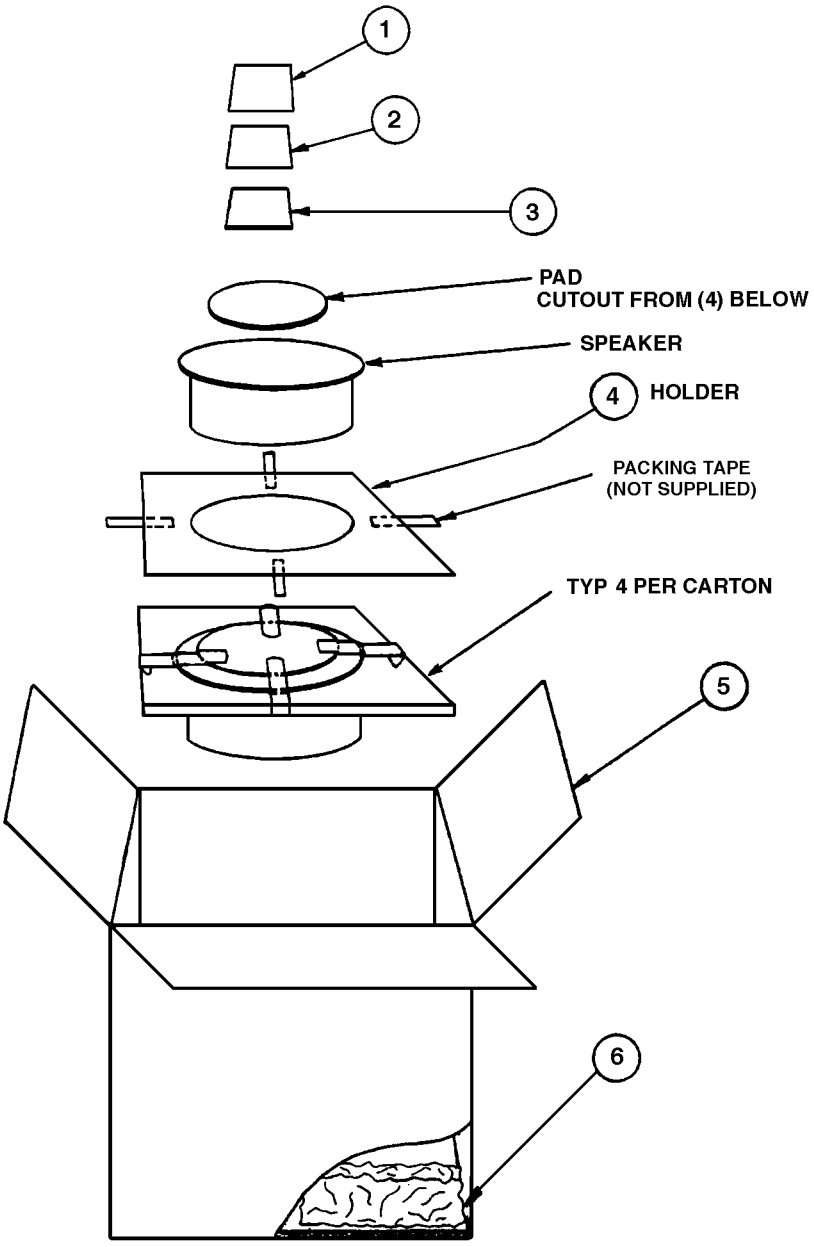

Figure 14. 102 Flush-Mount Packing Diagram

102® Surface-Mount Loudspeaker Packing List

Item Number	Description	Part Number	Quantity
1	CARTON, RSC, 102 S	138389	1
2	PACKING, END CAP	124921	2
3	MANUAL, OWNER'S, 102S, TRANSFORMER VERSIONS PASSIVE VERSIONS	 130292 134683	 1 1
4	BROCHURE, ALL PRODUCTS	141478	1
-	BAG, POLY, 10X13X6X2 MIL	123831	2

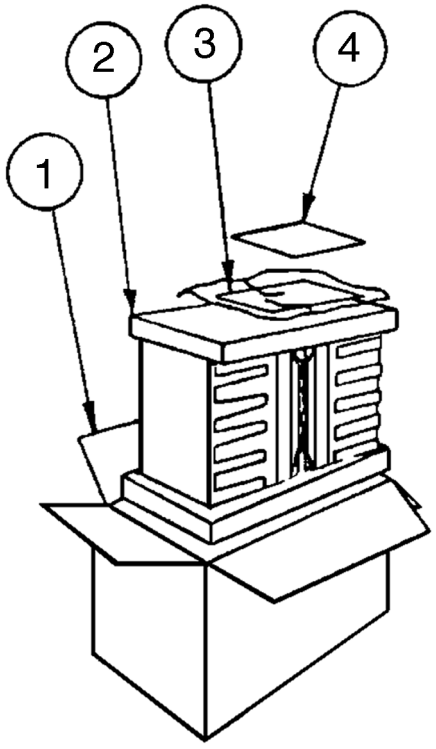

Figure 15. 102 Surface-Mount Packing Diagram

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
	00	Document release revision 00	Service Manual release	All
	01	Unknown		
11/96	02	Unknown		
02/06	03	Added RoHS part numbers	This product is now built with RoHS compliant parts.	1,17,19,28,29
6/09	04	Updated RoHS drawing for the 102F loudspeaker	Update	18

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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