

**FreeSpace[®] DS 16S and DS 16SE
Loudspeakers
(Indoor and Outdoor Versions)**



CONTENTS

Warranty Information	2
Specifications	3
Product Description	4
Part List Notes	4
Packaging List, FreeSpace® DS 16S and DS 16SE Loudspeakers	5
Figure 1. FreeSpace DS 16S and DS 16SE Packaging View	5
Main Part List, FreeSpace DS 16S Loudspeaker (Indoor Version)	6
Figure 2. FreeSpace DS 16S (Indoor Version) Exploded View	6
Main Part List, FreeSpace DS16 SE Loudspeaker (Outdoor Version)	7
Figure 3. FreeSpace DS 16SE (Outdoor Version) Exploded View	7
Main Part List, Basic Elevation Bracket (included with loudspeaker)	8
Figure 4. Basic Elevation Bracket Exploded View	8
Disassembly Procedures	9
Test Procedures	10
Figure 5. Loudspeaker Wiring Diagram	10
Service Manual Revision History	11

CAUTION: The Bose® FreeSpace® DS 16S and DS 16SE Loudspeakers contain no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

WARRANTY INFORMATION

The Bose FreeSpace DS 16S and DS 16SE Loudspeakers are covered by a 5-year transferable limited warranty.

PROPRIETARY INFORMATION

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

SPECIFICATIONS

FreeSpace® Model DS 16S and DS 16SE Loudspeakers

Electrical

Loudspeaker Impedance:	8 ohms
Power Handling:	16 Watts
70V Transformer TAP Settings:	1, 2, 4, 8 and 16W
100V Transformer TAP Settings:	2, 4, 8 and 16W

Acoustical

Sensitivity:	84 dB SPL @ 1W/1m.
Maximum Sound Pressure Level:	96 dB SPL @ 1m (pink noise)
Frequency Range:	90Hz - 16kHz
Radiation Pattern:	90 degrees conical averaged from 1kHz to 6 kHz
Compression:	< 3 dB with 32W watt sine wave
Distortion:	< 30% at 32W sine wave
Port Noise:	< -40dB (from fundamental)

Mechanical

Dimensions, Single Speaker:	(W) 9.85 in x (D) 4.61 in x (H) 4.88 in (250 mm x 117 mm x 124 mm)
Packed System:	(W) 12.6 in x (D) 9.1 in x (H) 9.0 in (320 mm x 231 mm x 229 mm)
System Weight:	Single Speaker: 4.0 lbs (1.8 kg) Packed System: 5.1 lbs (2.3 kg)

PRODUCT DESCRIPTION

The FreeSpace® DS16 S and DS16 SE are the entry level surface-mount speakers for business music applications. They consist of a single 2.25" driver in a rugged, plastic enclosure. There are two variants of the DS16 Loudspeaker, an indoor version qualified for use where it is not exposed to weather and an outdoor version qualified for use fully exposed to weather.

The indoor and outdoor variants are each available in two colors, black and white. They ship with a basic bracket allowing for pitch adjustments. An upgraded bracket is available that allows the speaker to be life safety compliant for the worldwide market. The upgraded bracket allows left to right (yaw) adjustments in addition to up and down (pitch) adjustments. When used with the upgraded bracket the surface mount DS16 loudspeaker is life safety compliant as described below.

The DS 16S and DS 16SE have passed extensive testing and comply with the following specifications and uses:


LISTED to ANSI/UL 1480-2005

- Fire Protective Signaling Use – UL Category UUMW, File Number S 3241. Control Number 42S9 when installed with a junction box (on-wall or in-wall). Not for use with DC-supervised systems.
- General Purpose Use – UL Category UEAY, File Number S 5591 Control Number 3N89.
- The DS 16SE is suitable for use outdoors in wet locations.
- The DS 16S is suitable for use indoors in damp locations.
- Suitable for installation using Class 1, Class 2, or Class 3 wiring methods in accordance with NFPA 70, National Electric Code, 2002, Article 640.
- Suitable for use with fire alarm circuit wiring methods in accordance with NFPA 70, National Electric Code, 2002, Article 760.
- EMC Directive 89/336/EEC and Article 10 (1) of the directive, EN50081-1 and EN50082-1 as signified by the CE mark.

The DS 16S and DS 16SE also have been designed to the requirements defined in the following European regulatory specification for combination systems:

- British Standard Code of Practice BS 5839, Part 8.
- Tested to IEC60268-5.

PART LIST NOTES

1. This part is not normally available from Customer Service. Approval from the Field Service Manager is required before ordering.
2. The individual parts located on the PCBs are listed in the Electrical Part List.
3.  This part is critical for safety purposes. Failure to use a substitute replacement with the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards.
4. This part is referenced for informational purposes only. It is not stocked as a repair part. Refer to the next higher assembly for a replacement part.

PACKAGING LIST

FreeSpace® DS 16S and DS 16SE Loudspeakers

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	WALL MOUNT BRACKET, BLK WALL MOUNT BRACKET, WHT INCLUDES: POLY BAG POLY BAG WASHER, M4, LOCK, SS SCREW, M4x60, PAN HEAD, SS SCREW, M4x20, SOCKET HEAD SCREW, M4x8, FLAT HEAD	295891-001 295891-002 - - - - - -	- - - - - - -	1 1 1 2 1 2 1	 4 4 4 4 4 4
2	INSTALLATION GUIDE	299653	4301-7248+1	1	
3	CARTON KIT, INCLUDES: CARTON SHEET POLY FOAM, EPS POLY BAG CARTON, DS16S ONLY CARTON, DS16SE ONLY	295900 325629-0010 325630-0010 - 325111-0010 308993	- 1450-9280+0 1490-4611+0 - 1437-8402+0-2 1437-8401+0-2	 1 1 1 1 1	 4

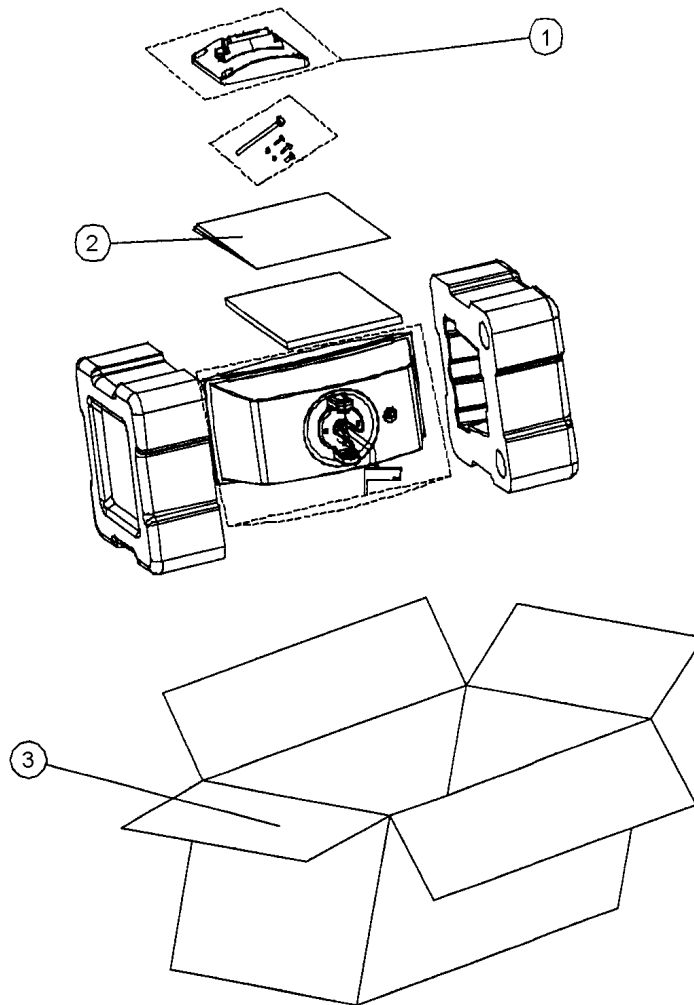


Figure 1. FreeSpace DS 16S and DS 16SE Packaging View

MAIN PART LIST

FreeSpace® DS 16S Loudspeaker (Indoor Version)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	GRILLE, INDOOR, BLACK GRILLE, INDOOR, WHITE INCLUDES: BOSE LOGO ASSY, BLACK or BOSE LOGO ASSY, WHITE	295896-001 295896-002 303039-001 303039-001	SVC-AMOE11+GRILL SVC-AMOE12+GRILL - -	1	
2	DRIVER, 2.75"	298081	8900-3840+0	1	
3	CAP, GRILLE, BLACK CAP, GRILLE, WHITE	295897-001 295897-002	1467-7001+0 1467-7002+0	2	
4	FRONT BAFFLE	295899-001	4155-1931+0	1	4
5	SCREW, TAPPING, M4X10	-	2954-4010+3000	10	4
6	XFMR/ROTARY SWITCH ASSY, 70/100V, 16W, 8 OHM	296602	SVC- AMOE11+TRANS	1	
7	GASKET	-	4149-0701+0	1	
8	CABINET, REAR, BLACK CABINET, REAR, WHITE	295895-001 295895-002	1467-6901+0 1467-6902+0	1	4
9	BRACKET, MOUNTING, BLACK BRACKET, MOUNTING, WHITE	295892-001 295892-002	4155-1993+0 4155-1994+0	1	
10	WIRE-CONN, 4P, P3.96, BLACK WIRE-CONN, 4P, P3.96, WHITE	295894-001 295894-002	7012-7710+0 7012-7711+0	1	
11	SCREW, M4X14, BLACK	-	2904-4014+3000	2	4
12	WASHER	-	2600-4008+0783	2	4
13	GROMMET, RUBBER, BLACK	295893-001	4157-1071+0	1	
14	ROTARY SWITCH	-	5200-4933+0	1	4
15	TAP KNOB	295898-001	2447-3601+0	1	
15	NUT, HEX, ROTARY SWITCH	-	-	1	4
16	SCREW, TAPPING, M3X10	-	2954-3010+3000	4	4
-	BOSE LOGO ASSY, BLACK BOSE LOGO ASSY, WHITE INCLUDES: CUP WASHER SPRING WASHER, SELF LOCKING	303039-001 303039-001	- - 4159-0170+0 2510-3931+0 2610-4003+1207	1	 4 4 4

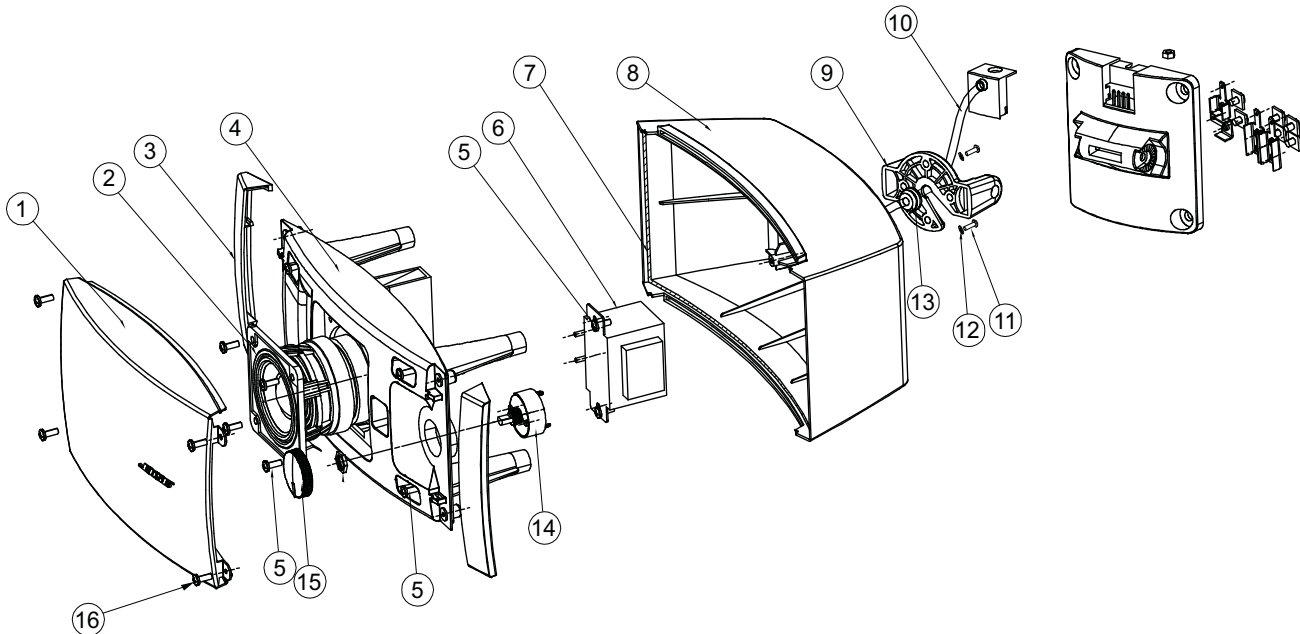


Figure 2. FreeSpace DS 16S (Indoor Version) Exploded View

MAIN PART LIST

FreeSpace® DS16 SE Loudspeaker (Outdoor Version)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	GRILLE, OUTDOOR, BLACK GRILLE, OUTDOOR, WHITE INCLUDES: BOSE LOGO, BLACK or BOSE LOGO, WHITE	298083-001 298083-002 303039-001 303039-002	SVC-MOESO11+GRIL SVC-MOESO12+GRIL - -	1	
2	DRIVER, 2.75"	298082	8900-3830+0	1	
3	CAP, GRILLE, BLACK CAP, GRILLE, WHITE	295897-001 295897-002	1467-7001+0 1467-7002+0	2	
4	FRONT Baffle	295899-001	4155-1931+0	1	4
5	SCREW, TAPPING, M4X10	-	2954-4010+3000	10	4
6	XFMR/ROTARY SWITCH ASSY, 70/100V, 16W, 8 OHM	296602	SVC-AMOE11+TRANS	1	
7	GASKET	-	4149-0701+0	1	4
8	CABINET, REAR, BLACK CABINET, REAR, WHITE	295895-003 295895-004	1467-6903+0 1467-6904+0	1	4
9	BRACKET, MOUNTING, BLK BRACKET, MOUNTING, WHT	295892-001 295892-002	4155-1993+0 4155-1994+0	1	
10	WIRE-CONN, 4P, P3.96, BLK WIRE-CONN, 4P, P3.96, WHT	295894-001 295894-002	7012-7710+0 7012-7711+0	1	
11	SCREW, M4X14, BLACK	-	2904-4014+3000	2	4
12	WASHER	-	2600-4008+0783	2	4
13	GROMMET, RUBBER, BLK	295893-001	4157-1071+0	1	
14	ROTARY SWITCH	-	5200-4933+0	1	4
15	TAP KNOB	295898-001	2447-3601+0	1	
15	NUT, HEX, ROTARY SWITCH	-	-	1	4
16	SCREW, TAPPING, M3X10	-	2954-3010+3000	4	4
-	BOSE LOGO ASSY, BLACK BOSE LOGO ASSY, WHITE INCLUDES: CUP WASHER, PLASTIC SPRING WASHER, SELF LOCKING	303039-001 303039-002 - - -	- - 2612-8520+1401 2510-3931+0 2610-4003+1203	1	 4 4 4

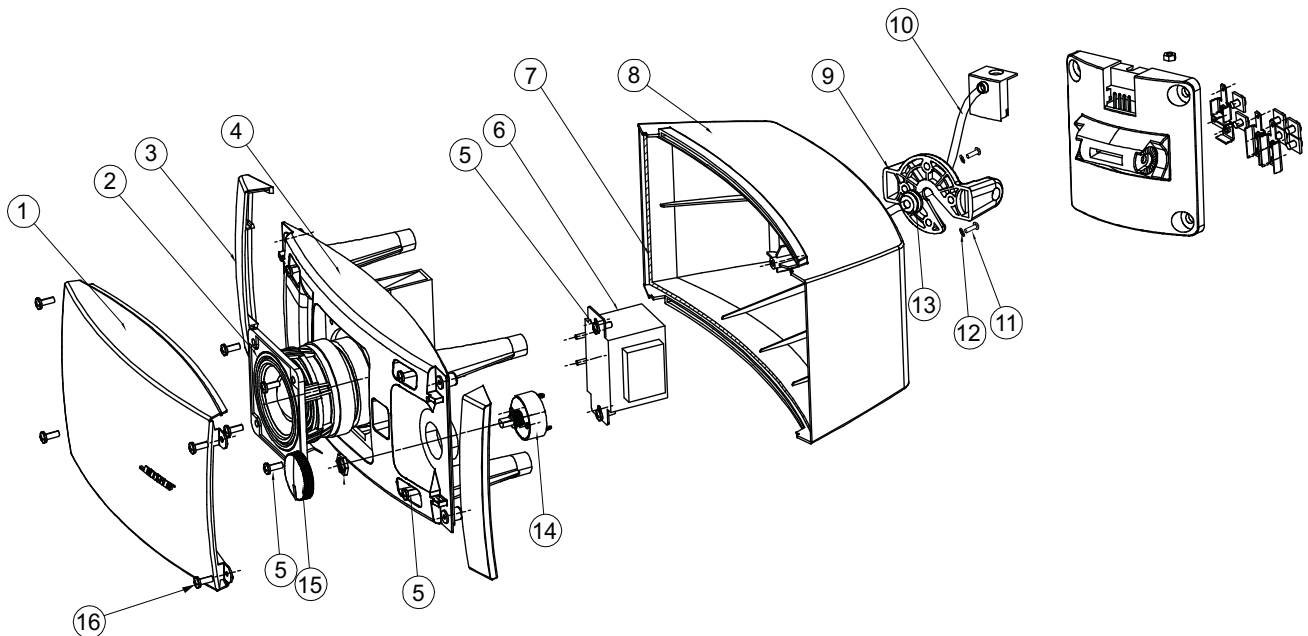


Figure 3. FreeSpace DS 16SE (Outdoor Version) Exploded View

MAIN PART LIST

Basic Elevation Bracket (included with loudspeaker)

Item Number	Description	Vendor Part Number	Qty.	Note
1	WALL MOUNT, PC/ABS	4155-1981+0	1	4
2	SPEAKER MOUNT, PC/ABS	4155-1991+0	1	4
3	GROMMET, RUBBER SBR	4157-1071+0	1	4
4	CONNECTOR, 4-PIN, PVC	7012-7710+0	1	4
5	SCREW, M4x8mm, FLAT HEAD	2901-4008+3000	1	4
6	SCREW, M4x60mm, PAN HEAD, SEMS	2900-4060+3000	1	4
7	SCREW, 8-32, WITH SQUARE WASHER	2AZZ-0003+ZZZZ	6	4
8	TERMINAL, DOUBLE HOLE, BRASS	4135-6481+0	2	4
9	SCREW, M4x20mm, 4mm SOCKET HEAD	2900-4020+3000	2	4
10	WASHER, M4, LOCK	2600-4008+0783	2	4
11	BAG, POLY	1497-0032+0	1	4
12	TERMINAL, SINGLE HOLE, BRASS	4135-6491+1	2	4
13	WIRE, INSULATED, 18 AWG, UL1007, BLUE	1681-0060+A	1	4
14	WIRE, INSULATED, 18 AWG, UL1007, YELLOW	1681-0040+A	1	4
15	WIRE, INSULATED, 18 AWG, UL1007, WHITE	1681-0090+A	2	4
16	CABLE TIE, 2.6x120mm	6360-1341+0	1	4
17	NUT, HEX, M4	2640-4030+0703	1	4

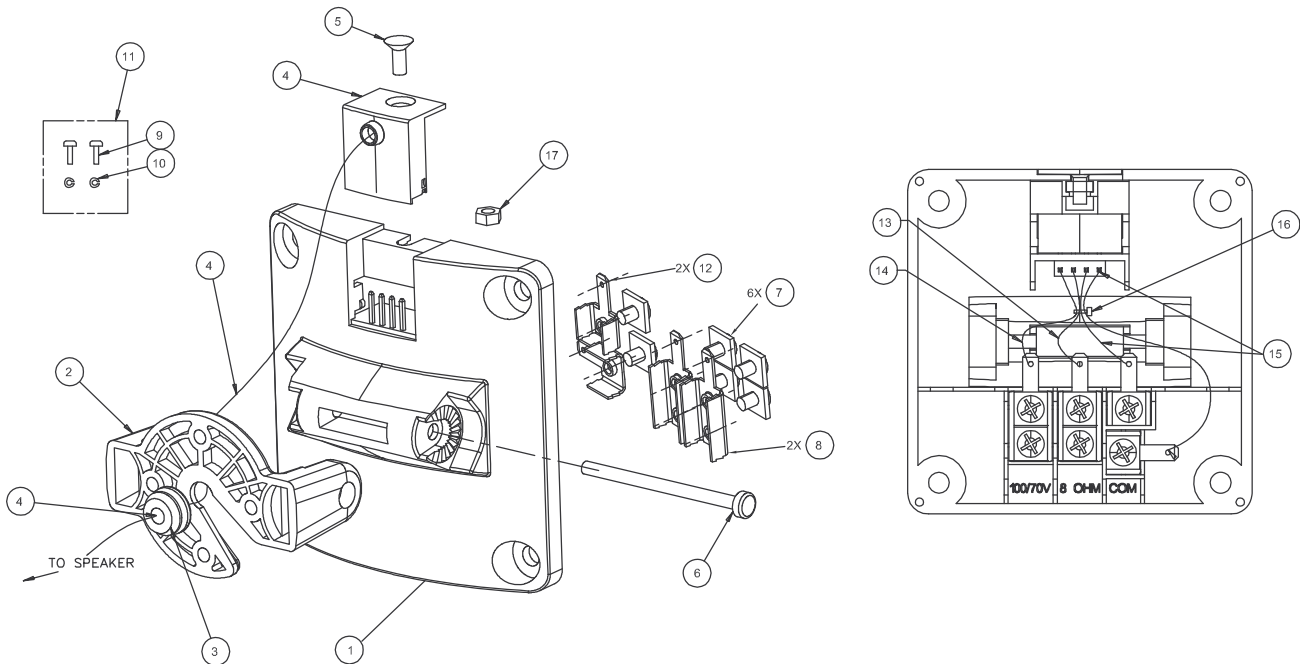


Figure 4. Basic Elevation Bracket Exploded View

DISASSEMBLY PROCEDURES

Note: Refer to Figures 2 and 3 for the following procedures.

1. Grille Removal

1.1 Remove the two grille end caps (3) by grasping them and pulling them straight away from the grille (1), off to the sides. This will expose the grille mounting screws (16).

1.2 Using a Phillips-head screwdriver, remove the four screws that secure the grille to the cabinet. Lift off the grille. Take care to not lose the four washers located under the grille tabs, if they are present.

2. Logo Removal

2.1 Remove the grille using procedure 1 above.

2.2 On the back of the grille (1), 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. Driver Removal

3.1 Perform procedure 1.

3.2 Remove the four screws (5) that secure the driver (2) to the front baffle (4).

3.3 Lift out the driver and disconnect the two Faston connectors from the driver.

4. Front Baffle Removal

4.1 Perform procedure 1.

4.2 Remove the four screws (5) that secure the front baffle (4) to the rear cabinet (8).

4.3 Lift off the front baffle.

5. Transformer/Rotary Switch Assembly Removal

5.1 Perform procedure 4.

5.2 Using a flat-head screwdriver, carefully pry the tap knob (15) off of the front baffle (4). Lift off the knob.

5.3 Using a 1/2" nut driver, remove the hex nut that secures the rotary switch (14) to the front baffle.

5.4 Disconnect the two Faston connectors from the driver.

5.5 Slide the wiring harness (10) through the rubber grommet (13).

5.6 Remove the two screws (5) that secure the transformer (6) to the rear cabinet (8).

TEST PROCEDURES

1. Air Leak Test

1.1 Remove the right-hand grille cap to gain access to the tap rotary switch. Set the switch to the 8 Ohm setting.

1.2 Apply a 7 Vrms, 95 Hz signal to the input terminals of the loudspeaker.

1.3 Listen for any air leaks around the driver, the rubber grommet located on the back of the speaker and any seams. Reject any speaker with an air leak. All repairs must be hidden. Replace any driver that has a rubbing or ticking noise.

2. Rub and Tick Test

2.1 Remove the right-hand grille cap to gain access to the tap rotary switch. Set the switch to the 8 Ohm setting.

2.2 Apply a 7 Vrms, 95 Hz signal to the input terminals of the loudspeaker.

2.3 At a distance of less than one foot, listen for any extraneous sounds from the speaker. Replace any driver that has a rubbing or ticking noise.

Note: There is a normal suspension noise. To distinguish between a rub or tick or suspension noise, displace the cone slightly with your finger. If the rubbing can be made to go away or get worse, then it is a rub or a tick. If the noise stays the same, it is a suspension noise.

3. Power Sweep Test

3.1 Remove the right-hand grille cap to gain access to the tap rotary switch. Set the switch to the 8 Ohm setting.

3.2 Apply a 7 Vrms, 50 Hz signal to the input terminals of the loudspeaker.

3.3 Change the oscillator frequency slowly from 50 Hz to 5 kHz. Listen for any buzzes, rattles or other extraneous noises from the driver or from the internal parts. The whooshing noise from the port at around 95 Hz is acceptable.

Replace any driver that has a buzzing noise. Ensure that there are no buzzes or rattles from any internal parts.

4. Transformer Tap Select Test

4.1 Remove the right-hand grille cap to gain access to the tap rotary switch. Set the switch to the 70V, 16W setting.

4.2 Apply a 70 Vrms, 100 Hz signal to the transformer input (70V/100V) of the loudspeaker.

4.3 Slowly change the tap selection from the high position (16W) to the 2W position. A decrease in level should be heard for each descending tap.

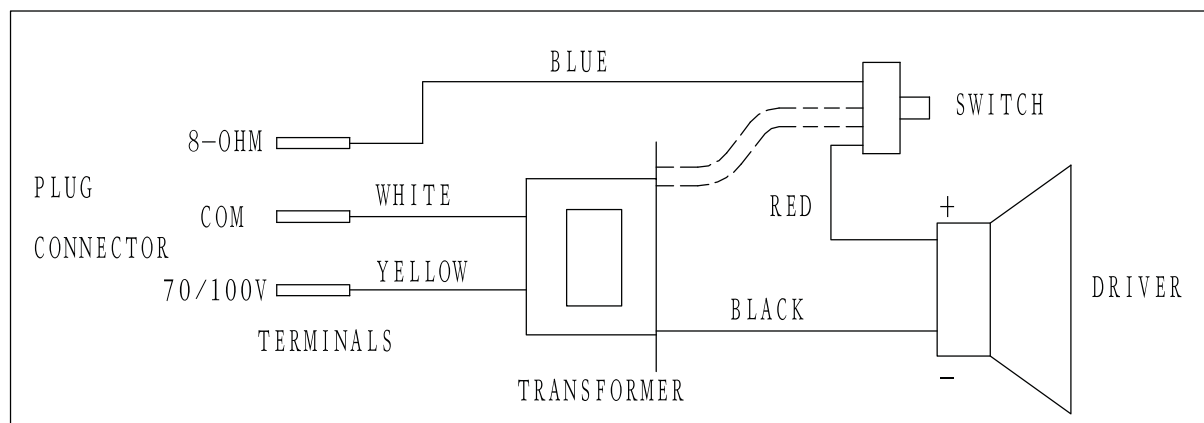


Figure 5. Loudspeaker Wiring Diagram

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
11/06	00	Document released at revision 00.	Service manual initial release	All
5/09	01	- Bracket vendor part number changes – Item 9. - Changed page order to match current service manual format.	Vendor part number change	6, 7 All
7/13	02	Added new part number for the DS16S loudspeaker.	New part number	5

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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Better sound through research[®]

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