

**SYNTHESIS<sup>®</sup>**

**JBL**

SYNTHESIS<sup>®</sup> THREE ARRAY<sup>™</sup>  
**SAM3HA,  
SAM3VA**

OWNER'S AND  
INSTALLER'S  
MANUAL

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## INTRODUCTION

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Congratulations on purchasing this JBL Synthesis® Three Array™ home theater speaker. This product represents the synthesis of everything that JBL has learned about the emotional power of audio and video in sixty years of preeminence in the field. It sets new benchmarks in the use of “high technology” and provides you with the experience of being in some of the world’s greatest movie houses and concert halls, right at home! JBL’s Synthesis Three Array speaker systems feature the following:

**THX ULTRA2™-LICENSED HOME AUDIO SYSTEM:** When used with a THX® controller and amplifiers, your speaker system will deliver a state-of-the-art THX home theater experience to your living room. You will hear in your home exactly what the director and sound engineer heard in the recording studio. The system will reproduce the audio flawlessly and without distortion.

**ULTRAHIGH-FREQUENCY COMPRESSION DRIVER:** 1" (25mm) Pure-titanium compression driver with aluminum edge-wound voice coil and 2" (51mm) neodymium motor assembly, mounted in a constant-directivity horn for extended high-frequency response to exceed SACD™ and DVD-Audio specifications.

**High-Power Compression Horn:** Horns are commonplace in movie theaters across the world, because of their high power handling and well-defined high-frequency output. The horns employed in SAM3 have very low distortion, and a well-controlled directivity, to put the dialogue at the center of the screen and the effects all around you.

**ACCURATE MID-BASS DRIVERS AND SUBWOOFERS:** The 6-1/2" (165mm) mid-bass drivers incorporate many of JBL’s patented technologies – such as Symmetrical Field Geometry™ (SFG), Symmetrical Inductance Modulation (SIM) and Vented Gap Cooling™ (VGC) – as well as unique cone and dome materials, to provide tight, smooth midrange sound without harshness, stridency or listener fatigue. From two to as many as four 12" or 15" (305mm or 380mm) high-power subwoofers complete the experience with earth-shattering, deep bass.

**COMMON VOICING:** Synthesis Three Array uses common voicing across the front three channels. Since identical drivers are used, each speaker has the same tonal qualities, thus as a sound is panned from one side to the other, there will be no change in timbre.

**MAGNETIC SHIELDING:** All front speakers are magnetically shielded, allowing you to place them near video monitors without generating interference or distorting the picture.

**DUAL “INSIDE” NEODYMIUM, SHIELDED MOTOR STRUCTURE:** The magnetic material is placed at the center of the motor structure, INSIDE the voice coil diameter. This inverted dual-magnet configuration improves magnetic shielding even further, reducing the extraneous magnetic field, and offers increased acoustic output.

**DEEP-ANODIZED CONE AND DOME MATERIAL:** The special deep-anodized aluminum cone and dome material, together with the motor features, helps to reduce midband distortions to very low levels (approximately 50dB to 60dB below the fundamental signal driven at 100dB output).

**TWO-STAGE PHASE PLUG:** The phase plug is a key element in this compression driver. The accuracy of the phase plug geometry is most important to achieve a wide and flat frequency response. The pressure distribution in the phase plug is manipulated by adjustments to the number and width of the slots and even the plug inside streamline is optimized to achieve a coherent pressure front across the operating range at the exit of the phase plug.

**SYMMETRICAL INDUCTANCE MODULATION (SIM):** The flux-stabilizing ring and copper gap ring are also optimized for size and position, to help minimize or eliminate “asymmetrical inductance modulation.” Minimizing this asymmetrical inductance modulation leads to even further distortion reduction and improved vocal clarity.

# SPEAKER PLACEMENT

Positioning your loudspeakers properly is critical in order to achieve the sonic performance of a home theater. Please read the following section for guidance in correct and optimal placement.

**LEFT AND RIGHT SPEAKERS:** If you have purchased a Synthesis Three Array Digital Home Theater System, then the model SAM3VA will serve as your front left and right main speakers.

Since the left and right speakers have been designed for maximum localization of sound, they should be placed with the center of the speakers at about the same height on screen as the actors would be, to aid in the illusion that the actors' voices are coming directly from their on-screen images. Ideally, the speakers will be placed about 45 degrees apart from each other, viewed from the listening position, so that the distance between the speakers is the same as each speaker's distance from the listener (see Figure 1).

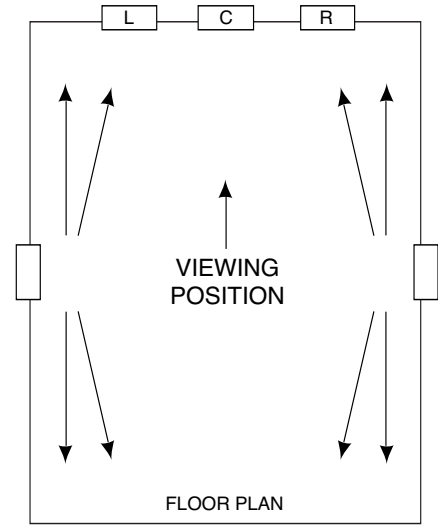


Figure 1. 5.1-Channel system

## CENTER CHANNEL SPEAKERS

**SAM3VA:** If you have purchased the vertical channel speaker (model SAM3VA) for the center position, be sure to place it vertically during installation in order to take advantage of its sound-dispersion characteristics. If you mount it horizontally, it will not provide the correct dispersion pattern. If the speaker is being used with a perforated projection screen, it should be mounted behind the center of the screen (see Figure 2). If a nonperforated projection screen, plasma display or other fixed video device is being used in the installation, the preferred center speaker is the model SAM3HA (below).

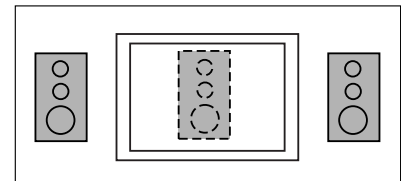


Figure 2.

**SAM3HA:** If you have purchased the horizontal channel speaker (model SAM3HA) for the center position, be sure to position it horizontally during installation in order to take advantage of its sound-dispersion characteristics. If you mount it vertically, it will not provide the correct dispersion pattern. Although the preferred speaker model to be used with a perforated projection screen is the vertical model SAM3VA (above), the SAM3HA horizontal speaker may be used instead and should be mounted behind the center of the screen. If a nonperforated projection screen, plasma display or other fixed video device is being used in the installation, then the recommended location is directly below and as close as possible to the video display (see Figure 3), although the inverse of this method will work also.

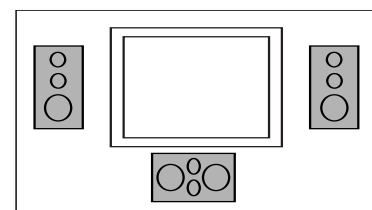


Figure 3.

# SPEAKER PLACEMENT

**NOTE:** It is extremely important to place the tweeter/mid-bass arrays for each of the center, left and right speakers at the same height. The horn array containing the tweeter in the center channel speaker should be no more than two feet (0.6 meter) higher or lower than those in the left and right speakers. This preserves the “localization integrity” of “sound pans,” in which the sound appears to move from left to center to right. If the program material also appears to travel up and down, it can destroy the illusion of panning effects and so should be avoided.

**AMBIENT SURROUND SPEAKERS:** Although it has been common for many years to use a number of surround speakers in commercial movie houses, until recently, the traditional home theater configuration called for 5.1 channels, i.e., front left, center, front right, surround left and surround right, plus a low-frequency-effects channel. The newer surround formats that are appearing in consumer audio equipment are calling for more complicated 6.1- and 7.1-channel systems. The advantages of using additional speakers are many. Additional channels enable a more versatile use of directionality for a more accurate surround presentation. Also, a higher overall sound-pressure level can be achieved with less energy expenditure from any individual speaker. Placement of the surround speakers remains critical.

## 5.1-CHANNEL SYSTEMS

The ambient surround speakers work optimally if they are placed as far back from the screen as the viewing chairs are. If there are two rows of chairs, these speakers should be placed between them.

The ambient surround speakers should be placed higher than the seating area, at least two feet (0.6 meter) above (seated) ear level (see Figure 4).

The preferred method to mount the ambient surrounds is to put them directly in the side walls. This lets each speaker radiate to the front and back of the room and to reflect off the side walls.

There are a few instances in which the ambient surrounds would perform better if mounted in the ceiling rather than the walls. If one or both of the walls are “acoustically dead,” due to the presence of windows, fabric, furniture or other absorption, it may be necessary to turn the ambient speakers sideways and, instead of mounting them in a vertical orientation, mount them in the ceiling in a horizontal orientation.

## 6.1-CHANNEL SYSTEMS

A 6.1-channel system can be thought of as a 5.1-channel system with the addition of a rear center speaker placed midway between the two surround speakers, and further to the rear than the surrounds. It should be placed at the same height as the side surround speakers (see Figure 5).

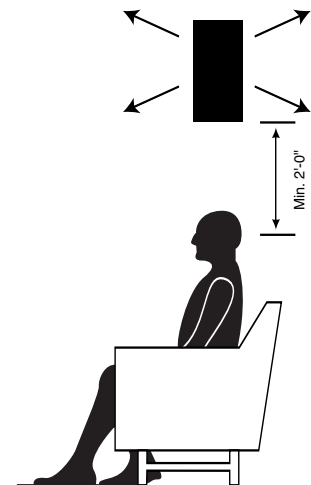


Figure 4.

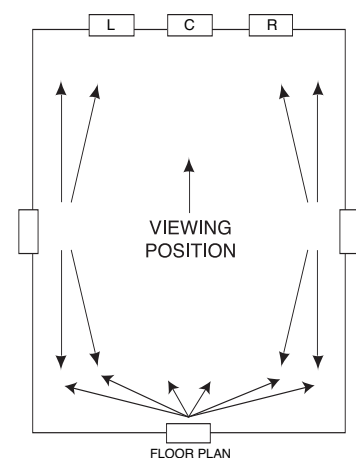


Figure 5. 6.1-Channel system

# SPEAKER PLACEMENT

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## 7.1-CHANNEL SYSTEMS

In a 7.1-channel system, two speakers are added for rear fill, in addition to the surround speakers in a 5.1-channel system. The two additional speakers are placed on the rear wall or near the rear wall in the ceiling (see Figure 6).

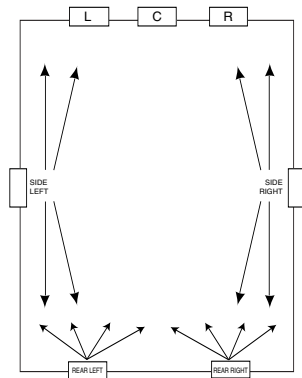


Figure 6. 7.1-Channel system

## CONNECTING THE SPEAKERS TO THE REST OF YOUR SYSTEM

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To connect the Synthesis Three Array loudspeakers to the power amplifiers or receiver, use two-conductor insulated speaker wire. We recommend #14 AWG wire as a minimum size. Your JBL dealer can recommend suitable cables. Both the SAM3VA and SAM3HA utilize 5-way binding posts that can accommodate up to #10 AWG stranded wire.

### PREPARING THE HOOKUP WIRE

1. First determine the distance between your amplifier and the most distant speaker in each group (fronts, surrounds, back surrounds, subwoofers).
2. Now make the hookup wires for all speakers in each group this length, even if one speaker is much closer to your amplifier than the other. This will help maintain proper signal balance.
3. Strip off 3/8" (10mm) of insulation from both ends of each conductor.
4. Twist each set of standard wires into a tightly bunched spiral.
5. Speakers and electronics terminals have corresponding (+) and (–) terminals. Most manufacturers of speakers and electronics, including JBL, use red to denote the (+) terminal and black for the (–) terminal, although some electronics manufacturers have adopted the new color-coding standard promulgated by the Consumer Electronics Association. In that case, the positive terminal will be colored to correspond to the channel position, while the negative terminal will be black.

It is important to connect all speakers identically: (+) on the speaker to (+) on the amplifier and (–) on the speaker to (–) on the amplifier. Wiring "out of phase" results in thin sound, weak bass and poor imaging.

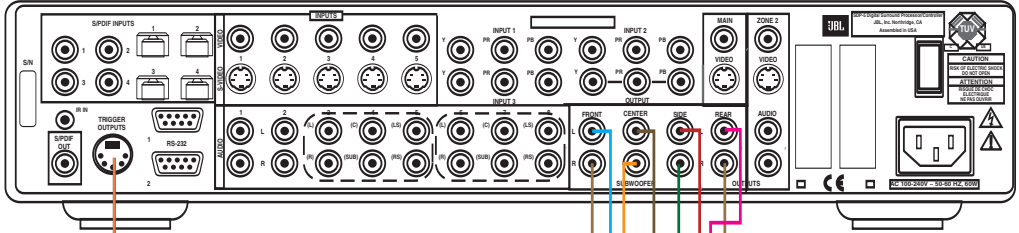
With the advent of multichannel surround sound systems, connecting all of the speakers in your system with the correct polarity remains equally important to preserve the proper ambience and directionality of the program material.

Now find a visual difference between the two conductors of each molded pair of speaker wires. Differentiating marks can be a different color wire (copper or silver); a strand of yarn in one conductor; thin, raised ribs on one part of the outer insulation; or a printed marking on one part of the outer insulation. It doesn't matter which of the two strands go to the (+) and (–) on the speakers and amplifiers, as long as all speakers are connected identically. Push down on the binding post, insert the wire into the hole, and release.

# CONNECTING THE SPEAKERS TO THE REST OF YOUR SYSTEM

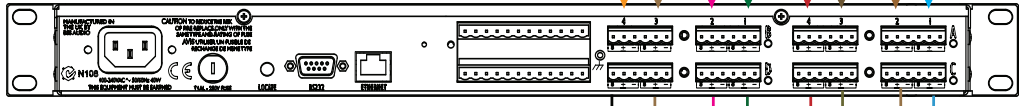
Figure 7. Synthesis Three Array with powered subwoofers

## SDP-5



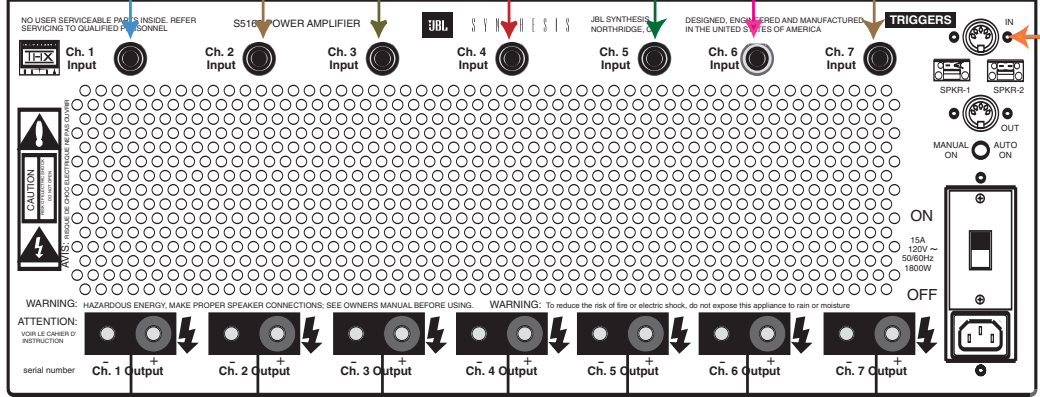
NOTE: Although the SDP-5 is shown here, connections for the SDP-40 are similar.

## SDEC-3000



INPUT	CHANNEL	OUTPUT
A1	Left Front	C1
A2	Right Front	C2
A3	Center	C3
A4	Left Side	C4
B1	Right Side	D1
B2	Left Rear	D2
B3	Right Rear	D3
B4	Subwoofer	D4

## S7150



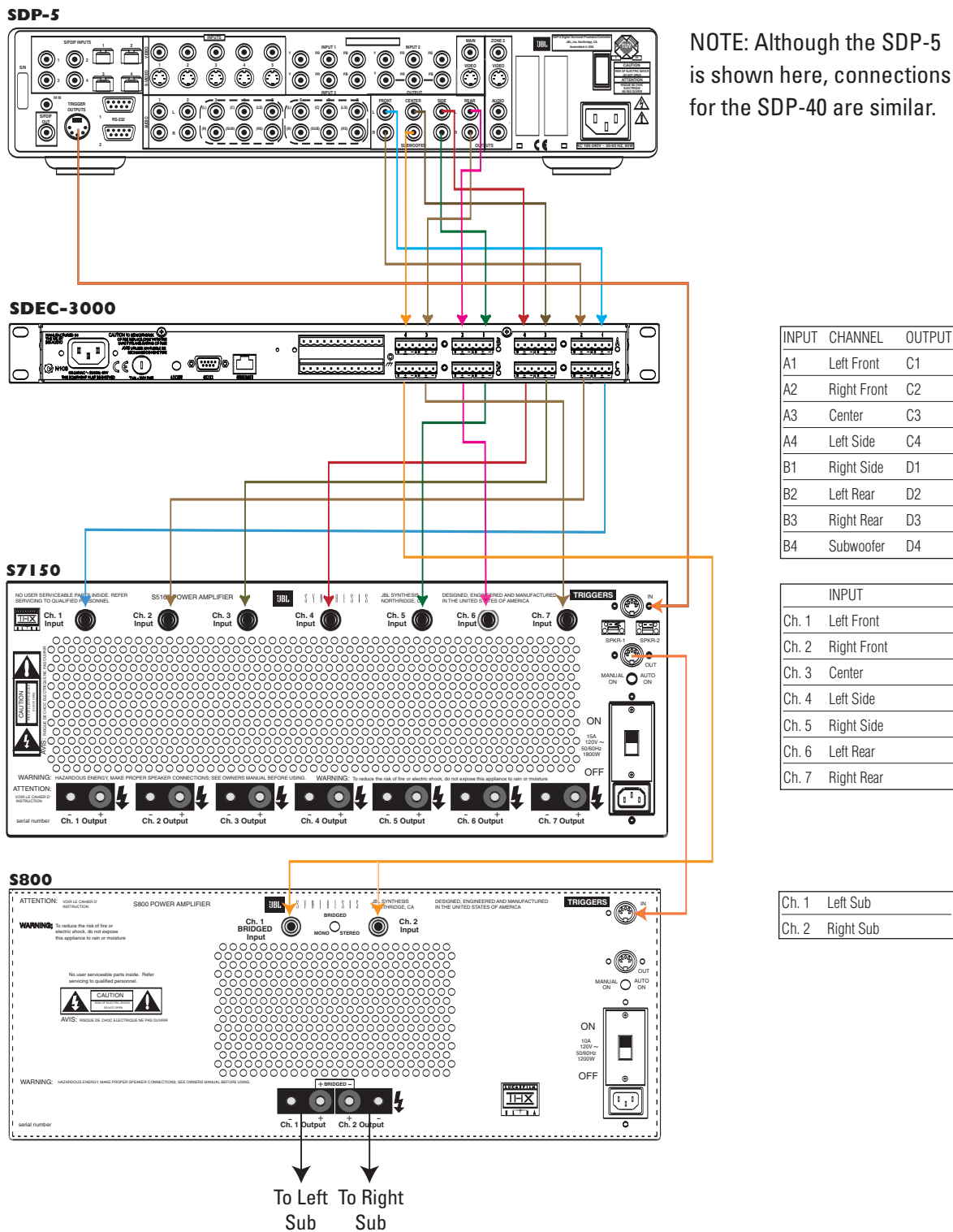
INPUT	
Ch. 1	Left Front
Ch. 2	Right Front
Ch. 3	Center
Ch. 4	Left Side
Ch. 5	Right Side
Ch. 6	Left Rear
Ch. 7	Right Rear

To Subwoofers

Front Left    Front Right    Front Center    Side Left    Side Right    Rear Left    Rear Right

# CONNECTING THE SPEAKERS TO THE REST OF YOUR SYSTEM

Figure 8. Synthesis Three Array with passive subwoofers





# TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
<p>No sound coming from speaker</p>	<ul style="list-style-type: none"> <li>• Amplifier not turned on</li> <li>• Amplifier gain is low</li> <li>• Correct source not selected or turned on</li> <li>• Defective patch cords to amplifier</li> <li>• Speaker wires not connected to amplifier</li> <li>• Balance control set improperly</li> <li>• Speaker wires damaged or shorted</li> <li>• Speaker not configured correctly</li> <li>• Center speaker is configured incorrectly</li> <li>• Problem not diagnosed</li> </ul>	<ul style="list-style-type: none"> <li>• Turn on amplifier.</li> <li>• Make sure that there is amplifier gain for that channel.</li> <li>• Select proper source.</li> <li>• Check/replace patch cords.</li> <li>• Check speaker wire connection to amplifier.</li> <li>• Make sure Balance control is set at center, or 12 o'clock, position.</li> <li>• Make sure none of the speaker wires are frayed, cut or punctured. Make sure no wires are touching other wires or terminals and creating a short circuit.</li> <li>• In Dolby® Digital or DTS® mode, make sure that the receiver/processor is configured so that the speaker in question is enabled.</li> <li>• In Dolby Pro Logic® mode, make sure the center speaker is not in phantom mode.</li> <li>• To diagnose the likely source of the problem, it is often helpful to switch the nonfunctioning speaker with one that is functioning correctly. Turn off all electronics before exchanging the speakers. Turn everything back on, and determine whether the problem is in the same place, or has moved with the speaker. If the problem is in the same place, the source is most likely with your receiver or amplifier. If the problem has followed the speaker, then contact your authorized JBL Synthesis custom installer or dealer for further assistance. If that is not possible, visit our Web site at <a href="http://www.jblsynthesis.com">www.jblsynthesis.com</a> for further information.</li> </ul>
<p>Bass is very weak</p>	<ul style="list-style-type: none"> <li>• Subwoofers are wired out of phase</li> <li>• Subwoofers have not been placed optimally</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure that positive terminals on the subwoofers go to the positive terminals on the amplifiers (red) and do the same for the negatives.</li> <li>• Experiment with different locations.</li> </ul>

# SPECIFICATIONS

	SAM3HA	SAM3VA
ULTRAHIGH-FREQUENCY DRIVER	045Ti 1" (25MM) PURE-TITANIUM COMPRESSION DRIVER WITH ALUMINUM EDGE-WOUND VOICE COIL AND 2" (51MM) NEODYMIUM MOTOR ASSEMBLY, MOUNTED IN A CONSTANT-DIRECTIVITY HORN	045Ti 1" (25MM) PURE-TITANIUM COMPRESSION DRIVER WITH ALUMINUM EDGE-WOUND VOICE COIL AND 2" (51MM) NEODYMIUM MOTOR ASSEMBLY, MOUNTED IN A CONSTANT-DIRECTIVITY HORN
HIGH-FREQUENCY TRANSDUCER	175Nd-3 1-3/4" (44MM) AQUAPLAS-TREATED ALUMINUM-DOME COMPRESSION DRIVER WITH ALUMINUM EDGE-WOUND VOICE COIL AND NEODYMIUM MOTOR ASSEMBLY, MOUNTED IN A VERTICAL CONSTANT-DIRECTIVITY HORN	175Nd-3 1-3/4" (44MM) AQUAPLAS-TREATED ALUMINUM-DOME COMPRESSION DRIVER WITH ALUMINUM EDGE-WOUND VOICE COIL AND NEODYMIUM MOTOR ASSEMBLY, MOUNTED IN A VERTICAL CONSTANT-DIRECTIVITY HORN
LOW-FREQUENCY TRANSDUCER	6-1/2" (165MM) DEEP-ANODIZED CONE AND DOME MATERIAL WITH DUAL "INSIDE" NEODYMIUM MAGNETS, SHIELDED MOTOR STRUCTURE AND 2" (51MM) VOICE COILS	6-1/2" (165MM) DEEP-ANODIZED CONE AND DOME MATERIAL WITH DUAL "INSIDE" NEODYMIUM MAGNETS, SHIELDED MOTOR STRUCTURE AND 2" (51MM) VOICE COILS
SENSITIVITY (2.83V/1M)	89dB	89dB
FREQUENCY RESPONSE (-3dB)	48Hz TO 40kHz	48Hz TO 40kHz
MAXIMUM RECOMMENDED AMPLIFIER POWER	200 WATTS	200 WATTS
CROSSOVER FREQUENCIES	1kHz, 10kHz	1kHz, 10kHz
NOMINAL IMPEDANCE	6 OHMS	6 OHMS
DIMENSIONS (H X W X D)	9-5/8" x 28-5/8" x 9-1/16"* (244MM x 727MM x 230MM)	27-3/8" x 10-3/16" x 12-5/8"* (695MM x 259MM x 321MM)
WEIGHT PER SPEAKER	31 LB (14KG)	34 LB (15.5KG)
<p>* Note: Dimensions do not include mounting hardware or feet. Add 1" (25mm) height for feet.</p>		

All features and specifications are subject to change without notice.

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# NOTES

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