



# ORION<sup>®</sup>

HIGH PERFORMANCE CAR AUDIO

**HCCA<sup>™</sup>**  
COMPETITION



*Subwoofer*

MODEL

**HCCA102**

**HCCA104**

**HCCA122**

**HCCA124**

**HCCA152**

**HCCA154**

**OWNER'S MANUAL**

## INSTALLATION

The performance of these HCCA subwoofers is directly proportional to the quality of installation. Care taken during the installation process will be rewarded with years of satisfying performance. If you are unsure about your installation capabilities, please refer to your local Authorized Orion Dealer for technical assistance. Orion dealers are trained professionals dedicated to extracting the maximum performance out of your Orion system. If you decide to install this speaker system yourself, please read the entire section on sealed and vented enclosures before starting your installation.

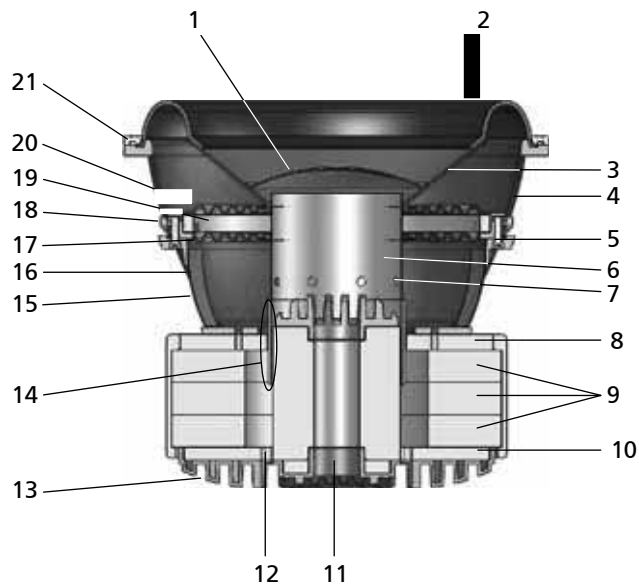
Please Note: Due to the extremely long excursion and high temperature possibilities of this woofer, it is recommended that when the woofer is installed it be positioned so that the cone either faces upward or downward only.

## FINDING SPEAKER MOUNTING LOCATIONS

Choosing the correct speaker locations will have the greatest effect on the sound quality of the system. There are many different considerations needed when choosing the locations that best suit your needs. The locations must be large enough for the speakers to fit. Care is needed to ensure that the location you have chosen will not affect any of the mechanical or electrical operations of the vehicle.

Determining the best location for the speakers will depend on your cosmetic needs and your vehicle's interior. Usually the woofers are installed in the trunk, rear seat, or rear of the vehicle.

## FEATURES



1	Polypropylene dust cap - moisture and UV resistant.
2	Tall, wide, balanced, NBR Foam (high density expanded polyester foam) surround for linear controlled long excursion using a Tri Radius symmetrical edge design optimized on non-linear FEA.
3	Paper cone - moisture and UV resistant.
4	Custom Cast Aluminum frame.
5	Spider ring attachment screws. Part of re-cone feature (8 hex screws)
6	aluminum voice coil former (10" uses 3" voice coil former, 12 & 15 use a 4" voice coil former)
7	Venting in Voice coil former. Part of the enhanced voice coil cooling system (forced convection)
8	11mm Steel front plate.
9	,ARGE3STACKCERAMICMAGNETS(10v264OZ 12/15v445OZ)
10	11MM3TEELBACKPLATE/POLEPIECE4 YOKEASSEMBLY
11	1.25" vent. Part of the enhanced voice coil cooling system (forced convection - aluminum heat sinking - shorting rings to reduce inductive heating)..
12	Voice coil gap vents. Part of the enhanced voice coil cooling system (forced convection - aluminum heat sinking -shorting rings to reduce inductive heating).
13	Cast aluminum rear pole piece heat sink with fins and vent holes. Part of the enhanced voice coil cooling system (forced convection - aluminum heat sinking)
14	High temperature (Polyester Amide Resin Coated) Copper clad Aluminum voice coil wound on an aluminum former (10" uses 3" voice coil, 12 & 15 use a 4" voice coil) Dual 2 and 4 ohm voice coils available
15	Screen meshed areas to allow venting below spider to and keep foreign object out of the voice coil gap.
16	Cast aluminum top pole piece heat sink with fins and vent hole. Part of the enhanced voice coil cooling system (forced convection-aluminum heat sinking-shorting rings to reduce inductive heating).
17	Bottom flat interlaced Conex spider with stitched and looped tinsel leads attached.
18	Custom allen head screw terminals. A pair on each side (one pair for each voice coil).
19	Spider spacer and spider mounting ring assembly part of field re-cone kit attachment method. (eight allen head screws).
20	Top flat interlaced Conex spider.
21	Surround clamp ring, part of field re-cone kit attachment method. (eight allen head screws).

## RE-CONE KIT

A re-cone kit is available for these speakers and can be obtained from your dealer. The part number for each model is listed below.

<b>Model/part #</b>	<b>Description</b>
HCCA102ck	ORION HCCA 10" 2 OHM Re-Cone Kit
HCCA104ck	ORION HCCA 10" 4 OHM Re-Cone Kit
HCCA122ck	ORION HCCA 12" 2 OHM Re-Cone Kit
HCCA124ck	ORION HCCA 12" 4 OHM Re-Cone Kit
HCCA152ck	ORION HCCA 15" 2 OHM Re-Cone Kit
HCCA154ck	ORION HCCA 15" 4 OHM Re-Cone Kit

## WIRING CONFIGURATIONS

The following illustrations provide guidelines on properly connecting your HCCA Orion woofer to an Orion amplifier for maximum power and performance using COMMONPARALLEL,ANDSERIES/PARALLELWIRINGCONFIGURATIONS.

<b>Recommended Amplifier Power</b>	
1 woofer	1,200 to 4,000 watts
2 woofers	2,400 to 8,000 watts
3 woofers	3,600 to 12,000 watts
4 woofers	4,800 to 16,000 watts

### Series—One Speaker (dual 2 ohm voice coils)

One dual 2 ohm voice coil woofer with voice coils in connected in series results in a 4 ohm load to the amplifier.

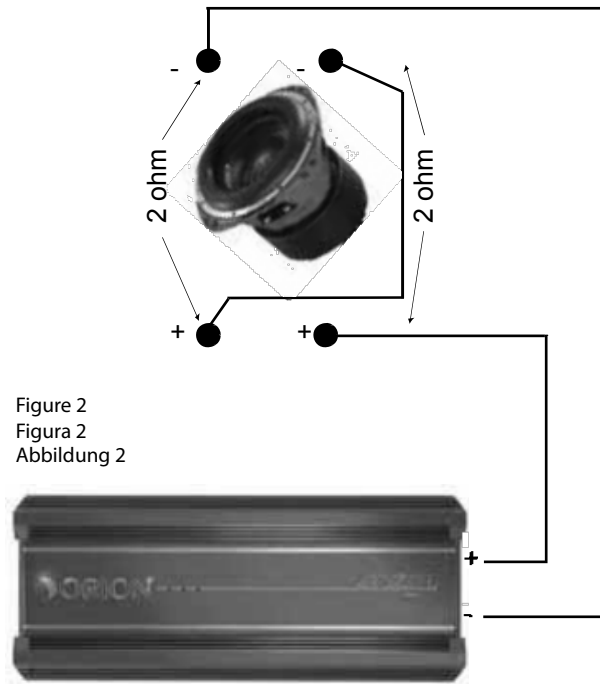


Figure 2  
Figura 2  
Abbildung 2

1. Connect the woofer in series by connecting the negative (-) of one terminal to the positive (+) terminal of the other coil.
2. Wire the positive (+) terminal of the first coil to the positive (+) terminal on the amplifier. Wire the negative (-) terminal of the second coil to the negative (-) terminal on the amplifier.

### Parallel—One Speaker (dual 2 ohm voice coils)

One dual 2 ohm voice coil woofer with voice coils in parallel results in a 1 ohm load to the amplifier.

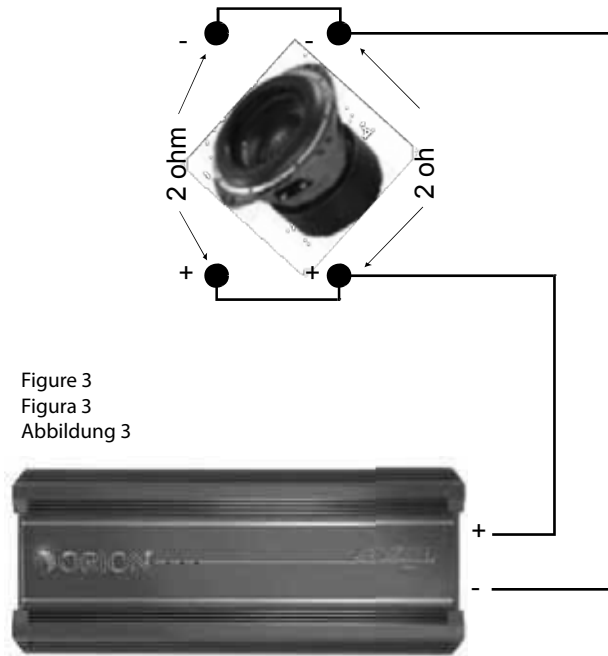


Figure 3  
Figura 3  
Abbildung 3

1. Connect the speaker in parallel by connecting the two positive (+) terminals together and the two negative (-) terminals together.
2. Wire the positive (+) terminals of the woofer to the positive (+) terminal on the amplifier. Wire the negative (-) terminals of the woofer to the negative (-) terminal on the amp.

### Parallel—One Speaker (dual 4 ohm voice coils)

One dual 4 ohm voice coil woofer with voice coils in parallel results in a 2 ohm load to the amplifier.

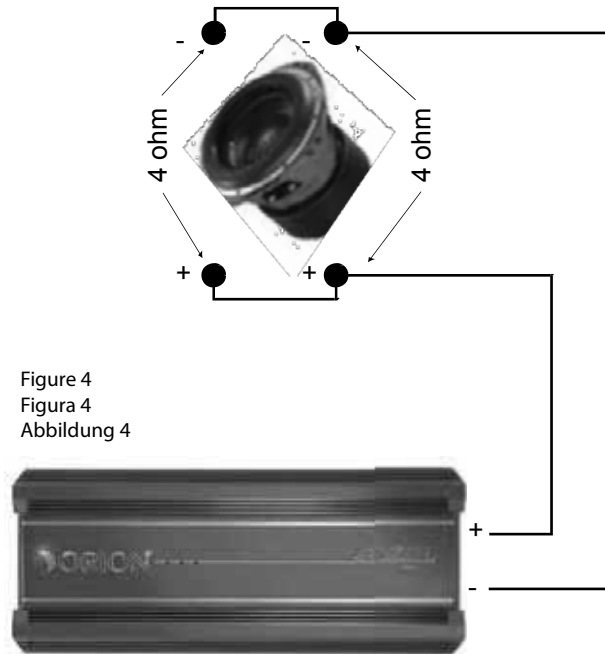


Figure 4  
Figura 4  
Abbildung 4

1. Connect the speaker in parallel by connecting the two positive (+) terminals together and the two negative (-) terminals together.
2. Wire both positive (+) terminals of the woofer to the positive (+) terminal on the amplifier. Wire both negative (-) terminals of the woofer to the negative (-) terminal on the amplifier.

### Parallel—Two Speakers (dual 4 ohm voice coils)

Two dual 4 ohm voice coil woofers with voice coils in parallel and the two woofers in parallel results in a 1 ohm load to the amplifier.

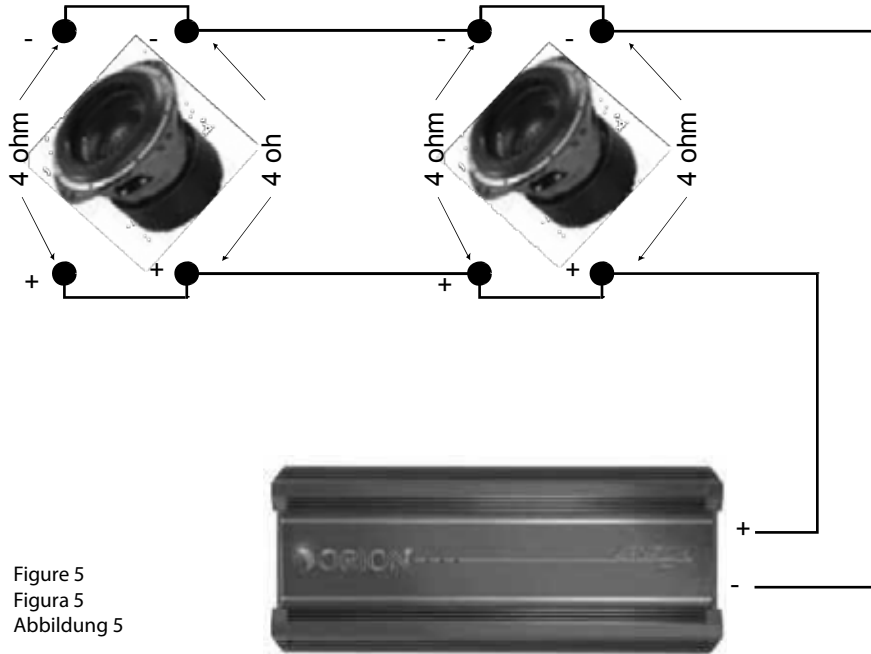


Figure 5  
Figura 5  
Abbildung 5

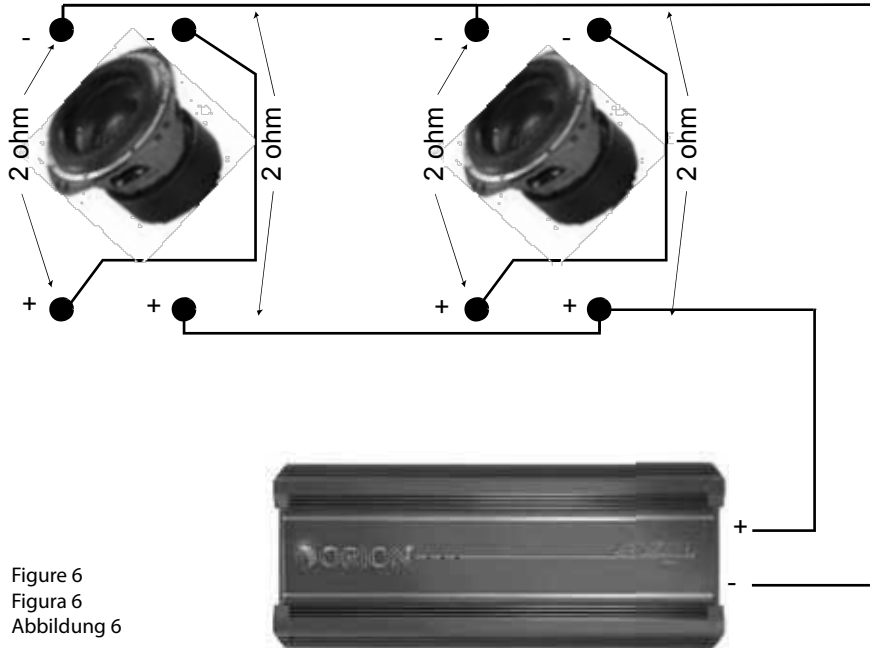
1. Connect the speaker in parallel by connecting the four positive (+) terminals together and the four negative (-) terminals together.
2. Wire the positive (+) terminals of the woofers to the positive (+) terminal on the amplifier. Wire the negative (-) terminals of the woofers to the negative (-) terminal on the amplifier.



### Series-Parallel—Two Speakers (dual 2 ohm voice coils)

**Note: Verify and ensure that the woofer wiring is connected as shown with the negative connection from the first woofer coil connected to the positive connection of the second woofer coil.**

Two dual 2 ohm voice coil woofers with voice coils in series and then parallel the two series woofers results in a 2 ohm load to the amplifier.

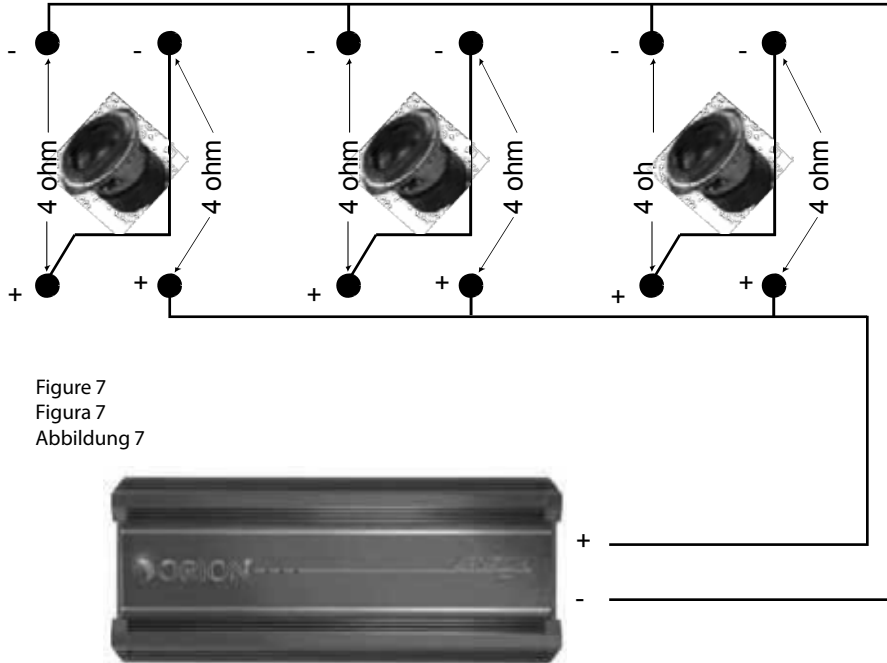


1. Connect each woofer in series by connecting the negative (-) of the first coil to the positive (+) terminal of the second coil.
2. Wire the positive (+) terminal of the first coil on each woofer to the positive (+) terminal on the amplifier. Wire the negative (-) terminal of the second coil on each woofer to the negative (-) terminal on the amplifier.

### Series-Parallel—Three Speakers (dual 4 ohm voice coils)

**Note: Verify and ensure that the woofer wiring is connected as shown with the negative connection from the first woofer coil connected to the positive connection of the second woofer coil.**

Three dual 4 ohm voice coil woofer with voice coils of each woofer wired in series and then parallel the three woofers for a resulting 2.67 ohms load to the amplifier.



1. Connect each woofer in series by connecting the negative (-) of the first coil to the positive (+) terminal of the second coil.

2. Wire the positive (+) terminal of each woofer's first coil to the positive (+) terminal on the amplifier. Wire the negative (-) terminal of each woofer's second coil to the negative (-) terminal on the amplifier.

### Series-Parallel—Four Speakers (dual 4 ohm voice coils)

**Note: Verify and ensure that the woofer wiring is connected as shown with the negative connection from the first woofer coil connected to the positive connection of the second woofer coil.**

Four dual 4 ohm voice coil woofers should be wired with the voice coils on each woofer in series and then parallel the four woofers for a resulting 2 ohm load to the amplifier.

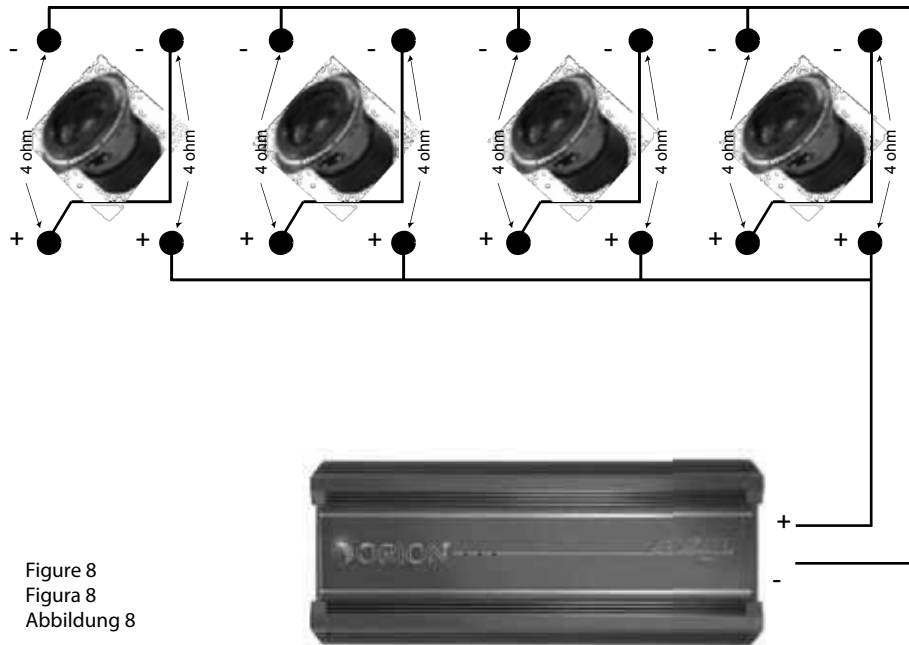


Figure 8  
Figura 8  
Abbildung 8

1. Connect each woofer in series by connecting the negative (-) of the first coil to the positive (+) terminal of the second coil.
2. Wire the positive (+) terminals of the first coil of each woofer to the positive (+) terminal on the amplifier. Wire the negative (-) terminal of the second coil of each woofer to the negative (-) terminal on the amplifier.

### Series-Parallel—Four Speakers (dual 2 ohm voice coils)

**Note: Verify and ensure that the woofer wiring is connected as shown with the negative connection from the first woofer coil connected to the positive connection of the second woofer coil.**

Four dual 2 ohm voice coil woofers should be wired with the voice coils on each woofer in series and then parallel the four woofers for a resulting 1 ohm load to the amplifier.

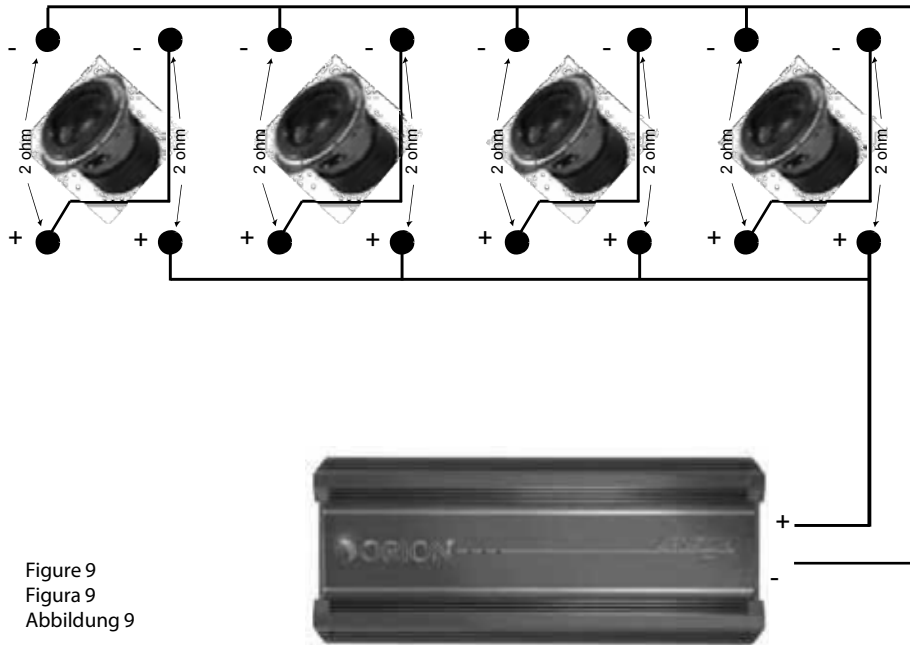


Figure 9  
Figura 9  
Abbildung 9

1. Connect each woofer in series by connecting the negative (-) of the first coil to the positive (+) terminal of the second coil.
2. Wire the positive (+) terminals of the first coil of each woofer to the positive (+) terminal on the amplifier. Wire the negative (-) terminal of the second coil of each woofer to the negative (-) terminal on the amplifier.

## 2 Amplifiers—One Speaker (dual 2 ohm voice coils)

One dual 2 ohm voice coil woofer with each voice coil connected to an individual amplifier, resulting in a 2 ohm load to each amplifier.

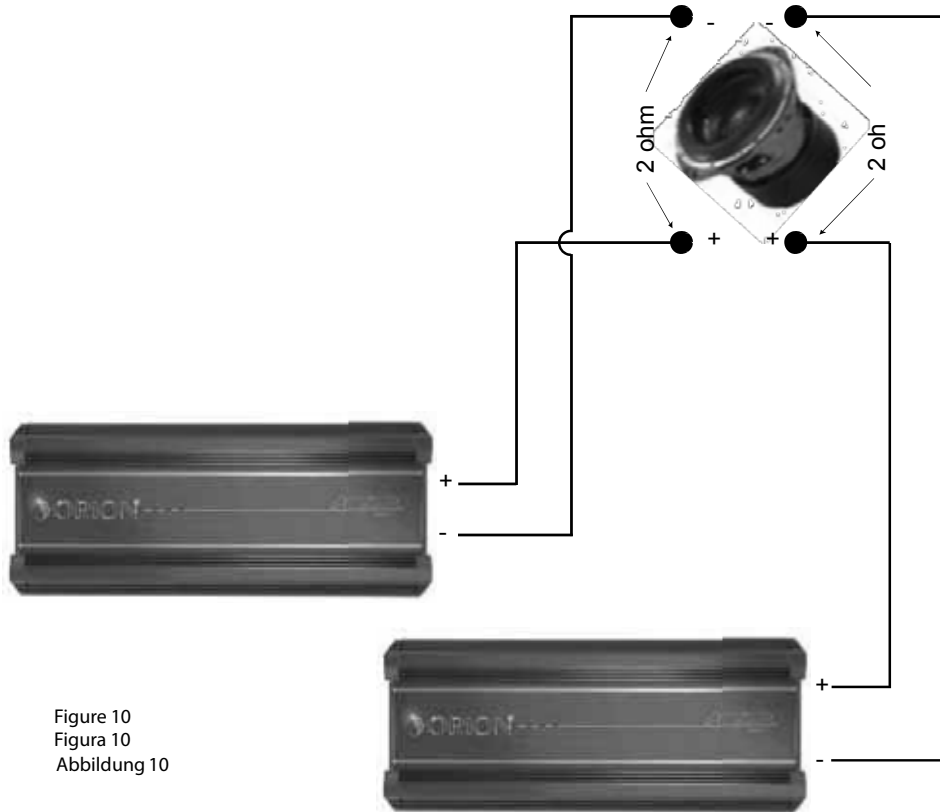


Figure 10  
Figura 10  
Abbildung 10

1. Connect one of the speaker's voice coils to the first amplifier by connecting the positive (+) terminal and the negative (-) terminal from the speaker to the respective positive (+) terminal and the negative (-) terminal from the first amplifier.
2. Connect the other of the speaker's voice coils to the second amplifier by connecting the positive (+) terminal and negative (-) terminal from the speaker to the respective positive (+) terminal and the negative (-) terminal from second amplifier.

## 2 Amplifiers—One Speaker (dual 4 ohm voice coils)

One dual 4 ohm voice coil woofer with each voice coil connected to an individual amplifier, resulting in a 4 ohm load to each amplifier.

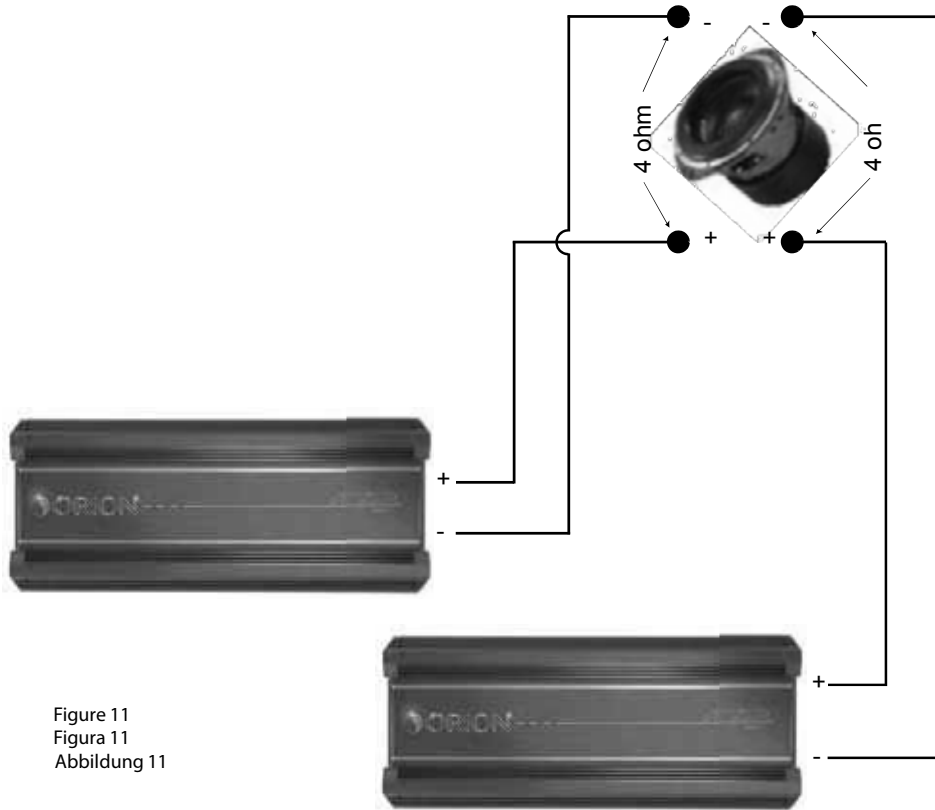


Figure 11  
Figura 11  
Abbildung 11

1. Connect one of the speaker's voice coils to the first amplifier by connecting the positive (+) terminal and the negative (-) terminal from the speaker to the respective positive (+) terminal and the negative (-) terminal from the first amplifier.
2. Connect the other of the speaker's voice coils to the second amplifier by connecting the positive (+) terminal and negative (-) terminal from the speaker to the respective positive (+) terminal and the negative (-) terminal from second amplifier.

## SPECIFICATIONS

Model/Part Number	HCCA102	HCCA104	HCCA122
Size	10"	10"	12"
<b>Thiele/Small Parameters</b>			
Fs (free-air resonance, Hz)	42.51	44.3	32.3
Vas (equivalent compliance, cu. ft.)	0.31029	0.31699	0.89274
Vas (equivalent compliance, liters)	8.79	8.98	25.29
Qms (Q, mechanical)	7.16	5.99	5.08
Qes (Q, electrical) ****	0.48	0.52	0.5
Qts (total driver Q) ****	0.45	0.48	0.45
Re (DC resistance, ohms) ****	3.9	7.4	4
Z (nominal impedance, ohms)	2 x 2	4 x 4	2 x 2
Le (inductance, mh) ****	1.93	2.93	2.61
Efficiency (1W @ 1M, dB)	86.51	83.66	84.22
Xmax (one way linear excursion, in.)	1.01948	1.01948	1.18939
Xmax (one way linear excursion, mm)	25.89	25.89	30.1875
Pe (continuous power handling, watts)	1500	1500	2000
Peak power handling (music, watts) *	3000	3000	4000
Mms (total moving mass, grams)	250	225	425
#MS(MECHANICAL COMPLIANCE, MM/.)	0.000056	0.000057	0.000057
Bl (motor strength, Tesla-M) ****	23.3	29.86	26.27
Sd (effective radiating area, sq. cm.)	333.29	333.29	559.9
Sd (effective radiating area, sq. in.)	51.66	51.66	86.78
Frequency range (Hz)	32 - 100	33 - 100	24 - 100
Energy Bandwidth Product (EBP) **	89	85	65
<b>Driver Physical Dimension</b>			
Speaker Displacement (cu ft)	0.1268	0.1268	0.28931
3PEAKER/UTER\$IAMETER(INCHES/MM)	238	238	292
-OUNTINGHOLEDIAMETER(INCHES/MM)	9.37	9.37	11.5
-OUNTINGDEPTH(INCHES/MM)	8.425/214	8.425/214	10.28/261
Magnet Weight (Oz)	263.7	263.7	444.98
"ASKETDIAMETER(INCHES/MM)			
<b>Recommended Enclosures</b>			
Typical sealed enclosure (cu. ft.)	0.9	0.9	2
Vented enclosure (cu. ft.) ***	0.75	0.75	1.5
Port tuning frequency (Hz)	42	42	40
Port square equivalent (inches)	2.5 x 2.5	2.5 x 2.5	14 x 2
Port length (inches)	10.95	10.95	30.33

Specifications are subject to change without notice.

## SPECIFICATIONS

Model/Part Number	HCCA124	HCCA152	HCCA154
Size	12"	15"	15"
<b>Thiele/Small Parameters</b>			
Fs (free-air resonance, Hz)	33.2	28.13	30.02
Vas (equivalent compliance, cu. ft.)	0.93157	2.95746	2.82259
Vas (equivalent compliance, liters)	26.39	83.78	79.96
Qms (Q, mechanical)	4.16	5.17	4.38
Qes (Q, electrical) ****	0.54	0.55	0.61
Qts (total driver Q) ****	0.48	0.5	0.54
Re (DC resistance, ohms) ****	7.4	4	7.3
Z (nominal impedance, ohms)	4 x 4	2 x 2	4 x 4
Le (inductance, mh) ****	3.67	2.59	3.68
Efficiency (1W @ 1M, dB)	83.38	87.2	87.4
Xmax (one way linear excursion, in.)	1.18939	1.18939	1.18939
Xmax (one way linear excursion, mm)	30.18	30.18	30.18
Pe (continuous power handling, watts)	2000	2000	2000
Peak power handling (music, watts) *	4000	4000	4000
Mms (total moving mass, grams)	386	500	460
#MS(MECHANICAL COMPLIANCE, MM/.)	0.00006	0.00005	0.000061
Bl (motor strength, Tesla-M) ****	33.2	25.34	32.21
Sd (effective radiating area, sq. cm.)	559.9	962.11	962.11
Sd (effective radiating area, sq. in.)	86.78	149.13	149.13
Frequency range (Hz)	25 - 100	21 - 100	22 - 100
Energy Bandwidth Product (EBP) **	61	51	49
<b>Driver Physical Dimension</b>			
Speaker Displacement (cu ft)	0.28931	0.37704	0.37704
3PEAKER/UTER\$IAMETER(INCHES/MM)	292	383	383
-OUNTINGHOLEDIAMETER(INCHES/MM)	11.5	15.079	15.079
-OUNTINGDEPTH(INCHES/MM)	10.28/261	11.575/294	11.575/294
Magnet Weight (Oz)	444.98	444.98	444.98
"ASKETDIAMETER(INCHES/MM)0			
<b>Recommended Enclosures</b>			
Typical sealed enclosure (cu. ft.)	2	3.64	3.64
Vented enclosure (cu. ft.) ***	1.5	3.05	3.05
Port tuning frequency (Hz)	40	38	38
Port square equivalent (inches)	14 x 2	16 x 3	16 x 3
Port length (inches)	31.33	26.62	26.62

Specifications are subject to change without notice



## ENCLOSURE DETAILS

1. Parameters listed are for conventional applications only, for further help please call Tech Audio Support
2. 1" MDF is recommended.
3. Recommended enclosures are NET Box Volumes, speaker and port displacement are calculated into the volume of the enclosure, you will not need to add these volumes to calculate GROSS volume for the enclosure.

### NOTES:

- \* Due to the high power capabilities and long excursion of these woofers, the 4HIELE/3MALLOARAMETERSWERECALCULATEDANDMEASUREDUSINGA+LIPPELANALYZER system.
- \*\* %NERGY "ANDWIDTH 0RODUCT (% "0) IS DETERMINED BY THE FOLLOWING FORMULA &S/ Qes = EBP. EBP values of 50 and lower suggest a sealed enclosure is best 50 to 91 means the subwoofers versatile and 90 and above mean vented enclosure is recommended.
- \*\*\* Sub-sonic filters should always be used and adjusted specifically for vented box designs.
- \*\*\*\* Electrical Parameters were calculated in series.

## ENCLOSURE DESIGN

This section gives the basic description for a sealed enclosure. Orion HCCA woofers are designed for sealed enclosures and vented enclosures. Sealed enclosures are generally considered the most versatile for all music types and are the easiest to build. They will also give high power handling with a wider range of frequencies. The enclosure must be absolutely air tight. Use a high quality wood glue for all seams of the enclosure. The enclosure should also be screwed together. The ENCLOSURESHOULDBENOLESSTHAN3/4vONSIDES.4HEBAFFLEBOARD(WOOFERMOUNTING plate) should be no less than 1". If the woofer mounting is to be recessed then a MINIMUMOFTWO3/4vPLATESTOGETHERSHOULDBEUSED. !S-\$ &ISA POROUSMATERIAL it is best to also seal the inside of the enclosure.

NOTE: The woofer must face up or down only, especially in sealed enclosures.

## EXPLANATION OF ENCLOSURE SPECIFICATIONS

There are many different factors that help determine the best style of enclosure for you or your vehicle. Listed below are some factors that should be considered.

The size of the enclosure is directly proportional to the efficiency and power handling of that speaker. A woofer in a smaller enclosure will handle more power than the same woofer in a larger enclosure. The exact opposite is true for efficiency, a larger enclosure will play lower frequencies at a higher volume with less power than a smaller enclosure.

The sealed enclosure design following is best for overall sound quality. The enclosure size to use will depend on the power and type of vehicle that it will be placed in. Larger enclosures are best suited if you have smaller amounts of power (25% to 50% of speaker's power handling), have a larger vehicle or looking for greater output. A smaller enclosure should be utilized if you have recommended power (50% to 100% of speaker's rated power handling), have a smaller (high gain) vehicle or are looking for more accurate sound reproduction. The smaller sealed enclosure will yield more control, this audible translates into faster and more accurate bass.

A vented enclosure will offer greater efficiency and stronger low bass output compared to a sealed design. A vented enclosure uses the back wave (sound from the back side of the cone) to reinforce the output from the speaker. A properly tuned enclosure will yield gain across the entire bandwidth of the subwoofer system and offer more cone control than a sealed enclosure. A low tuning will yield less overall gain but greater extension (low bass). A high tuned enclosure will offer more gain but limit the low end response of the system. One of the advantages of having a vented enclosure is because it is tunable to a specific frequency and that tuning frequency is known as the "Fb". Another important box specification is "F3", which is the rolloff frequency at which the driver's response is down 3dB. This is an important number when it comes to setting your a highpass filter or your ORION IntelliQ. The IntelliQ should be set at the same frequency as the "F3" as this will keep the speaker from damaging or what is know as overloading.

Good planning and proper construction will assure the best response from your system. The next pages will outline many different enclosures and designs that allow the HCCA subwoofers to perform best.

## HCCA102 & 104 Sealed Enclosure

**Note:** These Enclosures are designed for sound quality and offer very low tuning frequencies. If you are building a system where the goal is to listen to music, these are the enclosures to build. They offer the best low frequency performance of all the designs.

### Box Properties

— Description —

Type: Closed Box

Shape: Prism, Square

— Box Parameters —

Vb = 0.913 cu.ft

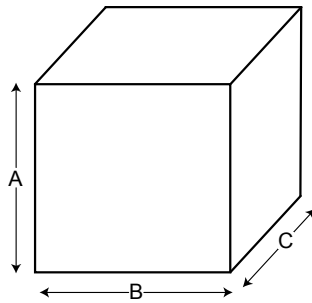
V(total) = 1 cu.ft

Qtc = 0.537

QL = 20

F3 = 67.85 Hz

Fill = none



— External Dimensions —

A = 14 in (356 mm)

B = 14 in (356 mm)

C = 14 in (356 mm)

— Internal Dimensions —

A = 12 in (305 mm)

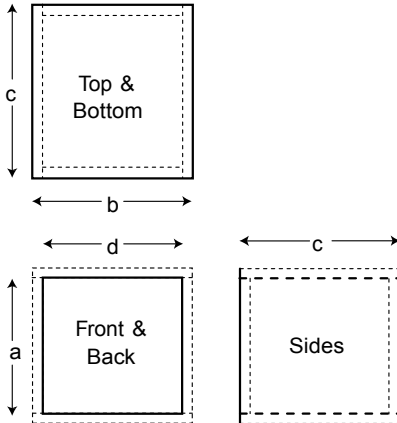
B = 12 in (305 mm)

C = 12 in (305 mm)

— Wall Thickness —

Front = 1 in. (25.4mm)

Sides = 1 in. (25.4mm)



—Box Parts—

Box Shape – Square Prism

depth (c) = 14 in. (356 mm)

width (b) = 14 in. (356 mm)

thickness = 1.0 in. (25.4mm)

1 Front, 1 Back

height (a) = 12 in. (305 mm)

width (d) = 12 in. (305 mm)

thickness = 1.0 in. (25.4mm)

2 Sides

height (a) = 12 in. (305 mm)

depth (c) = 14 in. (356 mm)

thickness = 1.0 in. (25.4mm)

— Driver Mounting —

Mounting: Front

## HCCA102 & 104 Vented 800 to 1500 Watts Input

**Note:** These enclosures will deliver higher sound pressure levels than sealed enclosures. The perceived loudness will be lower than a sealed enclosure, although the metered number will be higher. **WARNING:** proper setting of the IntelliQ is critical or woofers may become damaged from over excursion!

### Box Properties

#### — Description —

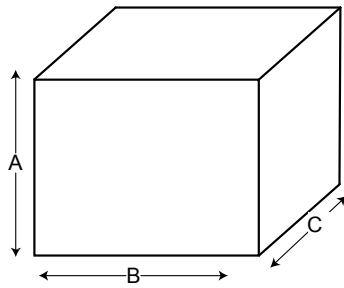
Type: Vented Box  
Shape: Prism, Square

#### — Box Parameters —

Vb = 1.785 cu.ft  
V(total) = 2.042 cu.ft  
Fb = 38 Hz  
QL = 7  
F3 = 32.05 Hz  
Fill = none

#### — Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 3.75 in. (95 mm)  
Wv = 3.75 in. (95 mm)  
Lv = 11.67 in. (296 mm)



#### — External Dimensions —

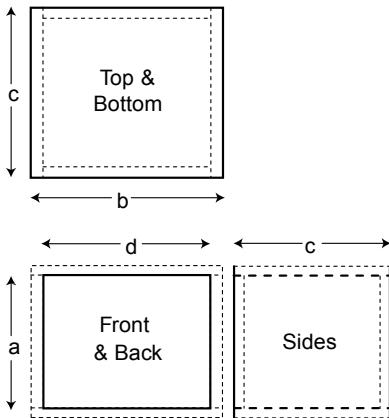
A = 16 in. (406 mm)  
B = 20 in. (508 mm)  
C = 16 in. (406 mm)

#### — Internal Dimensions —

A = 14 in.  
B = 18 in. (457 mm)  
C = 14 in. (356 mm)

#### — Wall Thickness —

Front = 1 in. (25.4mm)  
Sides = 1 in. (25.4mm)



#### — Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 16 in. (406 mm)  
width (b) = 20 in. (508 mm)  
thickness = 1 in. (25.4mm)

1 Front, 1 Back

height (a) = 14 in. (356 mm)  
width (d) = 18 in. (457 mm)  
thickness = 1 in. (25.4mm)

2 Sides

height (a) = 14 in. (356 mm)  
depth (c) = 16 in. (406 mm)  
thickness = 1 in. (25.4mm)

#### — Driver Mounting —

Mounting: Front

#### — Vent Parts —

1 Top, 1 Bottom

width (e) = 5.25 in. (133 mm)  
length (h) = 11.67 in. (296 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 3.75 in. (95 mm)  
length (h) = 11.67 in. (296 mm)  
thickness = 0.75 in. (19 mm)

## HCCA102 & 104 Vented 1500+ Watts Input

### Box Properties

— Description —

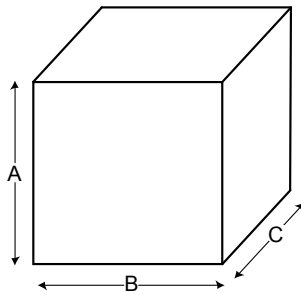
Type: Vented Box  
Shape: Prism, Square

— Box Parameters —

Vb = 0.75 cu.ft  
V(total) = 1.007 cu.ft  
Fb = 42 Hz  
QL = 7  
F3 = 35.53 Hz  
Fill = none

— Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 2.5 in. (64 mm)  
Wv = 2.5 in. (64 mm)  
Lv = 10.95 in. (278 mm)



— External Dimensions —

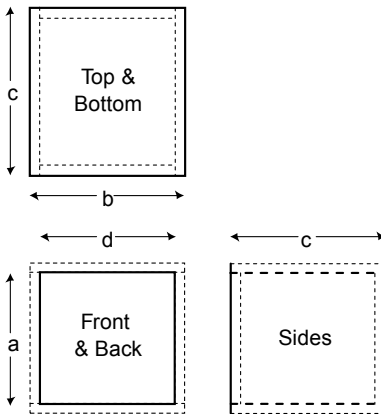
A = 13.5 in. (343 mm)  
B = 13.5 in. (343 mm)  
C = 15.16 in. (385 mm)

— Internal Dimensions —

A = 11.5 in. (292 mm)  
B = 11.5 in. (292 mm)  
C = 13.16 in. (334 mm)

— Wall Thickness —

Front = 1 in. (25.4mm)  
Sides = 1 in. (25.4mm)



— Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 15.16 in. (385 mm)  
width (b) = 13.5 in. (343 mm)  
thickness = 1 in. (25.4mm)

1 Front, 1 Back

height (a) = 11.5 in. (292 mm)  
width (d) = 11.5 in. (292 mm)  
thickness = 1 in. (25.4mm)

2 Sides

height (a) = 11.5 in. (292 mm)  
depth (c) = 15.16 in. (385 mm)  
thickness = 1 in. (25.4mm)

— Driver Mounting —

Mounting: Front

— Vent Parts —

1 Top, 1 Bottom

width (e) = 4 in. (102 mm)  
length (h) = 10.95 in. (278 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 2.5 in. (64 mm)  
length (h) = 10.95 in. (278 mm)  
thickness = 0.75 in. (19 mm)

## HCCA102 & 104 Vented SPL Enclosure Only.

**Note:** These SPL enclosures are for dB drag vehicles only!!!! If music is played through this type of enclosure, the woofer will be damaged! Listed here are starting points, experimentation is the key to success. Use extreme caution, the woofers can be damaged with frequencies below the tuning frequency.

### Box Properties

— Description —

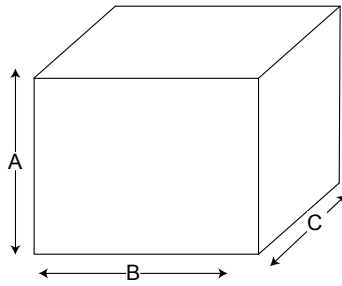
Type: Vented Box  
Shape: Prism, Square

— Box Parameters —

Vb = 1.25 cu.ft  
V(total) = 1.507 cu.ft  
Fb = 57 Hz  
QL = 7  
F3 = 44.65 Hz  
Fill = none

— Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 4.5 in. (114 mm)  
Wv = 4.5 in. (114 mm)  
Lv = 9.45 in. (240 mm)



— External Dimensions —

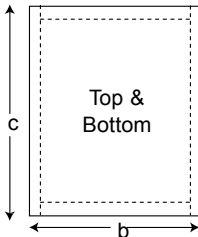
A = 15 in. (381 mm)  
B = 15 in. (381 mm)  
C = 17.41 in. (442 mm)

— Internal Dimensions —

A = 13 in. (330 mm)  
B = 13 in. (330 mm)  
C = 15.41 in. (391 mm)

— Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



— Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 17.41 in. (442 mm)  
width (b) = 15 in. (381 mm)  
thickness = 1 in. (25.4 mm)

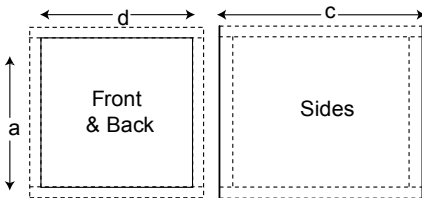
1 Front, 1 Back

height (a) = 13 in. (330 mm)

thickness = 1 in. (25.4 mm)

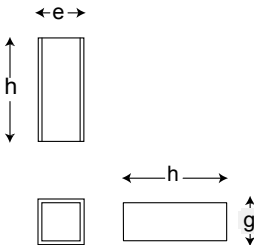
2 Sides

depth (c) = 17.41 in. (442 mm)  
thickness = 1 in. (25.4 mm)



— Driver Mounting —

Mounting: Front



— Vent Parts —

1 Top, 1 Bottom

width (e) = 6 in. (152 mm)  
length (h) = 9.45 in. (240 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 4.5 in. (114 mm)  
length (h) = 9.45 in. (240 mm)  
thickness = 0.75 in. (19 mm)

## HCCA122 & 124 Sealed Enclosures.

**Note:** These Enclosures are designed for sound quality and offer very low tuning frequencies. If you are building a system where the goal is to listen to music, these are the enclosures to build. They offer the best low frequency performance of all the designs.

### Box Properties

— Description —

Type: Closed Box

Shape: Prism, Square (optimum)

— Box Parameters — Vb

= 2 cu.ft

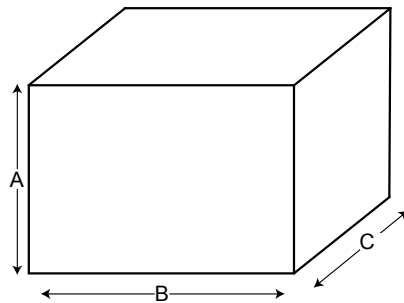
V(total) = 2.244 cu.ft

Qtc = 0.952

QL = 12.95

F3 = 32.93 Hz

Fill = none



— External Dimensions —

A = 17.71 in. (450 mm)

B = 27.42 in. (697 mm)

C = 11.71 in. (297 mm)

— Internal Dimensions —

A = 15.71 in. (399 mm)

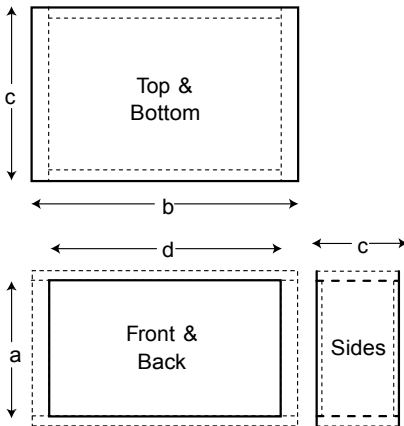
B = 25.42 in. (645.7 mm)

C = 9.709 in. (247 mm)

— Wall Thickness —

Front = 1 in. (25.4 mm)

Sides = 1 in. (25.4 mm)



—Box Parts—

Box Shape – Square Prism

depth (c) = 11.71 in. (297 mm)

width (b) = 27.42 in. (697 mm)

thickness = 1 in. (25.4 mm)

1 Front, 1 Back

height (a) = 15.71 in. (399 mm)

width (d) = 25.42 in. (645.7 mm)

thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 15.71 in. (399 mm)

depth (c) = 11.71 in. (297 mm)

thickness = 1 in. (25.4 mm)

— Driver Mounting —

Mounting: Front

## HCCA122 & 124 Vented 1200 to 2000 Watts Input

**Note:** These enclosures will deliver higher sound pressure levels than sealed enclosures. The perceived loudness will be lower than a sealed enclosure, although the metered number will be higher. **WARNING:** proper setting of the IntelliQ is critical or woofers may become damaged from over excursion!

### Box Properties

#### — Description —

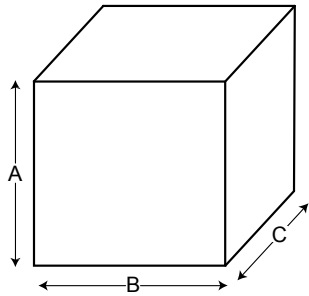
Type: Vented Box  
Shape: Prism, Square

#### — Box Parameters — Vb

= 2.5 cu.ft  
V(total) = 3.079 cu.ft  
Fb = 38 Hz  
QL = 5.256  
F3 = 31 Hz  
Fill = none

#### — Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 5 in. (127 mm)  
Wv = 5 in. (127 mm)  
Lv = 14.54 in. (369 mm)



#### — External Dimensions —

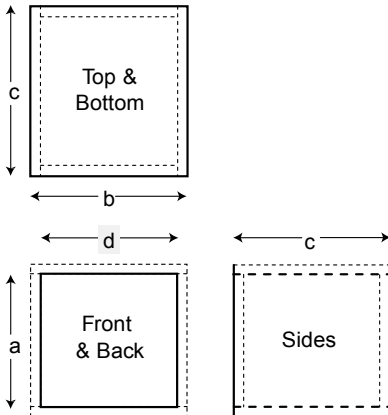
A = 18 in. (457 mm)  
B = 18 in. (457 mm)  
C = 22.78 in. (579 mm)

#### — Internal Dimensions —

A = 16 in. (406 mm)  
B = 16 in. (406 mm)  
C = 20.78 in. (528 mm)

#### — Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



#### — Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 22.78 in. (579 mm)  
width (b) = 18 in. (457 mm)  
thickness = 1 in. (25.4 mm)

1 Front, 1 Back

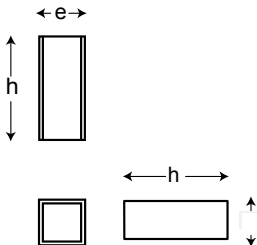
height (a) = 16 in. (406 mm)  
width (d) = 16 in. (406 mm)  
thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 16 in. (406 mm)  
depth (c) = 22.78 in. (579 mm)  
thickness = 1 in. (25.4 mm)

#### — Driver Mounting —

Mounting: Front



#### — Vent Parts —

1 Top, 1 Bottom

width (e) = 6.5 in. (165 mm)  
length (h) = 14.54 in. (369 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 5 in. (127 mm)  
length (h) = 14.54 in. (369 mm)  
thickness = 0.75 in. (19 mm)



## HCCA122 & 124 Vented 2000+ Watts Input

### Box Properties

— Description —

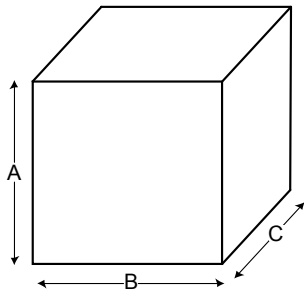
Type: Vented Box  
Shape: Prism, Square

— Box Parameters — Vb

= 1.5 cu.ft  
V(total) = 2.65 cu.ft  
Fb = 40 Hz  
QL = 5.256  
F3 = 32.98 Hz  
Fill = none

— Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 14 in. (356 mm)  
Wv = 2 in. (51 mm)  
Lv = 30.33 in. (770 mm)



— External Dimensions —

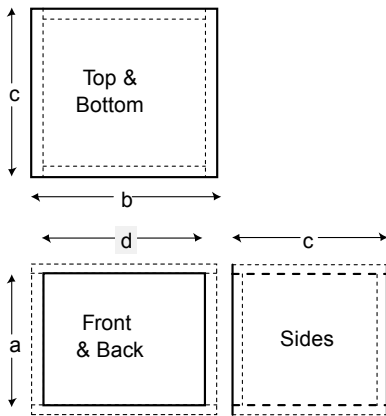
A = 16 in. (406 mm)  
B = 22 in. (559 mm)  
C = 18.36 in. (466 mm)

— Internal Dimensions —

A = 14 in. (356 mm)  
B = 20 in. (406 mm)  
C = 16.36 in. (416 mm)

— Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



— Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 18.36 in. (466 mm)  
width (b) = 22 in. (559 mm)  
thickness = 1 in. (25.4 mm)

1 Front, 1 Back

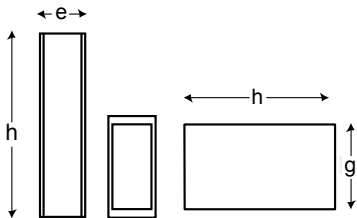
height (a) = 14 in. (356 mm)  
width (d) = 20 in. (406 mm)  
thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 14 in. (356 mm)  
depth (c) = 18.36 in. (466 mm)  
thickness = 1 in. (25.4 mm)

— Driver Mounting —

Mounting: Front



— Vent Parts —

1 Top, 1 Bottom

width (e) = 3.5 in. (89 mm)  
length (h) = 30.33 in. (770 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 14 in. (356 mm)  
length (h) = 30.33 in. (770 mm)  
thickness = 0.75 in. (19 mm)

## HCCA122 & 124 Vented SPL Enclosure Only.

**Note:** These SPL enclosures are for dB drag vehicles only!!!! If music is played through this type of enclosure, the woofer will be damaged! Listed here are starting points, experimentation is the key to success. Use extreme caution, the woofers can be damaged with frequencies below the tuning frequency.

### Box Properties

#### — Description —

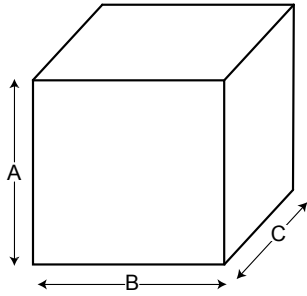
Type: Vented Box  
Shape: Prism, Square

#### — Box Parameters — Vb

= 2 cu.ft  
V(total) = 2.502 cu.ft  
Fb = 57 Hz  
QL = 5.256  
F3 = 42.9 Hz  
Fill = none

#### — Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 6 in. (152 mm)  
Wv = 6 in. (152 mm)  
Lv = 9.37 in. (238 mm)



#### — External Dimensions —

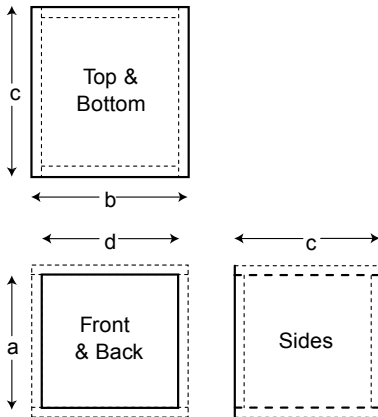
A = 18 in. (457 mm)  
B = 18 in. (457 mm)  
C = 18.89 in. (480 mm)

#### — Internal Dimensions —

A = 16 in. (406 mm)  
B = 16 in. (406 mm)  
C = 16.89 in. (429 mm)

#### — Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



#### — Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 18.89 in. (480 mm)  
width (b) = 18 in. (457 mm)  
thickness = 1 in. (25.4 mm)

1 Front, 1 Back

height (a) = 16 in. (406 mm)  
width (d) = 16 in. (406 mm)  
thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 16 in. (406 mm)  
depth (c) = 18.89 in. (480 mm)  
thickness = 1 in. (25.4 mm)

#### — Driver Mounting —

Mounting: Front

#### — Vent Parts —

1 Top, 1 Bottom

width (e) = 7.5 in. (191 mm)  
length (h) = 9.37 in. (238 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 6 in. (152 mm)  
length (h) = 9.37 in. (238 mm)  
thickness = 0.75 in. (19 mm)

## HCCA152 & 154 Sealed Enclosures.

**Note:** These Enclosures are designed for sound quality and offer very low tuning frequencies. If you are building a system where the goal is to listen to music, these are the enclosures to build. They offer the best low frequency performance of all the designs.

### Box Properties

— Description —

Type: Closed Box

Shape: Prism, Square

— Box Parameters —

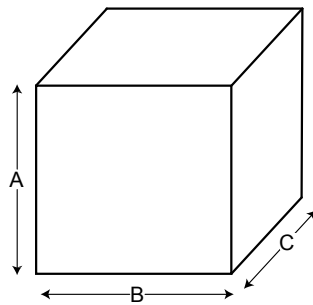
Vb = 3.64 cu.ft

Qtc = 0.587

QL = 5

F3 = 45.39 Hz

Fill = none



— External Dimensions —

A = 19.5 in. (495 mm)

B = 20 in. (508 mm)

C = 22 in. (559 mm)

— Internal Dimensions —

A = 17.5 in. (445 mm)

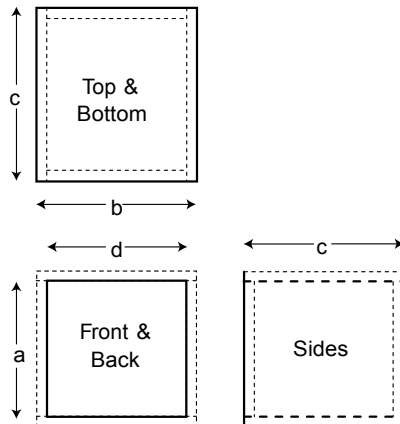
B = 18 in. (457 mm)

C = 20 in. (508 mm)

— Wall Thickness —

Front = 1 in. (25.4 mm)

Sides = 1 in. (25.4 mm)



—Box Parts—

Box Shape – Square Prism

depth (c) = 22 in. (559 mm)

width (b) = 20 in. (508 mm)

thickness = 1 in. (25.4 mm)

1 Front, 1 Back

height (a) = 17.5 in. (445 mm)

width (d) = 18 in. (457 mm)

thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 17.5 in. (445 mm)

depth (c) = 22 in. (559 mm)

thickness = 1 in. (25.4 mm)

— Driver Mounting —

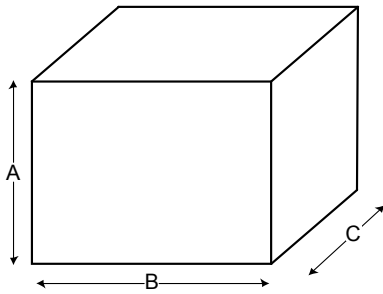
Mounting: Front

## HCCA152 & 154 Vented 1200 to 2000 Watts Input

**Note:** These enclosures will deliver higher sound pressure levels than sealed enclosures. The perceived loudness will be lower than a sealed enclosure, although the metered number will be higher. **WARNING:** proper setting of the IntelliQ is critical or woofers may become damaged from over excursion!

### Box Properties

— Description —	— Box Parameters — Vb	— Vents —
Type: Vented Box	= 4.5 cu.ft	No. of Vents = 1
Shape: Prism, Square	V(total) = 5.32 cu.ft	Vent shape = rectangle
	Fb = 38 Hz	Vent ends = one flush
	QL = 5	Hv = 7 in. (178 mm)
	F3 = 27.7 Hz	Wv = 7 in. (178 mm)
	Fill = none	Lv = 14.07 in. (357 mm)



### — External Dimensions —

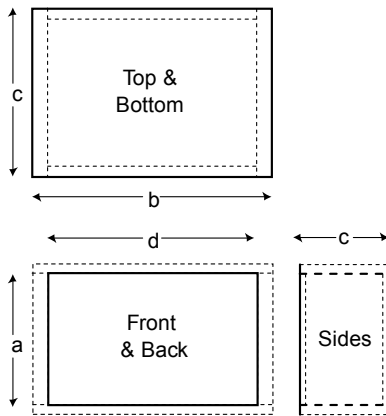
A = 22.95 in. (583 mm)  
 B = 35.9 in. (912 mm)  
 C = 14.95 in. (378 mm)

### — Internal Dimensions —

A = 20.95 in. (532 mm)  
 B = 33.9 in. (861 mm)  
 C = 12.95 in. (329 mm)

### — Wall Thickness —

Front = 1 in. (25.4 mm)  
 Sides = 1 in. (25.4 mm)



### — Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 14.95 in. (378 mm)  
 width (b) = 35.9 in. (912 mm)  
 thickness = 1 in. (25.4 mm)

1 Front, 1 Back

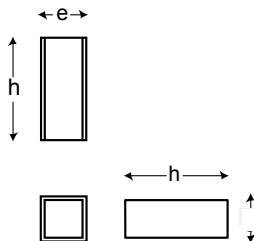
height (a) = 20.95 in. (532 mm)  
 width (d) = 33.9 in. (861 mm)  
 thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 20.95 in. (532 mm)  
 depth (c) = 14.95 in. (378 mm)  
 thickness = 1 in. (25.4 mm)

### — Driver Mounting —

Mounting: Front



### — Vent Parts —

1 Top, 1 Bottom

width (e) = 8.5 in. (216 mm)  
 length (h) = 14.07 in. (357 mm)  
 thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 7 in. (178 mm)  
 length (h) = 14.07 in. (357 mm)  
 thickness = 0.75 in. (19 mm)

## HCCA152 & 154 Vented 2000+ Watts Input

### Box Properties

— Description —

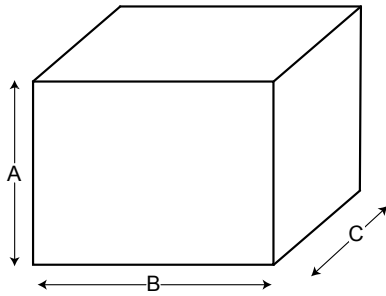
Type: Vented Box  
Shape: Prism, Square

— Box Parameters —

Vb = 3.05 cu.ft  
V(total) = 4.491 cu.ft  
Fb = 38 Hz  
QL = 5  
F3 = 29.47 Hz  
Fill = none

— Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 16 in. (406 mm)  
Wv = 3 in. (76 mm)  
Lv = 26.62 in. (676 mm)



— External Dimensions —

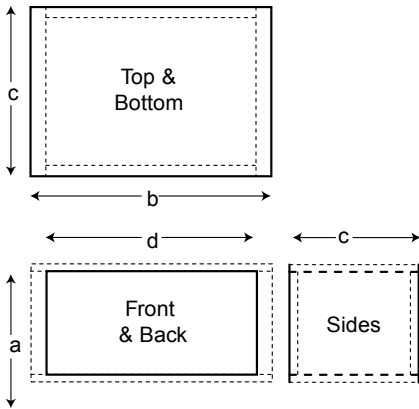
A = 18 in. (457 mm)  
B = 28 in. (711 mm)  
C = 20.66 in. (525 mm)

— Internal Dimensions —

A = 16 in. (406 mm)  
B = 26 in. (660 mm)  
C = 18.66 in. (474 mm)

— Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



— Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 20.66 in. (525 mm)  
width (b) = 28 in. (711 mm)  
thickness = 1 in. (25.4 mm)

1 Front, 1 Back

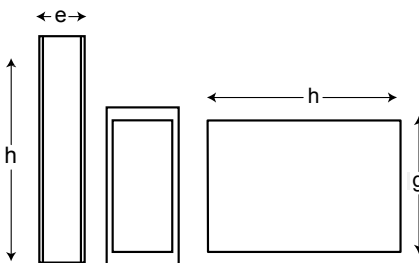
height (a) = 16 in. (406 mm)  
width (d) = 26 in. (660 mm)  
thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 16 in. (406 mm)  
depth (c) = 20.66 in. (525 mm)  
thickness = 1 in. (25.4 mm)

— Driver Mounting —

Mounting: Front



— Vent Parts —

1 Top, 1 Bottom

width (e) = 4.5 in. (114 mm)  
length (h) = 26.62 in. (676 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 16 in. (406 mm)  
length (h) = 26.62 in. (676 mm)  
thickness = 0.75 in. (19 mm)

## HCCA152 & 154 Vented SPL Enclosure Only.

**Note:** These SPL enclosures are for dB drag vehicles only!!!! If music is played through this type of enclosure, the woofer will be damaged! Listed here are starting points, experimentation is the key to success. Use extreme caution, the woofers can be damaged with frequencies below the tuning frequency.

### Box Properties

#### — Description —

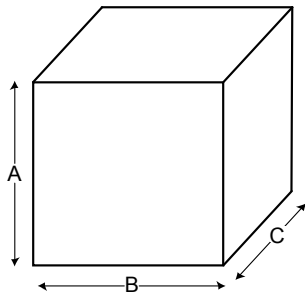
Type: Vented Box  
Shape: Prism, Square (optimum)

#### — Box Parameters — Vb

= 3.5 cu.ft  
V(total) = 4.794 cu.ft  
Fb = 57 Hz  
QL = 5  
F3 = 38.78 Hz  
Fill = none

#### — Vents —

No. of Vents = 1  
Vent shape = rectangle  
Vent ends = one flush  
Hv = 10 in. (254 mm)  
Wv = 10 in. (254 mm)  
Lv = 14.34 in. (364 mm)



#### — External Dimensions —

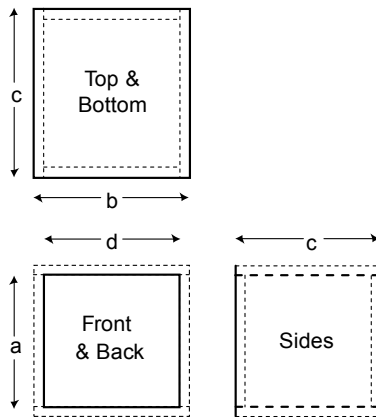
A = 22.23 in. (565 mm)  
B = 34.74 in. (882 mm)  
C = 14.51 in. (369 mm)

#### — Internal Dimensions —

A = 20.23 in. (514 mm)  
B = 32.74 in. (832 mm)  
C = 12.51 in. (318 mm)

#### — Wall Thickness —

Front = 1 in. (25.4 mm)  
Sides = 1 in. (25.4 mm)



#### — Box Parts —

Box Shape – Square Prism

1 Top, 1 Bottom

depth (c) = 14.51 in. (369 mm)  
width (b) = 34.74 in. (882 mm)  
thickness = 1 in. (25.4 mm)

1 Front, 1 Back

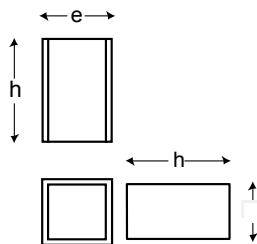
height (a) = 20.23 in. (514 mm)  
width (d) = 32.74 in. (832 mm)  
thickness = 1 in. (25.4 mm)

2 Sides

height (a) = 20.23 in. (514 mm)  
depth (c) = 14.51 in. (369 mm)  
thickness = 1 in. (25.4 mm)

#### — Driver Mounting —

Mounting: Front



#### — Vent Parts —

1 Top, 1 Bottom

width (e) = 11.5 in  
length (h) = 14.34 in. (364 mm)  
thickness = 0.75 in. (19 mm)

2 Sides

height (g) = 10 in. (254 mm)  
length (h) = 14.34 in. (364 mm)  
thickness = 0.75 in. (19 mm)