

i n d u s t r i a



Including:
IA-10, IA-12, IA-15

Speaker Owner's Manual

Introduction

Congratulations on your purchase of this Audio Products car audio speaker system. Your choice indicates your careful attention to quality and technical excellence. This world class product incorporates thorough attention to design and uses the finest quality materials. This Audio Products car audio system is among the most sophisticated available.

General Description

Our major objective at Audio Products is to make the best sounding car speakers in the world. This goal has been achieved by the following design characteristics.

1. Accurate phase coherence for superior transient response and three dimensional soundest reproduction.
2. Complete hemispherical dispersion.
3. High efficiency for use with any high fidelity amplifier.
4. Esthetic beauty unrivaled in any class.

Inspection for shipping damage

After unpacking your Audio Products speakers please inspect them for any shipping damage. Each unit leaves our plant only after receiving thorough inspection. Therefore, if any damage exists, it has occurred in transit after leaving the plant.

If you have obtained the speaker directly from an Audio Products dealer, it should be returned to them for inspection. If you received you speakers via commercial shipper, report the damage at once to the carrier and follow their directions for prompt action.

This section of the manual has been prepared to help you make a decision on the woofer, enclosure and desired tuning for a particular application. As you can see on the following pages there are many possible variations of woofers and enclosure sizes that may be used to achieve a specific performance. Considering all space and power handling limitations, choose the woofer and enclosure size that will give you the desired performance for your application.

All measurements used to calculate the volume are INTERNAL MEASUREMENTS. Always allow for the thickness of the wood.

FORMULA FOR VOLUME:

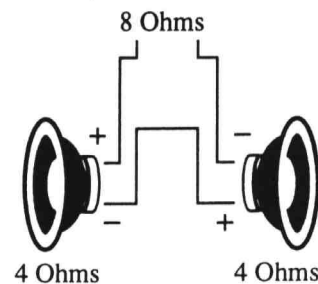
Volume for cu. ft. = $H \text{ (in.)} \times W \text{ (in.)} \times D \text{ (in.)} \div 1728$
(Divide by 1,728 to convert to cubic feet.)

WIRING:

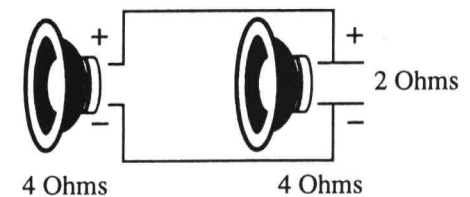
Wiring (Series or Parallel) The wiring of two or more drivers can affect impedance for the whole system. Care must be taken to assure that the resulting impedance does not exceed the amplifier's requirements. When wiring in series, just add the impedance together. (Fig. A) When wiring in parallel, things get more complicated. The formula is:

$$1 \text{ divided by } 1/R_1 + 1/R_2 + 1/R_3 + 1/R_4 = \text{Total}$$

Impedance, where R= the impedance of each individual speaker. (Fig. B)



(Fig. A)



(Fig. B)

CABINET MATERIAL:

Generally 5/8" to 3/4" material should be used on all enclosures. The following is a list of commonly used construction materials:

- Medium Density Fiber Board: The best overall material for speaker cabinets. M.D.F. is extremely rigid, and is able to withstand high pressure levels.
- Birch, Oak and most hard woods: These are also very rigid; however, they are usually very expensive.
- Standard Grade Plywood & Underlayment Particle Board: Both are commonly used; however, they are not well suited for the car audio environment.

BRACING:

Internal bracing is encouraged to prevent flexing and to strengthen the cabinet. NOTE: Volume taken up by the bracing must be added to the total enclosure volume. There are three main types of bracing they are:

- Corner Bracing: Corner bracing helps to strengthen the cabinet and prevents splitting of particle board caused by screws going into the panel edge. 1" x 1" at all corner joints, glued and screwed.
- Diagonal Bracing: Diagonal bracing on all panels prevents panel flexing under high sound pressure conditions. Remember that any flexing panels will produce unwanted sound vibrations, which can lead to a "muddy sound". 1" x 2", with the 1" surfaced glued and screwed to the panel
- Cross Bracing: Cross braces used between opposite panels will tie them together as one structure, again helping to prevent panel flexing. Diagonal braces will provide convenient anchoring points for cross braces. 1" x 1" glued and screwed.

DAMPING:

All inside surfaces should be lined with 1/2" thick Dacron or fiber fill for sound damping. Be sure to attach the insulation firmly to prevent interference with the woofer(s) and or port(s).

PORTING:

When placing ports, keep in mind the following guidelines:

- Allow a minimum of the ports internal diameter between the end of the port and the rear wall.
- Do not block the port inside the box with any insulation material.
- Place port on the same surface as the woofer.
- Remember, adding length to the port will lower the tuning frequency thus changing the mechanical impedance.

Technical Service

It is our pleasure to offer the assistance of our technical staff any time you have a question or observation. We will happily help you with any aspect of your system setup. Call your local Hifonics dealer or call us directly at (800) 635-4380. Because of our continuing engineering efforts, we reserve the right to make changes throughout the product line without notice.

i n d u s t r i a



Loudspeaker Parameters
 General Information
 Company: Hifonics
 Model: ZA104
 Note/SN

IA-10

-Mechanical Parameters-

Fs = 39.6 Hz
 Qms = 8.648
 Vas = 1.738 cu.ft.
 Cms = 52.517 in/lb
 Mms = 1.891 oz
 Xmax = 0.177 in
 Sd = 51.8 sq.in
 Dia = 8.1 in

-Electrical Parameters-

Qes = 0.325
 Re = 3.5 ohms
 Le = 1.6 mH
 Z = 4.0 ohms
 BL = 12.0 N/A
 Pe = 350.0 watts

-Combination Parameters-

Qts = 0.313
 η^0 = 0.917%
 Sens = 91.64 dB (1 watt)

-Multiple Drivers

Number = 1
 Wiring: single

-Enclosure type	.75 cu. ft. Vented	1.00 cu. ft. Vented	Band Pass
Rear Chamber			
Vb1 =			0.750 cu.ft
Vb =	0.750 cu.ft.	1.000 cu.ft.	
Fb =	50.4 hertz	50.4 hertz	35.0 hertz
F3 =	54.4 hertz	49.4 hertz	36.8 hertz
QL =	7.0	7.0	
Fill =	normal	normal	
Ports =	1 (round)	1 (round)	1 (round)
Dv =	3.00 in	3.00 in	3.00 in
Lv =	7.00 in	4.50 in	11.00 in
-Front Chamber-			
Vb2 =			0.350 cu.ft
Fb =			80.0 hertz
F3 =			142.4 hertz

Loudspeaker Parameters
 General Information
 Company: Hifonics
 Model: ZA124
 Note/SN

IA-12

-Mechanical Parameters-

Fs = 31.0 Hz
 Qms = 10.514
 Vas = 4.966 cu.ft.
 Cms = 66.680 in/lb
 Mms = 2.428 oz
 Xmax = 0.177 in
 Sd = 80.5 sq.in
 Dia = 10.1 in

-Electrical Parameters-

Qes = 0.296
 Re = 3.5 ohms
 Le = 1.6 mH
 Z = 4.0 ohms
 BL = 12.0 N/A
 Pe = 400.0 watts

-Combination Parameters-

Qts = 0.313
 η^0 = 1.379%
 Sens = 93.41 dB (1 watt)

-Multiple Drivers

Number = 1
 Wiring: single

-Enclosure type	1.5 cu. ft. Vented	2.00 cu. ft. Vented	Band Pass
Rear Chamber			
Vb1 =			1.50 cu.ft
Vb =	1.500 cu.ft.	2.000 cu.ft.	
Fb =	43.4 hertz	41.2 hertz	30.0 hertz
F3 =	49.3 hertz	43.9 hertz	42.0 hertz
QL =	7.0	7.0	
Fill =	normal	normal	
Ports =	1 (round)	1 (round)	1 (round)
Dv =	4.00 in	4.00 in	4.00 in
Lv =	8.00 in	6.00 in	6.30 in
-Front Chamber-			
Vb2 =			0.8 cu.ft
Fb =			80.0 hertz
F3 =			112.0 hertz

Loudspeaker Parameters

General Information

Company: Hifonics

Model: ZA154

Note/SN

-Mechanical Parameters-

Fs =	27.4 Hz
Qms =	9.259
Vas =	12.534 cu.ft.
Cms =	55.263 in/lb
Mms =	3.760 oz
Xmax =	0.177 in
Sd =	132.9 sq.in
Dia =	13.0 in

-Electrical Parameters-

Qes =	0.560
Re =	3.5 ohms
Le =	
Z =	4.0 ohms
BL =	10.7 N/A
Pe =	500.0 watts

-Combination Parameters-

Qts =	0.528
η^0 =	1.266%
Sens =	93.04 dB (1watt)

-Multiple Drivers

Number =	1
Wiring:	single

-Enclosure type	3.00 cu. ft. Vented	3.50 cu. ft. Vented	Band Pass
Rear Chamber			
Vb1 =			2.500 cu.ft
Vb =	3.000 cu.ft.	3.500 cu.ft	
Fb =	25.1 hertz	24.6 hertz	64.7 hertz
F3	44.3 hertz	42.0 hertz	35.2 hertz
QL =	7.0	7.0	
Fill =	normal	normal	
Ports =	1 (round)	1 (round)	4 (round)
Dv =	4.00 in	4.00 in	6.00 in
Lv =	14.00 in	12.00 in	
-Front Chamber-			
Vb2 =			2.5 cu.ft
Fb =			65.0 hertz
F3 =			119.6 hertz

Glossary of Terms:

Q	The system losses of relative damping (ratio of stored to dissipated energy or ratio of reactive to resistive energy).
Fs	Free air resonance of driver in Hz.
Qms	Mechanical Q of system.
Vas	Volume of air equivalent to drive from rest position.
Cms	Mechanical compliance of a loudspeaker suspension.
Mms	Moving mass of total assembly.
Xmax	The maximum linear excursion of a loudspeaker piston.
Sd	Surface area of cone.
Dia	The piston diameter of a loudspeaker.
Qes	Electrical Q of system.
Re	DC resistance.
Le	VC inductance.
Pe	Maximum input power
Qts	Total Q of system.
Sens	Sensitivity.
Vc	Volume of a closed enclosure.
Vb	Volume of a vented enclosure.
Fc	The resonant frequency of a closed box system.
Fb	The resonant frequency of a vented box system.
F3	The half-power (-3 dB) frequency of a loudspeaker enclosure design.
Qtc	The Q of a loudspeaker at Fc in a closed box considering both its electrical and mechanical resistance.
QL	The Q of a vented box resulting from all box losses.
Fill	The acoustic absorption added inside a box to suppress unwanted resonances.
Ports	Number of ports.
DV	Diameter of vent.
LV	Length of vent.
H	Height.
W	Width.
D	Depth.

Troubleshooting

Basic Problem	Possible Solution
1. No sound from speaker	Confirm power is on from all components. Check all cables and connections.
2. Very low sound	Adjust fader control. Check connection, cables, equip. etc...
3. Unnatural bass emphasis	Adjust loudness contour. Crossover points, bass control, etc...
4. Whining sound	Clean and tighten power connections. Clean and tighten ground connections. Check all cables and contacts. Check all grounding points.
5. Distortion at very high listening levels	Check gain control. Check amplifier input or output controls.
6. No high frequency output	Check passive crossover/active crossover. Check all cables and connections.

Congratulations

on your purchase of quality Hifonics car audio gear. Years of testing and development have gone into each Hifonics product, and you can rest assured that you've purchased the best. Your precision-engineered Hifonics components will perform best when installed by experienced installers. Therefore, we highly recommend that you contact your authorized Hifonics dealer to help customize and install your system. Hifonics audio products are made to withstand years of hard use, and to consistently deliver audiophile quality sound.

LIMITED WARRANTY

Speakers: 1 year Electronics: 3 years

Note: A stock = (new goods) 1 year speakers - 3 years electronics
B stock = (refurbished or repaired goods) 90 days

30 DAY EXCHANGE: Hifonics will replace all products with another A stock product (over the counter exchange) within 30 days of original purchase, providing the product is found to be defective. Receipt required. After 30 days, Hifonics will repair or replace product (with a product we deem to be equivalent) at our discretion. Amplifiers are covered for three years, speakers are covered for one year from date shown on receipt.

WHAT IS COVERED: This warranty applies only to Hifonics products sold by authorized Hifonics dealers in the USA. Products purchased by consumers from authorized Hifonics dealers in another country are covered only by that country's distributor and not by Hifonics USA.

WHO IS COVERED: Original purchaser (non-transferrable) of Hifonics products purchased at an authorized Hifonics dealer. In order to receive service, purchaser must provide Hifonics with a copy of the sales receipt stating the customer's name, dealer name, product purchased and date of purchase.

LIMITED WARRANTY: Warranty is in effect for the period after date of original purchase by consumer. One year for Speakers, three years for Electronics. No person is authorized by Hifonics to assume any other liability in connection with the sale of this product. This warranty **DOES NOT COVER** the following: 1) Damage caused by abuse, misuse, accident, water or theft. 2) Damage caused by improper installation. 3) Any cost or expense related to removal and reinstallation. 4) Service performed by anyone other than an authorized Hifonics service center. 5) Any product which has had the serial number removed, altered or defaced. 6) Subsequent damage to other components. 7) Any product purchased outside the USA. 8) Any product not purchased from an authorized Hifonics dealer.

How to receive service; Call (800) 635-4380 for customer service. Obtain a return authorization number (RA#).

Customers are responsible for shipping to Audio Products. Ship to: 2510 Commonwealth Ave. North Chicago, IL 60064