



Speaker Owner's  
Manual  
For models:  
DS - 10E DS - 12E DS 15E



### 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 your 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:

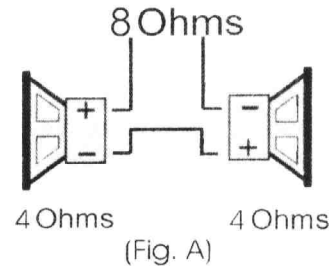
Volume for cu. Ft. = H (in.) x W (in.) x D (in.) ÷ 1728  
(Divide by 1,728 to convert to cubic feet)

### WIRING:

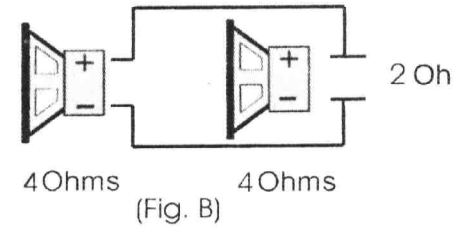
*Wiring (Series or Parallel)* The wiring of two or more drivers can affect impedance for the entire system. Care must be taken to insure that the resulting impedance does not exceed the amplifier's requirements. When wiring in series, just add the impedance together. (Fig. A) When wiring in parallel,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

1 divided by  $1/R1 + 1/R2 + 1/R3 + 1/R4 = \text{Total}$

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



Series



Paralell

**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 Fiberboard: The best overall material for speaker cabinets, MDF 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 particleboard: 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 particleboard 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 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 for fiber fill for sound damping. Be sure to attach the insulation firmly to prevent interference with woofer(s) and or port(s).

**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 Crunch dealer or call us directly at: (800) 635-4380 (8:30am-5:30pm CST M-F) Because of our continuing engineering efforts, we reserve the right to make changes throughout the product line without notice.



PRODUCT SPECIFICATIONS:

DS 10E

Le mH	1.64
Vas L	38.4
Sens. dB	87
Mms/gr.	94
Cms	0.26
Q	0.39
Qes	0.41
Qms	5.54
Re Ohms	2.8
Fs Hz	32

Le mH	1.9180
Vas L	42.5848
Sens. dB	89.19
Mms/gr.	109.5381
Cms	173.558
Q	1.5019
Qes	1.5590
Qms	4.9203
Re Ohms	3.0776
Fs Hz	36.5070

PRODUCT SPECIFICATIONS:

DS 12E

Le mH	1.52
Vas L	61.7
Sens. dB	90
Mms/gr.	113
Cms	0.18
Q	0.44
Qes	0.47
Qms	6.43
Re Ohms	3.0
Fs Hz	35

Le mH	1.9199
Vas L	42.5939
Sens. dB	89.16
Mms/gr.	109.0135
Cms	173.522
Q	1.5089
Qes	1.5671
Qms	4.9439
Re Ohms	3.0757
Fs Hz	36.5788

**PRODUCT SPECIFICATIONS:**

**DS 15E**

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 drive 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 (-3dB) 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 resonance.	Ports	Number of ports.	DV	Diameter of vent.	LV	length of vent.	H	Height	W	Width	D	Depth
Fs Hz	32	Vas	32	Qms	32	Re Ohms	2.4	Xmax	2.4	Sd	2.4	Dia	4.50	Qes	4.50	Le	0.54	Qts	0.54	Sens	0.48	Vc	0.15	Vb	0.15	Fc	0.15	Fb	0.15	F3	0.15	Qtc	0.15	QL	158	Fill	158	Ports	92	DV	92	LV	92	H	92	W	92	D	92								
Mms	151.4	Vas L	151.4	Qms	151.4	Re Ohms	1.22	Xmax	1.22	Sd	1.22	Dia	1.22	Qes	1.22	Le	1.22	Qts	1.22	Sens	1.22	Vc	1.22	Vb	1.22	Fc	1.22	Fb	1.22	F3	1.22	Qtc	1.22	QL	1.22	Fill	1.22	Ports	1.22	DV	1.22	LV	1.22	H	1.22	W	1.22	D	1.22								
Mms	1.22	Vas L	1.22	Qms	1.22	Re Ohms	1.22	Xmax	1.22	Sd	1.22	Dia	1.22	Qes	1.22	Le	1.22	Qts	1.22	Sens	1.22	Vc	1.22	Vb	1.22	Fc	1.22	Fb	1.22	F3	1.22	Qtc	1.22	QL	1.22	Fill	1.22	Ports	1.22	DV	1.22	LV	1.22	H	1.22	W	1.22	D	1.22								
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**TROUBLESHOOTING:**

**BASIC PROBLEM**

**POSSIBLE SOLUTION**

**NO SOUND FROM SPEAKER**

Confirm power is on from all components.

**VERY LOW SOUND**

Check all cables and connections.

Adjust fader control.

Check connection cables equipment.  
Etc...

**UNNATURAL BASS EMPHASIS**

Adjust loudness contour.  
Crossover points, bass control, etc...

**WHINING SOUND**

Clean and tighten power/ground connections. Check all cables and contacts. Check all grounding points.

**DISTORTION AT VERY HIGH LISTENING LEVELS**

Check gain control. Check amplifier input or output controls.

**NO HIGH FREQUENCY OUTPUT**

Check passive crossover/active crossover. Check all cables and connections.

**LIMITED WARRANTY**

Note:

A stock = (new goods); 1 year speakers, 3 years electronics  
B stock = (refurbished or repaired goods) 90 days

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

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

**WHO IS COVERED:** Original purchaser (non-transferable) of Crunch products purchased at an authorized Crunch dealer, purchaser must provide Audio Products incorporated with a copy of the sales receipt stating customer's name, dealer's name, product purchased, product serial number and date of purchase.

**LIMITED WARRANTY:** Warranty is in effect for the period after the date of the original purchase by the consumer. No person is authorized by Audio Product incorporated to assume any other liability in connection with 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 Audio Product incorporated 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 products not purchased from an authorized Crunch 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