Velodyne

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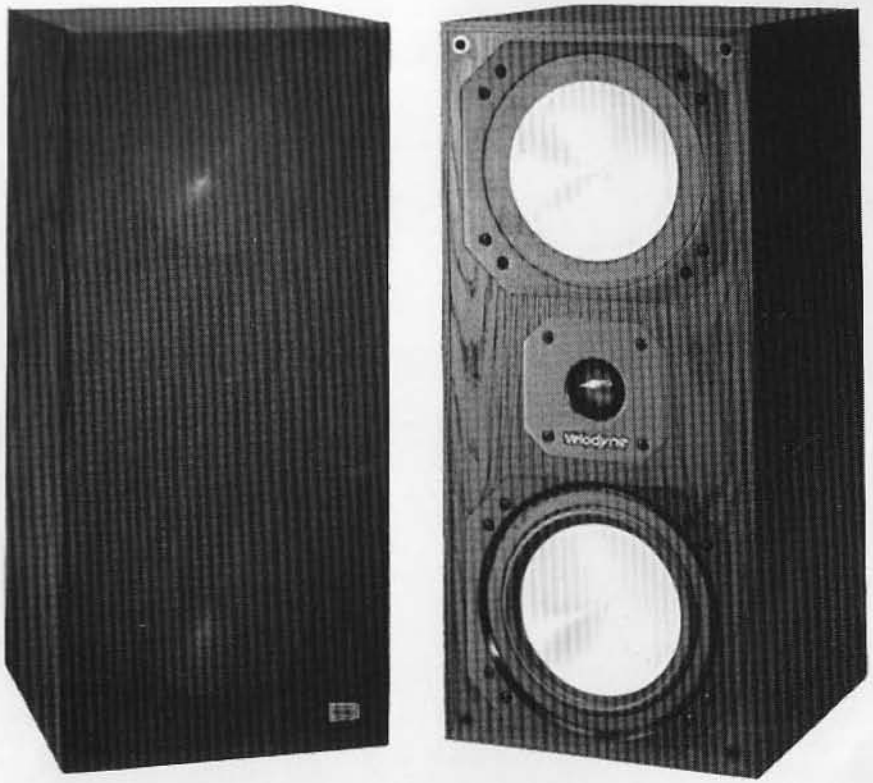
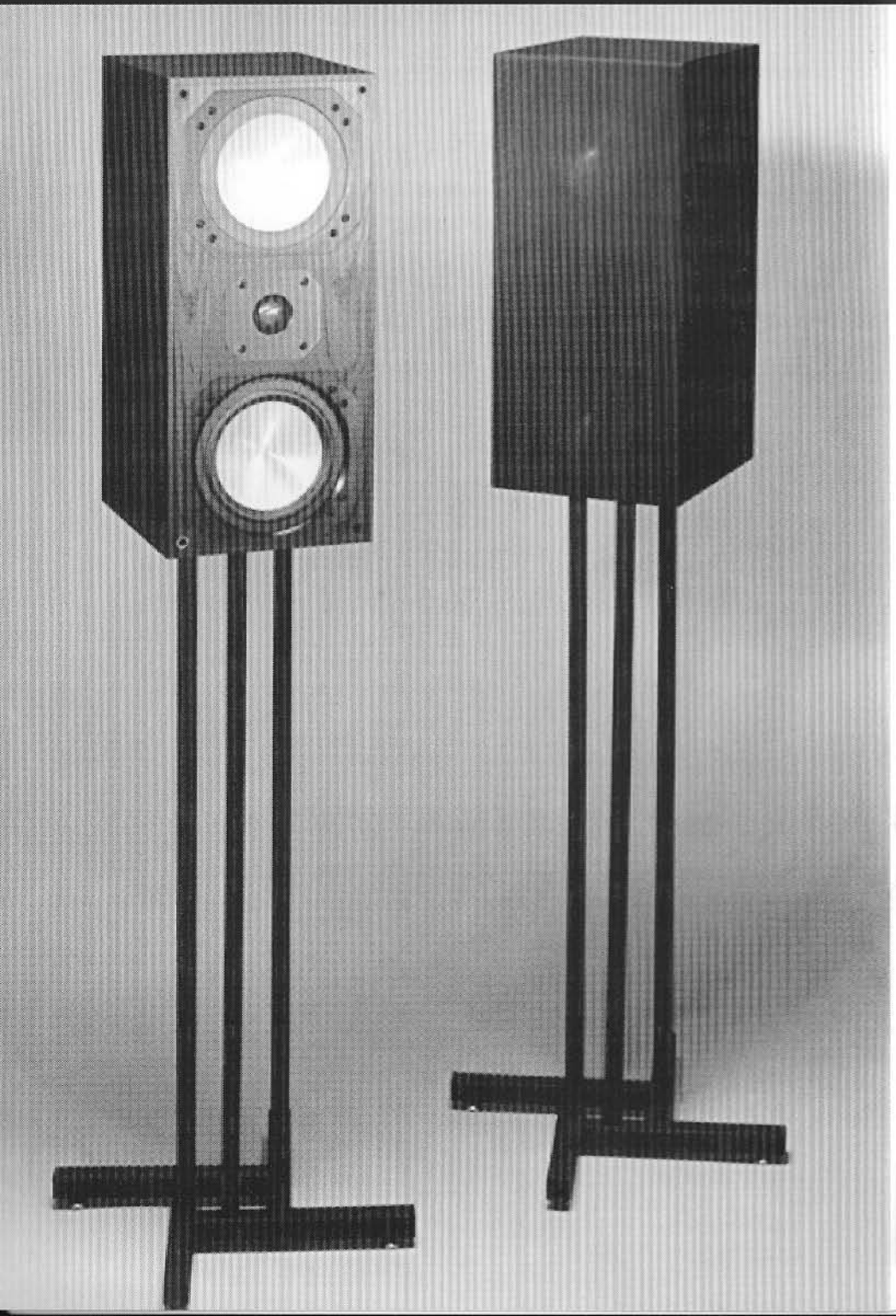
Velodyne

Owner's Manual

DF-661

DISTORTION-FREE FULL-RANGE LOUDSPEAKER





Printed on recycled paper.

P/N 80-FRIFINBG • P/N 80-FRIFINBV • P/N 80-FRIFINRW

Thank you.

You've just made an important purchase. The DF-661 Distortion-Free Full-Range Loudspeaker is guaranteed to bring you the superior performance and quality sound that you demand. Years of listening pleasure — all brought to you by *Velodyne.*

The DF-661 is a true breakthrough in audio technology. By designing drivers from the ground up to be low in distortion, and incorporating several new technologies never before seen in production, *Velodyne* has reduced harmonic distortion to an order of magnitude below that in the best drivers currently available.

Velodyne believes that harmonic distortion is the basis for most of the problems associated with music reproduction. Using this theory as a design parameter, the first ULD (Ultra Low Distortion) subwoofer was created in 1983. The success of the subwoofers has proven that low distortion does make a difference. Now, with the help of many new materials and technologies, the low distortion design principle has been applied to the entire audio spectrum. The result — a loudspeaker with unprecedented clarity, detail, and dynamics.

Velodyne's DF-661is a timeless piece — offering you years of the highest quality sound. Once you listen, you will never be satisfied with anything less.

Safety first

CAUTION: To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The clam point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read instructions. All safety and operating instructions should be read before the appliance is operated.

2. Retain instructions. The safety and operating instructions should be retained for future reference.

3. Heed Warnings. All warnings on the appliance and in the operating instructions should be adhered to.

4. Follow instructions. All operating and use instructions should be followed.

5. Water and moisture. The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool or the like.

6. Carts and Stands. The appliance should be used only with a cart or stand recommended by the manufacturer.

7. Wall or Ceiling Mounting. The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.

8. Heat. The appliance should be situated away from heat sources such as radiators, stoves, or other appliances that produce heat.

9. Cleaning. The appliance should be cleaned only as recommended by the manufacturer.

10. Object and Liquid Entry. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

11. Damage Requiring Service. The appliance should be serviced by qualified service personnel when:

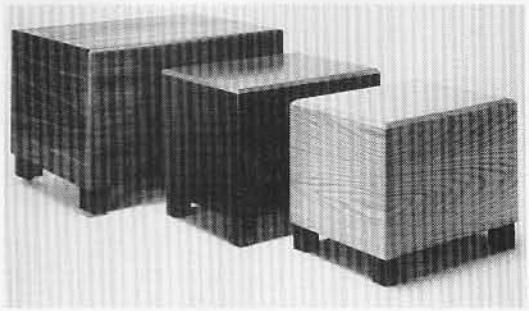
a. Objects have fallen or liquid has been spilled into the appliance; or

b. The appliance has been exposed to rain; or

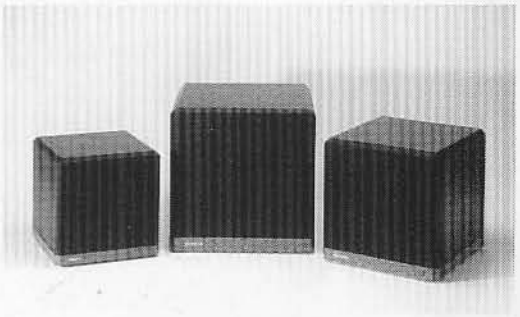
c. The appliance does not appear to operate normally or exhibits a marked change in performance; or

d. The appliance has been dropped, or the enclosure damaged.

12. Servicing. The user should not attempt to service the appliance beyond what is described in the operating instructions. All other servicing should be referred to qualified service personnel.



ULD Series
ULD-18 THX • ULD-18
ULD-15 • ULD-12



F-Series
F-1000 • F-1200 • F-1500

VA-Series
VA-810 • VA-1012

When the best gets better.

After listening to your DF-661 full-range speakers, you're probably wondering how you have gotten along without them. Your DF-661 stands alone in the world of full-range loudspeakers — but what about the rest of your audio environment?

We already know by your DF-661 purchase that you care about the amount of distortion infiltrating your music. If you also care about clean, powerful bass, and you think you're not getting the utmost bass performance — consider a *Velodyne* subwoofer. The ULD- and F- Series *Velodyne* subwoofers feature our patented High Gain Servo (HGS) technology which produces bass with output and accuracy, and like the DF-661, reduces harmonic distortion to a level that is practically non-existent.

Velodyne produces three unique series of subwoofers, similar in technology, but differing in response and output. When deciding between the three series, consider the size and acoustic character of your listening room, the overall sound of your main system, and your preferred listening level. We recommend asking your *Velodyne* dealer for a demonstration.

Unpacking

Please unpack the system carefully. Remove all staples used to seal the carton as they can scratch the cabinet.

IMPORTANT: PLEASE SAVE THE CARTON AND ALL PACKAGING MATERIALS FOR FUTURE USE. WHEN REPACKING, PROPER HANDLING IS ESSENTIAL. DO NOT USE ANY SHIPPING MATERIALS THAT MAY PERMEATE THE GRILL OF THE LOUDSPEAKER AND/OR DAMAGE THE FRONT OF THE SPEAKER ASSEMBLY.

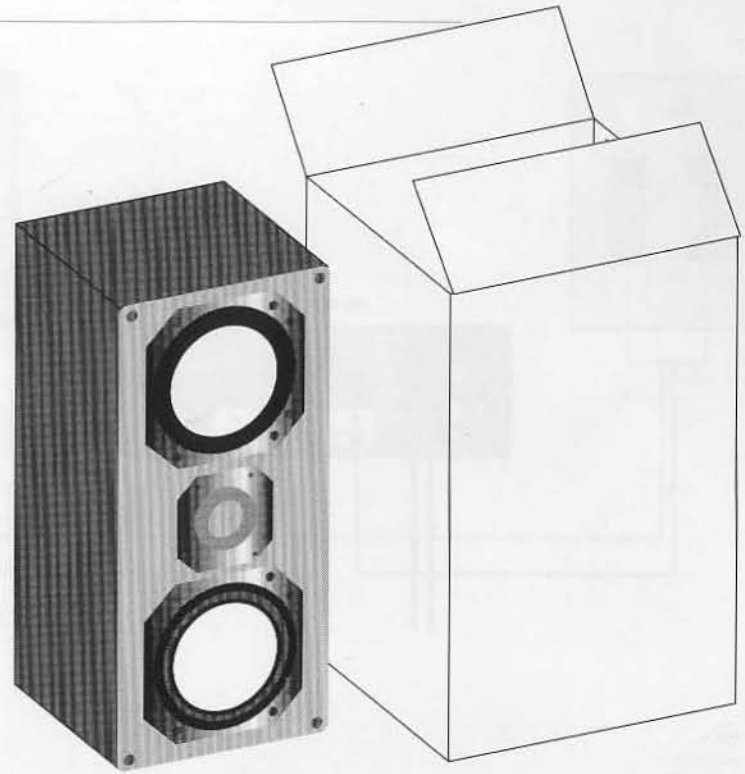
Record the serial number in the space provided below and on both locations on the warranty card for future reference.

FOR YOUR RECORDS:

Serial Number _____

Date of purchase _____

Name of store _____



Installation Option #1: *Conventional*

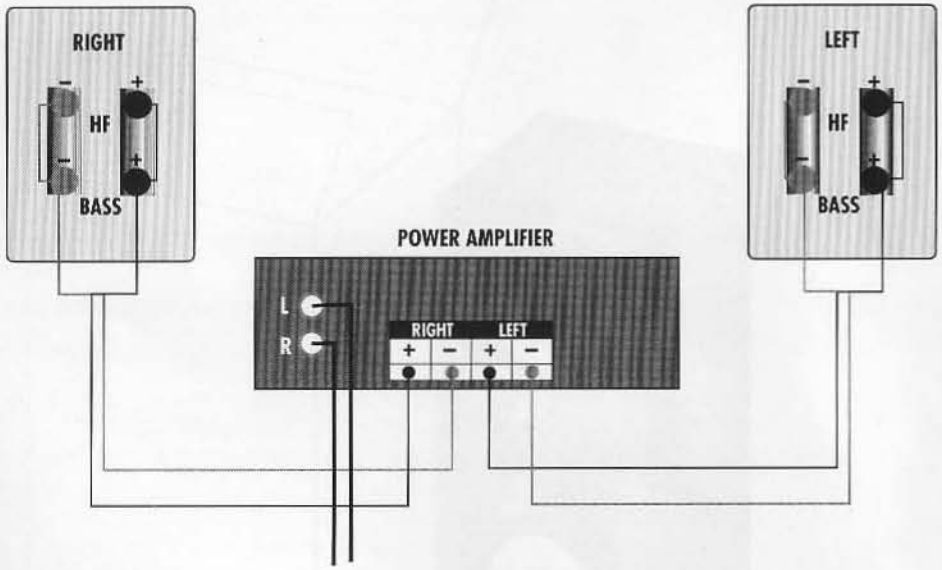
For standard installation, use the four shorting bars to link the following sockets on the back of your DF-661:

RED POSITIVE (+) HF ▸▸▸ RED POSITIVE (+) BASS
BLACK NEGATIVE (–) HF ▸▸▸ BLACK NEGATIVE (–) BASS

Repeat this procedure for the other speaker.

Now, link the speaker cable to the power amplifier:

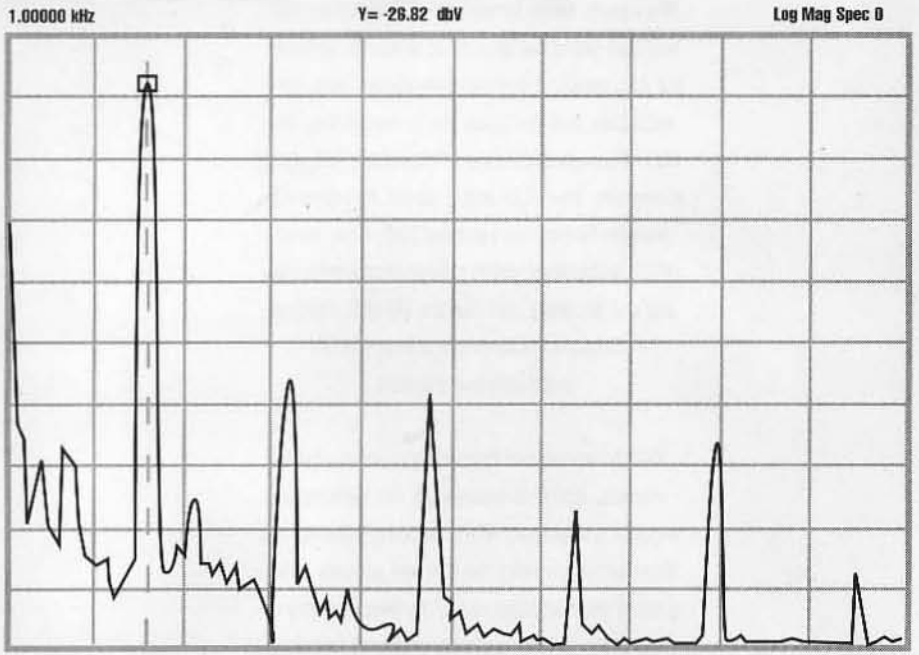
RED POSITIVE (+) AMP ▸▸▸ RED POSITIVE (+) BASS
BLACK NEGATIVE (–) AMP ▸▸▸ BLACK NEGATIVE (–) BASS



heard clearly and precisely, as it was generated, without the masking of the additional harmonic distortions.

The resulting improvement in clarity and detail provides the discerning listener with the most accurate, distortion-free production of music available in the world today. Finally, you can hear all the nuances of the music unmasked by the elimination of the unintended distortions.

Other Comparable System

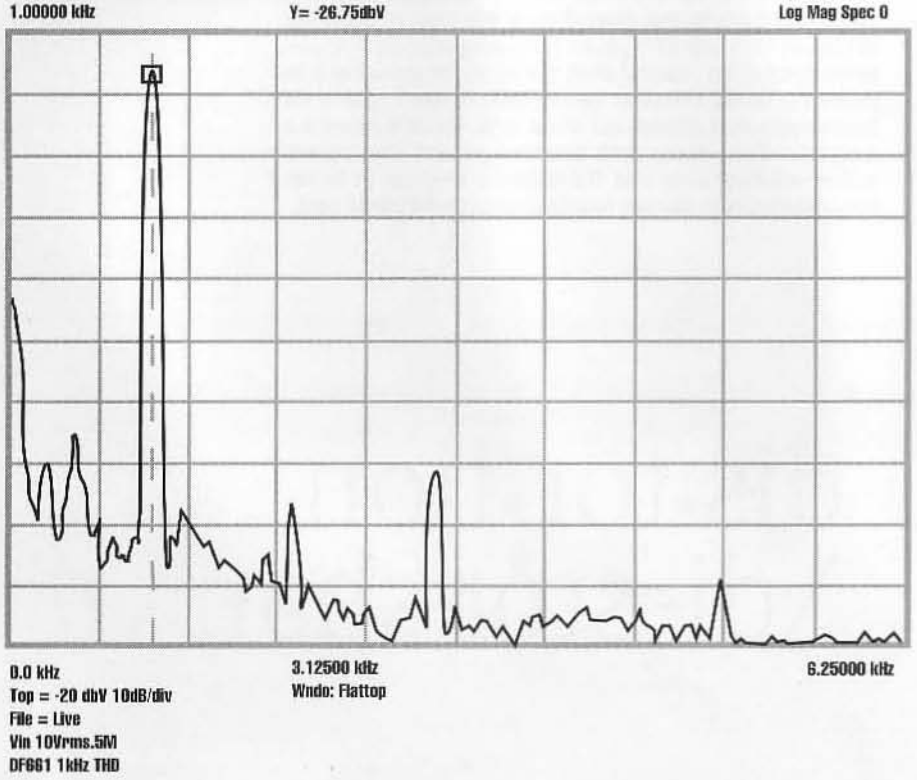


Proof Positive

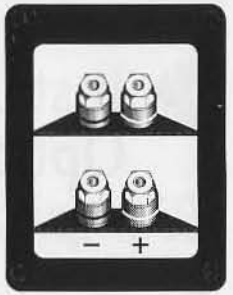
Presented below you will see two graphs comparing the DF-661 to a highly regarded competively priced speaker. In each case, the highest peak represented the fundamental 1KHz signal generated in the test. The information to the left of the fundamental on the graph is noise generated by the test equipment itself.

Note the size of the additional harmonics, that is,the peaks generated at 2KHz, 3KHz, 4KHz, 5KHz, and 6KHz. Each of these represents a variation from the original signal, a distortion. You can easily see the improvement in the DF-661. The DF-661 technology has significantly reduced the harmonic distortion present in the speaker, allowing the fundamental 1KHz note to be

DF-661



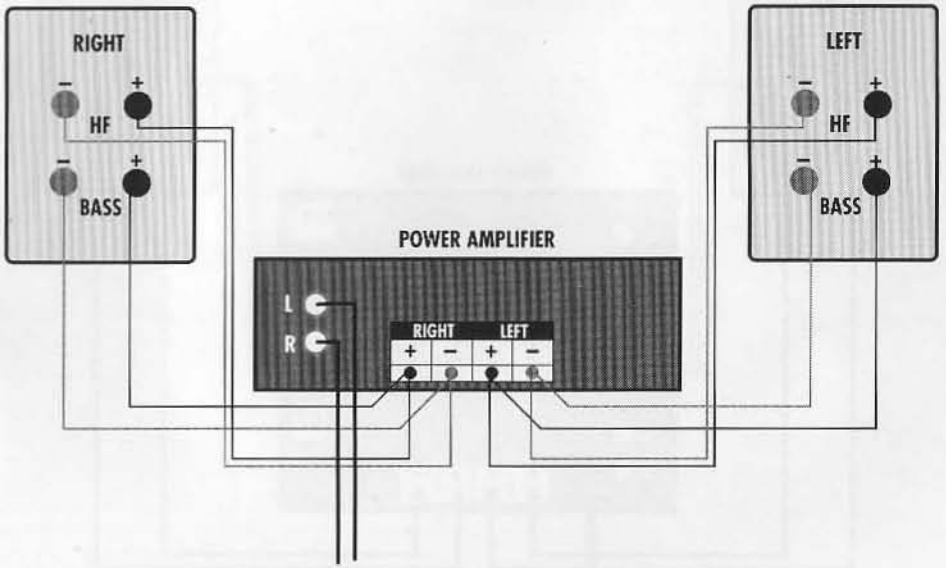
Installation Option #2:
Bi-wired



Bi-wiring requires <u>two</u> sets of speaker cables. Cables can either be the same, or different cable can be used for the BASS and HF crossovers. NO SHORTING BARS ARE REQUIRED FOR THIS INSTALLATION OPTION.

RED POSITIVE (+) HF	♦♦♦	RED POSITIVE (+) AMP
RED POSITIVE (+) AMP	♦♦♦	RED POSITIVE (+) BASS
BLACK NEGATIVE (–) HF	♦♦♦	BLACK NEGATIVE (–) AMP
BLACK NEGATIVE (–) AMP	♦♦♦	BLACK NEGATIVE (–) BASS

Repeat this procedure for the other speaker.

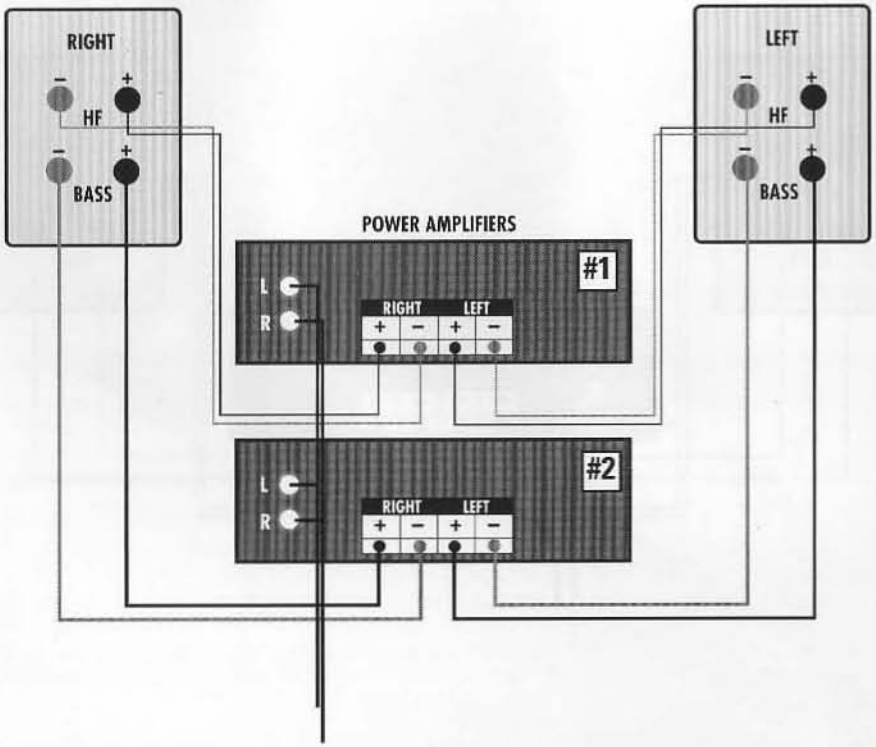


Installation Option #3: *Bi-amplified*

Bi-amplification requires <u>two</u> stereo power amplifiers (noted below as #1 and #2). NO SHORTING BARS ARE REQUIRED FOR THIS INSTALLATION OPTION.

RED POSITIVE (+) HF	♦♦♦	RED POSITIVE (+) AMP #1
BLACK NEGATIVE (–) HF	♦♦♦	BLACK NEGATIVE (–) AMP #1
RED POSITIVE (+) BASS	♦♦♦	RED POSITIVE (+) AMP #2
BLACK NEGATIVE (–) BASS	♦♦♦	BLACK NEGATIVE (–) AMP #2

Repeat this procedure for the other speaker.



rounds them.

SHOULD A LOUDSPEAKER HAVE DISTORTION?

Distortion can have a profound influence on the perception of reproduced sound. It can make the music less complex, and add a pleasant bassy overtone. However, this can be achieved during the recording and mixing process, and isn't that where it belongs? A loudspeaker has no business manipulating the music. Its sole function is to reproduce, and it should reproduce as faithfully as possible.

DOES DISTORTION MATTER?

For all practical purposes, the audio world has dismissed distortion as having a negative impact on music reproduction. Several rationalizations have emerged. If the loudspeaker is distorting, the distortion should be audible as such. Although one can easily hear distortion products from a single tone, music supposedly has a masking effect that covers up these overtones. If low distortion were important, then why don't loudspeakers with lower distortion sound better than ones with more distortion?

Distortion is audible as a noise source that is synchronous with the music. You notice it most while listening to the background music rather than the principle instrument. The experiments done on "masking"up to this point have been valid only for small groups of steady-state tones, not the dynamics of music. The human ear is capable of discerning very complex musical events; therefore, the "masking" effect need not be that pronounced to be problematic. Usually, attempts at lowering distortion have focused on the 2nd harmonic, which, although less critical, is the easiest to correct in a loudspeaker. A more distinguishable distortion is produced when a speaker is played at a slightly higher level. This results in an increase in the 3rd harmonic distortion with a decidedly negative effect on the reproduced sound.

dis•tor•tion
\di-'stȯr-shən\ *n*

The Facts on Distortion

WHAT IS IT?

The distortion that *Velodyne* believes should be eradicated is that which causes harmonic and intermodulation distortion products. These are extra tones or notes that are unintentionally created by the speaker when reproducing the orginal signal. The result is the characteristic "tone" that speakers exhibit — a tone that is not present in the original source. Harmonic distortion is just a simpler version of intermodulation distortion. If a distorting loudspeaker reproduces a single frequency, the loudspeaker will create additional frequencies that are natural harmonics of the fundamental. For instance, if the loudspeaker were to play 1000Hz, and the speaker had 2nd harmonic distortion of 1% at the given playback level, then a 2000Hz note 1% as loud as the fundamental would be created. If the speaker had 3rd harmonic distortion, a note of 3000Hz would be created as well.

Intermodulation occurs when two or more frequencies are reproduced simultaneously. Now several new frequencies are created along with the harmonics as explained above. These new frequencies, called sum and differences, are determined by adding and subtracting the two fundamentals. Thus, if the loudspeaker were to reproduce 1000Hz and 400Hz, new frequencies of 1400Hz (the sum) and 600Hz (the difference) would be created by a speaker containing 2nd harmonic distortion. For 3rd harmonic distortion, four new frequencies are created in the addition to the above. These are 2x one fundamental plus or minus the other fundamental. If you mix three frequencies together, the result is an alarming increase in the number of the distortion products.

HOW DOES DISTORTION AFFECT MUSIC REPRODUCTION?

The music that we listen to almost always consists of many separate frequencies. The resulting distortion products are so many that they merge into a sea of noise. On better loudspeakers, the noise is uniform at all frequencies. On lesser loudspeakers, this noise will peak at one or more separate frequency bands. This gives the loudspeaker its "tone." Often this has been thought of as a frequency response related problem. However, small changes in the frequency response have a proportionately larger effect on the distortion profile, as the distortion products are intensity-related.

Often, music will consist of one or more louder instruments along with many other instruments recorded at a much lower level. In a live performance, these instruments are clearly distinguishable. But during playback, the louder instruments are the chief source of a blanket of noise. This noise, if only 1% as loud as the main instruments, can easily be louder than the background instruments! Thus, the background instruments seem to blend together and do not sound that much different from noise that sur-

Speaker Placement

The DF-661 offers the listener unprecedented clarity — the highest quality sound. Where you position your speakers can either enhance or hinder its performance. Each room is different and has its own ideal listening spot. Setting up your own listening "sound stage" is usually best done by trial and error. When in doubt, consider these suggestions:

- **Find your space.**
  Select an area of the room which gives you an unobstructed line of sight to your speakers.

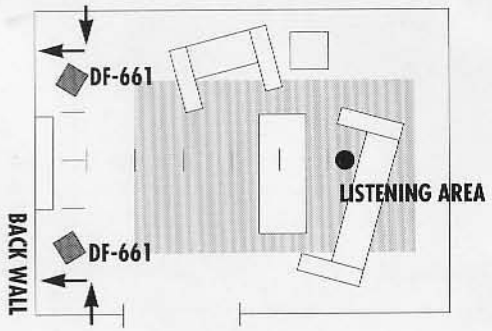
- **Achieve proper bass response.**
  Your loudspeakers will perform best when they are at least 2-3 feet from your back wall and 1-2 feet from side walls. Move speakers progressively back or forth — several inches at a time.

- **Achieve tonal balance.**
  For good tonal balance, angle of the speakers should be slightly toed-in, and identical in the amount of toe-in.

- **Achieve midrange and high frequency performance.**
  Select your listening point —the sitting area or spot you will be while enjoying your music. For good center imaging, the space between both speakers should be about half the distance of the space between your listening area and the speakers. Move speakers progressively left or right, a few inches at a time, until you hear unity of sound and you are satisfied with the results.

- **Listen for cohesiveness.**
  When trial positioning your loudspeakers, choose music with repetitive bass. Listen for tight bass, clarity, and cohesiveness. Sound should have a central focus.

- **Enjoy!**



Maintenance

We recommend using a clean damp cloth for cleaning the cabinet. Never use detergents or abrasives on your DF-661.

Trouble-shooting & Service

Before contacting your dealer for service, please note the conditions below that may cause seemingly unusual behavior in your system.

- **No output**
  Make sure that your system components are turned on, and that the speaker wires and all interconnecting cables are connected.

- **Popping and/or ticking noises**
  Tighten all terminals to prevent vibration.

- **Poor Imaging**
  Check placement. For best results, your pair of DF-661 speakers should be about the same distance from the walls with the same amount of toe-in. Moving the speakers away from the surrounding walls may improve imaging. Check polarity.

- **Weak output, loss of highs**
  Check that shorting bars are installed.

- **Lack of Bass**
  Check to make sure the polarity of the speaker wires is correct.

DF-661 Specifications

DIMENSIONS:
Height: 18 7/8"
Width: 8 1/2"
Depth: 10 1/2"
Drive units: Low reactance woofer 6" • Low reactance midrange 6" • tweeter 1" aluminum dome

WEIGHT (each): 40lbs.

DISTORTION:
< 0.1% THD at 1 watt

INTERNAL VOLUME:
Woofer/ 700 cubic inches • midrange /260 cubic inches

IMPEDENCE: 6 ohms

SENSITIVITY: 1 watt at 1 meter produces 88dB

POWER RATING: 75 watts minimum, 300 watts maximum per channel

CROSSOVER FREQUENCY: 3-way, 750Hz/5000Hz, 18/12/12/24 dB/Octave

SYSTEM FREQUENCY RESPONSE:
Flat -2dB from 60Hz -20K Hz

WARRANTY: 2 years