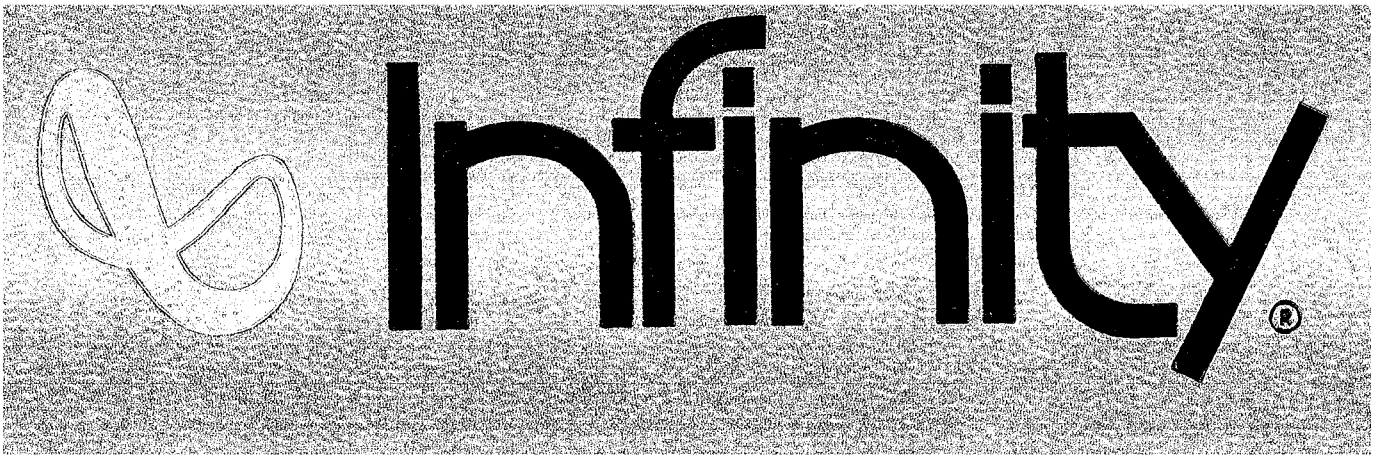

Infinity®

# *Owner's Manual,*

# *Infinity Reference Standard*

# *Beta Speaker System*

(p/n .930...3601)

Congratulations on purchasing one of the finest audio products available, the Infinity Reference Standard Beta. In order to insure optimum performance from this speaker system, it is highly recommended you take the time to read this instruction booklet thoroughly before installation.

## TABLE OF CONTENTS

## A WORD OF WARNING

Improper connection of the IRS Beta's low-frequency circuit will trigger the Servo Control Unit's protection circuit. Such misconnections include:

1. Reversing the accelerometer cables, left accelerometer input to the right woofer tower and vice-versa.
2. Reversing the signal connecting cables from the LOW FREQ SERVO OUTPUTS of the Servo Control Unit to the INPUTS of the low-frequency power amplifier(s), right to left and left to right.
3. Reversing the left and right channels of the woofer speaker leads.

The protection circuit of the Servo Control Unit will prevent excessively loud low frequency tones generated by misconnection; however it is advisable to make every effort to connect the servo system properly. Check and retrace the connecting cables making sure of polarity and right and left channels prior to turning on your system. These are critical connections and, therefore, they must be accurate.

## UNPACKING

Check your speakers and Servo Control Unit carefully. If they have been damaged in transit, contact your Infinity dealer and/or whoever delivered the cartons *immediately.*

The IRS Beta speakers are quite heavy; it is, therefore, recommended that you obtain the help of a friend before unpacking. Care should be exercised while unpacking to avoid scratching or otherwise damaging the speakers. Be especially careful to protect the black surfaces of the midrange/tweeter sections.

Keep the original cartons and packing material in the event of future need. (The cartons fold flat for easy storage.) Protect the packing materials from exposure.

## ASSOCIATED COMPONENTS

Your IRS Beta speaker system will accurately reproduce whatever you feed into it. For this reason the choice of associated components as well as the quality of listening material is important.

The system may be used with either two stereo amplifiers or four mono amplifiers. One stereo amplifier (or two matched mono amps) should be used to power the midrange/tweeter sections while the other stereo amplifier (or two matched mono amps) should power the woofer columns.

The mid/high-frequency amplifier(s) should be rated between 75 and 300 watts-per-channel into 4 ohms. The low-frequency power amplifier(s) should be able to deliver between 100 and 500 watts-per-channel into 4 ohms. In all cases, each amplifier must be able to deliver its full rated power into a 4 ohm load at all audio frequencies with absolute stability. The IRS Beta is a low-impedance speaker system and damage could result to the speakers and/or amplifiers if the power amps are unable to deliver the required, undistorted power. Your Infinity dealer will be able to assist you in acquiring suitable amplifiers.

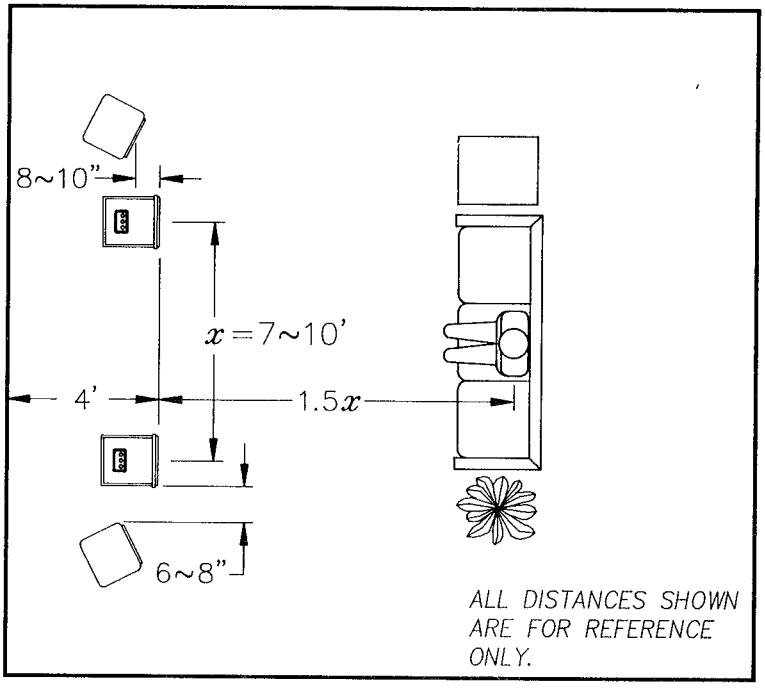
With high-powered amplifiers, it is essential that all necessary measures are taken to avoid acoustic feedback (discussed on page 16) and other non-musical input signals. Make sure that each power amplifier is TURNED OFF before connecting or disconnecting your speakers or low-level cables, and always turn the amplifier (or preamp) volume control(s) to minimum whenever the cartridge of a turntable is being raised or lowered onto a record, or whenever a change is made from one mode or another (ie, TAPE to PHONO), or when changing from station to station if your tuner does not have a muting circuit.

## POSITIONING

Room acoustics vary widely depending upon the size and shape of the listening room,furniture, ceiling height and so on. Since even a slight change in the position of your speakers will affect the sound, it is worthwhile to experiment with different room positions, listening for the best results.

For the best stereo image, the mid/tweeter sections should be two to three meters (seven to ten feet) apart and not less than the same distance from the primary listening area (see figure 1 for a suggested starting position).

*Figure 1:*




The spacial relationship between the mid/tweeter section and the woofer towers will affect how well the bass and middle frequencies blend together (the low-to-mid coherence of the system). Moving the mid/tweeter sections further away from the rear wall will give the sound more depth. Moving the woofer towers closer to corners and walls will add more bass.

For optimum results, avoid placing your Beta speaker system directly in front of acoustically absorbent surfaces such as heavy draperies, open windows, etc.

Due to the driver configuration the mid/tweeter sections may tend to be front-heavy. As a result they lean forward a bit when placed on plush carpeting or similar surfaces. This can be compensated for by adjusting the levelers located under their front edges.

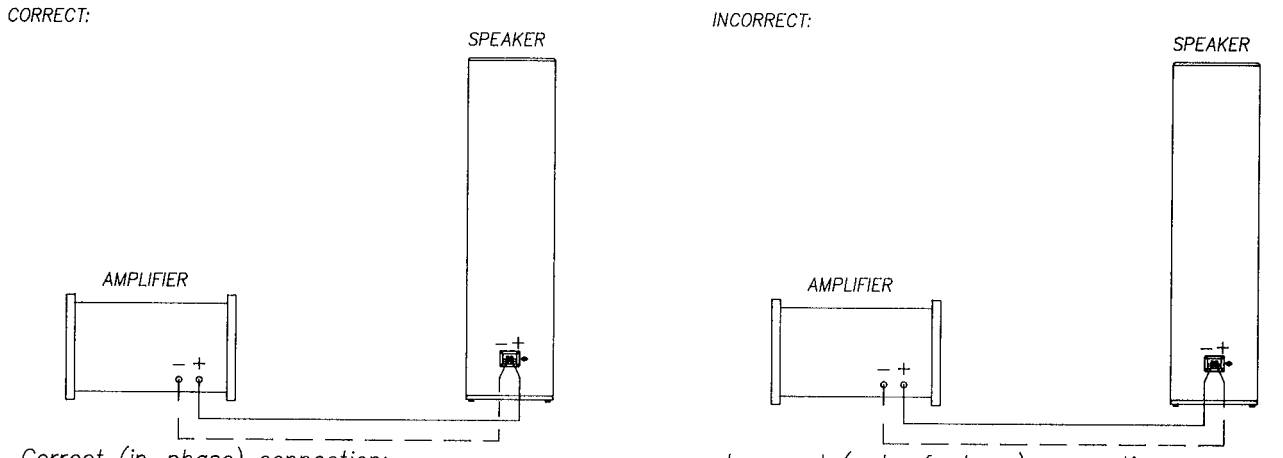
The IRS Beta is shipped with a set of pointed steel feet which you may choose to use for optimum coupling of the speakers to your listening room floor. Ask your audio dealer's resident expert for his advice as to whether or not these devices would be beneficial in your particular application.

# CONNECTING THE SYSTEM

All connections must be made with high-quality audio connector cables *only.*

Connections from your amplifier(s) to the speakers should be made with very heavy-gauge (#14 or better) two-conductor stranded wire with a polarity coding (typically a ridge or stripe along the insulation of one of the conductors). It is *vital* that the speakers are connected "in-phase". Use the polarity coding to ascertain that the "+" outputs of the power amplifiers connect to the "+" (red) input terminals of the speakers, and the "–" outputs ("grounds") connect to the "–" (black) input terminals. (See figure 2.)

*Figure 2:*




*Correct (in–phase) connection:*
*Plus (red) goes to plus.*
*Minus (black) goes to minus.*

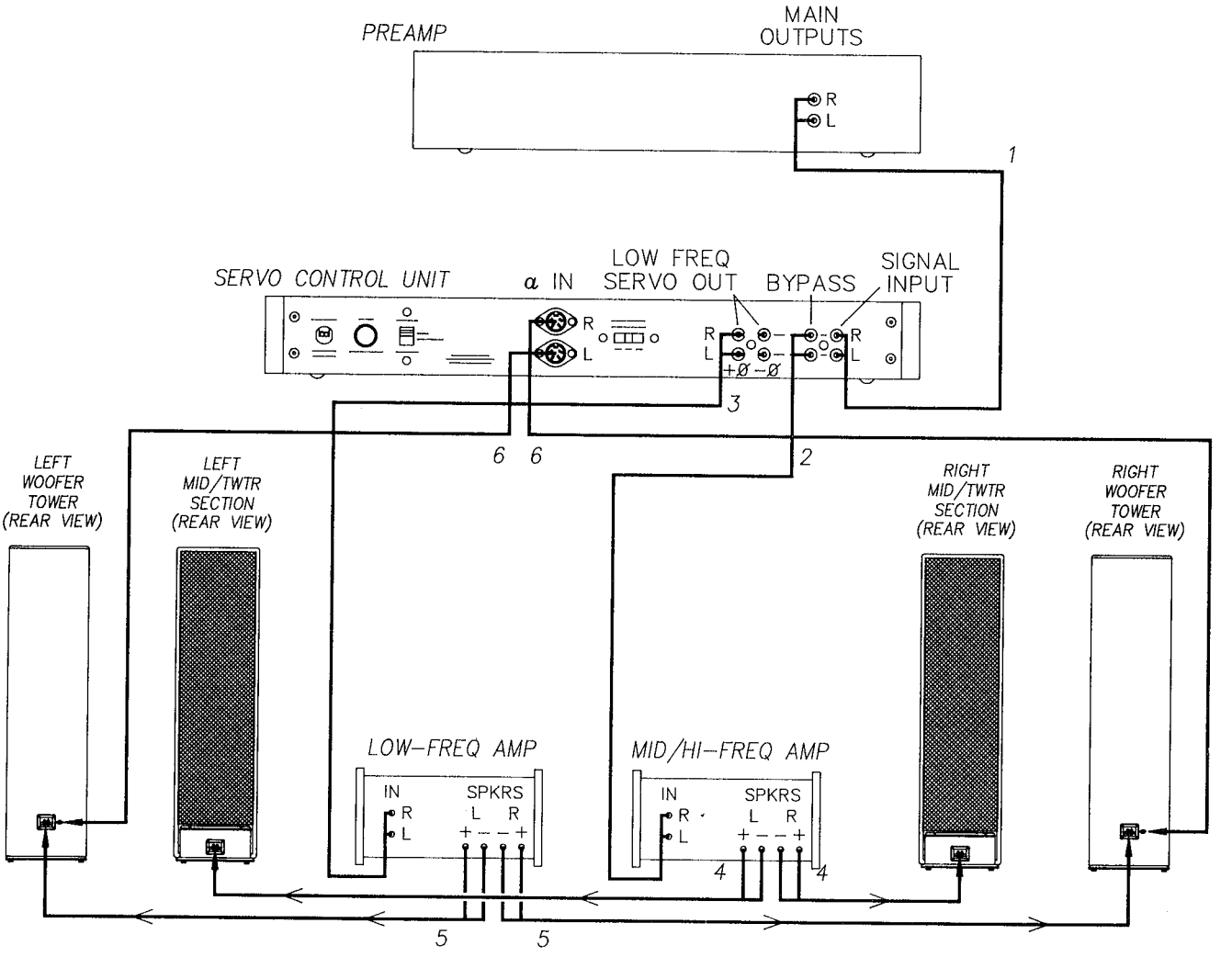
*Incorrect (out–of–phase) connection:*
*Plus–to–minus, minus–to–plus.*
*Results in distored sound, poor imaging, triggering of Servo Unit protect circuit.*

## BASIC SYSTEM CONNECTION

PLEASE NOTE: On various audio equipment, the connectors are not always labeled "left" and "right", so use the guideline: 1 = left = A; 2 = right = B.

Make sure that all components are turned off before making connections. Refer to figure 3 for an illustration.

*Figure 3:*




1. Connect the MAIN OUTPUTS of your preamp to the SIGNAL INPUTS of the Servo Control Unit (Left to Left and Right to Right).

2. Connect the BYPASS pair of signal jacks on the Servo Control Unit to the INPUTS of the mid/high-frequency power amplifier(s) (Left to Left and Right to Right).

3. Connect the +Ø LOW FREQ SERVO OUT pair of signal jacks on the Servo Control Unit to the INPUTS of the low-frequency power amplifier(s) (Left to Left and Right to Right).

NOTE: Most stereo power amplifiers DO NOT INVERT phase from input to output (ie they are NON-INVERTING). A few power amplifiers DO INVERT phase from input to output. If an "inverting" amplifier is to be used, use the −Ø LOW FREQ SERVO OUTPUT pair of jacks to connect to the power amplifier(s). If in doubt about your low-frequency power amplifier being INVERTING, consult it's owners manual or contact the manufacturer.

4. Connect the SPEAKER OUTPUTS of the mid/high-frequency power amplifier(s) to the Beta midrange/tweeter sections' input posts observing polarity ("+" to "+" and "−" to "−") and left/right channel orientation (left to left, right to right).

5. Connect the SPEAKER OUTPUTS of the low-frequency power amplifier(s) to the woofer towers' input posts. It is imperative to maintain proper polarity ("+" to "+" and "−" to "−") in each wire pair along with proper channel orientation (left to left and right to right).

6. Connect the supplied ACCELEROMETER FEEDBACK cables (the two 50' 4-pin DIN cables) to the system as follows: One of the cables has a piece of red tubing at each end, just below the connector. Use this cable for the RIGHT channel connection *only*. Connect one end of the cable with the red tubing into the jack on the back of the RIGHT woofer tower; the other end into the RIGHT accelerometer input (aIN, R) on the back of the Servo Control Unit. Connect the remaining cable to the LEFT woofer tower and the Servo Control Unit's LEFT accelerometer input (aIN, L) in the same manner. Be sure to insert the connectors fully into the jacks.

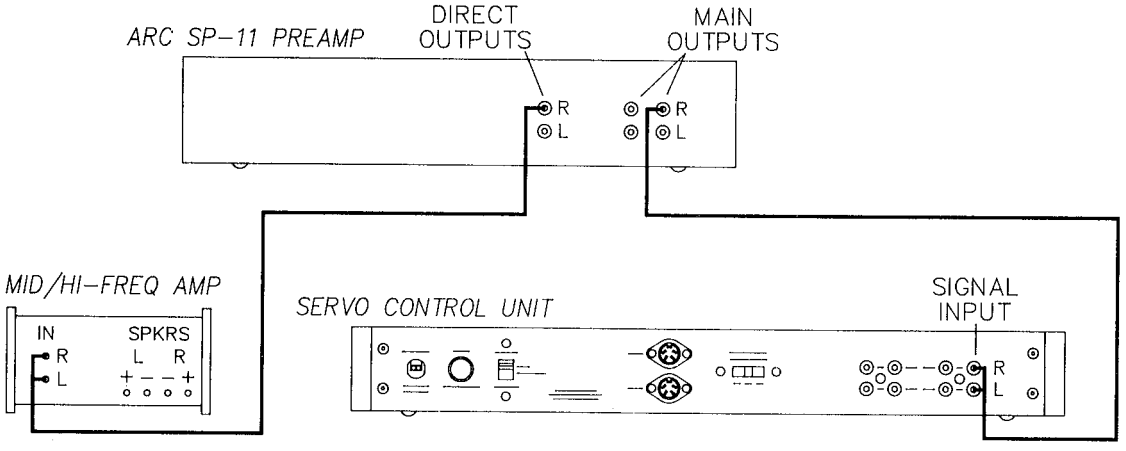
7. It is *EXTREMELY* important to get the connections to the WOOFER SYSTEM correct (accelerometer cables, speaker leads to the woofer towers, signal leads to the low-frequency power amplifier) because the Beta woofer system is a FEEDBACK CONTROL SYSTEM that reduces woofer distortion, extends low frequency response and renders low frequency transients more acoustically correct. In order to accomplish this the feedback has to be *negative*. If, for instance, the polarity of the cables connecting the low-frequency power amplifier(s) to the woofer towers is incorrect (ie, "+" of an amplifier output to the "−" terminal of a woofer tower) the feedback becomes *positive*, resulting in an attempt at full power oscillation at about 60 Hz. The Servo Control Unit has a protection circuit that prevents such continuous full power oscillation from occurring. The result of an incorrect connection will be short bursts of full power oscillation which will indicate that one or more of the connections are incorrect. This condition could also occur when a NON-INVERTING power amplifier is connected at the −Ø LOW FREQ SERVO OUTPUTS or when an INVERTING (rare) power amplifier is connected at the +Ø LOW FREQ SERVO OUTPUTS.

## ALTERNATE CONNECTIONS

7A. "Purer signal path" for the mid/high-frequency power amplifier(s). "Purer" here means less interconnections - less signal jacks and cables in the signal path. Some preamps have two pairs of MAIN OUTPUTS. If this is the case with your preamp, connect the INPUTS of the mid/high-frequency power amplifier directly to one of the pairs of MAIN OUTPUTS on your preamp.

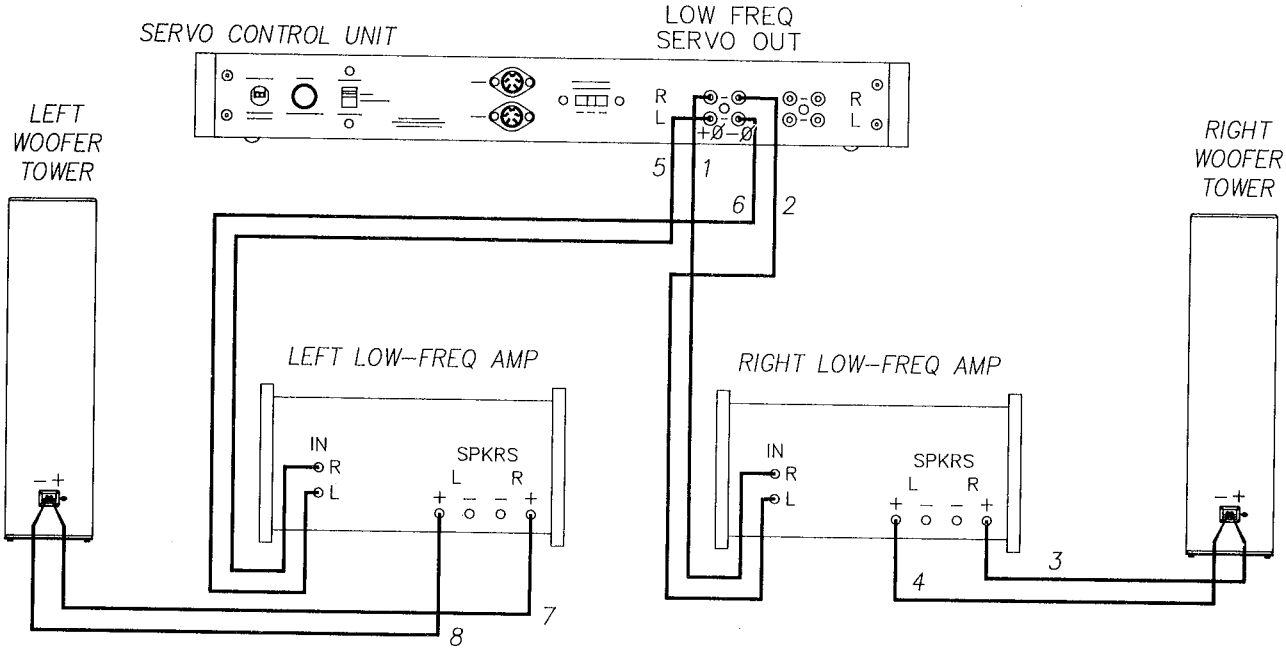
The Audio Research Company's SP-11, for example, has two MAIN OUTPUTS and a DIRECT OUTPUT. The preferred way to use the SP-11 with the Beta system is to connect its DIRECT OUTPUTS to the INPUTS of the mid/high-frequency power amplifier(s) and connect *one* pair of the MAIN OUTPUTS to the SIGNAL INPUTS of the Servo Control Unit. (See figure 4.)

*Figure 4:*



7B. Use of two stereo power amplifiers for driving the woofer towers. The Servo Control Unit contains provisions for "bridging" a stereo power amplifier, turning it into a higher-powered mono unit. (See figure 5)

*Figure 5:*




1. Connect one end of a signal cable to the *right-channel* INPUT of the stereo power amplifier that will drive the RIGHT woofer tower. Connect the other end of this cable to the RIGHT +Ø LOW FREQ SERVO OUT jack of the Servo Control Unit.

2. Connect another signal cable from the RIGHT –Ø LOW FREQ SERVO OUTPUT to the *left-channel* INPUT of the same amplifier.

3. Connect this amplifier's *right-channel* "+" SPEAKER OUTPUT to the RIGHT woofer tower's "+" input terminal.

4. Connect the amp's *left-channel* "+" SPEAKER OUTPUT to the "–" input terminal of the RIGHT woofer tower

5. Connect one end of a signal cable to the *right-channel* INPUT of the other stereo power amplifier that will drive the LEFT woofer tower. Connect the other end of this cable to the LEFT +Ø LOW FREQ SERVO OUT jack of the Servo Control Unit.

6. Connect another signal cable from the LEFT –Ø LOW FREQ SERVO OUTPUT to the left-channel INPUT of the same amplifier.

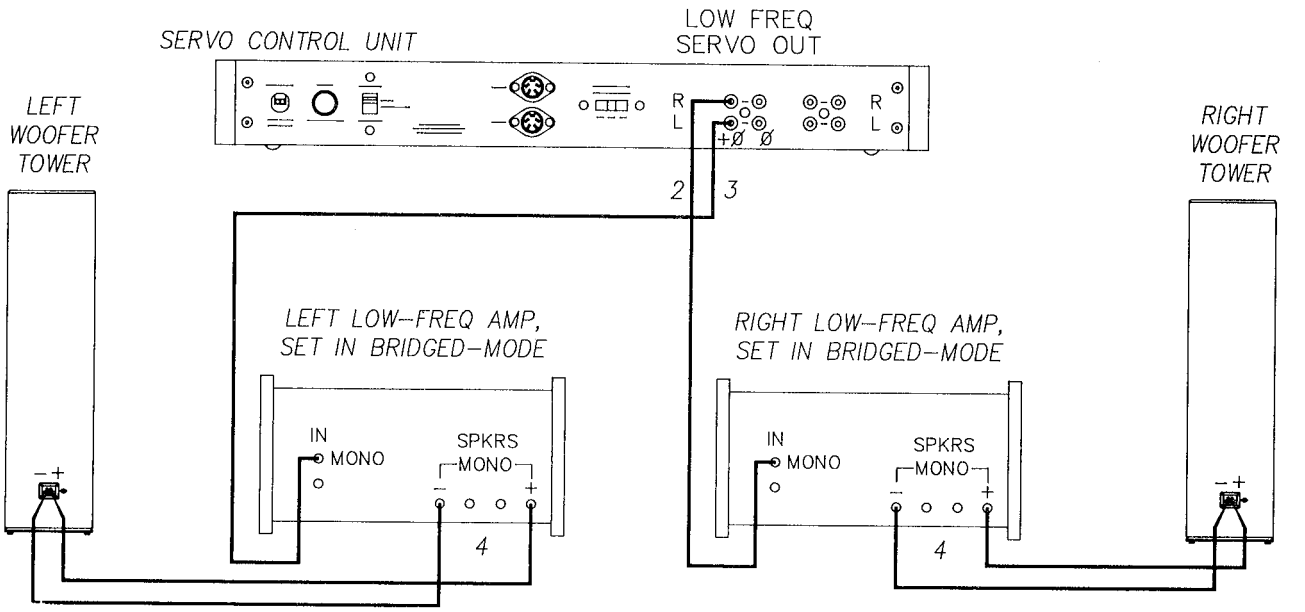
7. Connect this amplifier's *right-channel* "+" SPEAKER OUTPUT to the LEFT woofer tower's "+" input terminal.

8. Connect the amp's *left-channel* "+" SPEAKER OUTPUT to the "–" input terminal of the LEFT woofer tower.

All other connections per figure 3, BASIC SYSTEM CONNECTIONS.

7C. Use of two stereo power amplifiers that are bridgeable by switching for driving the woofer towers. (See figure 6.)

*Figure 6:*




1. Consult the amplifier's owners manual to determine whether its MONO INPUT is its LEFT or RIGHT INPUT jack in the bridged mode.

2. Connect the Servo Control Unit's RIGHT +Ø LOW FREQ SERVO OUTPUT to the MONO or BRIDGED-MODE INPUT of the stereo power amplifier that will drive the RIGHT woofer tower.

3. Connect the LEFT +Ø LOW FREQ SERVO OUTPUT to the MONO or BRIDGED-MODE INPUT of the stereo power amplifier that will drive the LEFT woofer tower.

4. Consult the amplifier's owners manual as to which OUTPUT terminals will serve as the "+" and "–" in the bridged-mode. Connect the woofer towers to the amplifiers, maintaining proper polarity and left/right channel orientation.

5. Set the two amplifiers to their MONO or BRIDGED mode (consult their owners manuals).

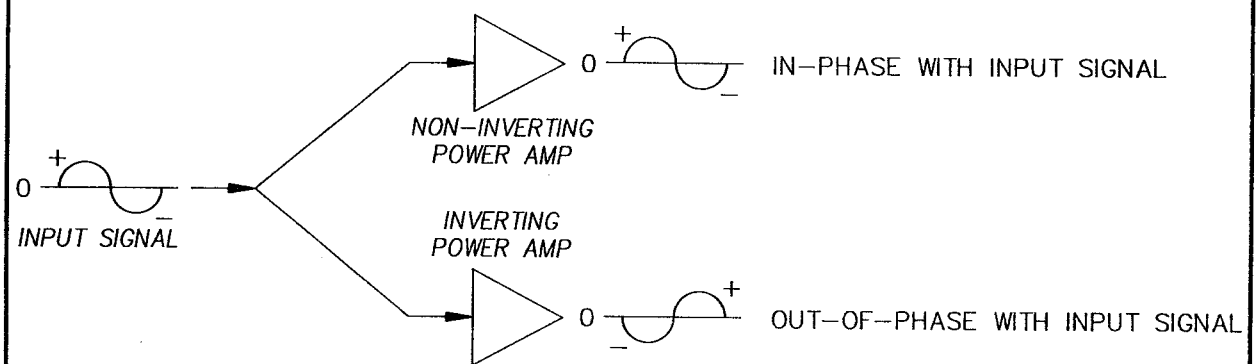
**NOTE:** In the event this connection INVERTS phase within the stereo power amplifiers when used in their bridged modes and causes bursts of loud low frequency signals out of the woofer towers upon system power-up, use the –Ø LOW FREQ SERVO OUTPUTS in steps 2 and 3.

# A WORD ABOUT ABSOLUTE PHASE

In order to obtain the proper results from the IRS Beta speaker system, and to avoid triggering the protection circuit in the Servo Control Unit and possible subsequent damages, it is essential to maintain *absolute phase* throughout the entire audio system.

Consider a sine wave being fed into two amplifiers, one NON-INVERTING, the other one INVERTING. The output of the NON-INVERTING amplifier is *in-phase* with the input signal, while the output of the INVERTING amplifier is now *180-degrees out-of-phase* with the input. (See figure 7.)

*Figure 7:*




Determine if any of your audio components are INVERTING. (If this information is not provided in the owners manuals, consult your audio dealer or the equipment manufacturer.)

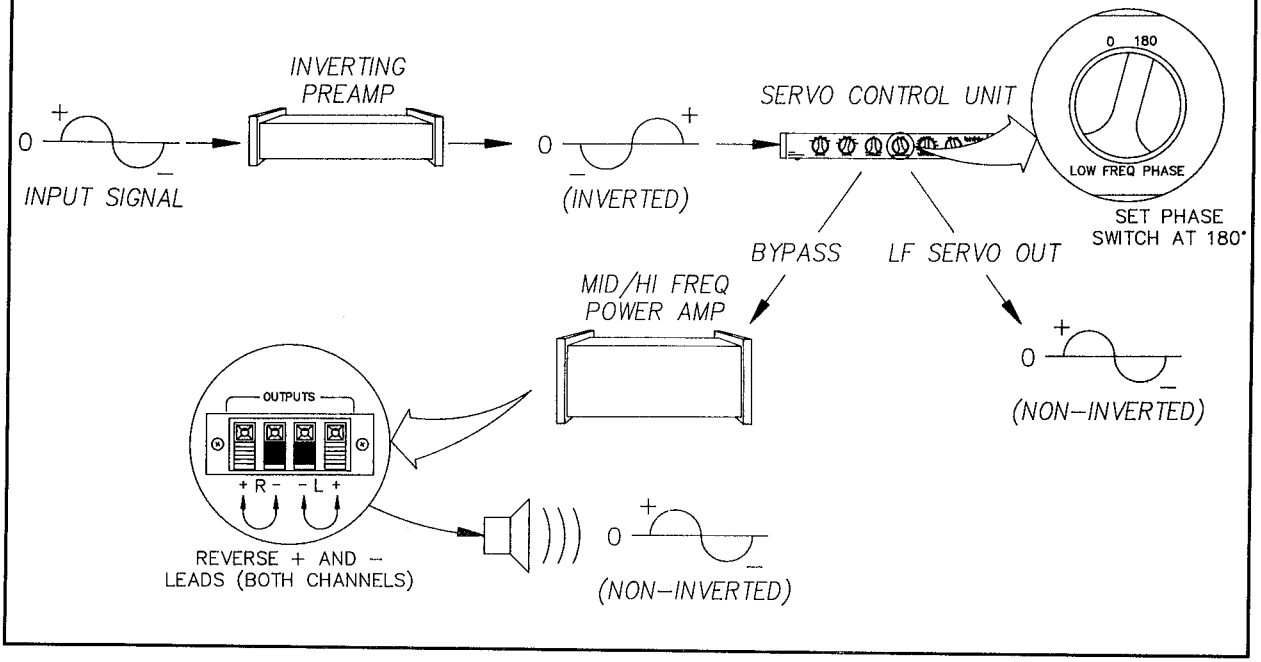
If *all* of your components are NON-INVERTING, absolute phase will be maintained simply by observing proper polarity at all connections ("+" to "+", "–" to "–", and by setting the LOW FREQ PHASE control of the Servo Unit to its 0 position. However, if *any* of your components are INVERTING some connection changes will be necessary to maintain absolute phase.

Example #1: If your preamp was your only INVERTING component, the signal would be 180-degrees out-of-phase from the preamp through the rest of the audio chain. Two changes are required to maintain absolute phase in this instance:

1. Set the LOW FREQ PHASE control of the Servo Control Unit to its "180" position. This corrects the low-frequency signal.

2. Reverse the polarity of the SPEAKER OUTPUTS of your mid/high-frequency power amplifier(s). (See figure 8.)

*Figure 8:*




Example #2: If both your preamp and mid/high-frequency power amplifier(s) were INVERTING, and the rest of the components were NON-INVERTING:

1. Set the Servo Control Unit's LOW FREQ PHASE control to its "180" position.

Since the mid/high-frequency amplifier is also INVERTING, the signal which was inverted by the preamp will be phase-corrected when it passes through the mid/high amplifier.

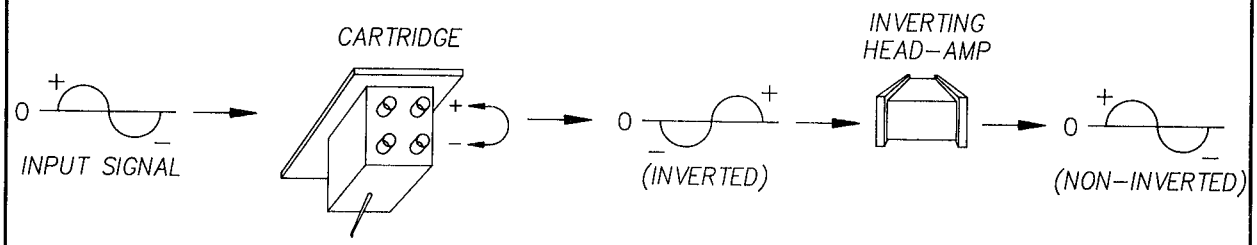
Example #3: If your mid/high frequency amplifier is your only INVERTING component:

1. Reverse the polarity of its SPEAKER OUTPUTS.

Example #4. If your turntable employs a head-amp (pre-preamp for the cartridge), and if that head-amp is INVERTING:

1. Carefully reverse the "+" and "–" leads at the cartridge. (See figure 9.)

*Figure 9:*




In short, if the number of inverting components that a signal must pass through is ODD, the signal will end up 180-degrees out-of-phase, or INVERTED. If the number of inverting components is EVEN, the signal will end up in-phase, or NON-INVERTED.

Use the previous guidelines to determine what changes, if any, need to be made in the polarity of the connections in your audio system, and where to set the LOW FREQ PHASE control of the Servo Control Unit, and make all necessary changes prior to operating the system.

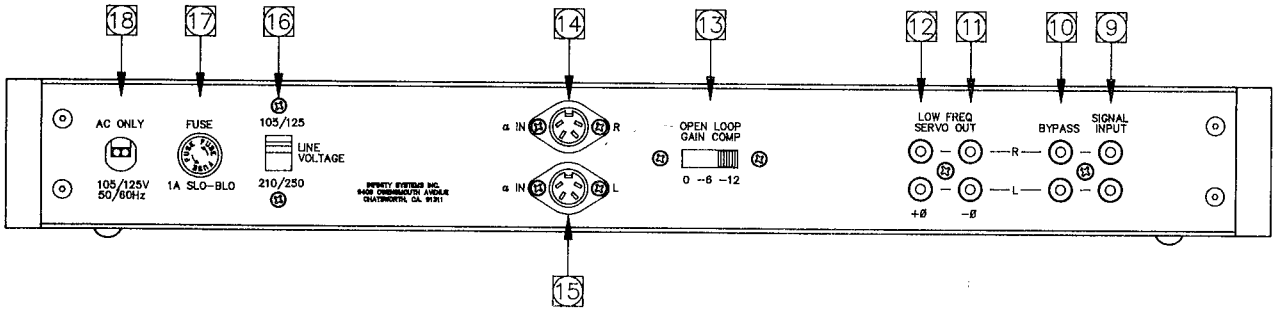
5. LOW FREQ LEVEL sets the amount of low-frequency output from the woofers. Adjust the level to obtain the best balance of bass to mid/high-frequencies.

6. POWER switches the A.C. power to the unit. (There is a 12 to 15 second delay before the woofers begin playing after power is turned on.)

7. SERVO ON indicator comes on after the 12 to 15 second woofer delay and indicate that the servo is on and active.

8. POWER ON indicator stays on while the unit is turned on.

*Rear Panel:*




9. SIGNAL INPUT jacks are used to connect the low-frequency control system input signal from the preamp main output.

10. BYPASS jacks are used to connect the signal to the inputs of the mid/high-frequency power amplifier(s).

11. LOW FREQ SERVO OUT, $-\emptyset$ jacks are used to connect to the low-frequency power amplifier(s) when the amplifiers are INVERTING. (Note: Both $+\emptyset$ and $-\emptyset$ are used to bridge drive two stereo amplifiers for more low-frequency power; see pages 11 and 12.)

12. LOW FREQ SERVO OUT, $+\emptyset$ jacks are used to connect to the low-frequency power amplifier(s) when the amplifiers are NON-INVERTING.

13. OPEN LOOP GAIN COMP is used to compensate for various power amplifiers that have different gains (ratio of output voltage, usually expressed in decibels or dB) so that the amount of motional negative feedback in the woofer system is in the proper range. Most power amplifiers have a gain of 26 to 30 dB. The normal position of the switch is 0 dB. Some power amplifiers have higher gains than this normal range and if used with the switch set at 0 dB, may cause the woofer system to oscillate in the frequency range of 5 to 20Hz or 500 to 1000Hz *even though the system is correctly hooked up.* This would occur with no signal going through the system (the preamp volume at minimum, for example). If this should occur, place the switch in the −6 dB (middle) position. If the power amps used for the woofer system are operated in the bridged mode (see pages 10, 11 and 12), start with the switch in the −6 dB position and if any signs of the aforementioned oscillation occurs, move the switch to the −12 dB position.

14. A (ACCELEROMETER) IN, RIGHT is used to connect the right-channel's accelerometer cable between the Servo Control Unit and the right woofer tower using one of the cables supplied.

15. A (ACCELEROMETER) IN, LEFT is used to connect the left-channel's accelerometer cable between the Servo Control Unit and the left woofer tower using one of the cables supplied.

16. LINE VOLTAGE selector sets the primary strapping of the power transformer for the line voltage to which the unit is connected. Use the tip of a flatblade screwdriver in the slot of the switch to slide it into the proper position.

17. FUSE protects the unit against possible internal damages in the event of power surges or a malfunction inside the Servo Control Unit. To avoid the possibility of electrical shock or other damages, replace the fuse with the specified size and type ONLY:

| | |
|---|---|
| 105/125 VAC: | 1-amp slow-blow |
| 210/250 VAC: | 1/2-amp slow-blow |

18. POWER CORD connects to a suitable source of A.C. power.

## OPERATING THE SYSTEM

After finalizing all connections, and double-checking proper polarity and channel orientation of all leads and signal cables, set the controls of the Servo Control Unit as follows (all other components are OFF at this time).

| | |
|---|---|
| HP FILTER | 22 |
| LP FILTER | 110 |
| BASS CONTOUR | 0 |
| LOW FREQ PHASE | Refer to the section on Absolute Phase |
| LOW FREQ LEVEL | FULL CCW |
| POWER | ON |

Remove the grille from one of the woofer towers and *gently* tap the cone of the woofer located second from the top, along its vertical axis between the dust cap and the foam surround with your fingernail. Under normal operating conditions, you will hear tapping reproduced in the woofers. (NOTE: Do not tap or poke the woofer along its horizontal axis, since the control woofer may react adversely to this.) Repeat for the other woofer tower.

If the reproduced taps are not present, double-check all connections to the Servo Control Unit, the accelerometer cables, and the power supply to the Servo Unit. If the woofers still seem inoperative, contact your Infinity dealer or Infinity's Customer Service department.

Turn on all of your audio components and slowly bring the volume of a record, tape or disk up to a comfortable listening level. (At this time you will not have low-frequencies reproduced.) Turn the balance control to fully the right and verify output from the RIGHT mid/tweeter section *only.* Turn the balance fully to the left and verify output from the LEFT mid/tweeter section *only.* Return the balance control to center.

Slowly bring the Servo Control Unit's LOW FREQ LEVEL control up until there is a balance of low-frequencies being reproduced with the output of the mid/tweeter sections. Repeat the balance test for the woofer towers.

Infinity strives always to improve existing products, as well as create new ones. Therefore the specifications and construction details in this and other Infinity publications are subject to change without notice.

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