

~~—~~APOGEE ACOUSTICS, INC.

Grand

DESCRIPTION:

The Apogee GRAND is the ultimate in loudspeaker design. It is a full range, four-way loudspeaker system featuring advanced ribbon designs for the tweeter, mid-range, and woofer transducers. The low frequencies are reproduced by custom designed and built extra long throw, high power 12 inch sub-woofers. The GRAND also features built-in active crossover network circuitry which is fully activated via wireless remote control as well as RS-232 computer link. All functions of the active network are echoed on a front mounted blue vacuum fluorescent display. A built-in 500 watt amplifier powers the two 12" sub-woofer units and another 500 watt amplifier powers the tweeter ribbon. Specially selected components are featured throughout the construction of the Apogee GRAND. All components were selected for their contribution to convenience, quality, and performance.

The Apogee GRAND stands 88 inches tall, is 32 inches wide, and is 40 inches deep. Each loudspeaker weighs 600 pounds. The loudspeaker features a 60 inch long, .5 inch wide tweeter element operating from 9000Hz to 25KHz, a 60 inch long by 1.5 inch wide mid-range element operating from 250Hz to 9000Hz, a 60 inch long by 18 inch wide trapezoidal shaped woofer element operating from 70Hz to 250Hz, and two 12 inch diameter sub-woofers operating from 16 Hz to 70Hz.

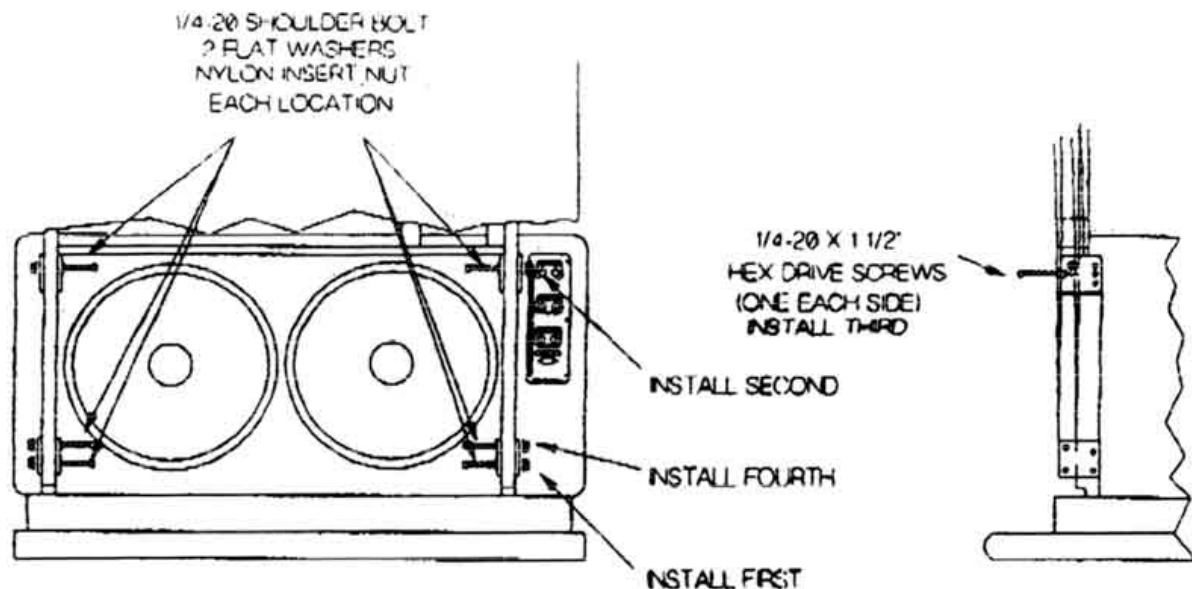
The active crossover network is the ultimate refinement of the Apogee DAX, specifically tailored for the GRAND. It is capable of operating with single-ended or fully balanced input-output signal interconnects. Output signals to the built in amplifiers are balanced. Input impedance adjustment controls fine tune the matching characteristics between the GRAND and pre-amplifiers. Selectable amplifier gain matching provisions ensure total system compatibility. A built-in diagnostic feature determines correct amplifier phasing, provides a measurement signal for correct amplifier gain matching, and monitors the working status of all amplifiers. The crossover allows adjustment of overall volume level, balance (left/right), mute, individual driver level, absolute system phasing, ON/OFF, and an Apogee exclusive Rake control that tailors the sound of the GRAND to your listening environment. All crossover functions can be operated via remote control or over a built in computer interface circuit. All internal crossover operation is controlled by several computer circuits that are easily upgraded as new features become available.

UNPACKING AND INSTALLATION:

We recommend that the Apogee GRAND be installed only by professional audio technicians. The set-up, positioning, and installation of the GRAND are key to the ultimate enjoyment of the loudspeaker. Be patient and experiment. Every installation is unique and requires careful consideration for room placement of the speakers and auxiliary equipment, room treatment, etc. We are here to assist you with any difficulties you may have. Please call us at 617-963-0124, or write: Apogee Acoustics, Inc. 35 York Avenue, Randolph, MA 02368 USA

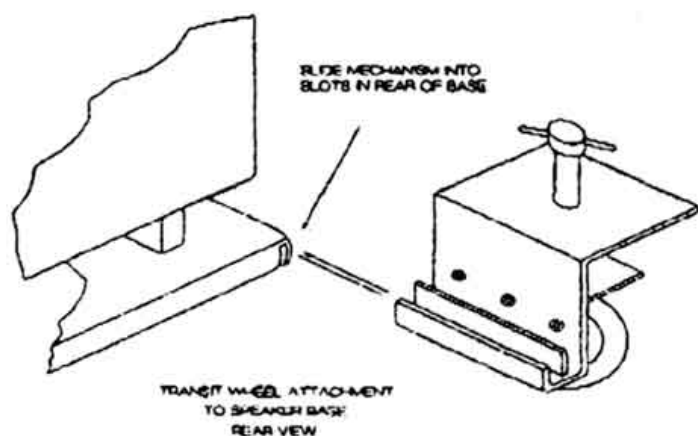
MAINS POWER CONSIDERATIONS:

The Apogee GRAND system, once set up, will consist of a total of 4 high power mono amplifiers (built-in) plus those you choose to supplement the system with. It is extremely important to ensure enough power can be supplied to the loudspeaker system without failure. The GRAND itself will require its own 20 Ampere service per speaker (10 Ampere for 200-240 volt mains). Consult your electrician and/or installing audio technician to determine your requirements for the rest of the amplification. Because of the GRAND'S complexity, be sure all mains phasing and grounds are correct. This will help in obtaining the lowest noise condition.

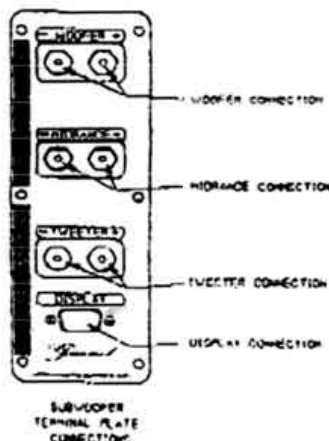


HINGE AND SAFETY BOLT LOCATIONS
AND ORDER OF ASSEMBLY

Locate the hardware pack supplied with each speaker. Locate and remove the hex wrenches, 1/4-20 shoulder bolts, washers, 1/4-20 hex nuts, and 1/4-20 X 1-1/2 hex drive screws. Locate the eight supplied auxiliary transit wheel sets and place four with each sub-woofer unit. These may be attached to the sub-woofers at this time, if so desired. In combination, the transit wheels are strong enough to support the entire GRAND assembly, including ribbon sections. To attach, slide two

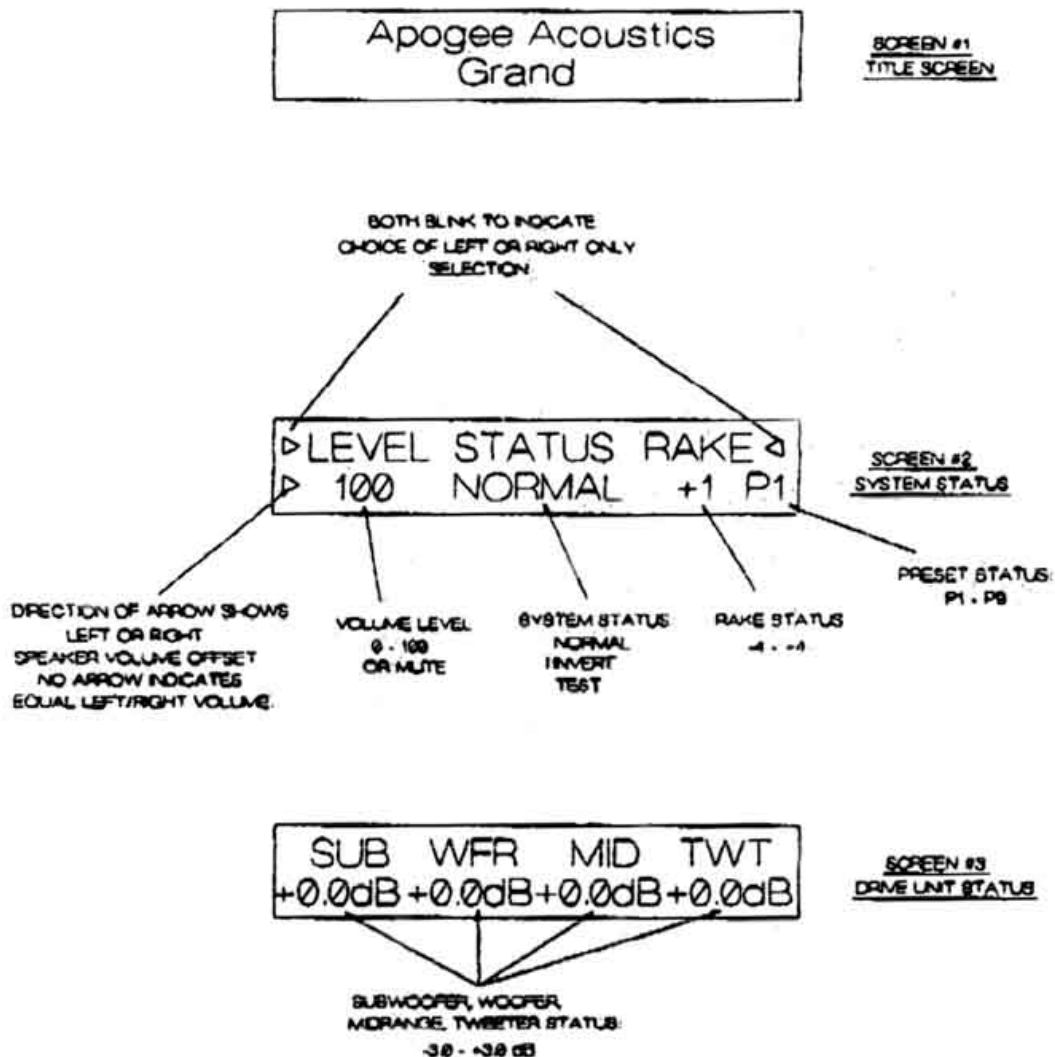


wheel sets per side of each. Slide one to the front of the speaker, and one to the rear. Be sure the rubber bumpers will make good contact with the sides of the sub-woofer. Using the long hex driver supplied with the GRAND, tighten each screw along the side of each transit wheel until snug. Rotate the top screw of each transit wheel until the wheel makes contact with the floor. Now, rotate this screw on each wheel a few turns to elevate the GRAND off the floor in an even manner. The GRAND may now be wheeled into the desired position. Before attaching the ribbon section, if it has not been connected,



ted, please lower each subwoofer to the floor. Wheel the ribbon sections to its respective sub-woofer. Still on the cart and in a horizontal position, align the connector bars with the receptacle hinge plates at the bottom of the sub-woofer. When the holes are properly aligned, insert the 1/4" shoulder bolts into each hinge plate. Place and attach washers and hex nuts on the bolts. Do not fully tighten nuts at this time. Carefully lift and rotate the ribbon sections upward from the cart into a vertical position. Be aware that the unit is heavier on the midrange/tweeter side. Install another 1/4" shoulder bolt, washer, hex nut in each slotted position in the plate above each hinge plate. Once this has been accomplished, it is safe to release the upright ribbon section. Next install a 1/4-20 hex screw into each bar near the slotted positions. Rotate until snug but do not over tighten. Repeat this

The figure below shows the appearance of the various display screens.



DISPLAY SCREENS

FUTURE:

The GRAND electronics module was designed as a software controlled package of state-of-the-art hardware components and design. There are many possible configurations of software that could be employed to control, monitor, test, and adjust the functions of the GRAND. The controlling software for the GRAND is programmed into memory chips in the GRAND, and as new software is written, updated, and expanded, the memory chips can be installed to keep your unit up to date. The factory will keep you and your dealer abreast of all current developments.

12. RAKE This control is used to adjust the upper frequency tonal balance up or down. The status of this control appears on screen #2.

13. DRIVER LEVELS SUB, WFR, MID, TWT Up/Down

The driver levels can be adjusted up or down by 3dB in 0.2dB steps. The status of each driver level is displayed on screen #3. These settings can be stored using the store preset commands.

Be sure all equipment is ready and switched on. Using the remote control unit, press the POWER button. The blue display units of each speaker should light. The first menu page should appear and read "Apogee Acoustics GRAND". Press the display button to scroll to the next menu page. Indications for volume, status, pre-set, and rake should appear. Press the mute button on the remote if mute is indicated under the "Status" bar. Make a musical selection on your source device and turn the pre-amplifier level up slowly. Press the volume up button if necessary to bring the volume to a low level. Be sure all speaker elements are functioning. Adjust the volume level on your pre-amplifier and volume level on the GRAND at 100 so it is the maximum desired listening level. When this level has been obtained, press the volume down button on the remote unit. You should not need to adjust the volume of your pre-amplifier after this; simply use the volume control of the GRAND remote unit.

DISPLAY PANEL INFORMATION:

The Apogee GRAND has been designed with a blue colored vacuum fluorescent display unit in each speaker. The purpose of the display is to give a variety of information about the working status of the loudspeaker. Various screens, or menus, have been programmed into the display unit. For the purposes of description and identification, we will label the screens as numbers. Each screen is accessed by pressing the display button on the remote unit. By repeated depressing of this button, you can scroll through the various screens. After the last screen has been displayed, screen #1 will appear if the button is pressed again. The default screen is screen #1, and upon system turn on, this screen will appear. A description of each screen follows:

Screen #1: This screen identifies the loudspeaker as the "Apogee Acoustics GRAND". Upon turning the GRAND on, this screen will always appear.

Screen #2: This screen displays information on the overall working status of the loudspeaker. In particular, the output volume "LEVEL" is displayed in units of 1 to 100, or shows "MUTE", the "STATUS" is displayed indicating "NORMAL", "INVERT", or "TEST", the selected preset is shown as "P1" through "P9", and "RAKE" position from "-4" to "+4". In addition, when LEFT ONLY or RIGHT ONLY is selected on the remote, blinking arrows appear on the selected speaker. If BALANCE is selected to offset the left-right volume level, an arrow appears to show which speaker is set to the loudest output.

Screen #3: This screen displays information on the relative level of each driver of the GRAND. The level of each driver is independently adjustable in 0.2dB increments, from -3.0dB to +3.0dB. The start-up setting is 0.0dB for all units. The levels are displayed for "SUB" or subwoofer, "WFR" or woofer, "MID" or midrange, and "TWT" for tweeter.

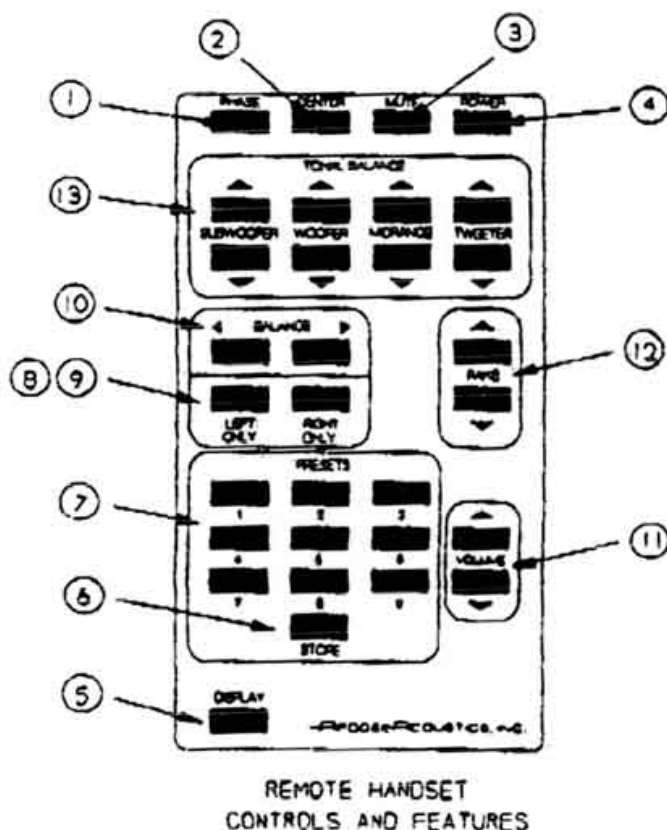
Screen #4: This screen is intentionally blank. This was done to provide the option of blanking out the display units if desired.

Note: If your GRAND was equipped with the optional tweeter amplifier, you will not read any voltage at the tweeter input binding post.

Note: If your measurements for amplifier gain and setting do not fall into the ranges as shown above, please contact the factory for assistance.

Once you have made the amplifier gain adjustments, you are ready for the first sound checks.

REMOTE CONTROL FUNCTIONS:



1.PHASE The absolute polarity of the audio signal is inverted by this control and is indicated on screen #2.

2.CENTER If the channel balance has been changed by the balance controls, the channel levels can be made equal again with this control.

3.MUTE The output of the system can be muted by this control. This is indicated on screen #2 under LEVEL label.

4.POWER When the system is powered up with this control, screen #1 will appear. When the system is turned off the outputs are muted and the display goes to screen #4. It is now in "sleep" mode.

5.DISPLAY The user can scroll through the 4 screens with this control.

6.STORE If this button is pressed and followed by pressing one of the nine numeric keys, the current settings of the balance, Rake, driver levels and polarity functions will be stored in this memory

location. To recall a preset simply press and hold the desired numeric key for a moment.

7.# 1-9 Presets 1-9 can be stored or accessed with these keys. See description above of how these functions operate.

8.LEFT ONLY If this button is pressed and immediately followed by using the driver level controls, the user can adjust the left driver levels independently. Pressing this button again returns to "Normal" mode. After entering this mode, if no buttons are pressed, the system automatically returns to "Normal" mode.

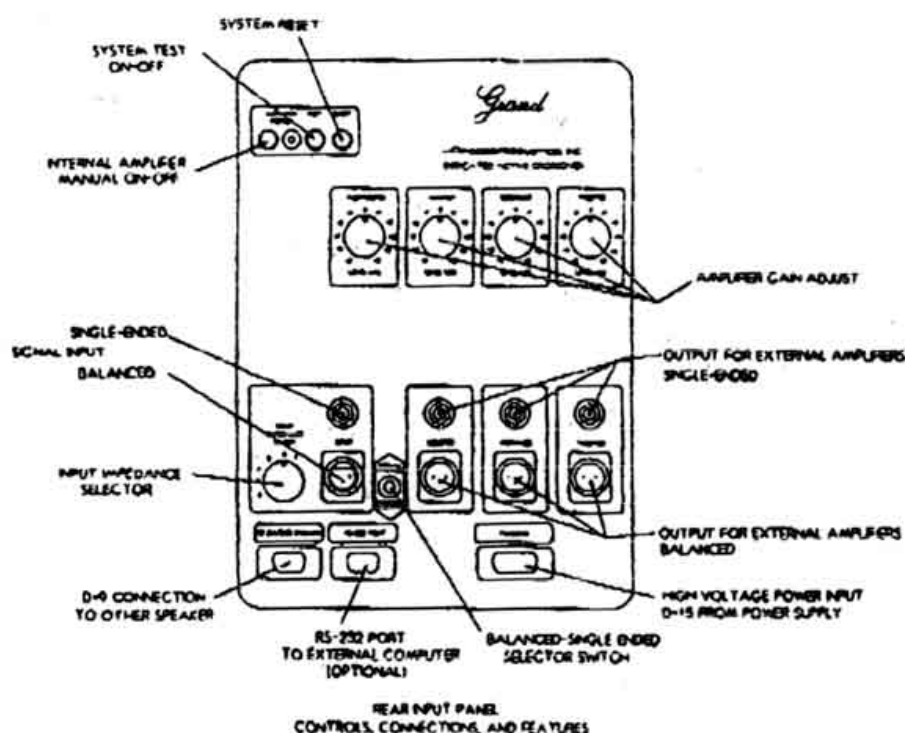
9.RIGHT ONLY Please see above description.

10.BALANCE These buttons allow the user to move the image from left to right or vice-versa. Equal channel balance can be restored by pressing the CENTER button.

11.VOLUME These buttons control the systems output level. Be sure to use a preamplifier to feed the Grand a line level signal. The Grand's volume control is provided only as a convenience and is not meant to replace your preamplifier. Here is a technique we like to use to set system levels: Set the loudest output level you may realistically want on the preamp with the Grand's volume set to a maximum level of 100. This will help you limit the absolute loudest level and help prevent damage to the system.

If you are unsure about what impedance value to select, determine if your pre-amplifier is tube or solid state. If it is tube type, select the highest impedance value. If it is solid state, select the lowest impedance value.

NOTE: If you are using high impedance signal cables, do not select low impedance settings.

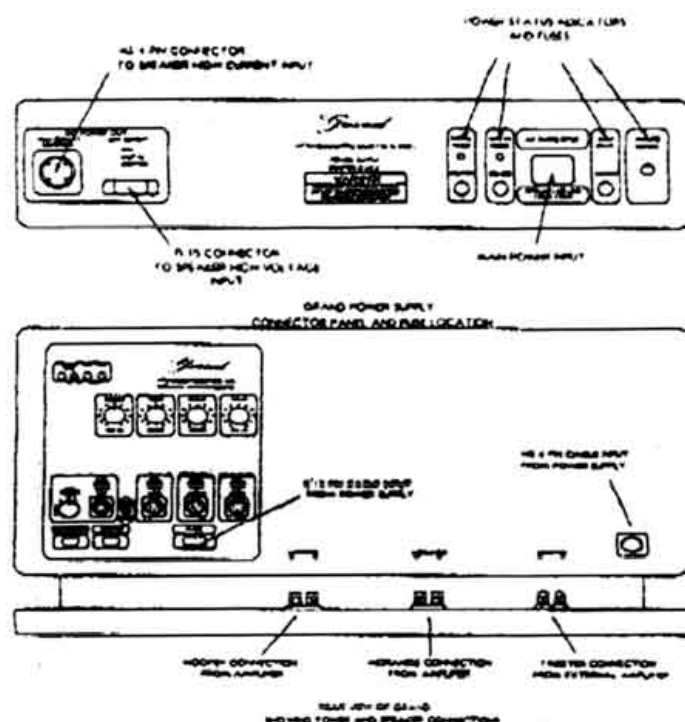


Select amplifier sensitivity. Determine what the gain of your auxiliary amplifiers are from the manufacturer or supplied literature. The GRAND's internal amplifiers are set for a gain of 26 dB. If your amplifier has a gain different to the sub-woofer amplifier, an adjustment will have to be made. For each amplifier input, select "+" or "-" the number of dB different your amplifiers are. If they are 28 dB, select +2 dB, if 24 dB, select -2dB. A further check for amplifier sensitivity is described below if you are not sure of the correct selection and/or want a more exact determination or check.

You will need a high quality, battery operated, true RMS level reading volt meter to complete the following test. Set the voltmeter for AC volts on a 10 volt range. Plug in the power for the GRAND then the external amplifiers. Turn on all source equipment and pre-amplifier. Switch on the GRAND and then turn on all external amplifiers. Be sure the level reading on the GRAND is set to 100. On the rear panel of the GRAND, press the "TEST" button and read the voltage from each external amplifier at the respective binding posts on the rear of the GRAND. Refer to the chart below to determine what setting the amplifier gain switches should be set to.

Set New	Woofer	Mid-Range	Tweeter
Level To:	min-max	min-max	min-max
5	0.4 max	0.49 max	0.43 max
4	0.40-0.44	0.49-0.56	0.38-0.43
3	0.44-0.49	0.56-0.63	0.43-0.48
2	0.49-0.56	0.63-0.71	0.48-0.54
Apogee 1	0.56-0.62	0.71-0.80	0.54-0.61
Reference >0	0.62-0.70	0.80-0.90	0.61-0.68
Level -1	0.70-0.79	0.90-1.01	0.68-0.77
-2	0.79-0.89	1.02-1.14	0.77-0.86
-3	0.89-0.99	1.14-1.28	0.86-0.97
-4	0.99-1.12	1.28-1.45	0.97-1.08
-5	1.12 min	1.45 min	1.08 min

procedure for the other speaker. Make electrical connections from the ribbon section to the sub-woofer. Connect the red-black wire pair to the terminals marked "Woofer". Connect red to "+", black to "-". Connect the blue-black pair to the terminals marked "Midrange", and the white-black pair to the terminals marked "Tweeter". Arrange the speaker cables such that they lay as flat as possible. Use the supplied hex wrench to firmly secure the cable ends to the terminals. Lastly, attach the D-shaped computer cable to its receptacle on the terminal plate. Use the screw anchors on each side of the connector to secure the cable to the terminal. Locate and unpack the GRAND Power Supplies. Place a power supply as close to its final position with each speaker as possible. Connect the larger diameter cable from the power supply to the GRAND and attach firmly by rotating the outer ring of each connector securely. Next, connect the smaller computer type cable from the power supply to the rear of each GRAND. Use the screw anchors to secure the cable at each end. Do this for both GRAND speakers but do not connect the power supplies to the power mains at this time. Attach the subwoofer grilles. Be sure cables are neatly dressed for proper grille clearance. The GRAND is now assembled and ready for final connection and tuning.



AMPLIFIER CONNECTION:

Locate and place all additional amplifiers in as close to their final positions as possible. Determine if you will be using single ended or balanced signal interconnects. Adjust the switch position on the back of each GRAND to correspond to your choice. Make all signal connections at this time. Also, connect each amplifier speaker output to woofer, midrange, or tweeter as required. Note: If your GRAND was supplied with optional tweeter amplifier built in, do not make any connections to the crossover tweeter output or speaker tweeter input. Using the supplied hex wrench, secure the speaker cables to their connectors. Do not turn on any auxiliary amplifiers at this time.

Select which speaker will be the "master" unit. Both GRANDS are fully equipped to be the receiver for the remote control unit, however, only one unit can function this way

at one time. Therefore, you must select which unit will be the receiving unit, or "master". The factory pre-set condition is for the left unit to be the master. If you wish to switch the "master" selection, remove the grilles of the sub-woofer units. Reach up and to the side of the display units. Toggle the switches to the opposite position to reverse the "master" selection.

Select input impedance. Determine from the manufacturer of your selected pre-amplifier, what the desired load impedance should be for optimum performance. Move the impedance selector knob on the GRAND to that position indicated below:

IMPEDANCE VALUE

POSITION	BALANCED	SINGLE ENDED
1	80K Ohms	100K Ohms
2	20K	80K
3	5000	40K
4	2500	20K
5	1200	10K
6	600	5000

RS-232 LINK:

On the rear panel of each GRAND is a 9 pin D-connector labelled "RS-232 PORT". This connection is provided for future connection of the GRAND to a personal computer, custom installation, or other computer interface device. All functions of the remote control unit are available through this port as well as expansions of numbers of presets and more intimate interfacing with the central command processing units. The factory will keep you abreast of further developments in this area. Interfacing information is available for custom programmers; please contact the factory.

To use the RS-232 port, both GRAND speakers must be set to slave mode. This is done by moving the toggle switches of each display unit towards the cable connector on the side of the display. The switch is accessed by removing the black rear grille panel of each speaker. Change the switch position and re-install the grille. Install a RS-232 cable from the port on the rear of either GRAND to the computer interface device. Initiate the software in the computer device and follow commands to control the GRAND.

SPECIFICATIONS:

Frequency Response:

Below 18Hz to over 27KHz

Crossover:

Dedicated active four-way crossover with remote control. User adjustable level controls for each drive unit in 0.2dB increments from -3.0dB to +3.0dB, as well as high frequency boost or cut. User adjustable volume level from full mute to full output. Absolute phase inversion control.

Electrical Crossover Frequency:

70Hz, 250Hz, 9000Hz

Amplification:

Dedicated subwoofer and tweeter amplifiers rated at 500 watts each. (User supplies two additional channels of amplification per speaker for woofer and midrange)

Fully external power supply for lowest possible electrical noise induction.

Sound Level:

Over 120 dB SPL peak at 4 meters

Nominal Impedance:

three ohms

Dimensions:

88"(H) x 32"(W) x 39"(D)

Weight:

1300 lbs. per system, including power supplies.