



# RH-1 DYNA-GARD UNIVERSAL PROCESSOR

## OPERATION MANUAL

THANK YOU FOR PURCHASING AN RH-1 DYNA-GARD PROCESSOR. IT IS A PRODUCT OF PROFESSIONAL QUALITY, DESIGNED AND BUILT TO DELIVER RELIABLE PERFORMANCE. PLEASE READ THIS MANUAL CAREFULLY TO MAKE THE MOST OF YOUR SOUND SYSTEM'S CAPABILITIES

### LIMITED WARRANTY

Renkus-Heinz warrants this product to be free from defects in materials and workmanship for a period of three (3) years from the date of the original customer purchase.

The warranty may be transferred to subsequent owners, provided the original dated bill of sale is retained and presented whenever warranty service is required.

Renkus-Heinz is not responsible for:

- 1) damage caused by accident, abuse, misuse, product modification or neglect,
- 2) damage incurred during shipment,
- 3) damage caused resulting from failure to follow instructions contained in this operation manual,
- 4) damage to speakers, speaker systems or amplifiers,
- 5) damage resulting from repair performed by persons not authorized by Renkus-Heinz,
- 6) claims based on any misrepresentations made by the seller.

In the event that this product requires warranty service, call or write to the factory for a return authorization number. Pack the unit securely in the original packing carton, including a copy of the original dated bill of sale, and ship it, prepaid, to Renkus-Heinz, Inc. at 17191 Armstrong Ave, Irvine, CA 92714.

If warrantable, Renkus-Heinz will repair and return the product free of charge.

**Limitation of implied warranties:** All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

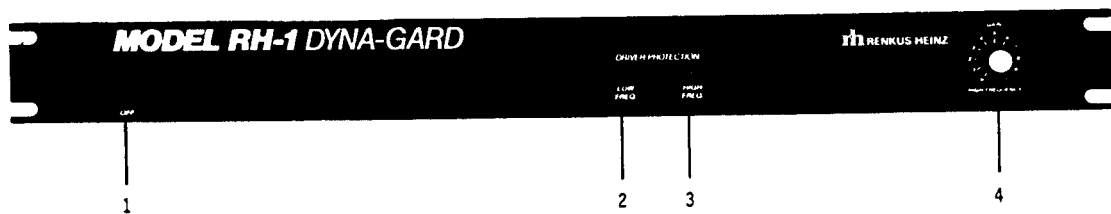
**Exclusion of certain damages:** The liability of Renkus-Heinz is limited to the repair or replacement, at our option, of any defective product and shall in no event include incidental or consequential commercial damages of any kind.

Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply in your case.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

We sincerely appreciate your confidence in Renkus-Heinz products. The unit which you have just purchased reflects the most advanced professional design and has been meticulously assembled by carefully trained craftsmen with one purpose in mind - - to bring you years of uninterrupted musical enjoyment.

## FRONT PANEL INDICATORS & CONTROLS



### (1) POWER SWITCH

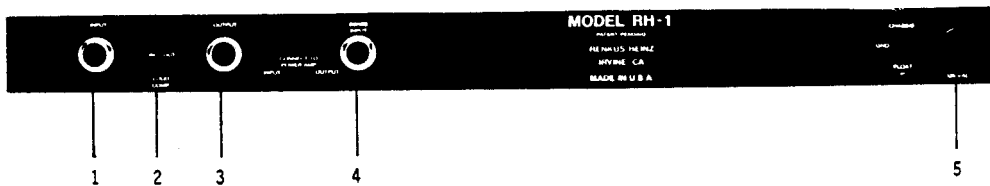
Press upwards to turn the unit on. A protective muting circuit is automatically activated that shorts the output momentarily after the unit is either turned "ON" or "OFF". This prevents damage to power amplifiers and speakers due to the initial power surge.

### DRIVER PROTECTION INDICATORS

**IMPORTANT:** LED'S INDICATE ACTIVATION OF THE PROTECTIVE CIRCUITS. THESE CIRCUITS WILL AUTOMATICALLY ADJUST DRIVER POWER TO A SAFE LEVEL. HOWEVER, ANY OF THE LED'S GLOWING BRIGHTLY FOR EXTENDED PERIODS OF TIME INDICATE THAT PART OF THE SYSTEM IS OVERLOADED. POWER SHOULD BE REDUCED OR, IF HIGHER SOUND PRESSURE LEVELS ARE REQUIRED, SPEAKER SYSTEMS MUST BE ADDED.

- (2) Low Frequency LED indicates activation of the L.F. protection circuits, which control the L.F. energy spectrum.
- (3) High Frequency LED indicates that the H.F. thermal protection circuits are reducing the level of the H.F. energy to the H.F. Driver.
- (4) High Frequency Gain controls level of High Frequency Driver(s)

## REAR PANEL CONNECTORS AND SWITCHES



### (1) INPUT

Balanced stereo (tip, ring, sleeve) 1/4" phone jack. Tip is "+" (non-inverting), ring 3 is "-" (inverting), sleeve is ground.

### (2) LOUDNESS COMPENSATION SWITCH

The IN/OUT switch for a level sensitive low frequency contour that automatically compensates for human hearing response at low Sound Pressure Levels. Except for purposes of room equalization, this switch should be "ON".

### (3) OUTPUT

Unbalanced mono (tip, sleeve) 1/4" phone jack provides signal to input of the power amplifier(s). Tip is "+" or "hot", and sleeve is "-" or ground.

### (4) SENSE INPUT

A 1/4" phone jack connects the protection circuits to the power amplifier output. The protection circuits sense both power and frequency content of the signal delivered to the drivers and act instantaneously to protect the L.F. Driver from either excessive heat or over-exursion, and the H.F. Driver from overheating. The sense input is isolated from ground, balanced and insensitive to polarity.

A Sense cable with proper matching connectors is provided.

### (5) LINE CORD

3-wire, heavy duty line cord connects to the main power line. The unit requires nominally 120 V ac at 60 Hz and is designed to work from 90 to 130 volts. Export models are equipped with 220 V transformers. These units will operate from 200 volts to 250 volts at 50 Hz or 60 Hz.

### (6) FUSE (located inside chassis, remove top cover to access)

The fuse, connected in series with the primary of the power transformer, must be 1/4 AMP, TYPE 3 AG. In export models the fuse must be reduced to 1/8 AMP, TYPE 3 AG. CAUTION: DO NOT REPLACE WITH HIGHER VALUE OR DIFFERENT TYPE.

## PC BOARD PROGRAM JUMPERS

Your RH-1 DYNA-GARD processor may be programmed for use with any Renkus-Heinz enclosures, in addition to a majority of passive 2- and 3- way speaker systems. PC-board mounted jumpers set the high frequency equalization and protection circuits for proper operation. Your processor has been programmed at the factory for maximum high and low frequency protection and high frequency equalization suitable for 1" compression drivers. Program your processor for the particular driver combination in your speaker system. The top panel diagram identifies the location of the program jumpers SW2 thru SW5.

**SW2** - provides 3 alternative settings of high frequency equalization. OUT: flat response for use with bullet tweeters or compression drivers on exponential horns, 1": equalized for 1" compression drivers on constant beamwidth horns, 2": equalized for 2" compression drivers on constant beamwidth horns.

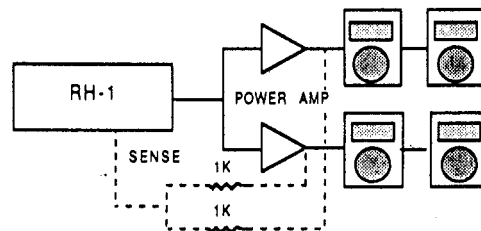
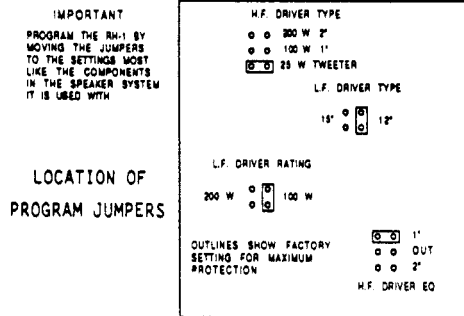
**SW3** - controls the low frequency excursion of the woofer, or how far the woofer cone is allowed to travel before damage can occur. Set to 12" if your speaker system has 12" woofers, set to 15" for 15" woofers.

**SW4** - controls the amount of power fed to the woofer and protects against over-heating of the speaker coil. Set for the power rating corresponding to that listed on your speaker cabinets.

**SW5** - controls the amount of power fed to the high frequency section of your system and protects against overheating of the tweeter or driver coil. The protection circuits have been optimised for TWEETER : 50 Watts, 1" : 100 Watts, 2" : 200 Watts.

For example:

for use with Renkus-Heinz FRS 1580, set SW2 to OUT, SW3 to 15", SW4 to 100W, SW5 to 1".  
for use with Renkus-Heinz SMS 1280, set SW2 to OUT, SW3 to 12", SW4 to 100W, SW5 to 1".  
for use with Renkus-Heinz PBS 1582-CB, set SW2 to 2", SW3 to 15", SW4 to 200W, SW5 to 2".



CONNECTION FOR MULTIPLE AMPLIFIERS

## SET UP AND OPERATIONS

PROPER CONNECTION OF YOUR RH-1 DYNA-GARD PROCESSOR IS VITAL TO THE SAFE HIGH OUTPUT OPERATION OF YOUR SOUND SYSTEM. EXTREME CARE SHOULD BE TAKEN TO ENSURE THAT BOTH SIGNAL AND SENSE LOOP CONNECTIONS ARE PROPERLY MADE AND THAT PROTECTION CIRCUITS ARE FUNCTIONING. PLEASE BE SURE TO FOLLOW THE INSTRUCTIONS BELOW.

**Input and Output Cables:** RH-1 input is balanced with active circuitry using tip "+" (non-inverting), ring "-" (inverting) and sleeve ground. It is acceptable to connect single ended (unbalanced) equipment to the input of the RH-1 by simply using a mono (tip, sleeve) 1/4" phone plug. The input will be automatically unbalanced. RH-1 output is single ended (unbalanced).

**Sense Input Cables:** Connections are most conveniently accomplished from the output of the power amplifier to the sense inputs. A proper sense cable with 1/4" phone plug and dual banana plug is supplied with your processor. If your power amplifier requires other connectors and/ or if longer sense lines are needed, you can substitute other cable. High current capability, shielding, or polarity are not important.

**Multiple Power Amplifiers:** In larger systems it is economical to use several amplifiers with each processor. The diagram above illustrates a system using four like enclosures driven by a 2-channel amplifier. Connect a sense cable from each amplifier channel output through a 1K ohm 1/4W resistor to the processor sense input as shown.

### MOUNTING OF PROCESSORS WITH OTHER EQUIPMENT

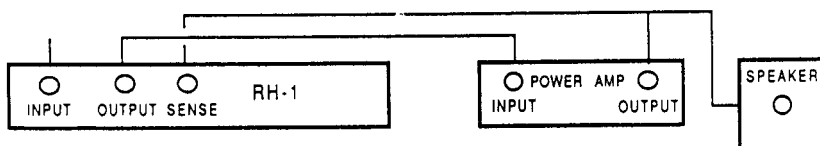
In most installations it is best to mount the RH-1 DYNA-GARD processor in the power amplifier rack. In this arrangement the sense connections are short and easy to verify. However, keep in mind that all amplifiers radiate 50/60 Hz magnetic hum fields from their power transformers. Some amplifiers do this more than others. It may be necessary to allow space between the RH-1 processor and the nearest power amplifier to prevent hum.

### SELECTION OF POWER AMPLIFIERS

Select power amplifiers that most closely match the power handling (or power requirements) and nominal system impedance of your speaker system. Do not use amplifiers of a lower power rating than that required by the speaker system as this will cause the amplifier to clip early and damage the drivers. We do not recommend the use of amplifiers of more than 1.5 times rated speaker power, because the RH-1 processor does not limit extremely fast rise-time transients, and damage to the drivers may occur. Avoid the use of amplifiers with power limiting or compression features as this may interfere with the correct functioning of the processor's protection circuits. If higher sound pressure levels are required, additional amplifiers and speaker systems will be needed.

## SYSTEM CONNECTIONS

Connect components as shown below, then verify that all connections and protection circuits operate as detailed in "Verification" section below. With program material adjust the high frequency gain control for the desired tonal balance.



## VERIFICATION OF PROTECTION CIRCUIT OPERATION

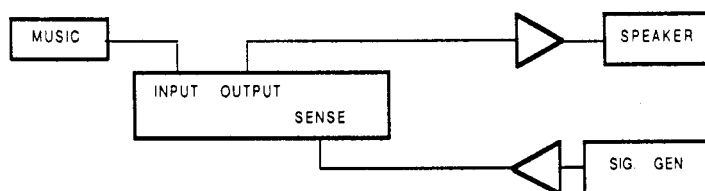
**VISUAL VERIFICATION:** Before applying power to the system trace and verify all connections. Check all sense cables and the setting of the internal program jumpers. After visual verification proceed to a functional check at low power. Connect a suitable high quality music source to the input of the mixer. Set gain controls on all power amplifiers to zero. Only then turn on power.

**FUNCTIONAL VERIFICATION:** The following procedure requires an audio generator and an amplifier capable of 40 V rms output. This is the preferred method of checking the RH-1 as it can be done at low output levels and it provides for a complete operational check of all protection circuits.

**Low frequency section:** Make connections as shown below. Disconnect the sense cable from the power amplifier output and connect it to the output of the the generator/amplifier combination. Turn the H.F. gain control counterclockwise and adjust the system power amplifier gain for a comfortable output with the music source. Set audio generator to 40 Hz and increase its level until the Low Frequency LED comes on. It should be audible that the system low frequency cut-off has moved higher. (Listen for the low, low bass). Now adjust the audio generator frequency to 500 Hz and increase its level until the L.F. LED comes on. The output from the L.F. Driver(s) should decrease.

**High frequency section:** Check the H.F. section, by first setting the H.F. gain control to maximum. Set audio generator frequency to 5000 Hz and increase its level until the High Frequency LED comes on. The output from the H.F. Driver should decrease.

**ALTERNATE VERIFICATION:** If the above equipment is unavailable, disconnect all speakers, leaving the sense lines connected. Increase amplifier gain until the RH-1 protection LED's flash. Reduce amplifier gain before reconnecting speakers.



## TECHNICAL SPECIFICATIONS

### PROCESSOR SPECIFICATIONS

INPUT IMPEDANCE : 33 K ohm balanced  
 FREQUENCY RESPONSE (sum) : + .5 dB 20-20 KHz (no EQ)  
 TOTAL HARMONIC & IM DIST. : < .01% 20-20 KHz (no EQ)  
 HUM & NOISE : < 85 dBm 20-20 KHz (no EQ)  
 OVERALL GAIN : UNITY, 20-20 KHz (no EQ)  
 OUTPUT IMPEDANCE : 300 ohm unbalanced  
 INDICATORS : HIGH FREQ & LOW FREQ  
                   OVERLOAD  
 DIMENSIONS (WxHxD) : 19" x 1.75" x 8.5"  
                           : (48.2 x 4.4 x 21.6 cm)  
 NET WEIGHT : 6.5 lbs (3.0 kg)  
 SHIPPING WEIGHT : 8.5 lbs (3.9 kg)

### SYSTEM EQUALIZATION

LOW-FREQUENCY : LOUDNESS COMPENSATION  
 HIGH-FREQUENCY : HIGH QUALITY TWEETERS  
                           : 1" AND 2" DRIVERS  
 DYNA-GARD PROTECTION  
 PROTECTION SENSE IMP. : 47 K OHM BALANCED  
 DYNA-GARD PROTECTION  
 WOOFER PROTECTION  
                           operates on : LOUDNESS COMP, LF GAIN  
 H-F DRIVER PROTECTION  
                           operates on : HIGH-FREQ. GAIN  
 POWER REQUIREMENTS : 105-130 V 50/60 Hz  
                           : 210-250 V 50/60 Hz  
                           : 15 WATTS max.

All specifications subject to change without notice

R-H RENKUS-HEINZ INC., MANUFACTURERS OF PROFESSIONAL AUDIO COMPONENTS AND SYSTEMS.  
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