

Owner's Manual

# HA-6AB

## HEADPHONE MONITOR / AMPLIFIER



**FURMAN**

**HEADPHONE  
MONITORING SERIES**

# HA-6AB / HA-6ABE Manual

**Important Note:** To obtain best results from this Furman Sound electronic product, please be sure to read this manual carefully before using it. Please fill out and return the Warranty Registration Card immediately to obtain full protection under the terms of the Limited Warranty, in case your ownership documents are lost. Please verify that the serial number shown on the Warranty Card matches the serial number on your unit.

## INTRODUCTION

Congratulations on your purchase of a Furman Sound HA-6AB. You have chosen the most versatile headphone amplifier available. The HA-6AB is a unique combination of a headphone amplifier and a conventional power amplifier, which can save the expense of an extra power amplifier in many situations. Its high power capacity provides adequate headphone listening levels without distortion in any environment. Additionally, the HA-6AB's toroidal transformer assures noise-free performance. It eliminates electrical hum and mechanical noise from the unit itself, as well as leakage into other sensitive equipment, such as mic preamplifiers, video monitors, etc. The HA-6AB is designed for recording studios, rehearsal studios, language labs, and for use in demonstrations of audio tracks or audio equipment.

## FEATURES

- Powers headphones and speakers
- 20 watts per channel, stereo
- Toroidal power transformer for ultra-quiet performance
- 6 headphone outputs, each with its own volume control

- Separate front panel switches for speakers and remote headphone outputs or a second set of speakers
- Automatically switches to mono mode when right channel is not used
- Signal-present and Overload LED's for each channel
- Ground lift switch
- Power-on indicator
- Convenient Remote/Satellites outlet provides signal for up to 12 remote headphone stations. (Such as the Furman HR-2 remote station.)

## DESCRIPTION

The HA-6AB is a single rack space 20 watt per channel stereo amplifier. Unlike a conventional power amplifier, however, it has six headphone outputs (stereo phone jacks) on the front panel, each with its own volume control. When used for overdubbing or rehearsal, this provides more than adequate volume in all headphones (even low-impedance models), and allows each musician to set his or her own listening level. When overdubbing is complete and the musicians remove their headphones, the HA-6AB can power the tape playback through a set of studio monitor speak-

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ers, selected by pressing front panel pushbuttons. Without the HA-6AB, a separate amplifier would be needed for the studio speakers. The HA-6AB also features a convenient input level control on the left side of the front panel. A pair of yellow LED's (one for each channel) light up whenever a signal is present. Another pair of red LED's shows an overload condition in either channel.

The Furman HA-6AB's 20 watts-per-channel make it ideal as a low distortion headphone driver for the most critical listening situations. While most headphone amplifiers provide half a watt or less per headphone channel, the HA-6AB's higher power can drive headphones of any impedance to their full rated listening level, and do so with minimal noise and distortion. Its power capacity is also just right for the small near field monitors used in most recording studios; as a comparison with the main control room monitors, it can power them without overpowering them. On the studio floor, a set of small monitor speakers driven by the HA-6AB can make a session progress more efficiently by giving the musicians a chance to hear a playback without needing to disconnect themselves from their equipment and walk into the control room. Additionally, the HA-6AB is fully protected against thermal overload, and it can withstand a short circuit on any or all outputs for an indefinite time without damage.

## ACCESSORIES

Model HR-2 Headphone Remote Station: A compact, unobtrusive box that clamps to any

mic stand, providing two headphone jacks, each with its own volume control. Up to twelve HR-2 boxes may be connected to a HA-6AB, employing standard microphone cables (depending on the impedance of the headphones used).

## USES OF HA-6AB

The HA-6AB may be used as a power amplifier to drive up to two pairs of speakers, or as a headphone amplifier for one to six pairs of headphones, or both. Additional headphones may be connected through use of HR-2 Remote Boxes.

## RECORDING

In the recording studio, headphones are most often used in the overdubbing process, whereby new musical tracks are recorded in synchronization with previously recorded tracks. The musicians doing the overdub hear the previously recorded tracks in their headphones, and play along with them. Synchronization is maintained because almost all multitrack recorders have the capability of playing back through certain channels of the record head while recording through others. In this way, it is possible to build up a complete recording of many tracks, adding one or more new tracks with each overdub.

Headphones are much preferred to speakers for cueing the overdub, because of the presence of open microphones which would pick up the cue tracks as well as the overdub. Any trace of the cue tracks in the overdub tracks would degrade the tracks' separation and make it difficult to achieve a good mix later on. In fact, even if headphones

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are used, it is important that they clamp tightly to the musicians' heads so that a minimal amount of sound leaks out.

The cue mix heard in the headphones is a combination of the previously recorded tracks along with the new sounds being added. It is generally derived from a "Cue" or "Headphone" mixing buss on the recording console, which is then routed to the Left and Right Inputs on the HA-6AB's rear panel. If this mix is mono, connect it to the Left Input. The HA-6AB will then automatically be in mono mode, so that the mix can be heard with both ears (and both speakers, if used).

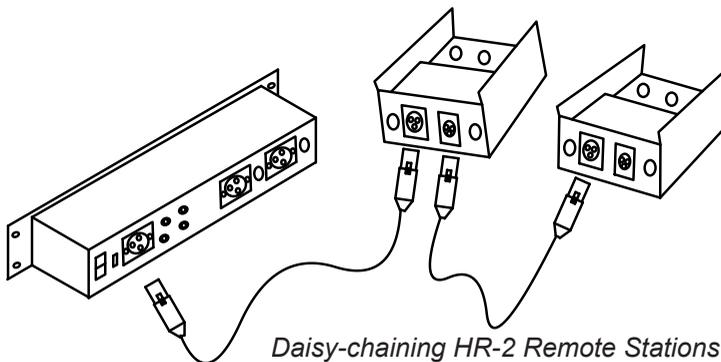
In a small studio, if no more than six sets of headphones are needed, it may be most convenient to locate the HA-6AB on the studio floor, and plug all headphone sets directly into its front panel. You may want to put a large, easily readable number on each set so that each musician will be able to locate his or her volume control, even if the cables become tangled.

In a larger studio, you may find it more practical to use several HR-2 Remote Stations at strategic locations around the studio, while the

HA-6AB itself is installed in the control room. In this arrangement, the Speaker buttons will be more easily accessible to the engineer, and each musician's volume control will be right on the mic stand in front of him or her. And of course, if the engineer or others in the control room want to hear the cue mix, they can just plug headphones into any of the HA-6AB's front panel jacks. See the section on "Use of the HR-2 Remote Stations" for additional details.

**NOTE:** For studios that require each tracking musician to have their own personalized mix, the Furman HDS-6/HR-6 or the HDS-16/HRM-16 may be required as an alternative to the HA6-AB.

The HR-2 Remote Stations connect in "a daisy chain" fashion to the Speaker B output on the rear panel of the HA-6AB. This output is an XLR connector, so that standard microphone cables can be used. The HA-6AB connects to the first HR-2 box; another mic cable connects the first HR-2 box to the second HR-2 box; a third mic cable connects the second HR-2 to the third HR-2; and so forth. However, twelve HR-2 is the recommended maximum.



*Daisy-chaining HR-2 Remote Stations to the HA-6AB*

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One or two sets of studio speakers may be connected to the HA-6AB. If two sets are needed, the “B” pair must be connected to the XLR output using a custom made cable. HR-2 Remote Stations cannot be used in this case.

## REHEARSAL

Headphones are used in rehearsal sessions not only to avoid disturbing neighbors with loud sounds, but also to provide each musician an easily controlled mix of all the other tracks. Using headphones guarantees that each will hear a balanced mix regardless of where they are positioned relative to various instruments or speakers (a luxury not always available in performance). As in recording, a mixing board must be used, whose output will drive the HA-6AB either in mono (use Left Input only) or stereo (use both inputs).

The main consideration in locating the HA-6AB is whether each musician will need easy access to his or her own volume control. If the musicians are spread around a large room, the use of a chain of HR-2 Remote Stations may be more convenient than having each pair of headphones plug directly into the HA-6AB.

## LANGUAGE LABS

Language labs occasionally need to drive as many as 50 headphone sets. If more than twenty five sets are required, they must be high-impedance types. HR-2 Remote Stations provide a convenient way to place a volume control at each listening position (two listeners can share each box).

## USE OF THE HR-2 REMOTE STATIONS (SATELLITES)

The HR-2 Remote Stations may be used to increase the number of headphones which can be accommodated by an HA-6AB, and to place a volume control within reach of each individual needing it. They are compact boxes which easily attach with a thumbscrew to any microphone stand. Each HR-2 has two stereo volume controls and two headphone jacks. There are also two XLR connectors, one male and one female. These may be used to “daisy chain” HR-2 boxes together with standard microphone cables. Begin the chain at the SPEAKER B - SATELLITE/REMOTE connector on the rear of the HA-6AB. The HA-6AB connects to the first HR-2 box; another mic cable connects the first HR-2 box to the second HR-2 box; a third mic cable connects the second HR-2 to the third HR-2; and so on. If low impedance headphones are used, up to twelve HR-2’s may be in the chain. If medium or high impedance headphones are used, 25 or more Remote Stations may be chained. If desired, the clip on an HR-2 box may be hung on a belt if no microphone stand is convenient.

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## DESCRIPTION OF CONTROLS:

### FRONT PANEL

**INPUT LEVEL:** The Input Level control provides a means of scaling the effect of the individual headphone volume controls. The Input Level should be adjusted so that there is an adequate range of volumes available at each listening position, so that any listener can be accommodated, and the average listener's volume will be set at about halfway. The Input Level control is stereo; it affects both left and right channels simultaneously.

**SIGNAL PRESENT LIGHTS:** These yellow LED's turn on whenever a signal exceeding 125 millivolts RMS (40 dB below full power) is present at the HA-6AB's input jack. They will increase in brightness as the signal strength increases. This feature is very useful and can provide a clue to where the fault may lie if the expected program is not heard at the listening stations.

**OVERLOAD LIGHTS:** These LED's glow red to indicate an overload in the HA-6AB. If the LED lights up, either the drive level to the unit should be reduced, or the setting of the Input Level control should be reduced until the LED remains off. The lights turn on when the signal level at either output approaches .5 to 1 dB of clipping. Once

triggered, the lights will stay lit for a minimum of 50 milliseconds so they can be easily seen, even if the actual duration of the overload is much shorter.

**HEADPHONE JACKS / VOLUME CONTROLS:** Any type of headphones, wired with a standard 1/4" stereo phone plug, may be used successfully. All six outputs receive the same stereo signal. They differ only in the individual volume settings.

**SPEAKER-A BUTTON:** Depressing this button turns on the speakers connected to the SPEAKER-A banana jacks on the rear panel, and simultaneously turns off the signal to all the front panel headphone outputs.

**SPEAKER-B BUTTON:** Depressing this button turns on whatever is plugged into the SPEAKER-B SATELLITE/REMOTE XLR connector on the rear panel. This will be either a pair of speakers or a chain of HR-2 Remote Stations. Therefore, leave this button depressed when using Remote Stations. Depressing it does not turn off the front panel headphone outputs. See the section on the Rear Panel for speaker wiring.

**POWER LIGHT:** Glows red when unit is receiving power and the ON-OFF SWITCH is in the ON position.



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## REAR PANEL

**ON-OFF SWITCH:** This switch turns the HA-6AB on and off. For convenience, it is recommended that the HA-6AB and any other rack-mount equipment be powered through a switchable outlet box, such as the Furman Sound PL-8 or PL-PLUS Power Conditioner and Light Module. The PL Series provides an easy way to power up the whole rack with one front-panel switch, and provides discreet illumination on dark stages and studios as well. If you do use a switchable outlet box, leave the HA-6AB's on-off switch in the ON position at all times.

**GROUND LIFT SWITCH:** In many installations, hum-causing ground loops are formed by the common connection of various pieces of equipment to the power line ground, and by contact between chassis, as in a rack with metal rails. Sliding the Ground Lift switch up completely isolates all signal grounds from the chassis, breaking any ground loops. The chassis always remains connected to the ground pin on the AC cord for safety and to provide shielding against RF interference. Try both positions of the Ground Lift switch, and leave the switch in the position that results in the least hum in your system.

**Note:** The ground lift can be rendered ineffective by 3 pin audio connectors that tie pin 1 (signal ground) to the metal shell of the connector (chassis ground).

The connection from pin 1 to the shell is optional on all 3 pin connectors, and can be removed if present, by opening up the connector on the cable and disconnecting it.

**SPEAKER A OUTPUTS:** These outputs should be used when a pair of speakers is used as an alternative to headphones, since the headphones are switched off when the speakers are switched on. The connections are 5-way binding posts, which can accommodate dual banana plugs, bare wires, or wires terminated in spade lugs.

**SPEAKER B SATELLITE/REMOTE OUTPUT:** This output is a single male XLR connector containing both the left and right channel outputs. It is wired as follows: Pin 3-left (high); Pin 2-right (high); and Pin 1-low, common to both channels. This output should be used as the starting point for a chain of HR-2 Remote Stations (satellites). It will receive signal whenever the front panel SPEAKER B button is depressed. If necessary, it may also be used to connect a second set of speakers. However, if it is used for speakers, note that depressing the SPEAKER B button will not switch off the front panel headphone jacks in the way that the SPEAKER A button does.

**INPUTS:** Quarter-inch (mono) phone jacks are intended for line level signals such as the outputs of a mixer. Microphones and/or instrument pickups may not have strong enough outputs to drive the



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HA-6AB directly without first being preamplified. The 1/4" phone inputs are stereo jacks (tip-ring-sleeve) wired for a balanced input. If a mono phone plug is inserted, the input will automatically be converted to unbalanced. If using a mono signal plug into the left 1/4" jack the HA-6AB will send signal to both left and right channels.

The HA-6AB is also equipped with left and right balanced female XLR connectors in addition to the standard 1/4" phone jacks. Balanced lines offer the benefits of cancellation of hum, noise, and RF interference which may be picked up in the interconnecting cables. For balanced connections, shielded twisted pair cable must be used. The wiring is as follows: Pin 1-shield; Pin 2-signal positive; and Pin 3-signal negative. The XLR inputs can not be used in mono like the 1/4" input jacks.

## CIRCUIT DESCRIPTION

*CAUTION!* This section is intended to assist the professional user with considerable experience in electronics to achieve a better understanding of the operation of the HA-6AB. Under no circumstances should persons without electronics troubleshooting experience and training undertake repairs on their own. There are no user serviceable parts inside the HA-6AB. All problems should be referred to the factory or to other qualified service personnel.

The inputs to the HA-6AB proceeds from the input connectors to op-amplifier buffers wired as differential (balanced) amplifiers.

The input connectors are stereo 1/4" phone jacks. In the HA-6AB, these will be paralleled by XLR connectors. If a mono plug is inserted, the ring connection will be grounded through the body of the plug, converting the differential amplifier to a noninverting amplifier. After the buffers, the left and right signals proceed to the two decks of the stereo Input Level control.

The HA-6AB's power amplification is derived from a pair of LM1875 integrated circuits, which have internal short-circuit and thermal overload protection. They are set for a voltage gain of 26 dB. The LM1875's drive the speaker outputs directly. The headphone outputs first pass through special high-power pots wired as volume controls.

The HA-6AB's power supply provides +/-24 volts unregulated to the LM1875 stages, which may drop to +/-20 volts under full load. A network of dropping resistors and zener diodes provides  $\pm 15$  volts to the rest of the circuit.

Both the Overload LED's and the Signal Present LED's monitor signal levels at the output (before the volume controls).

## INSTALLATION

The HA-6AB is intended for mounting in standard 19" equipment racks. Standard racks come equipped with mounting rails with holes tapped for 10-32 machine screws. Be sure to use only 10-32 screws (in particular, avoid 10-24 screws, which will fit if forced but will strip the threads). To avoid marring the panel when tightening the screws, use nylon washers under the screw heads.

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For best results, the input cables plugged into the HA-6AB should be shielded. Balanced connections should use shielded, twisted-pair cable. Headphone cables and speaker cables do not need to be shielded, though no harm is done if shielded cables (such as microphone cables) are used.

## **THREE YEAR LIMITED WARRANTY**

Furman Sound, Inc., having its principal place of business at 1997 South McDowell Blvd., Petaluma, CA 94954 ("Manufacturer") warrants its HA-6AB (the "Product") as follows:

Manufacturer warrants to the original Purchaser of the Product that the Product sold hereunder will be free from defects in material and workmanship for a period of three years from the date of purchase. The Purchaser of the product is allowed fifteen days from the date of purchase to complete warranty registration by mail or on-line at the Furman website. If the Product does not conform to this Limited Warranty during the warranty period (as herein above specified), Purchaser shall notify Manufacturer in writing of the claimed defects. If the defects are of such type and nature as to be covered by this warranty, Manufacturer shall authorize Purchaser to return the Product to the Furman factory or to an authorized Furman repair location. Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date; this is not necessary if the Warranty Registration was completed either via the mailed in

warranty card or on-line website registration. Shipping charges to the Furman factory or to an authorized repair location must be prepaid by the Purchaser of the product. Manufacturer shall, at its own expense, furnish a replacement Product or, at Manufacturer's option, repair the defective Product. Return shipping charges back to Purchaser will be paid by Manufacturer.

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Manufacturer does not warrant against damages or defects arising out of improper or abnormal use of handling of the Product; against defects or damages arising from improper installation, against defects in products or components not manufactured by Manufacturer, or against damages resulting from such non-Manufacturer made products or components. This warranty shall be cancelable by Manufacturer at its sole discretion if the product is modified in any way without written authorization from Furman Sound. This warranty also does not apply to Products upon which repairs have been affected or attempted by persons other than pursuant to written authorization by Manufacturer.

THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Product in the manner and for the period provided above. Manufacturer shall not have any other

obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for incidental, special, or consequential damages. Manufacturer's employees or representatives' ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by Purchaser, and are not a part of the contract for sale or this limited warranty. This Limited Warranty states the entire obligation of Manufacturer with respect to the Product. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

## **SERVICE**

Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.

NOTE: All equipment being returned for repair must have a Return Authorization (RA) Number. To get an RA Number, please call the Furman Service Department, (707) 763-1010, Ext. 120 or 121, between 8 am and 5 pm U.S. Pacific Time. Please display your RA Number prominently on the front of all packages.

## HA-6AB SPECIFICATIONS

### OUTPUTS:

- Power: 20 watts per channel, stereo, into either 4 ohms or 8 ohms, 20 Hz to 20 KHz.
- Connectors: Speakers A: 5-way binding posts (accommodates dual banana plugs, spade lugs, bare wires, etc.)  
Speakers B-Satellite
- Remote: Male XLR.

### INPUTS:

- Input Impedance: 20K ohms.
- Sensitivity: -4 dBV (635 mv) required for full output.
- Connectors: HA-6AB, both stereo phone (balanced) and XLR (balanced).

### GENERAL:

- Distortion: .01 % THD at full rated power at 1 KHz; .05% THD 20Hz to 20 KHz.
- Signal to Noise: Greater than 99 dB below full rated output.
- Frequency Response: +0, -1 dB from 20 Hz to 20 KHz, 1 watt output.
- Dynamic Headroom: 2 dB, stereo, measured with 10 ms toneburst at 1 KHz, 1 % duty cycle.
- Power Requirement: HA-6AB: 120 VAC, 60 Hz, 70 watts  
HA-6ABE: 230 VAC, 50/60 Hz, 70 watts

### MECHANICAL:

- Dimensions: 1.75" H x 19" W x 7.25" D. Wt: 7.5 lbs (3.4 kg)

# ***FURMAN***

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