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MODEL HA-6A

Owner's Manual

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

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HA -6A SPECIFICATIONS

OUTPUTS: Power:

Connectors:

INPUTS: Input Impedance: Sensitivity: Connectors:

GENERAL: Distortion:

Signal to Noise: Frequency Response Dynamic Headroom:

Power Requirement:

Mechanical:

20 watts per channel, stereo, into either 4 ohms or 8 ohms, 20 Hz to 20 KHz. Speak-s A: 5-way binding posts (accommodates dual banana plug,,, spade lijgs, bare wires, etc.) Speakers B-Satellite/Remote: XLR.

20K ohms. -4 dBV (635 mv) required for full output. HA-6A, 1/4* stereo phone, balanced or unbalanced; HA-6AB, both stereo phone (balanced or unbalanced) and XLR (balanced).

. 01 % THD at full rated power at 1 KHz;
.05% THD 20Hz to 20 KHz.
Greater than 99 dB below full rated output.
+0, -1 dB from 20 Hz to 20 KHz, 1 watt output.
2 dB, stereo, measured with 10 ms toneburst at I KHz,
1 % duty cycle.
HA-6A, HA-6AB: 120 VAC, 60 Hz, 70 wafts
HA-6AE, HA-6ABE: 230 VAC, 50/60 Hz, 70 watts
Dimensions: 1.75" H x 19" W x 7.25" D. Wt: 7.5 lbs (3.4 kg)

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Introduction

Congratulations on your purchase of a Furman Sound HA-6A. You have chosen the most versatile headphone amplifier available. The HA-6A is a unique combination of a headphone amp and a conventional power amp, which can save the expense of an extra power amp in many situations. Its high power capacity allows it to provide adequate headphone listening levels without distortion in any environment. Additionally, the HA-6A's new 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 preamps, video monitors, etc.

The HA-6A 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 outs, each with its own volume control
- Switches for two sets of speakers
- Automatically switches to mono mode when right channel is not used
- Overload and signal-present LED's for each channel

- Ground lift, on-off switches
- Power-on indicator
- Provision for remotely located volume controls

Description

The HA-6A is basically a 20 watt per channel stereo amplifier. Unlike a conventional power amp, however, it has six headphone outputs (stereo phone jacks) on the front panel, each with an associated volume control. When used for overdubbing or rehearsal, this provides more than adequate loudness in all headphones (even older low-impedance models), and allows each musician to set hi or her own comfortable volume level. When the overdubbing is complete and the musicians remove their headphones, the HA-6A can power the tape playback through either (or both) of two sets of studio monitor speakers, selected by pressing front panel pushbuttons. Without the HA-6A, a separate amp would be needed for the studio speakers.

The HA-6A also features a convenient input level control on the left side o the front panel. A pair of yellow LED's (one for each channel) light up whenever signal is present. Another pair of red LED's show an overload condition in either channel.

The Furman HA-6A's 20 watts-per-channel make it ideal as a low distortion headphone driver for the most critical listening situations. While most headphone amps provide half a watt or less per headphone channel, the HA-6A'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 "cube" reference speakers 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-6A 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. With the HA-6A, both headphones and monitor speakers are free of the hum that can occur when using an amplifier not equipped with a toroidal transformer.

The HA-6A is fully protected against thermal overload, and it can withstand a short circuit on any or all outputs for an indefinite time without damage.

Options and Accessories

Option: Model HA-6AB: Provides XLR connectors for balanced inputs, and also standard 1/4" phone jacks, which can be either balanced or unbalanced, depending on whether a stereo or mono phone plug, respectively, is used.
Accessory: Model HR-2 Headphone Remote Station: A compact, unobtrusive box that clamps to any mike stand, providing two headphone jacks, each with its own volume control. Twelve or more HR-2 boxes may be connected to a HA-6A using standard microphone cables, depending on the impedance of the headphones used.

Uses of the HA-6A

The HA-6A may be used as a power amplifier to drive up to two pairs of speakers, or as a headphone, amplifier for from 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 already recorded tracks in their headphones, and play along with them. Synchronization is maintained because almost all multi-track 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 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-6A's rear panel. If this mix is mono, connect it to the Left Input. The HA-6A 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-6A 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-6A 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-6A's front panel jacks. See the section on "Use of the HR-2 Remote Stations" for additional details.

The HR-2 Remote Stations connect in "daisy chain" fashion to the Speaker B output on the rear panel of the HA-6A. This output is an XLR connector, so that standard microphone cables can be used. The HA-6A 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. There is no limit to the number of HR-2's that may be chained together. However, if low impedance headphones are used, twelve is the recommended maximum.

One or two sets of studio speakers may be connected to the HA-6A. If two sets are needed, the "B" pair must be connected to the XLR output. 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-6A either in mono (use Left Input only) or stereo (use both inputs). The main consideration in locating the HA-6A 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-6A.

Language Labs

Language labs occasionally need to drive as many as 50 headphone sets. If more than twelve sets are required, they should 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).

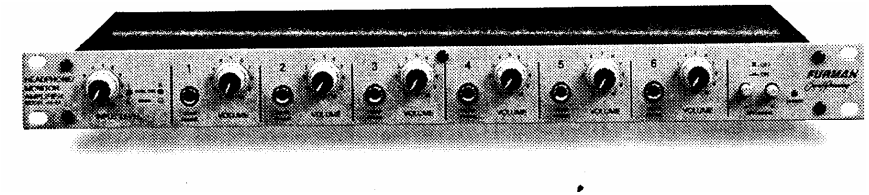
Use of the HR-2 Remote Stations (Satellites)

The HR-2 Remote Stations may be used to increase the number of headphones which can be accommodated by an HA-6A, and to place a volume control within easy 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/R EMOTE connector on the rear of the HA-6A. The HA-6A 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.

Descriptions 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. t

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-6A's input jack. They will increase in brightness as the signal strength increases. This feature is very useful as a clue to where the fault may lie if the expected program is not heard at the listening stations.

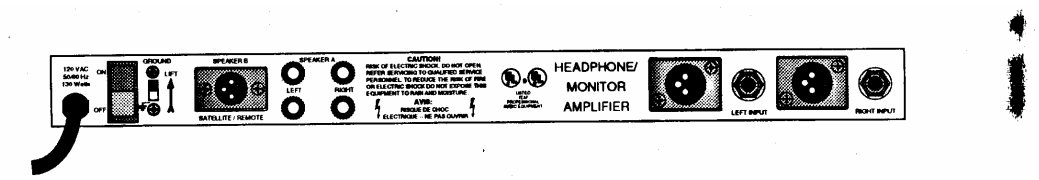
OVERLOAD LIGHTS: These LED's glow red to indicate an overload in the HA6A. If the LED lights up, either the drive level to the unit should be reduced, or the setting of the Input Level control should be reduced until the LED remains off. The lights turn on when the signal level at either output approaches .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.



Rear Panel

ON-OFF SWITCH: This switch turns the HA-6A on and off. For convenience, it is recommended that the HA-6A and any other rack-mount equipment be powered through a switchable outlet box, such as the Furman Sound PL-8 or PLPLUS Power Conditioner and Light Module. The PL-8 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-6A'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 via multiple-use terminals, which can accommodate either dual banana plugs, bare wires, or wires terminated in spade lugs.

SPEAKER B SATELLITE/R EMOTE 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 standard on all HA-6A's. They are intended for high level (line level) signals such as would appear at the outputs of a mixer. Microphones and/or instrument pickups may not have strong enough outputs to drive the HA-6A directly without first being preamplified. On all HA-6A's, the 1/4" phone inputs are stereo jacks (tip-ring-sleeve) wired for balanced lines. If a mono phone plug is inserted, the input will automatically be converted to unbalanced.

BALANCED OPTION: If the balanced option has been installed (Model HA-6AB), female XLR connectors will be present on each channel input 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.

Installation

The HA-6A 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.

For best results, the input cables plugged into the HA-6A 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.

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-6A. 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-6A. All problems should be referred to the factory or to other qualified service personnel.

The inputs to the HA-6A proceeds from the input connectors to op-amp 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 amp to a noninverting amp. After the buffers, the left and right signals proceed to the two decks of the stereo Input Level control.

The HA-6A'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-6A'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 ±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).

Limited Warranty

The Furman HA-6A is warranted against failures due to defective parts or faulty workmanship for a period of one year after delivery to the original owner. During this period, Furman will make any necessary repairs without charge for parts or labor. Shipping charges to the factory or repair station must be prepaid by the owner; return shipping charges (via UPS Ground) will be paid by Furman.

This warranty applies only to the original owner and is not transferable. Also, it does not apply to repairs done other than by the Furman factory or Authorized Repair Stations.

This warranty may be cancelled by Furman at its sole discretion if the HA-6A unit has been subjected to physical abuse or has been modified in any way without written authorization from Furman. Furman's liability under this warranty is limited to repair or replacement of the defective unit.

Furman will not be responsible for incidental or consequential damages resulting from the use or misuse of its products. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date (if a Warranty Registration Card was mailed in at the time of purchase, this is not necessary). Before returning any equipment for repair, please read the important information on service on page 11.

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 (R.A.) Number. To get an R.A. Number, please call the Furman Service Department, (707) 763-1010, Ext. 40, between 8 am and 5 pm U.S. Pacific Time, or fax us at (707) 763-1310. Please display your R.A. Number prominently on the front of all packages.

When returning any equipment for repair, please be sure that it is adequately cushioned against damage in shipment, that it is insured, and that a note is enclosed giving your name, address, phone number, and a description of the problem.

Other Furman Products

Power Conditioning & Distribution

PL-8, PL-PLUS	**Power Conditioner& I ight Mo,** *lulo. 15A*
PL-TUNER	**Power Conciltioner/Institwwrit Tui,.** r, **15A**
PL-PRO	**Power Conditioner & Liqt it M, , lifle, ~- jA**
PM-8	**Power Conditwrier/Monil(,r, VA**
PM-PRO	**Power Conditiwinr/Monii,,r, :,,A**
PS-8	**Power Condition-** q , ***or,*** **If.'**
PS-PRO	**Power Conditioneri** *, 1,,, **ricer, 2(j,,**
PowerPort	**Remote AC Power Conlirullur**
MiniPort	**Power Relay, 20A**
RS-1	**System Control Panel**
AR-1 215	**AC Line Volt,i(j,) R, r, ISA, 12(V**
AR-2306	**AC Line Volt,i(j,!** R, i,jh1,,r. I '. 2 V
AR-1 220	**AC Line Volt.** v lo R, 1. ~r, ; A, 12- 1 **OOV**

AR-2330	**AC Line Volt,up!** R, A,22, ...!,)V
AR-PRO	**AC Line Voll,iyii R, jula(or, ",,)A, 112(** *V,* **Woodwido**
ACD-1 00	**Power Distro, 10, A**
IT-1220	**Isolation Trari Aormer, Power, 20A**
ADP-1 520	**Adapter Cord, 15A to 2(,,**
BP-1 000	**On-Line UPS, 1 KVA**

Audio Signal Processing

PO-4	**Parametric EquFklizer/Proaryip**
Q-151, 0-152	**Dual 15-Band Gral** ~1 **iic I q,, iiiier**
0-301,0-302	**30-Band Graphic Iqjah/m**
Q-602	**Dual 30-Band Graphic I (Itialiior**
Q-541	**Quad 5-band Steitio Grapl,,~.** *I U*
PUNCH-10	**Bass Enhancement Systum**
X-312	**12 dB Crossover**
X-324	**2-Way/3-Way 24 dB Cros-voir**
X-424	**3-Way/4,5-Way 24 d13 Cr(** *r*
X-524	**4-Way 24 dB Crossover**
C-1 28	**Compressor/Limiter**
LC-6	**Stereo Compressor/Gate**
QN-44	**Quad Noise Gate**

SP-20A	**Stereo Halt Rack Power Amp, 20W per channel**
HR-2	**Headphone Passive Remote** *box*
MM-4A	**4 x 1 Rack-Mount Mixer**
MM-8A	**4 x 2 Rack-Mount Mixer**
DJM-6	**DJ Production Mixer**
DJM-8	**DJ Production Mixer**
SM-3	**Stereo Mixer with Ducking**
PB-40	**Patch Bay**
IP-8	**Iso-Patch, Isolated Patch Bay, 8 channel**
IP-2	**Iso-Patch, Dual Isolator, 2-channel**
VU-40	**System Monitor (PowerNU Metur)**

SC-1, 2Security Covers