

# SP-20AB / SP-20ABE

## HALF RACK POWER AMPLIFIER



# FURMAN

## 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. 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.

## **SP-20AB Features**

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- 20 watts per channel in stereo mode
- XLR Balanced inputs
- May be bridged for 40 watt mono operation (requires load of 8 or more ohms)
- Front panel headphone jack with volume control
- Ideal for small speakers or headphone system
- Speaker on-off switch
- Overload and signal-present LED's for each channel
- Power-on indicator
- Ground lift switch
- Provision for remotely located headphone volume controls (Using the Furman HR-2 Remote headphone station)

## **Introduction**

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Congratulations on your purchase of a Furman Model SP-20AB you have chosen an extremely versatile general purpose power amplifier. The SP-20AB is a compact 20 watt per channel stereo amplifier capable of normal

stereo, two channel mono, or single channel (bridged) mono operation. It is intended to power speakers or headphones with equal ease. The SP-20AB is fully protected against thermal overload and can withstand a short circuit on either or both outputs for an indefinite time without damage. Additionally, the SP-20AB's advanced toroidal transformer assures reduced electrical hum and mechanical noise from the unit itself. This minimizes leakage into other nearby sensitive equipment, such as mic preamps, video monitors, etc.

The SP-20AB is expected to find application in recording studios (for driving small near field monitors and/or headphone systems), in distributed commercial sound installations, for powering high-frequency drivers in bi-amped or tri-amped PA systems, and wherever a requirement exists for compact, high quality, moderate power audio amplification.

## **Description**

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The SP-20AB Stereo Power Amplifier is a unique and economical 20 watt per channel stereo amplifier. It may be operated in any of three modes as selected by a rear-panel switch: normal stereo, two channel mono, or single channel (bridged) mono. The latter mode allows a power output of 40 watts provided the load is 8 or more ohms.

The SP-20AB is housed in a half single-space rackmount chassis. The SP-20AB can be mounted in a 19" rack by using the Furman HRKIT-1 rack mounting kit or side by side with another SP-20AB using the HRKIT-2 rack mounting kit.

The SP-20AB's compact size and 20 watts per channel make it ideal for modular use in large commercial installations with multiple small speakers. Its power capacity is also just right for driving 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.

The SP-20AB's output is available through either of two connectors: standard banana jack binding posts for speakers, or through a male XLR connector. The Satellite/Remote XLR output allows the unit to become a headphone driver, linking any number of 'Furman HR-2 Headphone Remote Stations together via standard microphone cables. Each HR-2 station conveniently clips to a mic stand and provides individual volume controls for two sets of headphones. When used for overdubbing or rehearsal, this setup provides more than adequate loudness in all headphones (even older high-impedance models), and allows each musician to set his or her own comfortable volume level. When the overdubbing is complete and the musicians remove their headphones, the SP-20AB can also power the tape playback speakers through the banana jacks, as selected by pressing the SPEAKERS button on the front panel. An additional headset may be plugged directly into the SP-20AB's front panel. A volume control is provided for it.

The SP-20AB has 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 signal is present (threshold -30 dBu). Another pair of red LED's show an overload condition in either channel.

## ***Options and Accessories***

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- **Model HR-2 Headphone Remote Station:**

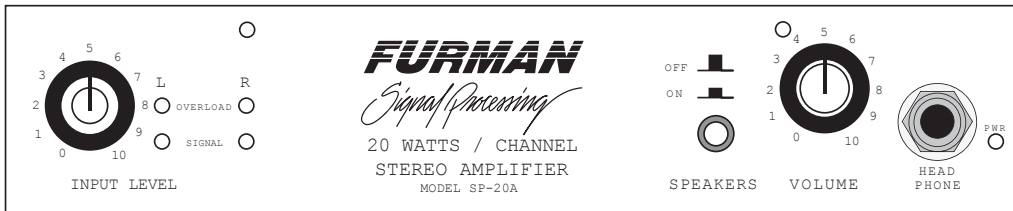
The HR-2 is compact, unobtrusive box that clamps to a mike stand or belt, providing two headphone jacks, each with its own volume control. Any number of HR-2 stations may be connected to a SP-20AB using standard microphone cables. The HR-2 comes with snap-on, snap-off mike stand clamp.

- **HRKIT-1:**

The HRKIT-1 allows mounting of one SP-20AB in a single rack space. Unit is centered in the space, which equally distributes the weight and allows room for user customizations such as additional selector switches, indicator lights, extra banana jacks, etc.

- **HRKIT-2:**

Allows side by side mounting of two SP-20AB's in a single rack space or one SP-20AB in a standard half rack enclosure.



## Descriptions of Controls

### Front Panel

**INPUT LEVEL:** The Input Level control can be adjusted for maximum signal to noise and minimum clipping. The Input Level control is stereo - it affects both left and right channels simultaneously and affects all outputs.

**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 SP-20AB'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 outputs.

**OVERLOAD LIGHTS:** These LED's glow red to indicate an overload in the SP-20AB. 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 is within 2 to 3dB 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 JACK / HEADPHONE VOLUME:** Any type of headphones wired with a standard 1/4" stereo phone plug may be used successfully. Note that the headphone

volume may be adjusted without affecting the speaker level or the level of any other headphones connected through HR-2 Remote Stations.

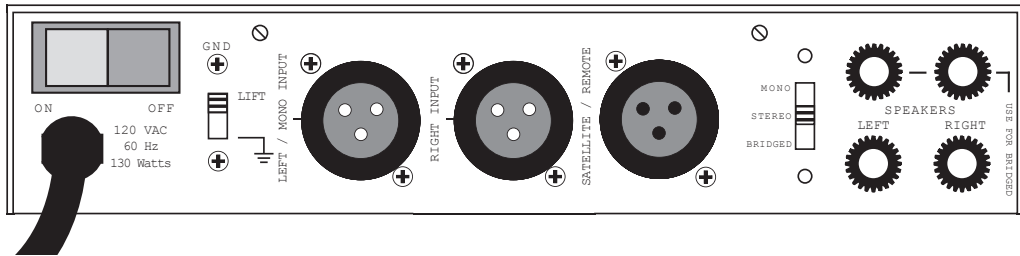
**SPEAKERS BUTTON:** Depressing this button turns on the speakers connected to the SPEAKER banana jacks on the rear panel. This provides an easy way to mute the sound without changing the volume setting.

**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 SP-20AB on and off. For convenience, it is recommended that the SP-20AB 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-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 SP-20AB'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.

**MODE SWITCH:** This three position slide switch determines the SP-20AB's mode of operation. The three choices are:  
**MONO:** This position is also referred to as "Dual Mono" because while both channels are operating separately (each driving its own speaker), there is only one input, which appears at both outputs. The input must be connected to the "Left/Mono Input" jack.  
**STEREO:** This position is for normal stereo operation, where there are two inputs (left and right) and two outputs.  
**BRIDGED:** This position should be used for straight mono operation, when there is

only one input (plugged into the "Left/Mono Input" jack) and all the SP-20AB's power is to be concentrated into one output. Note that under some circumstances, this can amount to more than double the rated 20 watts per channel for stereo - to as much as 50 watts. Therefore, in bridged mode, for adequate protection, the speaker connected should be able to handle approximately 100 watts without damage. See "SPEAKER OUTPUTS" below for details of how to connect the speaker.

**SPEAKER OUTPUTS:** These outputs should be used for driving speakers. The connections are via multiple-use terminals, which can accommodate either dual banana plugs, bare wires, or wires terminated in spade lugs. For stereo or dual mono operation, connect one speaker to the left pair of terminals and the other speaker to the right pair. Observe proper polarity - make sure that the wire connected to the top (red) terminal on the left channel connects to the red terminal of the left speaker, and that the wire connected to the top (red) terminal on the right channel connects to the red terminal of the right speaker. If the wires to one speaker are reversed, the speakers will be of opposite polarity (or "out of phase"), and a severe loss of low frequencies may result. If Mono Bridged operation is desired, the *single* speaker must be connected to the

two top (red) terminals. In this case, *nothing* should be connected to the bottom (black) terminals. Positive polarity will be on the left channel (red) terminal.

**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). If necessary, it may also be used to connect a second set of speakers. This output is also turned on and off by the **SPEAKERS** button. This *output should not be used with HR-2 Stations when in Mono Bridged mode.*

**INPUTS:** The SP-20AB is equipped with left and right balanced female XLR connectors. 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.

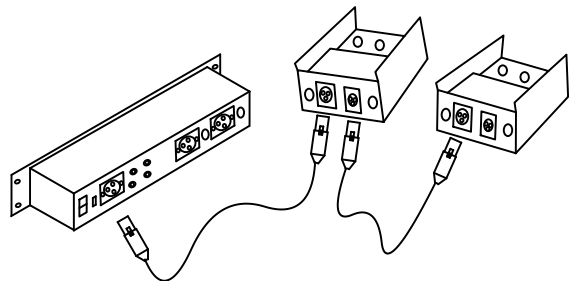
## Use of the HR-2 Headphone Remote Stations

The HR-2 Remote Stations may be used to increase the number of headphones which can be accommodated by an SP-20AB, and to place a volume control within easy reach of each individual needing it. This allows the SP-20AB to be used to power a headphone system for a recording studio, rehearsal studio, language lab, demonstration of audio equipment, or for

other applications. The HR-2 units 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 **SATELLITE/REMOTE** connector on the rear of the SP-20AB, as shown in the above diagram. The SP-20AB 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.



*Daisy-chaining HR-2 Remote Stations to the SP-20AB*

## ***Installation***

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For installation as a free-standing unit, attach the four adhesive rubber feet supplied with the SP-20AB to the bottom of its case.

With either the HRKIT-1 or the HRKIT-2 adaptor kits the SP-20AB may be mounted in standard 19" equipment racks. The HRKIT-1 is for mounting one SP-20AB in the center of a 19" rack. The HRKIT-2 is for mounting two units side by side in a 19" rack (or for mounting a single unit in a "half rack"). Complete installation instructions are supplied with the kits.

When installing any equipment in racks, keep in mind that standard racks come equipped with mounting rails with holes tapped for 10-32 machine screws. Be sure to use only 10-32 screws for this purpose (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 SP-20AB 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***

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**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 SP-20AB. Under no circumstances should persons without

electronics troubleshooting experience and training undertake repairs on their own. There are no user serviceable parts inside the SP-20AB. All problems should be referred to the Factory or to other qualified service personnel.

The input connectors are XLR balanced. The inputs to the SP-20AB proceed from the input connectors to op-amp buffers wired as differential (balanced) amplifiers. If a mono signal is inserted this will convert the differential op-amp to a non-inverting amp. After the buffers, the left and right signals proceed to the two decks of the stereo Input Level control.

The SP-20AB'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 and drive the speaker outputs through a standard RLC network. The network establishes the high frequency rolloff, as well as preventing voltages generated by the speakers from reaching back into the IC and causing damage. The headphone output passes through a special high-power pot wired as a volume control.

The SP-20AB's power supply provides  $\pm 30$  volts unregulated DC (with 120VAC line input) to the LM1875 stages, which may drop to  $\pm 23$  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 of the LM1875, but before the headphone volume control and the Speaker On/Off Switch.



## **Limited Warranty**

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Furman Sound, Inc., having its principal place of business at 1997 South McDowell Blvd., Petaluma, CA 94954 ("Manufacturer") warrants its SP-20AB (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

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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 Authorizatilon (RA) Number. To get an RA Number, please call the Furman Service Department: (707) 763-1010. Please display your RA Number prominently on the front of all packages.*

## SPECIFICATIONS

### OUTPUTS:

Power: 20 Watts per channel, stereo, into either 4 Ohms or 8 Ohms, or 40 Watts mono into 8 Ohms, 20 Hz to 20 KHz

Connectors: Speakers: 5-way binding posts (accommodates dual banana plugs, spade lugs, bare wires, etc.)  
Remote Headphone: XLR.

### INPUTS:

Input Impedance: 20K Ohms.  
Sensitivity: -6.5 dBu required for full output.  
Connectors: XLR, balanced.

### GENERAL:

Distortion: .01 % THD at full rated power at 1 KHz; .05% THD 20 Hz to 20 KHz.

Dynamic Range: Greater than 99 dB, A weighted

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: SP-20AB: 120 VAC, 60 Hz, 70 watts  
SP-20ABE: 230 VAC, 50/60 Hz, 70 watts

Mechanical: Dimensions: 1.75" H x 8.45"W x 8.25" D.  
Weight: 9 lbs (4.2 kg).

*NOTE:* 0 dBu equals .775 Vrms.

# SP-20AB MANUAL

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***FURMAN***

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