

# OWNERS MANUAL

**Hafler** 

# JF2000

SIGNATURE SERIES PRE-AMPLIFIER

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# INTRODUCTION

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The JF2000 is the first amplifier in the signature series line of Hafler audio components. In the Hafler tradition, it is hand-made in America. The signature series embodies Hafler's philosophy of supplying the same quality music reproduction of higher priced audio components for less.

## FEATURES

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<b>Output Section</b>	The JF2000 uses 32 MOSFET output devices - 16 per channel - to source the high current and power required. Each device is rated at 4.0 Amperes continuous drain current at 100 degrees Celsius.
<b>High Current Capability</b>	Each channel can safely produce peak transient output currents exceeding 50 Amperes. This ensures that momentary speaker impedance dips and surge current requirements are easily supplied.
<b>Wide Load Range</b>	<p>The JF2000 is fully rated for loads of 4 and 8 Ohms. It is stable to 2 Ohms. (This means it will operate safely, cleanly and stably into 2 Ohms, but very high power dissipation may lead to frequent thermal shutdown.)</p> <p>The 16 output devices per channel assure operation well within the MOSFET Safe Operating Area with low impedances and/or reactive loads.</p>
<b>SOA Protection (Safe Operating Area)</b>	The output devices of the JF2000 are protected by a sophisticated analog computing system. The device instantaneous temperature is continuously calculated by the computer and compared to a maximum limit. If the limit is reached, the computer cuts back the power and lights the channel's distortion (red) front panel LED.
<b>Thermal Protection</b>	A pair of thermistors, one mounted on each heatsink, measure temperature of the output system. They control fan speed and provide thermal shutdown in case temperatures become too high for safe operation. (Thermal shutdown turns the power lamp red.)

### Fan Cooling

The fan cooling system is a key to the JF2000's performance. The fan is of a very quiet design, with continuous variable speed control. When the amp is cool, the fan is off. As the amp is driven harder, the fan gradually turns on and speeds up only to the extent needed to sustain the power dissipation needed for the conditions.

### Toroidal Transformer

The power supply for the JF2000 is based on a 1000 Volt-Ampere toroidal (donut-shaped) line transformer. We use the toroid core (which is more expensive than a conventional square transformer) for its higher efficiency, lower weight, smaller size, and freedom from stray magnetic fields. The 1000 Volt-Ampere rating indicates that the transformer can supply power to a load of 1000 Watts continuously.

### Energy Storage

Energy storage for the power supply consists of two 42,000 Microfarad capacitors. This large energy storage capability provides a low-impedance source of extremely high current for surges, musical transients, variations in speaker impedance, and very low frequencies.

### Great Flexibility

Individual channel gain controls match the JF2000 to a wide range of installations.

Four Output Modes are available to fit almost any requirement: Normal Stereo, Stereo plus Bridged Mono, Bridged Mono, and Dual Mono.

### Display

Simple three-LED multicolor display shows amplifier status including power, signal level, distortion, and thermal condition.

## INSTALLATION AND SETUP

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### Amplifier Placement

The JF2000 is designed to be placed on a shelf or other substantial support. (A rack-mount front panel is available.) Take care to ensure unimpeded airflow behind the amplifier, as the intake and exhaust vents are located at the rear. If the amp is to be placed in an enclosed wall unit or cabinet, it would be a good idea to allow for fresh air intake and hot air exhaust venting in the back of the cabinet, especially for continuous high-output operation.

**Power  
Connection**

The JF2000 is designed to operate on 120 Volts AC, 60 Hertz standard U.S. line output) only. Connection is via a standard 3-prong grounded AC plug. If a 3-prong (grounded) outlet is not available, the third (ground) wire **MUST** be grounded to a satisfactory electrical ground using adapters available at most hardware stores.

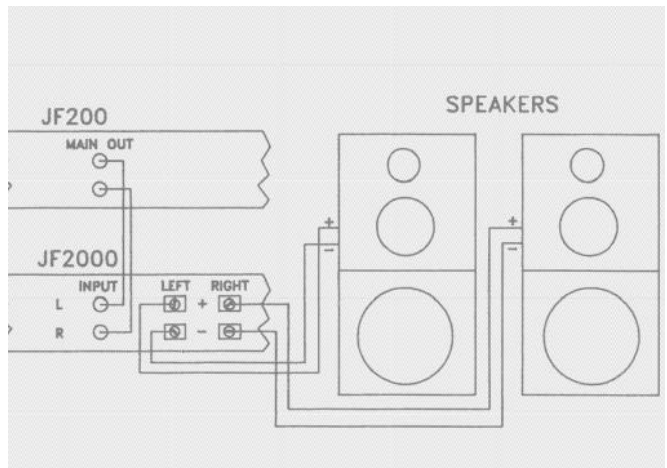
If an extension cord must be used, it will rob power from the amplifier. Use only the highest quality 3-wire (grounded) extension cords, with large wire (14-Gauge or larger) to reduce losses.

**Speaker  
Connection**

Speaker connectors are heavy-duty gold-plated "5-way" binding posts, spaced for standard banana jack connectors. They will accept bare stranded wire up to approximately 12-Gauge. Banana connectors may be more convenient.

**Normal Stereo  
Connections**

For normal stereo operation leave ALL REAR PANEL SWITCHES IN. The amplifier's left channel red binding post connects to the left positive (+) speaker terminal and the left black post goes to the left negative (-) speaker terminal. Wire the right channel the same. (Refer to Figure 1)



**Figure 1**

Left positive (+) terminal (red) to Left Speaker positive (+)  
Left negative (-) terminal (black) to Left Speaker negative (-)  
Right positive (+) terminal (red) to Right Speaker positive (+)  
Right negative (-) terminal (black) to Right Speaker negative (-)

## Speaker Polarity Note

Be sure to observe speaker polarity (+ and - leads) through-out your system. Getting them wrong can result in missing bass, massive distortion, or blown speakers!

# SPECIAL SYSTEM CONFIGURATIONS

## Bi-amplification

**'PLEASE NOTE:** The minimum nominal load impedance for each channel of the amplifier is 4 ohms. In bridged mode, each channel of the amplifier uses half of the nominal load impedance. Therefore, in bridged/mono mode the minimum required load impedance is 8 ohms.

If the speaker system in use is capable of having separate inputs for the woofer and midrange or tweeters, or if the system has a woofer in a separate box and satellite midrange and tweeters, then the final sound from the system could be improved by bi-amplifying. This means using two amplifiers in normal stereo mode, each being driven by a dedicated signal - high or low frequency - and loaded by a dedicated driver - high or low frequency. This allows different power levels to be applied to the high and low frequency drivers of a speaker system. (Refer to Figure 2 for proper hook-up.)

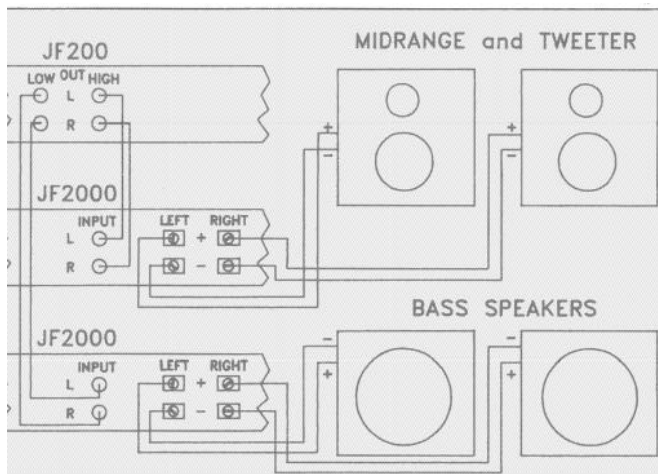


Figure 2

## Dual Monaural (Mona) What

Both channels are driven by the same signal. (In the JF-2000 the common signal input is the Left channel input.) In this mode, both amplifiers are controlled by the left input gain control and put out exactly the same kind of signal and power.

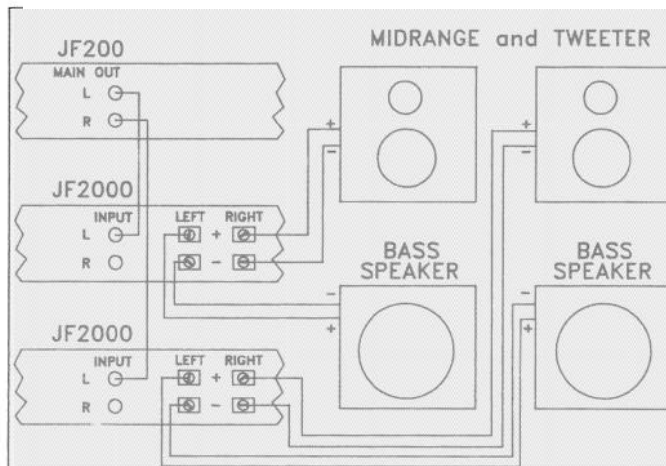
## Why

\*You may wish to drive biamplified pairs of speakers with identical signals if the speakers have internal crossovers.

\*You may wish to drive multiple speakers which would be too low in impedance if driven together (under 4 Ohms).

## How

Set the INPUT switch to MONO (out). This feeds the right and left channel power amplifier section from the left input signal jack. Connect the speakers the same as you would for standard stereo. Leave all other switches in the standard position (IN) unless you have other reasons for using them. (Refer to Figure 3)



**Figure 3**

Left positive (+) terminal (red) to Left Speaker positive (+)  
Left negative (-) terminal (black) to Left Speaker negative (-)  
Right positive (+) terminal (red) to Right Speaker positive (+)  
Right negative (-) terminal (black) to Right Speaker negative (-)

## Bridged Mono What is Bridging?

“Bridging” an amplifier means using two amplifier channels to drive a single speaker. Normally, one terminal of the speaker is driven by an amplifier section, and the other terminal is grounded (that is, current is returned to the driving amplifier). When a speaker load is driven by a bridged amplifier pair, each terminal of the speaker is driven by a separate amplifier section.

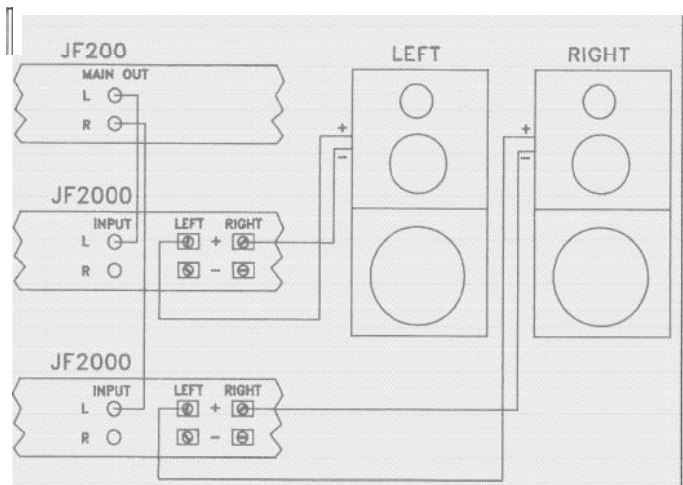
Bridging applies much more power to the speaker load than either amplifier channel would alone. For an 8-Ohm speaker, the JF2000 is rated for a minimum output of 200 Watts for a single channel. For both channels bridged into the same speaker, the minimum output would be 600 Watts.

When the application calls for higher power levels than you can get from the JF2000 in normal stereo, you can use the bridged mono mode.

**USE CAUTION!** Most speakers cannot handle the power of the JF2000 in bridged mono mode.

Typical applications include: driving large (mono) subwoofers, large power hungry speaker systems, or bi-amp applications where large amounts of power are required.

In order to use both channels of input to sum the signal to drive a mono speaker, set the input switch to stereo (IN) and the output switch to mono (OUT). The amplifier's left channel red binding post connect to the positive (+) speaker terminal and the right channel red binding post connects to the negative (-) speaker terminal. (Refer to Figure 4)



**Figure 4**

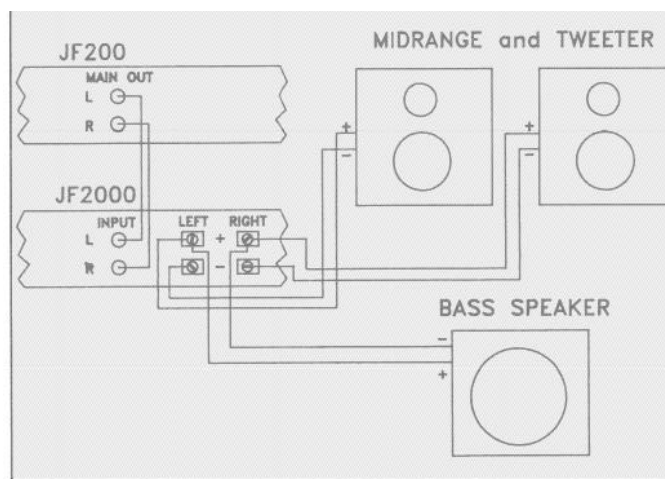


## Stereo Plus Bridged Mono

Stereo satellites can be driven at the same time as a bridged mono subwoofer or bridged center channel speaker (with one JF2000).

If you have satellites designed specifically for midrange and treble, with a single mono subwoofer designed for bass only:

Set output switch to MONO (OUT). All other switches IN. This inverts the right channel output, while leaving the input stereo. You will connect the left speaker normally, but the right speaker POS (+) and NEG (-) will be REVERSED from normal stereo. The center (bridged mono) channel will be connected between the two RED (MONO) amplifier terminals. (Refer to Fig. 5)



**Figure 5**

Left Positive (+) terminal (red) to Left Speaker Positive (+)  
Left Negative (-) terminal (black) to Left Speaker Negative (-)  
Right Negative (-) terminal (black) to Right Speaker Positive (+)  
Right Positive (+) terminal (red) to Right Speaker Negative (-)  
Left Positive (+) terminal (red) to Mono Speaker Positive (+)  
Right Positive (+) terminal (red) to Mono Speaker Negative (-)

# REAR PANEL

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## Switches

**NOTE:** Normal stereo position for all rear panel switches is IN. The only time any of the switches should be OUT is for one of the special functions in this section.

Be sure to turn the amplifier OFF before changing rear panel switch positions (to avoid possible pops and clicks).

## Balanced/ Unbalanced Input Switch Home Version

The Balanced/Unbalanced Input Switch is disabled in the JF2000. This function is used only with special professional connectors (XLR and 1/4 inch phone plugs) available with the

## Input Switch (Right Channel)

IN position: Stereo. Right input feeds Right channel.  
OUT position: Mono. Left input feeds Right channel.

## Output Switch (Right Channel)

IN position: Stereo (normal). Right channel is in phase with Left.  
OUT position: Mono. Right channel is reversed in phase compared to Left.

## Ground Switch

IN position: Floating (normal). Chassis ground separate from Output section ground.  
OUT position: Chassis. Chassis ground connected to output section ground.  
This switch should be set for minimum system hum.

## Input Connections Level Adjust

Input is via standard "RCA" style pin jacks.

Input sensitivity is adjustable with the level controls adjacent to each input RCA jack. The overall gain ranges from zero (fully counter-clockwise) to 36 dB (fully clockwise).

The JF2000 is equipped with AGC5-Ampere speaker protection fuses. These fuses are for speaker protection only.

## Speaker Fuses

Most speakers will not handle more than a 5-Ampere fuse (or less). Refer to your speaker manufacturer's recommendations for your fuse selection.

# OPERATION

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## Turning On The Amp

First Time: Before turning on the power switch to the JF2000 for the first time, double-check all speaker and input connections and turn the input level controls all the way down (fully counter-clockwise). Turn on your source equipment (pre-amp, CD player, etc.) Turn the power switch on and adjust the input controls so that the left and right channel LEDs light up green at a low preamp volume control position.

Normal Operation: As with any high-powered amplifier, it is best to turn on the amplifier AFTER all other equipment is on, and turn it off BEFORE any other equipment. This prevents any turn-on or turn-off transients from other equipment damaging your speakers.

# LED DISPLAYS

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## Channel Status LEDs

From left to right the front panel LEDs indicate: Left Channel Status, Right Channel Status, and Power Status.

The Channel Status LEDs indicate the condition of the Left and Right channel outputs. They will turn on GREEN to indicate a signal output of over about 200 Milliwatts. They will switch to RED to indicate distortion over about 0.5% THD. The Power Status LED will turn on GREEN to indicate power on. In case of overheating, it will switch to RED and the amplifier will turn off until it cools down.

The channel status LEDs can show three indications:

OFF indicates no signal or a signal level under about 200 Milliwatts (a very quiet level with most speakers).

GREEN indicates a signal over about 200 Milliwatts and very low distortion (under 0.5% for most conditions); that is, normal operation.

RED indicates distortion in the output signal for any reason: blown speaker fuse, shorted speakers, excessive speaker load, or any other reason.

## Power Status LEDs

The Power Status LED can show three indications:

OFF: The power switch is off, the amplifier is not plugged in, or the main fuse is blown.

GREEN: Indicates normal power and operation.

RED: Indicates amplifier overheat. Leave the switch on and the fan will cool the amplifier down to operating temperature very quickly.

## CARE

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Do not allow speaker wires to touch each other, chassis ground, or any metal object.

Protect your amplifier from moisture and dust.

Clean anodized finishes with soft, damp cloth.

Save the original carton and packing. It is the only safe way to ship the amplifier. If you need to replace the carton and/or packing, consult your authorized dealer or Hafler Customer Service Department.

No user serviceable parts inside. Do not disassemble amplifier for any reason. Refer to an authorized Hafler warranty station or to Hafler directly. See Warranty Statement.

## TROUBLESHOOTING

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### LED Displays for Troubleshooting

The LED displays show a lot of information about how the amplifier is acting. They can provide direction and troubleshooting information for most system problems if they are interpreted properly.

### Power Status LED (Rightmost LED)

The Power LED can show three indications:

OFF: No power is reaching the main amplifier board low-voltage section.

GREEN: Normal low-voltage power is available.

RED: Amplifier has shut down due to overheating (fan will still run to cool the amplifier).

## No LED

This is an indication that no power is reaching the amplifier. Possible reasons include:

- 1) Amplifier not securely plugged in.
- 2) Power source (socket) failed (AC line fuse blown, wiring open, etc.)
- 3) Internal amplifier fuse blown. Fuse replacement should only be attempted by a qualified technician.

## Turns Red (overheats) Rapidly

- 1) Rear cooling channels blocked. Clear the area behind the amp.
- 2) No fresh air ventilation (rear air intake and output feeding each other). Provide a source of fresh air (not heated air) for the inlets at the sides.
- 3) Excessive loading. If the amplifier is run into less than a 4-Ohm speaker load per channel, or is bridged into less than 8-Ohms, the amplifier may not be able to produce continuous high output levels without overheating. Reduce the loading by increasing load impedance.
- 4) Fan is jammed or has failed. Clear the obstruction or replace the fan.
- 5) There may have been an internal malfunction. Send amp to the factory or a qualified technician for repair.

## Channel Status LEDs (Two Left LEDs)

The channel status LEDs can show three indications:

OFF indicates no signal or a signal level under about 200 Milliwatts (a very quiet level with most speakers).

GREEN indicates a signal over about 200 Milliwatts and very low distortion (under 0.5%) for most conditions); that is, normal operation.

RED indicates distortion in the output amplifier section for any reason: blown speaker fuse, shorted speakers, excessive speaker load, or any other reason.

# SPECIFICATIONS

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**8-Ohm  
Performance**

**POWER:** Over 200 Watts per channel from 20 Hertz to 20,000 Hertz, both channels driven, at rated distortion.

**DISTORTION:** Less than 0.05% Total Harmonic Distortion plus Noise, 20 Hz to 20,000 Hz, both channels driven at full power.

**IM DISTORTION (IHF):** Less than 0.01%

**SLEW RATE:** Exceeds 80 Volts per Microsecond.

**4-Ohm  
Performance**

**POWER:** Over 300 Watts per channel from 20 Hertz to 20,000 Hertz, both channels driven, at rated distortion.

**DISTORTION:** Less than 0.10% Total Harmonic Distortion plus Noise, 20 Hz to 20,000 Hz, both channels driven at full power.

**IM DISTORTION (IHF):** Less than 0.02%

**2-Ohm  
Performance**

Stable into two Ohms.

May overheat and shut down rapidly if driven hard at 2 Ohms.

**S/N Ratio:**

Over 110 dB (unweighted) with respect to full power.

**Peak Output  
Current:**

50 Amperes

**Frequency  
Response:**

20 Hz to 20,000 Hz: +0.1, -0.25 dB

5 Hz to 75,000 Hz: +0.1, -3.0 dB

**Power Bandwidth:**

5 Hz to 75,000 Hz

**Protection:**

Capable of safe operation indefinitely into any load condition.

Sustained (over 1 second) hard clipping at ultrasonic frequencies (over 20 KHz) will cause protection to activate, the limit peak power. Please test ultrasonic behavior either with signals that don't cause clipping or with tone bursts.

## **FACTORY SERVICE AND LIMITED WARRANTY**

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If you encounter any difficulty or have any questions concerning your JF2000 preamplifier, please call our Customer Service department weekdays, 8:00 am to 3:30 pm Mountain Standard time, at 602-967-3565.

Before returning any unit to the factory for service, please call us. All units being returned (regardless of warranty status) must receive a Return Authorization (RA) Number. In addition, we can offer trouble-shooting assistance that may often simplify or even eliminate the need for factory service.

The Hafler JF2000 is warranted for 3 years from date of purchase, including parts, labor, and return shipping costs from the factory to the owner within the Continental U.S.A.

It is the owner's responsibility to pay shipping (preferably UPS) to the factory: collect shipments will not be accepted. Units under warranty should be accompanied by a copy of a dated Bill of Sale. Use the original carton and all packing material, and be sure to include a return address, and a brief description of the difficulty, including whether it is intermittent.

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

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