
Modèle LS2/LS2BMKII

AMPLIFICATEUR DE LIGNE STÉRÉO

Modell LS2/LS2BMKII

STEREO-VORVERSTÄRKER

Modello LS2/LS2BMKII

AMPLIFICATORE DE LINEA STEREO

Modelo LS2/LS2BMKII

AMPLIFICADOR ESTEREOFONICO DE LINEA

Model LS2/LS2BMKII

STEREO LINE AMPLIFIER

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HIGH DEFINITION®

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Model LS2/LS2BMKII

Contents

Stereo Line Amplifier..... 1

Contenu

Amplificateur De Ligne Stéréo..... 6

Inhalt

Stereo-Vorverstärker..... 12

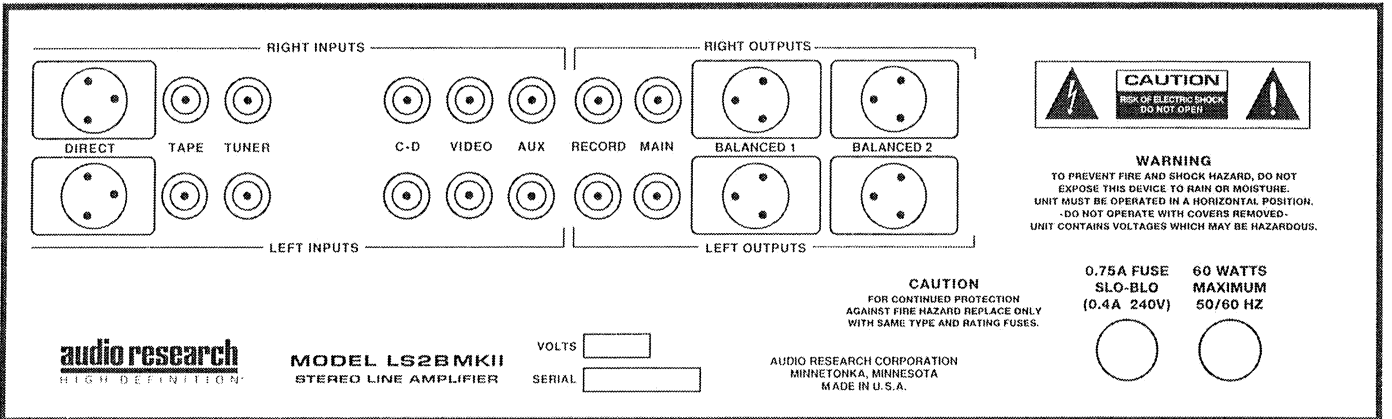
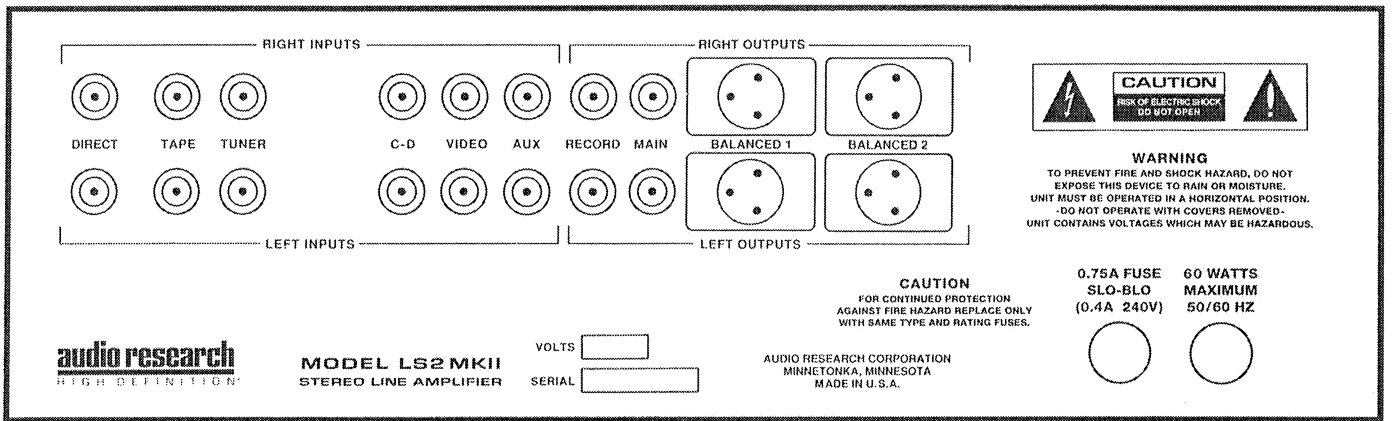
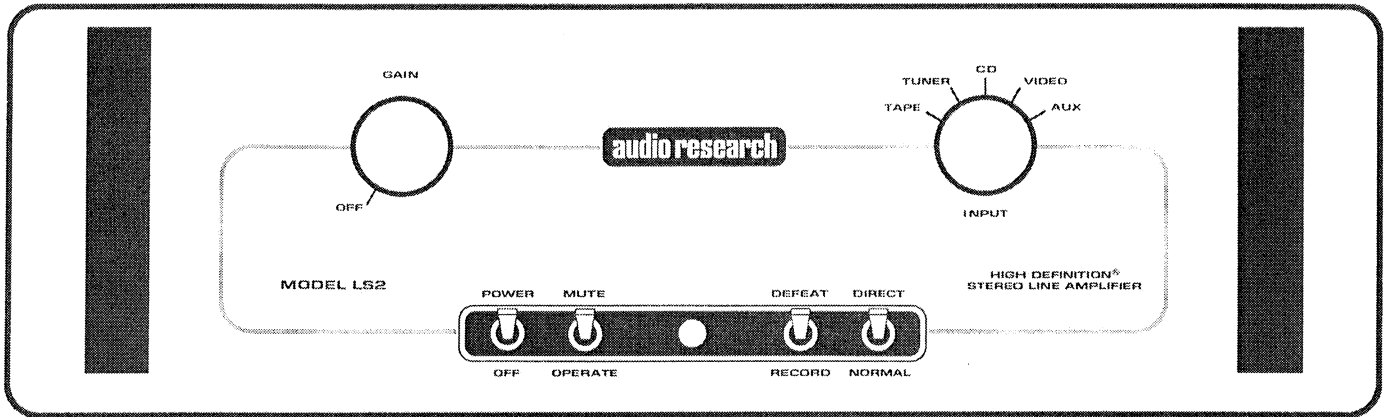
Indice

Amplificatore De Linea Stereo..... 17

Contenido

Amplificador Estereofónico De Línea..... 23

Model LS2/LS2BMKII



Model LS2/LS2B MKII

Preface

Please take time to carefully read and understand the following instructions before you install or attempt to operate this equipment. Becoming familiar with the product and its correct operating procedures will help assure you of maximum musical enjoyment and reliable operation. The effort you invest now will be well rewarded in the years ahead.

Warnings

1. To prevent fire or shock hazard, do not expose this product to rain or moisture.
2. This unit operates on voltages which can cause serious injury or death. Do not operate with covers removed. Any necessary servicing should be carried out by your authorized Audio Research dealer or other qualified electronics technician.
3. The power cord on this unit is safety-tested and is equipped with a proper grounding plug. If used normally, it will provide a safe earth ground connection of the chassis. Defeat of the grounding plug or replacement of the plug or power cord, or any unauthorized modification of the active circuitry or controls of this unit, automatically voids warranty coverage, and could cause injury or death.
4. For safe operation and protection against fire hazard, replace fuses only with those of the same type and rating as those supplied with this unit.

Note to LS2B Owners

Since operation of the LS2B is virtually identical to the standard LS2, one owner's manual is used for both products. In addition to this page, the only other information applying specifically to the LS2B can be found in the specifications of this manual.

On the LS2B, the Direct inputs are balanced XLR-type connectors rather than the standard single-ended "RCA"-type jacks used on the LS2. Input impedance on the balanced inputs of the LS2B is 3 megohms; impedance on the standard inputs remains unchanged at 50K ohms.

XLR pin connector leads are: pin 1-shield; pin 2-positive; pin 3-negative.

Additional input circuitry in the LS2B for (+) and (-) halves of the incoming input signal provides ultra-low noise and more lifelike music reproduction from any program source— analog or digital—having XLR-type balanced outputs.

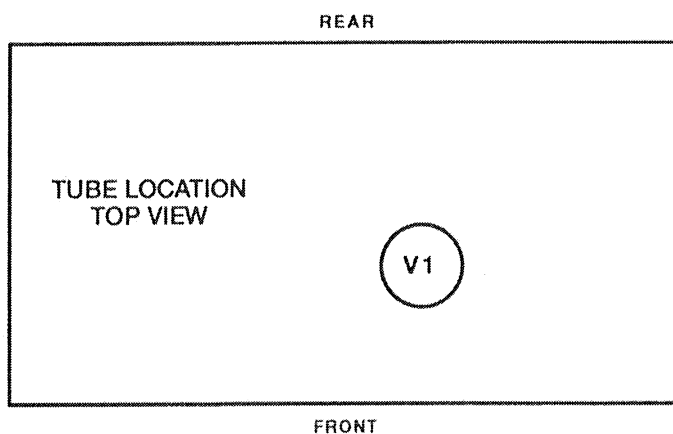
Selection of the XLR or "Direct" inputs is accomplished by the designated toggle switch on the front panel, just as on the standard LS2.

Packaging

Save all packaging accompanying this product. You have purchased a precision electronic instrument, and it should be properly cartoned any time shipment becomes necessary. It is very possible that this unit could be damaged during shipment if repackaged in cartoning other than that designed for it. The original packaging materials help protect your investment from unnecessary damage, delay and added expense whenever shipment of this unit is required.

Note This unit has been shipped with the vacuum tube installed in a protective foam block under the top cover. Using a phillips-head screwdriver to loosen the fastening screws, remove the top cover and set aside. Install the numbered tube in its socket, refasten the top cover and store the foam block with your carton.

DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT BEFORE INSTALLING THE VACUUM TUBE IN ITS PROPER SOCKET.



Description of Controls

GAIN CONTROL: Use it to control volume. Rotation to the left attenuates gain, rotation to the right increases gain.

INPUT SELECTOR: Detents indicate selection of various source material options: "Tape" for cassette, DAT, or other tape formats; "Tuner" for FM/AM radio tuners; "CD" for digital disc players or processors; "Video" for audio input from Beta or VHS Hi-Fi videotape decks; "Aux" for any additional high level source – tape, tuner, CD, video, etc.

The signal source chosen by the input selector is fed to the Tape outputs when the Defeat/Record toggle switch is set to "Record".

The signal source chosen by the input selector is fed to the Main outputs when the Direct/Normal switch is set to "Normal".

Model LS2/LS2B MKII

POWER SWITCH: Supplies power from AC wall outlet to LS2 when in "Power" position. Although not strictly necessary, it is nonetheless good practice to put the LS2 in "Mute" before turning on power for maximum protection of your power amplifier(s) and speakers.

MUTE/OPERATE SWITCH: In "Mute" position, shorts the main outputs of the line stage amplifier to allow listening interruptions for telephone answering or other reasons. This switch should always be activated between listening uses or switching of inputs, in addition to turning the Gain (volume) control counter-clockwise. These two simple precautions will prevent inadvertent misuse of your LS2 and help protect your power amplifier(s) and speakers from unexpected transient signal pulses. In "Operate" position, this switch allows the signal to pass normally to the outputs.

CAUTION: Do not turn up the Gain control beyond normal listening positions when the LS2 is in the Mute mode. Always turn the Gain control down when changing program sources, even when it is muted. The LS2 has an extremely wide dynamic range, and switching to "Operate" at loud levels may be too much for amplifiers, speakers or ears. Furthermore, at extremely high signal levels in the Mute mode, the LS2 could overload internally. This will not harm the LS2, but it may take 10-15 seconds to stabilize from the overload. If you switch to "Operate" before the LS2 has recovered from the overload, you will hear a "pop" when the Mute switch is actuated. If you hear a "pop", switch immediately back to "Mute", turn down the Gain control and wait 15 seconds or so and try again. Under normal conditions the LS2 muting has no "pops". Subsonic program energy may also cause small, harmless mute "pops". These "pops" may be eliminated by turning down the LS2 Gain control before muting.

POWER/MUTING CIRCUIT LED: Glows green to indicate unit is on and receiving power from the power supply. Note that for approximately 45 seconds after start-up or in Mute mode, this LED will glow more dimly, indicating proper operation of the muting circuit. In the Operate mode (after warm-up) the LED brightens and your LS2 is ready for normal operation.

DEFEAT/RECORD SWITCH: In "Record" position, the source chosen by the input selector is fed to the Tape outputs. In "Defeat" position, the Tape outputs are disconnected, with no signal being fed to them.

It is recommended that the Defeat/Record switch be left in the "Defeat" position at all times (unless a tape recording is being made) for best sound quality.

DIRECT/NORMAL SWITCH: Allows the use of either the "Direct" set of inputs or the "Normal" inputs otherwise found on the Input selector switch. The "Direct" position provides the highest possible resolution for the high level source (CD player, DAC processor, etc.) routed through it, bypassing the Input selector control. Since the "Direct" inputs are wholly independent from the other inputs, it is not possible to record off the "Direct" inputs (see also "Tape Recording Procedure").

Connections

INPUT CONNECTORS: All are clearly marked to indicate use. The inputs are 50K ohms impedance.

Note: The LS2B "Direct" input is 3 megohms.

MAIN OUTPUT CONNECTORS: There are three sets of output connectors: one utilizes (unbalanced) RCA connectors; the other two have (balanced) XLR type connectors. Any combination of these should be connected to your crossover or amplifiers(s) as necessary.

NOTE: The XLR connector pin leads are as follows: 1-shield; 2-positive; 3-negative. If used with a power amplifier which utilizes different pin leads for positive, negative and/or shield, the signal being fed to the loudspeakers will be incorrect. Please consult your Audio Research dealer.

NOTE: At the performance level of the LS2, high-quality audio signal interconnect cables are critical to preserving maximum fidelity. Audio Research RFI-shielded or unshielded interconnect cables are highly recommended for connection to your power amplifier(s) and to other ancillary equipment. See your authorized Audio Research dealer for recommended lengths.

TAPE OUTPUT CONNECTORS: The LS2's Tape outputs should be connected to your tape deck's "REC" or "LINE" inputs. These outputs supply whatever is selected by the Input selector control to the tape deck for recording when the Defeat/Record switch is set to "Record". Level is non-variable and approximately the same as the selected input source. The "Direct" inputs cannot be routed to the Tape outputs in any way.

"Hot rodding" the LS2 by connecting a power amplifier to the "Tape" outputs instead of the "Main" outputs is not recommended. Sound quality will be degraded somewhat, instead of being enhanced, when routed in this manner.

All input/output connectors have heavy gold plating and connect "ground" before "hot". (On disconnect, "hot" is first.)

Model LS2/LS2B MKII

Installation Instructions

While the LS2 does not dissipate an unusual amount of heat, it is important that it be provided with reasonable air-flow to assure long, trouble-free operation. In addition, the following installation guidelines will help insure maximum sonic performance as well as reliable service.

1. Upright and horizontal mounting is suggested if extended operation (longer than one hour) is contemplated.
2. Do not "stack" the LS2 on top of a power amplifier: not only could this cause overheating, but "hum" may be introduced into the LS2 from the proximity of the amplifier's power transformer.
3. Do not place or operate your LS2 on a soft or irregular surface such as a rug. This will prevent proper ventilation.
4. Do not operate your LS2 without the top and bottom covers installed. These are required both for safety as well as shielding from interference (except in service operations).
5. If rack mounting is employed, use Audio Research Rack Mount Ventilators (RMV-3) below and above your LS2.
6. If side-by-side mounting with other equipment is employed, place the LS2 to the left of the other chassis, so as to provide maximum spacing between the transformer of the LS2 and the other component.
7. In a cabinet or rack-mount installation which has an enclosed back, an exhaust fan is desirable so as not to operate the LS2 in overheated ambient air. Operation of vacuum tube equipment for long periods of time in hot ambient air will shorten tube life and increase chance of failure of other component parts.

Operating Procedure

Start-Up:

1. Make sure Power switch is set to "Off" position; Mute switch should be in "Mute" position; and "Gain" control should be at minimum (full counter-clockwise rotation).
2. Secure all rear-panel connections between LS2, power amplifier(s) and input sources.
3. Plug 3-prong powerline cord from rear of LS2 into grounded AC wall receptacle.
4. Turn Power switch to "On". Green LED will glow *dimly* for approximately 45 seconds while power supply stabilizes, indicating operation of automatic muting circuit. After this warm-up muting period, the LED will brighten when "Operate" is selected, indicating that your LS2 is ready for operation.

Note: For superior sonic performance, a warm-up period of at least one hour is recommended. In addition, your LS2 may be safely left "on" continuously for maximum performance at all times, but at the expense of higher maintenance costs (more frequent tube replacement).

5. Rotate input selector to source desired; set switch options to positions desired.
6. Activate input source, then deactivate Mute switch and adjust Gain control as necessary.

Shut-Down:

1. Set "Mute" switch to "Mute" position.
2. Rotate "Gain" control counter-clockwise to minimum setting.
3. Turn off power amplifier(s).
4. Turn off all input sources.
5. Set LS2 Power Switch to "Off" position.

Tape Recording Procedure

When using the LS2 as a control center for recording, the program source to be recorded must be connected to one of the five inputs controlled by the Input selector. This routes the selected program to the Tape outputs. The "Direct" inputs cannot be routed through the Tape outputs at any time.

If you own a three-head tape deck, and wish to monitor the actual tape while making a recording (for a true "A-B" comparison of signals before and after recording), follow this procedure:

- a) remove the tape deck's outputs from the "Tape" inputs on the LS2.
- b) Insert the tape deck's outputs in the "Direct" inputs of the LS2.

If you are recording from a compact disc player, for example, you will hear the signal going to the tape deck when the Input selector is set to CD and the Defeat/Record switch is set to "Record." You can then monitor off the tape as it is being recorded by switching to "Direct" on the Direct/Normal switch.

It is also possible to dub from one tape deck to another. Simply connect the output from one tape deck to an unused set of inputs controlled by the Input selector (Aux, Video, etc.) on the LS2. This signal will then be routed to the second tape deck when the Defeat/Record switch is set to "Record", and the appropriate input is selected on the Input selector.

Model LS2/LS2B MKII

Muting Provisions

The LS2 has several provisions to help protect against misuse of the exceptional dynamic range and wide bandwidth that it offers. It is not subject to damage itself, but some power amplifiers and speakers are more limited in their ability to withstand signal extremes. These provisions, both manual and automatic, are designed not to interfere with the listening experience, while giving reasonable protection against warm-up surges and power line interruptions. However, for absolute protection of associated equipment some operator understanding and responsibility are required.

Initial "settling" time of all circuit parameters within the LS2 requires approximately 5 to 10 minutes. The automatic muting circuitry timer is adjusted for about 45 seconds. (This is because recurrent interruption "settling" time is much less. You would not want to wait for 5 to 10 minutes each time such an interruption occurred.)

The Mute/Operate switch allows manual disabling of the LS2 outputs during the switching of equipment. Use of this switch will minimize stress on your amplifier even if it is "off". It is also highly recommended that manual muting be employed during the initial 45-second warm-up period as well as during turn-off for maximum protection.

While it is true that the automatic muting will provide reasonably adequate protection against speaker burnout during these periods, it has limitations. At the 45-second point the automatic timer "releases" the output, and since full subsonic stabilization has not yet occurred, some sonic unpleasantness may occur. Although this is normally adequate protection, utilization of the manual mute provision will completely avoid this stress to your speakers.

Some solid-state power amplifiers have a DC offset present at their input connections. (This, of course, should not be.) Operation of the manual Mute switch with such an amplifier connected will result in a "click" or "pop" in your loudspeaker (commensurate in level with the amount of the offset) each time the switch is activated. Repair or replacement of such amplifiers is suggested.

The automatic muting operates as follows:

1. The manual Mute switch always disables all "main" outputs and overrides any automatic provisions, even when the LS2 is turned off. (The "Operate" position of the manual Mute switch is functional only when the unit is not in the automatic mute mode.)

2. The 45-second warm-up timer will restart automatically and the LED will dim if the power is temporarily interrupted for 0.1 second or more.

Note: Power supply regulation of the LS2 is effective down to 100VAC without serious sonic degradation.

3. The automatic muting of the LS2 is designed to be effective only against power line interruptions and power line failures. It will *not* mute against subsonic signal transmissions from your input source. ***Proper fusing of speakers is essential to protect against excessive audio level or power amplifier faults.***

Reducing Gain

If the overall gain of the LS2 is too high with some sources, please consult your authorized Audio Research dealer or call Audio Research Customer Service at (612) 939-0600 (CST).

Servicing

Because of its careful design and exacting standards of manufacture, your LS2 should normally require only minimal routine service to maintain its high level of performance.

CAUTION: Your LS2 contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

The vacuum tube inside your LS2 is a quality 6922 type, and with normal use should not need to be changed for approximately 5,000 to 10,000 hours of use. Replacement 6922 tube need not be low-noise or matched for gain characteristics, and are available from Audio Research.

Cleaning

To maintain the new appearance of this unit, occasionally wipe the front panel and top cover with a soft, damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution or dilute isopropyl alcohol may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should *not* be used as they will damage the anodized finish of the front panel. A small, soft paint brush is effective in removing dust from bevels, the recessed nameplate and other features of the front panel.

Model LS2/LS2B MKII

Limited Warranty

Audio Research Corporation products are covered by a 3-Year Limited Warranty (all products except CD players, transports, and vacuum tubes), a 2-Year Limited Warranty (CD players and transports), or a 90-Day Limited Warranty (vacuum tubes). This Limited Warranty initiates from the date of purchase, and is limited to the original purchaser, or in the case of demonstration equipment, limited to the balance of warranty remaining after original shipment to the retailer or importer.

In the United States, the specific terms, conditions and remedies for fulfillment of this Limited Warranty are listed on the warranty card accompanying the product in its shipping carton, or may be obtained from the authorized retailer or from the Audio Research Customer Service Department. Outside the United States, the authorized importing retailer or distributor has accepted the responsibility for warranty of Audio Research products sold by them. The specific terms and remedies for fulfillment of the Limited Warranty may vary from country to country. Warranty service should normally be obtained from the importing retailer or distributor from whom the product was purchased.

In the unlikely event that technical service beyond the ability of the importer is required, Audio Research will fulfill the terms and conditions of the Limited Warranty. Such product must be returned at the purchaser's expense to the Audio Research factory, along with a photocopy of the dated purchase receipt for the product, a written description of the problem(s) encountered, and any information necessary for return shipment. The cost of return shipment is the responsibility of the purchaser.

Specifications

FREQUENCY RESPONSE: ± 0.5 dB, 1Hz to 100kHz, -3dB points below 0.1Hz and above 300kHz.

DISTORTION: Less than .01% at 2V RMS output (typically less than .005% in midband).

GAIN: Main output: 18dB; Balanced output: 24dB.
Tape output: 0dB; (Optional 9dB gain reduction).

INPUT IMPEDANCE: 50K ohms unbalanced, 3 megohm balanced.

OUTPUT IMPEDANCE: 200 ohms main output. 400 ohms Balanced 1, Balanced 2 (10K ohms minimum load and 2000pF maximum capacitance).

MAXIMUM INPUT: 20V maximum unbalanced, 8.5V maximum balanced.

RATED OUTPUTS: 2V RMS 1Hz to 100kHz into 60K ohm load (maximum output capability is 30V RMS [60V RMS balanced] output at .05% THD at 1kHz into a 10K ohm load).

POWER SUPPLIES: Electronically-regulated low and high voltage supplies. Two transformers (toroid for high voltage). Line regulation better than .01%.

NOISE: 20uV RMS residual 1HF weighted noise at main unbalanced output with gain control at minimum (100dB below 2V RMS output). Balanced input noise 100dB below 1V input.

TUBE COMPLEMENT: 1-6922 dual triode (hybrid FET/Tube audio circuit, solid-state power supply).

POWER REQUIREMENTS: 100-135VAC 60Hz (200-270VAC 50/60Hz) 60 watts maximum.

DIMENSIONS: 19" (48 cm) W x 5 $\frac{1}{4}$ " (13.4 cm) H (standard rack panel) x 10 $\frac{1}{4}$ " (26 cm) D. Handles extend 1 $\frac{5}{8}$ " (4.1 cm) forward of front panel. Rear chassis fittings extend $\frac{7}{8}$ " (2.3 cm).

WEIGHT: LS2: 13 lbs. (5.9 kg) Net; 21 lbs. (9.5 kg) Shipping.
LS2B MKII: 14 lbs. (6.0 kg) Net; 22lbs. (10 kg) Shipping.

Specifications subject to change without notice.

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