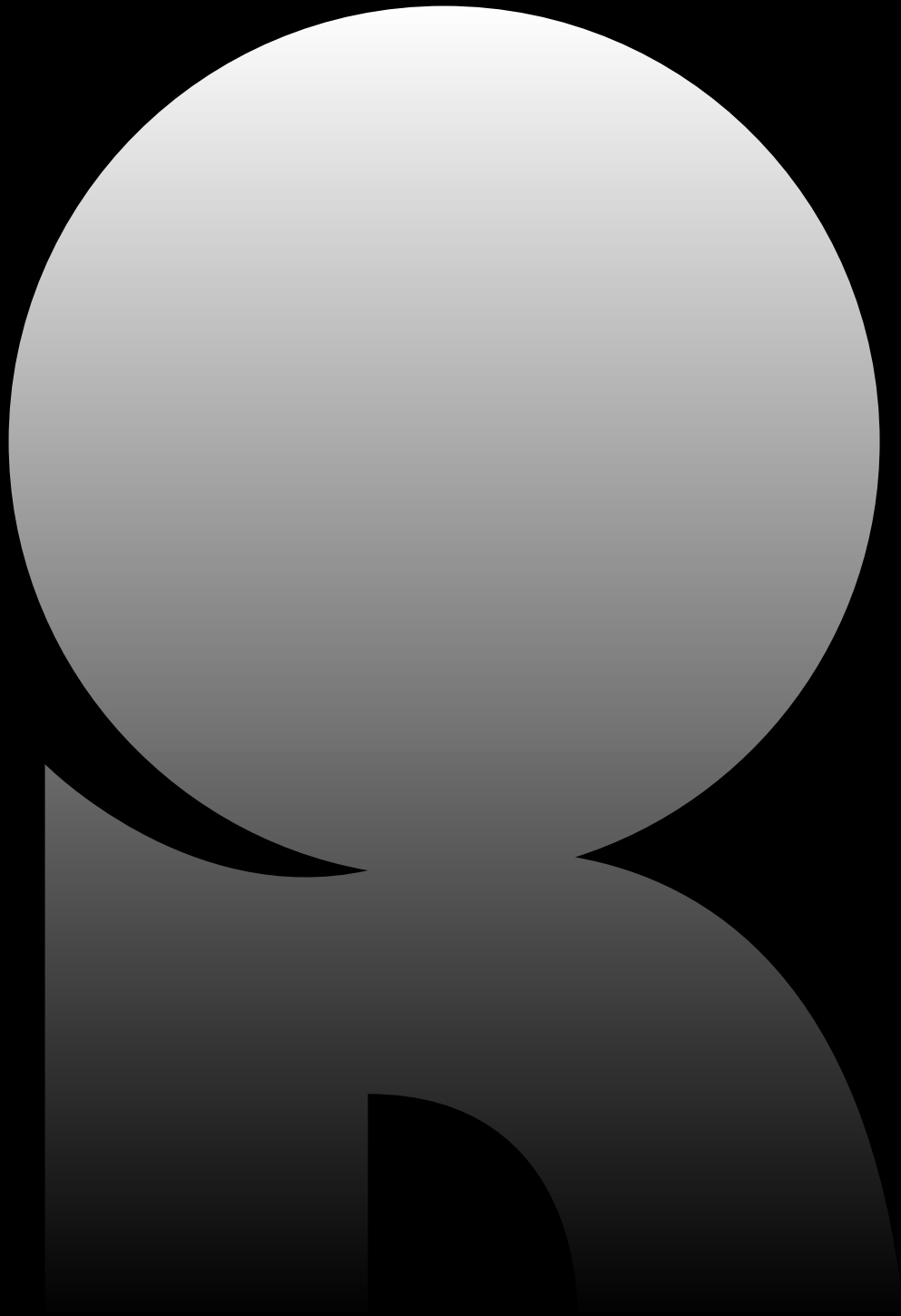
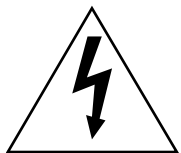
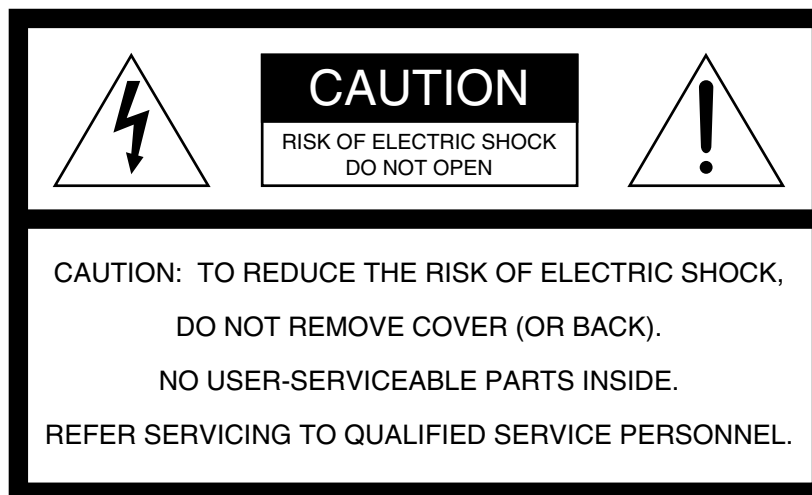


Revel® Ultima™ SUB-15/LE-1



REVEL®

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK,
DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY INSTRUCTIONS

Please read all instructions carefully and completely before operating your REVEL® ULTIMA™ SUB-15/LE-1 powered subwoofer system.

1. Always disconnect ac power before connecting or disconnecting any cables, or when cleaning any component.
2. This product uses a three-conductor power cord, which includes an earth-ground connection. To prevent shock hazard, always connect it directly to a grounded outlet.
3. Never use any ac extension cord with this product.
4. Never use flammable or combustible chemicals for cleaning audio components.
5. Never operate this product with any covers removed.
6. Never wet the inside of this product with any liquid.
7. Never pour or spill liquids directly onto this unit.
8. Never block air flow through ventilation slots or heatsinks.
9. Never bypass any fuse.
10. Never replace any fuse with a value or type other than specified.
11. Never attempt to repair this product yourself. If a problem occurs, contact your Revel retailer.
12. Never expose this unit to extremely high or low temperatures.
13. Never operate this product in an explosive atmosphere.
14. Always keep electrical equipment out of the reach of children.

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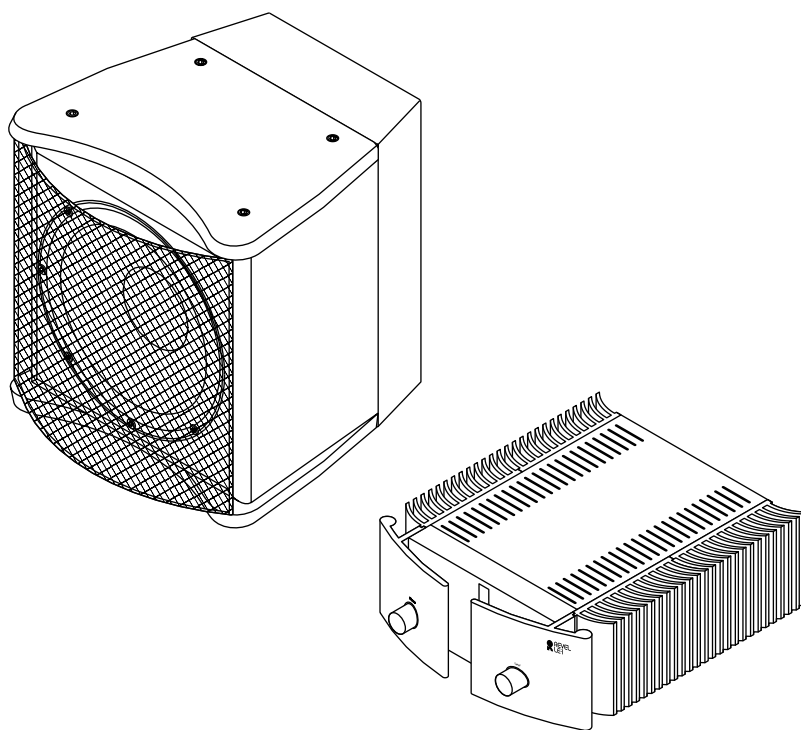
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INTRODUCTION

The REVEL® ULTIMA™ SUB-15/LE-1 powered subwoofer system combines an exceptional 15" subwoofer with a separate 700-watt (rms) low-frequency electronics section for greater installation flexibility. The ULTIMA SUB-15's graceful form and deceptively small size provide a surprisingly prodigious output and unprecedented tonal accuracy, even in the deepest octaves. The ULTIMA LE-1's impressive features and interchangeable filter module let you customize and adapt the powered subwoofer system in a wide variety of applications.

The ULTIMA SUB-15/LE-1 powered subwoofer system is an ideal companion for all Revel loudspeakers, as it integrates more precisely with other manufacturers' speakers than any other subwoofer.

Figure 1. The REVEL ULTIMA SUB-15 subwoofer and the LE-1 low frequency electronics section.



ABOUT THE MANUAL AND WARRANTY

To begin enjoying your ULTIMA SUB-15/LE-1 powered subwoofer system, first read and then perform the instructions in this owner's manual. Maximum performance is dependent on following all instructions described here, as well as those found in the owner's manuals of associated components in your audio system. Save these instructions for future reference.

The ULTIMA SUB-15/LE-1 system is covered by a limited warranty, so save the bill of sale to protect your purchase and aid in any service-related questions.

DESCRIPTION

The REVEL ULTIMA SUB-15 features a unique transducer that combines the brute-force capabilities of sound reinforcement drivers with the nuances necessary for audiophile sound reproduction. Combined with the LE-1's huge power capability, the result is a new standard of superb bass performance and adaptability for home entertainment systems.

SUB-15

To ensure uncompressed dynamic range, each ULTIMA SUB-15 is unique in the following ways:

- Oversized 4-inch diameter voice coil with flat copper wire offers higher power handling and freedom from compression for control of low frequencies during high acoustic output.
- Extremely long-throw voice coil is capable of 1.5 inches of peak-to-peak linear excursion, and 2 inches of maximum excursion for pure reproduction of deep sustained bass notes.
- Ultra-rigid Kevlar®- and Kapoc®-impregnated cellulose pulp cone body and dome operate as a perfect piston under all reproduction conditions.
- The heavy wall, cast aluminum frame maintains alignment between the massive 35-pound magnet structure and the moving elements, while offering excellent rigidity.

The ULTIMA SUB-15 cabinet has been optimally designed and internally braced with the aid of laser interferometry. Integral top and bottom panels provide a custom look via available finishes.

LE-1

The ULTIMA LE-1's amplifier section is rated for a minimum 700 watts (rms) into a single ULTIMA SUB-15, and a minimum 1,200 watts (rms) into two ULTIMA SUB-15s under actual load conditions. A unique circuit can be switched in to provide compensation for room gain. A remote control provides the listener with wireless control to set optimum performance while seated in the listening position. The internal FM-2 electronic crossover offers truly optimized performance for ideal blending between one or two ULTIMA SUB-15s and any main loudspeakers.

WARNING



UNPACKING

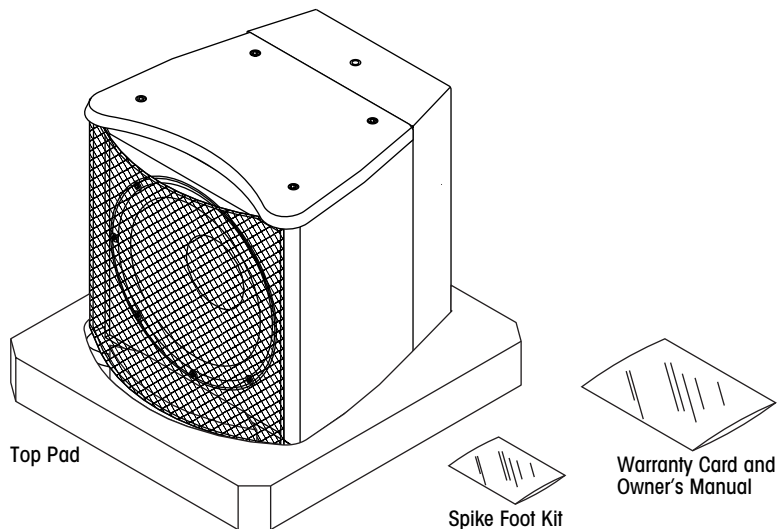
Each ULTIMA SUB-15 and LE-1 are packed in individual cartons with a combined shipping weight exceeding 198 pounds. To avoid personal injury and possible product damage, we strongly urge you to enlist additional help before unpacking either product. Also, be sure to observe the following precautions and procedures:

- *Do not attempt to lift either product from its packing carton alone. To unpack a product properly, at least two strong people will be needed.*
- *To avoid injury, use extreme care during unpacking.*
- *Do not lift a product while bending from the waist.*
- *Always stand as straight as possible and use leg muscles to lift a product.*

UNPACKING THE SUB-15

1. At the final placement choice (see *Placement* on page 10), set the packaged ULTIMA SUB-15 subwoofer on a rug or other soft material in the up position. Open the top flaps and set aside the spike foot kit and owner's manual.
2. With the top flaps folded back, roll the carton over onto its exposed top pad. Open the bottom flaps and fold them back. Remove the bottom pad.
3. Lift the carton off the subwoofer and set it aside, being careful not to damage the contents (see Figure 2 below).

Figure 2. The ULTIMA SUB-15 subwoofer with its inner packing materials.



...continued on next page

ULTIMA SUB-15/LE-1

Owner's Manual



UNPACKING

UNPACKING THE SUB-15 (Continued)

4. If you plan to add spike feet, perform the instructions in the last section, *Installing Spike Feet Onto The Sub-15*.
5. If you don't use spikes, roll the subwoofer onto its bottom and remove the top pad. Use caution to avoid scraping the finish or pulling off the grille.

UNPACKING THE LE-1

1. Set the packaged ULTIMA LE-1 on its top onto a rug or other soft material.
2. Open the bottom flaps and fold them back. Roll the carton over onto its exposed bottom pad.
3. Lift the carton off the ULTIMA LE-1 and set it aside, being careful not to damage the contents.
4. Remove the top and front pads. Grab the sides and lift the ULTIMA LE-1 up off its bottom pad.

Do not lift the ULTIMA LE-1 using the knobs.

INSPECTING THE SUB-15/LE-1

After unpacking both products, carefully inspect the ULTIMA SUB-15 and LE-1 for possible damage due to shipping. If you discover any damage, immediately contact your Revel dealer for further assistance.

Keep all packing materials for future shipping. In the unlikely event a product will need repair, Revel will only accept a unit in its original shipping carton. Using any other packing materials may result in damage to the product and is not covered by the warranty. See *Obtaining Service* on page 35 for additional details.

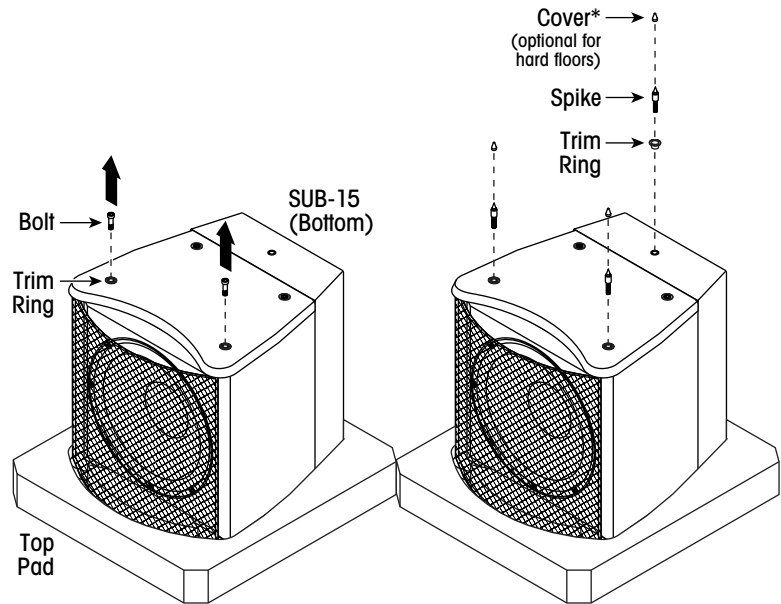
INSTALLING SPIKE FEET ONTO THE SUB-15

1. Verify the spike foot kit contains three (3) spike feet, three (3) covers, one (1) trim ring, one (1) wrench, and an adhesive packet.
2. Using the enclosed wrench, remove the two front bolts and trim rings from the bottom panel, as shown in Figure 3 (on the next page). Hold onto the trim rings for step 3. Store the bolts for possible future use.



IMPORTANT

Figure 3. Installing spike feet onto the ULTIMA SUB-15 subwoofer.



**Remove (2) Front Bolts;
Leave Trim Rings In Place**

**Install (3) Spikes (with Trim
Rings) Into Open Holes**

*NOTE: Apply a small bead of supplied silicone adhesive into each cover and fasten onto each spike. Wait 20 minutes for silicone to set.

3. Start the spike feet (with trim rings) by hand (see Figure 3) and tighten them with the enclosed wrench.
4. For use on hard floors, install covers onto the spike feet using the supplied adhesive. Wait 20 minutes for the silicone to set.
5. When finished, place the ULTIMA SUB-15 upright and remove the top pad.

PLACEMENT

SUB-15 PLACEMENT

Due to long wavelengths being reproduced, low-frequency bass response from the ULTIMA SUB-15 is non-directional and, therefore, the subwoofer does not require specific placement location. However, optimum results can be obtained by making in-room measurements to determine the precise locations of *all* speakers in your specific listening room. The location of a subwoofer, along with the listener's location, have a profound effect on sound quality. Revel has made measurements in hundreds of listening rooms and we suggest trying the following ideas to enhance performance:

- Use a corner placement for the ULTIMA SUB-15, as shown in Figure 4 below. This will provide the smoothest response in most rooms. If you cannot measure the response (in order to find the best location), place the subwoofer in a front corner.
- If you plan to use two ULTIMA SUB-15s (see Figure 5 on next page), place both subwoofers together in a front corner, side-by-side or stacked, or place a subwoofer in each of the front corners. However, if the room is not symmetrical, only place the subwoofers together in one front corner.

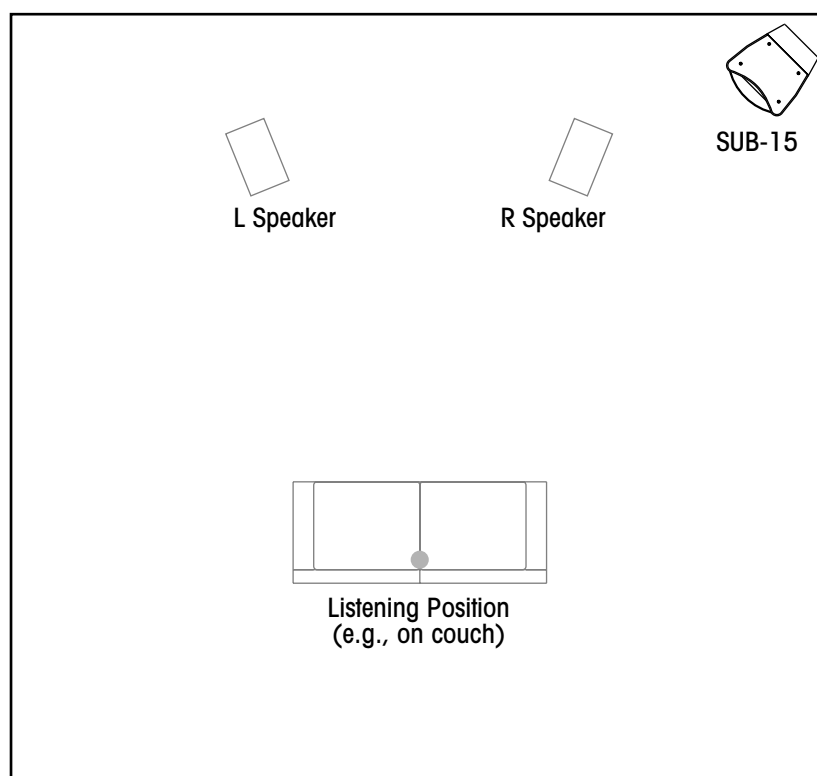
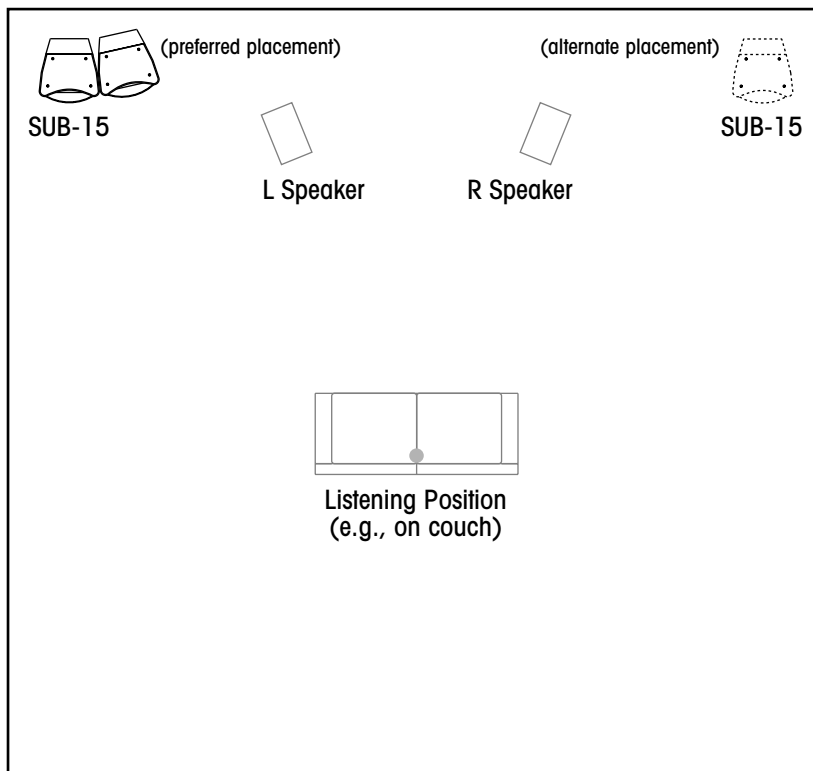


Figure 4. Typical placement of a ULTIMA SUB-15 in an average room.

Figure 5. Preferred placement of two ULTIMA SUB-15s in a corner of a larger room.

NOTE: If the room is symmetrical and the L/R speakers and listening position are also symmetrical within the room, the ULTIMA SUB-15s can be placed in opposite corners (see alternate placement).

- For very large rooms (e.g., over 3,000 cubic feet or 85 cubic meters), consider adding another ULTIMA SUB-15 or another ULTIMA LE-1/SUB-15 system for more bass output (see Figure 5). Consult your Revel dealer for specific recommendations on your audio system.



- For best results, place the ULTIMA SUB-15 near solid walls to reinforce bass response, and avoid windows which can rattle and transmit sound to the outside world.

PLACEMENT (Continued)

LE-1 PLACEMENT

In a normal installation, the ULTIMA LE-1 receives its signals from the preamplifier's main output jacks and sends its signals (via an internal crossover) to the ULTIMA SUB-15. To use the shortest interconnect cables, place the ULTIMA LE-1 near the amplifier. However, in doing so, please observe the following:

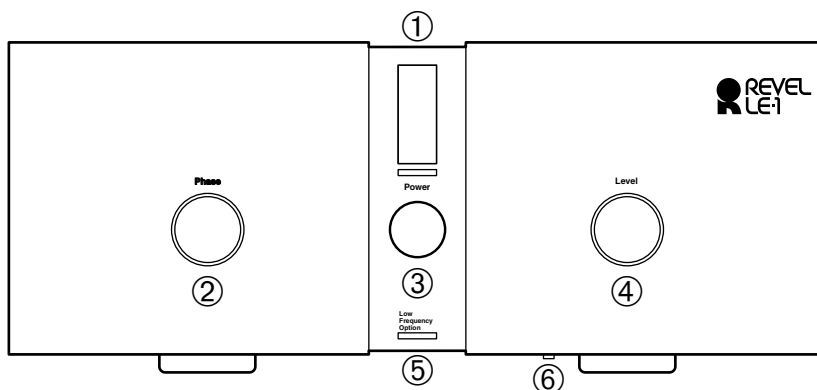
- To help dissipate internal heat, provide the ULTIMA LE-1 with adequate ventilation. Do not enclose the unit in an unvented cabinet. Allow a minimum clearance of 4 to 6 inches above the ULTIMA LE-1 and at least 2 inches on either side for air flow.
- Place the ULTIMA LE-1 so its front panel is readily accessible for viewing and control with the enclosed remote control.
- Provide convenient access to the ULTIMA LE-1's rear panel to allow for easy interconnection and later adjustment of system controls (see *System Optimization* on page 25).

NOTE: Be sure to use adequate speaker cables to connect the ULTIMA LE-1 and SUB-15(s). As an aid in determining the maximum wire length for any gauge of speaker cable, please see Figure 9 on page 18.

Figure 6. The ULTIMA LE-1's front panel layout shows locations of controls and indicators.

LE-1 LAYOUTS

FRONT PANEL LAYOUT



- ① The control-sensitive LED display shows ULTIMA LE-1 level in dB or phase in degrees. The display will show the current setting of the PHASE or LEVEL control when activated by touch during adjustment. The display reverts to a level reading during control inactivity.
- ② The PHASE control provides up to 180 degrees of phase shift of the subwoofer output relative to the main speakers.
- ③ The POWER control provides selection of power on or off as indicated by an accompanying LED. When Automatic Music Sensor is enabled (e.g., with a single dash on the LED display when in standby mode), pressing POWER turns on the unit. If no music is present within the first 25 minutes or it has been 25 minutes since music has stopped playing, the ULTIMA LE-1 will revert to standby mode. See page 28 for detailed operation.
- ④ The LEVEL control provides signal level adjustment for the ULTIMA SUB-15 subwoofer(s). It does not affect the level to the main L/R loudspeakers.
- ⑤ The LOW FREQUENCY OPTION LED shows that Room Gain Compensation is on (see *Rear Panel Layout, FREQ EQ IN/OUT*, on page 14 and *Room Gain Compensation* on page 27).
- ⑥ The manually-operated mechanical switch ("MOMS"), on the bottom panel below the LEVEL control, enables standby power. For normal operation, slide the switch to the right. To totally shut off the entire unit when leaving for an extended period of time (e.g., vacation), slide the switch to the left. In this mode, the POWER control will be disabled. Also see *Automatic Music Sensor* on page 28 for detailed operation.

LE-1 LAYOUTS (Continued)

REAR PANEL LAYOUT

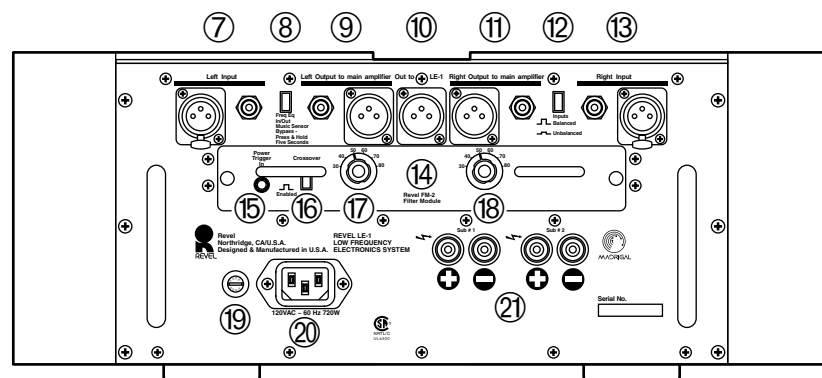


Figure 7. The ULTIMA LE-1's rear panel layout shows locations of audio connectors, switches, and the FM-2 crossover module.

- ⑦ LEFT INPUT, XLR (balanced) and RCA (unbalanced), for connections from the left preamplifier output, or front left output of a multi-channel decoder. Both inputs are 0 dBv (nominal)/+20 dBv (maximum). The XLR input is pin 2 high.
- ⑧ FREQ EQ IN/OUT – MUSIC SENSOR BYPASS provides on/off selection of Room Gain Compensation and bypass of Automatic Music Sensor through a momentary, multi-function switch, as follows:
 - To enable Room Gain Compensation, press the switch. The LOW FREQUENCY OPTION LED (on the front panel) will illuminate to confirm the selection. To disable the mode, press the switch once more. See *Room Gain Compensation* on page 27 for additional details.
 - To enable or disable Automatic Music Sensor, press and hold the switch for at least 5 seconds while the LE-1 is in normal operating mode. See *Automatic Music Sensor* on page 28 for additional details.
- ⑨ LEFT OUTPUT TO MAIN AMPLIFIER, XLR (balanced) and RCA (unbalanced), for (high-pass) connection (after LE-1's internal FM-2 crossover) to the main amplifier's left input. Both outputs are 0 dBv (nominal)/+20 dBv (maximum). The XLR output is pin 2 high.
- ⑩ OUT TO LE-1, XLR, for an audio-loop connection to another LE-1. The XLR output is +6 dBv, balanced with pin 2 high. This connection is not used for single LE-1 operation or when two LE-1s are setup for "stereo bass." See *SUB-15s/LE-1s and Stereo Bass* on page 24.

- ⑪ RIGHT OUTPUT TO MAIN AMPLIFIER, XLR (balanced) and RCA (unbalanced), for (high-pass) connection (after LE-1's internal FM-2 crossover) to the main amplifier's right input. Both outputs are 0 dBv (nominal)/+20 dBv (maximum). The XLR output is pin 2 high.
- ⑫ BALANCED/UNBALANCED INPUTS switch provides selection of balanced (XLR) or unbalanced (RCA) input connections. Press it in for unbalanced use or out for balanced.
- ⑬ RIGHT INPUT, XLR (balanced) and RCA (unbalanced), for connections from the right preamplifier output, or front right output of a multi-channel decoder. Both inputs are 0 dBv (nominal)/+20 dBv (maximum). The XLR input is pin 2 high.
- ⑭ Internal FM-2 crossover module provides optimized crossovers for any loudspeaker pair.
- ⑮ POWER TRIGGER IN is a 1/8" mini-jack for receiving a maintained 4 to 15 V_{dc} (tip positive) signal to turn the ULTIMA LE-1 on. This signal is generally provided by the system controller or surround-sound decoder.
- ⑯ CROSSOVER switch provides a hard-wire bypass of the internal low-pass (subwoofer) crossover for use with an external multi-channel controller's crossover. (*NOTE: The high-pass crossover is always active.*) See *SUB-15/LE-1 and A Multi-Channel Controller Using The Controller's Crossover* on page 20 for details.
- ⑰ LOW PASS FREQUENCY control provides selection of 30, 40, 50, 60, 70, and 80 Hz crossovers for low-pass filter on the FM-2 crossover module. See *Crossover Frequency and Slope Selection* on page 32.
- ⑱ HIGH PASS FREQUENCY control provides selection of 30, 40, 50, 60, 70, and 80 Hz crossovers for high-pass filter on the FM-2 crossover module. See *Crossover Frequency and Slope Selection* on page 32.
- ⑲ Power Fuse. Replace with same type, as follows:
For 120 V units, use a 12A (1/4" x 1") time-delayed fuse.
For 240 V units, use a T4A (5 x 20 mm) time-delayed fuse.
- ⑳ Connector for (enclosed) detachable IEC power cord.
- ㉑ SUB #1 and SUB #2 (binding posts) for connections to one or two ULTIMA SUB-15 subwoofer(s). Either pair of these identical connections may be used for single subwoofer operation.

LE-1 LAYOUTS (Continued)

REMOTE CONTROL LAYOUT

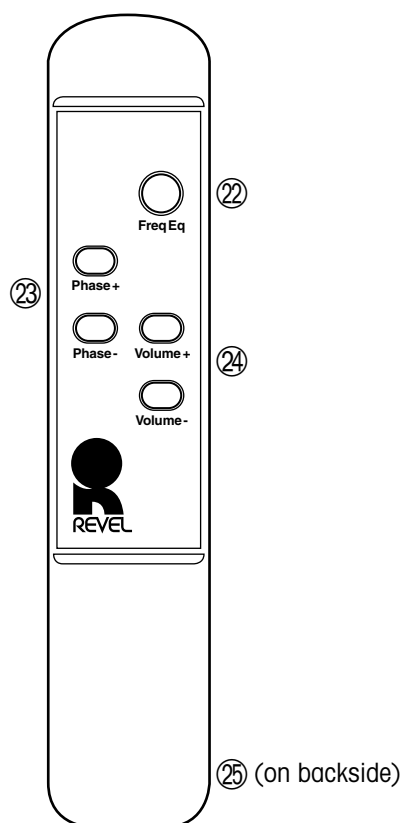


Figure 8. The ULTIMA LE-1's Remote Control layout.

- ②② FREQ EQ button provides compensation for “room gain.” The LOW FREQUENCY OPTION LED (on the LE-1's Front Panel) illuminates when the effect is on. See *Room Gain Compensation* on page 27 for operation details.
- ②③ PHASE + and PHASE – buttons provide up to 180° adjustment of LE-1's phase angle relative to the audio at the input. The current setting in degrees is indicated on the LED display (on the LE-1's Front Panel). See *Basic System Optimization* and *Optimizing Performance With A Test CD* on pages 25 and 26 for operation details.
- ②④ VOLUME + and VOLUME – buttons provide adjustment of subwoofer level relative to audio feeding the main loudspeakers. The current setting in dB is indicated on the LED display (on the LE-1's Front Panel). See *Basic System Optimization* on page 25 for operation details.
- ②⑤ The battery compartment (on backside) holds two preloaded AAA batteries for remote control power.

CONNECTIONS

The ULTIMA SUB-15/LE-1 is designed to be connected together to form a complete powered subwoofer system. Audio interconnections to your main amplifier or home theater controller can be any combination of unbalanced or balanced terminations, with full balanced connections offering the best noise suppression.

Please read the following six applications (starting on page 19) before proceeding with the actual connections. For clarity, power connections are not shown. Also, be sure to observe the following points:

- Use high-quality speaker cable with a maximum total loop resistance (for each wire run) of 0.07 ohms or less. Use the chart in Figure 9 (on the next page) to determine the maximum wire gauge.

A high loop resistance will result in improper low-frequency damping and serious degradation of sound quality. Follow the cable-gauge recommendations and make sure all connections are tight. Consult your Revel dealer as to specific recommendations for your application.

- Turn off all audio system power before making any connections.
- Read the owner's manuals that were included with your audio components to confirm their connection procedures.
- Verify correct polarities (i.e., + to + and - to -) when making connections, as shown in Figures 10 through 15 starting on page 19. Failure to do so will cause poor imaging and diminished bass response.

...continued on next page

IMPORTANT



CONNECTIONS (Continued)

WIRE GAUGE (AWG)	LENGTH (FEET)	LENGTH (METERS)
1	278	85
2	220	67
3	175	53
4	138	42
5	110	34
6	87	27
7	69	21
8	58	18
9	43	13
10	34	10
11	27	8
12	22	7
13	17	5
14	14	4
15	11	3
16	9	3
17	7	2
18	5	2

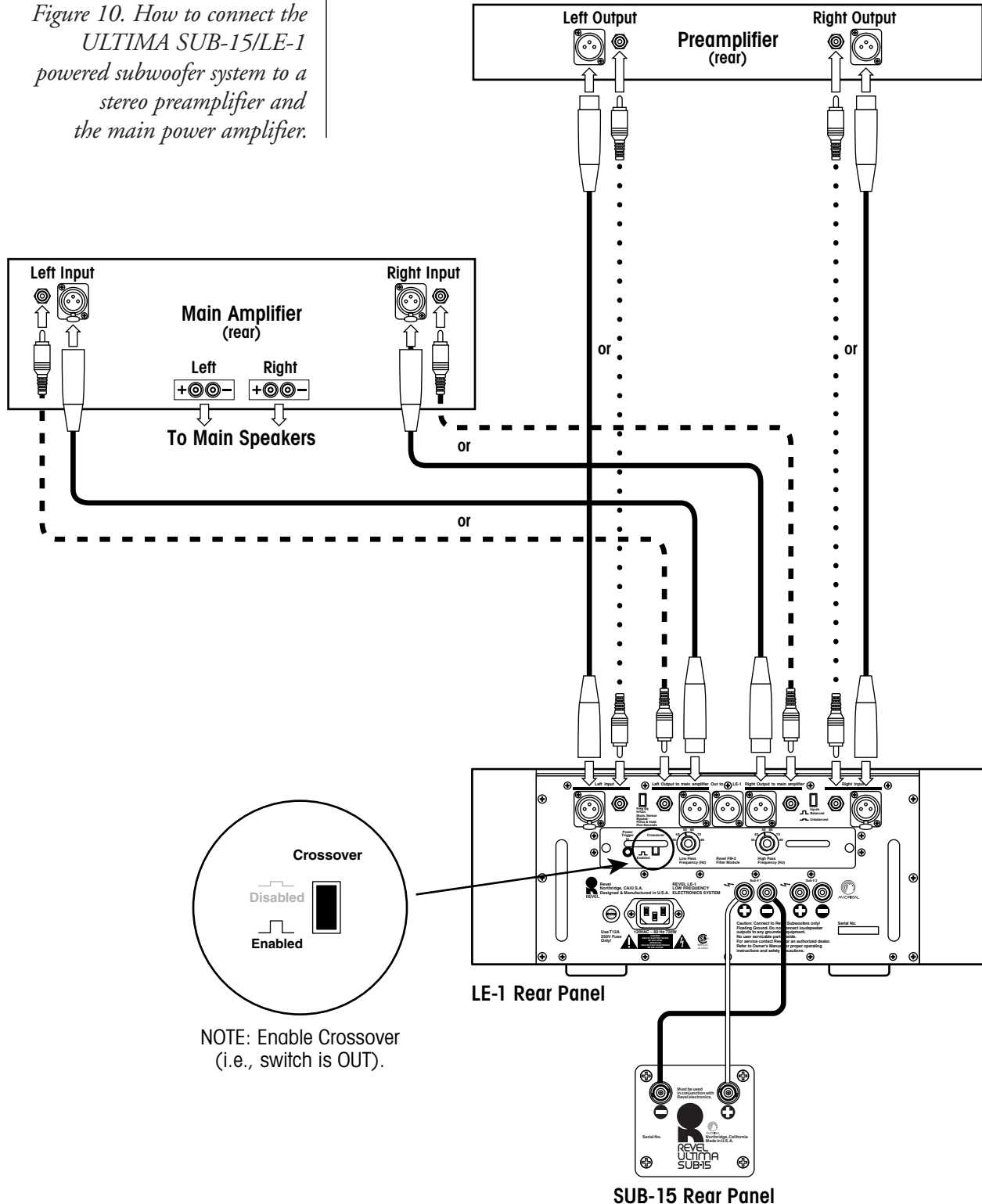
Figure 9. Wire gauge versus maximum wire run (with a maximum loop resistance of 0.07 ohms) for less than 0.2 dB response error.

NOTE: "Loop resistance" is the DC resistance measured at one end of a loudspeaker cable, with the other ends shorted together.

SUB-15/LE-1 AND A STEREO POWER AMPLIFIER

The most common application is interconnecting the SUB-15/LE-1 between a stereo preamplifier and the main power amplifier, as shown in Figure 10.

Figure 10. How to connect the ULTIMA SUB-15/LE-1 powered subwoofer system to a stereo preamplifier and the main power amplifier.



CONNECTIONS (Continued)

SUB-15/LE-1 AND A MULTI-CHANNEL CONTROLLER USING THE LE-1's CROSSOVER

In this application, the ULTIMA SUB-15/LE-1's internal FM-2 crossover is used to interconnect a home theater multi-channel controller, as shown in Figure 11.

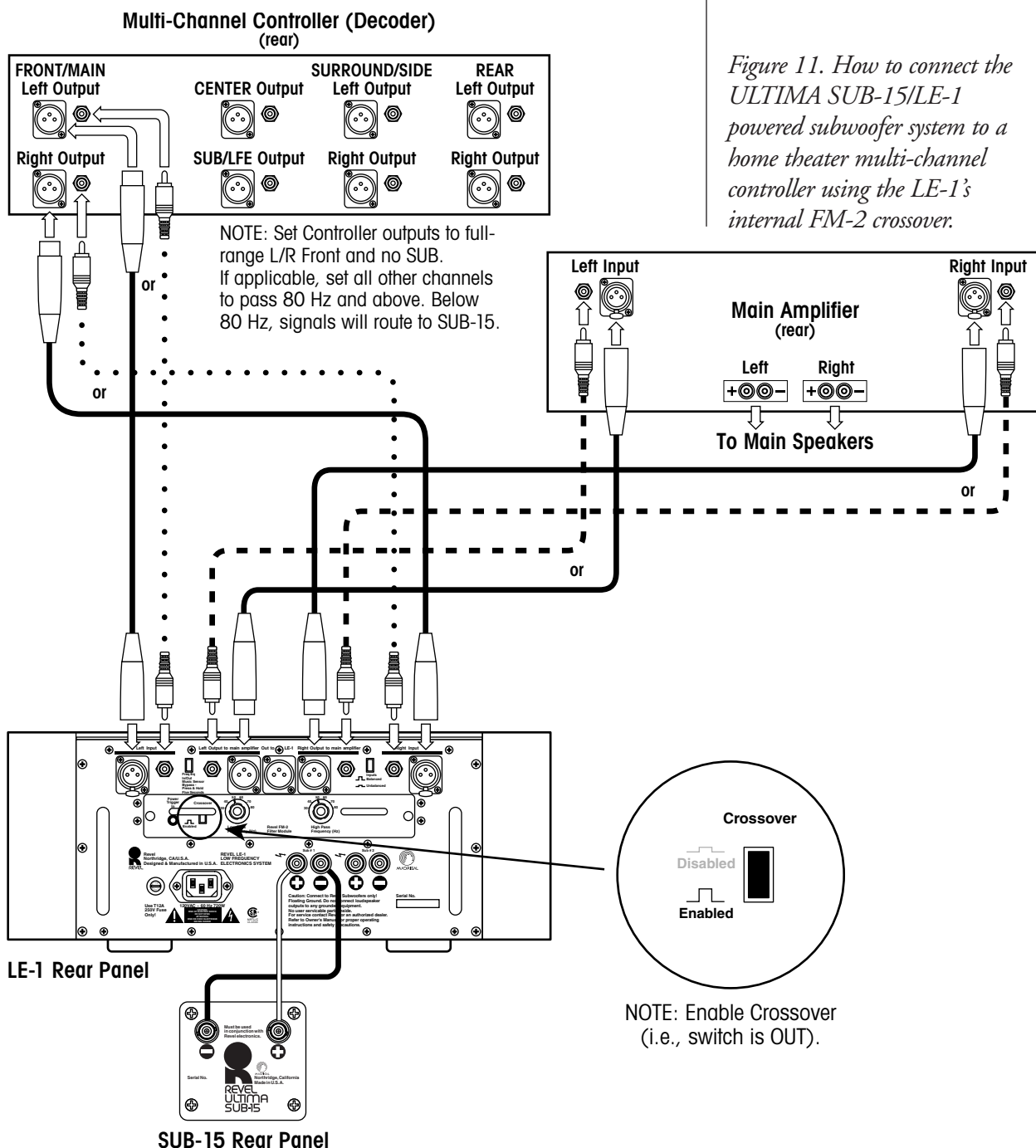
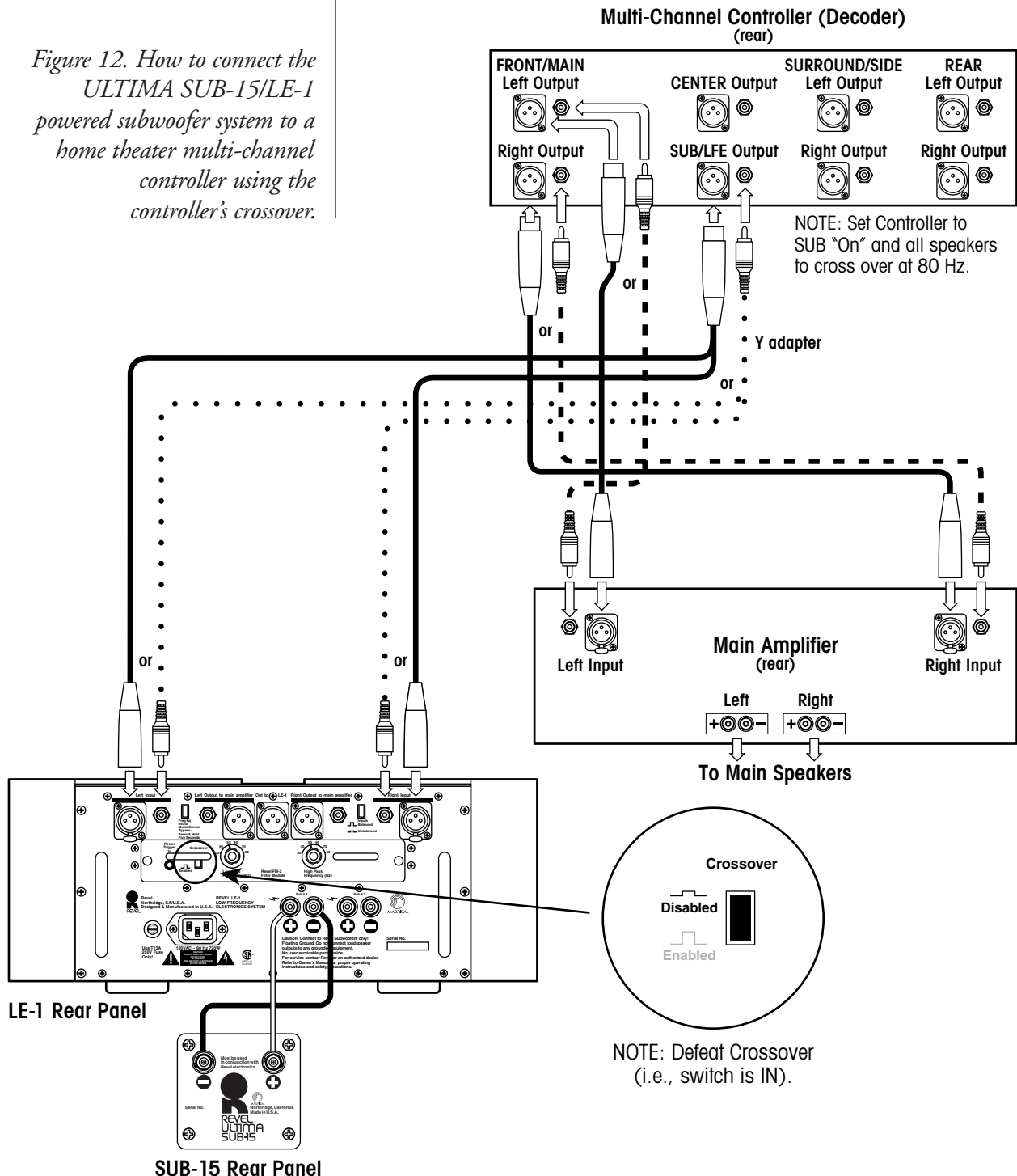


Figure 11. How to connect the ULTIMA SUB-15/LE-1 powered subwoofer system to a home theater multi-channel controller using the LE-1's internal FM-2 crossover.

SUB-15/LE-1 AND A MULTI-CHANNEL CONTROLLER USING THE CONTROLLER'S CROSSOVER

While the home-theater setup is shown on the previous page, it is possible to bypass the LE-1's internal FM-2 crossover and use the multi-channel controller's crossover instead, as shown in Figure 12.

Figure 12. How to connect the ULTIMA SUB-15/LE-1 powered subwoofer system to a home theater multi-channel controller using the controller's crossover.



CONNECTIONS (Continued)

SUB-15/LE-1 WITHOUT HIGH-PASS CROSSOVER

Revel recommends using both a low-pass and high-pass crossover with any “main” left and right loudspeakers. The FM-2 module is designed to be transparent when inserted in the main signal path. The use of a high-pass crossover greatly reduces distortion, increases dynamic range, and optimizes the transition from the ULTIMA SUB-15 to the main loudspeakers. Your Revel dealer can help with the proper FM-2 settings.

If the ULTIMA SUB-15/LE-1 will be used without a high-pass crossover (see Figure 13), contact your Revel dealer for help in setting the FM-2 low-pass crossover so the main speakers and the ULTIMA SUB-15(s) will produce an optimum combined response.

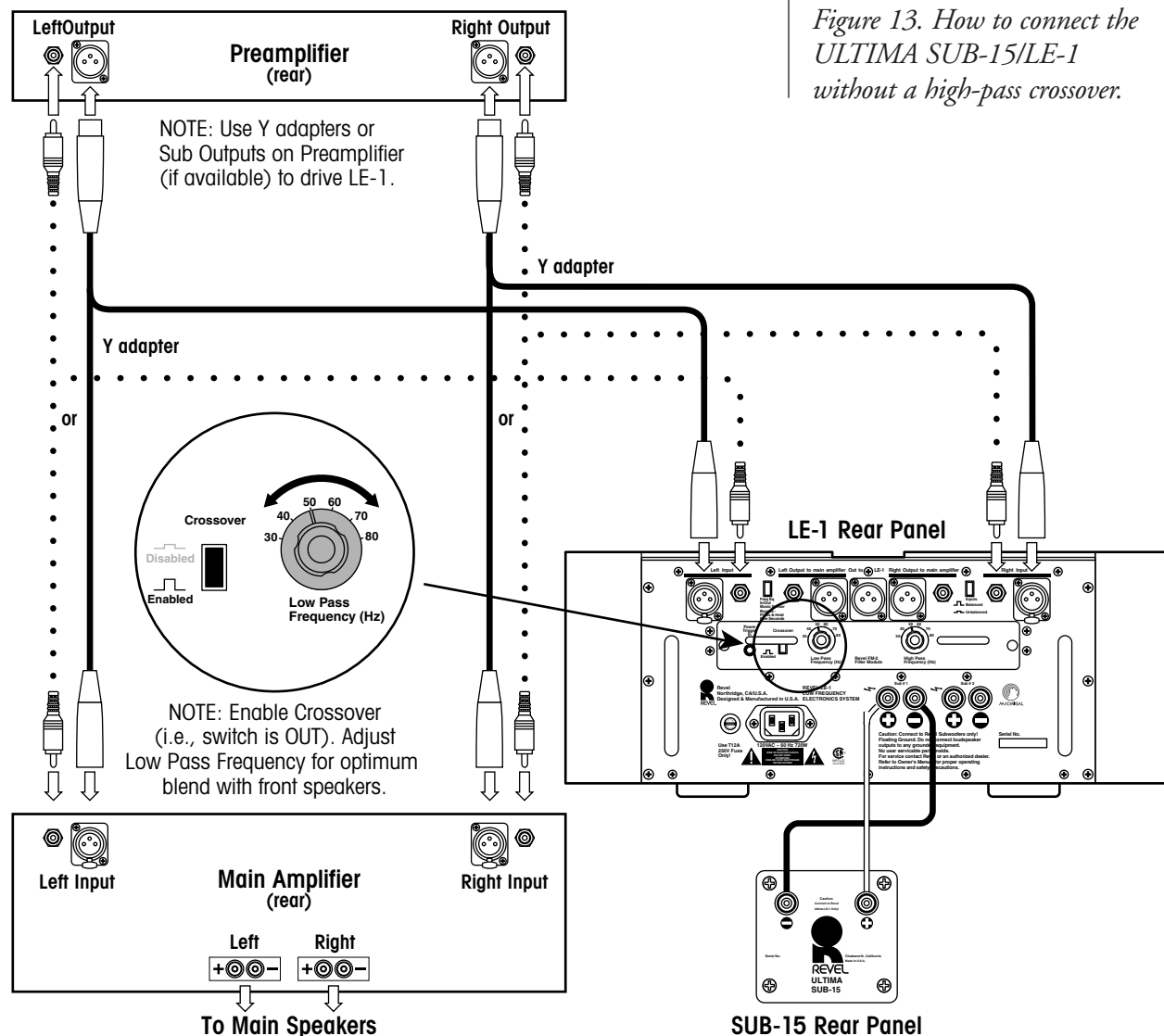
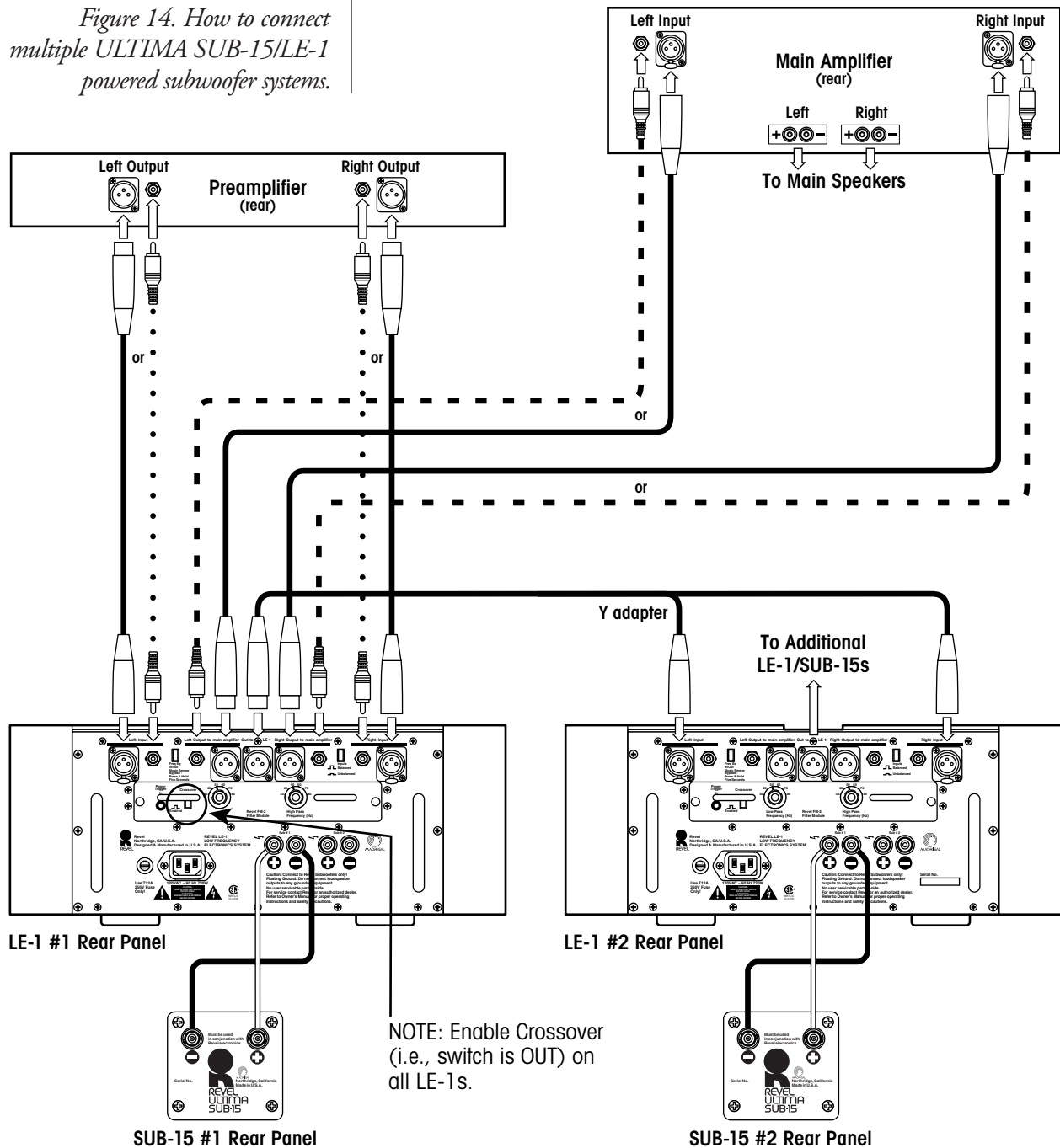


Figure 13. How to connect the ULTIMA SUB-15/LE-1 without a high-pass crossover.

SUB-15s/LE-1s IN MULTIPLE OPERATION

This setup shows multiple SUB-15/LE-1 powered subwoofer systems connected in a “daisy-chain” fashion with a stereo preamplifier and power amplifier, as shown in Figure 14. If all SUB-15s are placed next to each other or in symmetrical room locations, set all level and phase controls for the same respective values.

Figure 14. How to connect multiple ULTIMA SUB-15/LE-1 powered subwoofer systems.

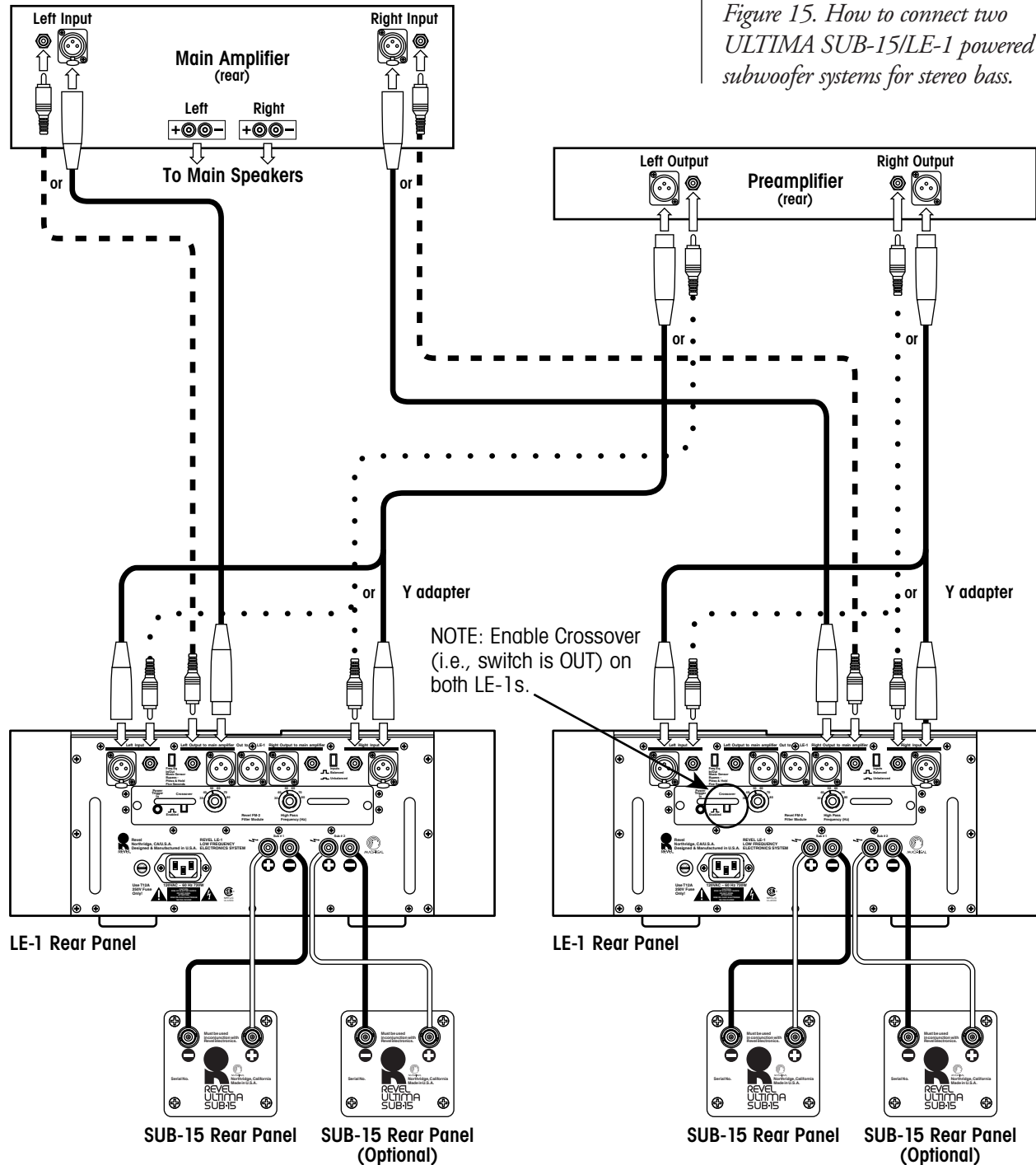


CONNECTIONS (Continued)

SUB-15s/LE-1s AND STEREO BASS

This setup shows two SUB-15/LE-1 powered subwoofer systems interconnected with a preamplifier and power amplifier for stereo bass, as shown in Figure 15. The system can be further expanded with an additional pair of SUB-15s.

Figure 15. How to connect two ULTIMA SUB-15/LE-1 powered subwoofer systems for stereo bass.



SYSTEM OPTIMIZATION

After connecting the ULTIMA SUB-15/LE-1, perform *Basic System Optimization* at the listening position. When finished, read *Optimizing Performance with a Test CD*, *Room Gain Compensation*, and *Boundary Compensation* (on the next three pages) to see if your application requires further optimization.

NOTES: The ULTIMA LE-1 is shipped with the CROSSOVER switch in the ENABLED position, allowing the audio signal to pass through the internal FM-2 crossover. In a multi-channel system (see Figure 11 on page 20), be sure to set controller outputs to full range L/R and no SUB. If applicable, set all other channels (i.e., center, side, and rear surrounds) to pass 80 Hz and above. Below 80 Hz, signals will route to the ULTIMA SUB-15.

If you intend to use the subwoofer output from a multi-channel controller, you must bypass the ULTIMA LE-1's internal FM-2 crossover (see Figure 12 on page 21).

BASIC SYSTEM OPTIMIZATION

1. Set all volume controls to minimum positions and all tone controls to flat. Turn on the audio system power. The ULTIMA LE-1's display will remain off for 5 seconds during a self-diagnosis test. Upon completion, the display will show one dash indicating Auto Music Sensor is on, or three horizontal dashes indicating this feature has been bypassed. Either display indicates that the ULTIMA LE-1 is in standby mode. See *Automatic Music Sensor* on page 28 for additional details.
2. Using pink noise as a source, increase the main amplifier's level controls to a comfortable listening level.

NOTE: Pink noise can be found on audiophile test and demonstration CDs, as well as home-theater controller setup laserdiscs and DVDs. Do not use the generated noise from a multi-channel controller, as it is not full-range.

If Automatic Music Sensor is active (see *Automatic Music Sensor* on page 28), the ULTIMA LE-1 will turn on. If it is not active, use either the Triggered Power Control or POWER switch (on the front panel) to turn on the ULTIMA LE-1. (See *A Note on Power Management* on page 29.)

...continued on next page

SYSTEM OPTIMIZATION

BASIC SYSTEM OPTIMIZATION (Continued)

NOTE: The ULTIMA LE-1 takes approximately 10 seconds to complete its “power-up” sequence. During this time, turning either the PHASE or LEVEL controls will not change the readings on the front panel display, nor will any sound emanate from the subwoofer. The “power-down” sequence also takes several seconds, after which the display indicates either one or three horizontal dashes, depending on whether Automatic Music Sensor is active or bypassed.

3. Aim the ULTIMA LE-1 Remote Control at the ULTIMA LE-1 and use the VOLUME +/- controls (or use the LEVEL control on the front panel) to set the bass output from the ULTIMA SUB-15. Try to smoothly blend its sound with the pink noise coming from the main speakers.

NOTE: The ULTIMA LE-1 display will indicate the level in dB.

4. Listen to a wide-range of program material to further fine-tune the subwoofer level. Adjust the remote's PHASE +/- controls (or use the front panel's PHASE control) to optimize the bass response. There is no right or wrong setting – only what sounds best.

NOTE: The ULTIMA LE-1 display indicates the phase in degrees and reverts to level display after a period of PHASE control inactivity.

OPTIMIZING PERFORMANCE WITH A TEST CD

If you have access to a CD, DVD, or laserdisc with special test signals, you can more accurately optimize the subwoofer's phase adjustment. The correct setting will be most easily heard by temporarily reversing the + and – connections to the ULTIMA SUB-15 (or to all ULTIMA SUB-15s, if more than one is present in the system).

1. Locate a source that is either a band of pink noise centered at or near 80 Hz, or a warble tone or sine wave near 80 Hz.
2. Turn off all system power and reverse the + and – connections to the ULTIMA SUB-15(s).
3. Turn on all system power and play the selected test signal. While sitting at the prime listening position, adjust the PHASE +/- controls (on the ULTIMA LE-1 Remote Control) until you hear minimum bass (because the subwoofer connections have temporarily been reversed).

IMPORTANT

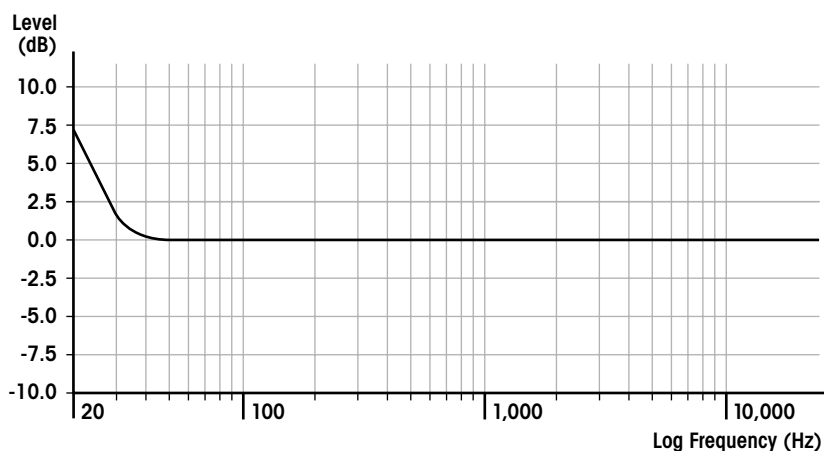


4. After making the adjustment, note the phase reading on the ULTIMA LE-1's LED display. (Don't forget that after a period of inactivity, the readout switches from phase to level.) Then, turn off all system power.
5. ***Switch the + and – connections on the ULTIMA SUB-15(s) to their original, in-phase connections.***
6. Turn on all system power.

ROOM GAIN COMPENSATION

At very low frequencies, most listening rooms exhibit a rising response known as *Room Gain*, as shown in Figure 16. While many audiophiles find this effect desirable, we've included a Room Gain Compensation circuit in the LE-1 that can be used to compensate for this gain to achieve ultimate accuracy in most rooms. When activated, it will equalize the low bass frequencies for a flatter response and will also significantly increase the dynamic range capability of the ULTIMA SUB-15(s), while reducing distortion. To activate (or defeat) Room Gain Compensation:

Figure 16. Frequency response of the ULTIMA SUB-15/LE-1 in a typical room without Room Gain Compensation.



1. At the listening position, aim the ULTIMA LE-1 Remote Control at the ULTIMA LE-1 and press **FREQ EQ** once to activate Room Gain Compensation. To defeat it, press **FREQ EQ** once more.

*NOTE: On the ULTIMA LE-1's front panel, a **LOW FREQUENCY OPTION** LED indicator will illuminate whenever Room Gain Compensation is on. Room Gain Compensation may also be turned on and off by pressing the **FREQ EQ IN/OUT** switch, located on the rear panel (see Figure 7 on page 14).*

2. Listen to a variety of sources and alternately press the **FREQ EQ** button (on and off) to judge whether to select the effect.

AUTOMATIC MUSIC SENSOR

The ULTIMA LE-1 is equipped with a power management system called Automatic Music Sensor. In the default mode, internal circuits continually sense the inputs for presence of audio signals. When detected, the ULTIMA LE-1's power supply will be automatically turned on. When audio signals are absent for approximately 25 minutes, the Automatic Music Sensor instructs the power supply to revert to the standby mode to conserve power. You can control the Automatic Music Sensor by performing the steps below:

1. On the ULTIMA LE-1 front panel, press POWER to apply full power to the unit. Wait approximately 10 seconds for the LE-1 to switch into its full operating mode.
2. On the ULTIMA LE-1 rear panel (refer to Figure 7 on page 14), locate the MUSIC SENSOR BYPASS switch.
3. Press and hold the switch for at least 5 seconds to bypass (or enable) Automatic Music Sensor. When the ULTIMA LE-1 is in standby mode, the front panel LED display will indicate three horizontal dashes when Automatic Music Sensor is bypassed, and one dash when it is enabled.

NOTE: In this mode, when this feature is bypassed, you can use the front panel POWER control to turn the ULTIMA LE-1 on and off, or use trigger control (see "Triggered Power Control" on page 29, or also see "Front Panel Layout" on page 13). The ULTIMA LE-1 will remember bypass (or enable) settings each time it is turned on (i.e., each repetition of Step 3 will cause Automatic Music Sensor mode to alternate between enabled and bypassed).

TRIGGERED POWER CONTROL

Another method for turning the ULTIMA LE-1 on and off is by means of the POWER TRIGGER IN jack, located on the FM-2 module (see *Rear Panel Layout* on page 14). When a dc voltage of between 4 and 15 volts is supplied to this 1/8" mini jack (tip is positive), the ULTIMA LE-1 will turn on and remain on until the trigger voltage is removed.

More reliable than music sensing, trigger control is frequently available in integrated audio-video systems.

A NOTE ON POWER MANAGEMENT.....

Power can be controlled by the trigger feature or Automatic Music Sensor, but not by both simultaneously. If you insert a plug into the POWER TRIGGER IN jack, be sure to disable the Automatic Music Sensor. Still, you can always use the front panel POWER switch to turn the ULTIMA LE-1 on or off, regardless of what automatic control feature is in use. The POWER switch will always override the active power control feature in use.

For example, when Automatic Music Sensor is active, pressing the POWER switch will turn on the ULTIMA LE-1 even though the music may be at such a low level that the automatic circuits are not activated. (For signal levels below threshold, the ULTIMA LE-1 is kept in the Standby mode, to eliminate its turning on due to transient signals or stray noise impulses.) If the POWER switch is pressed off and Automatic Music Sensor is active, the ULTIMA LE-1 will enter Standby mode and turn power back on if an audio signal of sufficient level is present at its inputs.

If triggered power control is being used, the front panel switch will turn the ULTIMA LE-1 on or off, regardless of the presence or absence of a trigger signal. The ULTIMA LE-1 will re-synchronize with the trigger signal after the trigger signal sequences through on-off or off-on states, accordingly.

LOW FREQUENCY GAIN SWITCH

The ULTIMA LE-1 incorporates a gain range adjustment that assures optimum operation with a wide variety of associated electronics and other conditions. This 3-position jumper system is set at the factory to +36 dB and usually does not require adjustment.

If, after performing *System Optimization* (starting on page 25), you feel the audio system requires additional (or lower) low frequency gain, perform the steps below to add (or subtract) another 6 dB:

1. Turn off all audio system power.
2. On the ULTIMA LE-1 rear panel (see Figure 7 on page 14), locate the FM-2 Filter Module, and remove the thumbscrews.
3. Gripping the two handles on the module, pull the FM-2 out of the chassis.
4. On the module, locate the gain range jumper, S5, and move it to the desired setting, as shown in Figure 17. Note that at the highest gain setting, the jumper is simply “stored,” rather than being used to make an electrical connection.
5. Reinsert the FM-2 Filter Module and firmly press it in. Tighten the thumbscrews.
6. Turn on all audio system power.

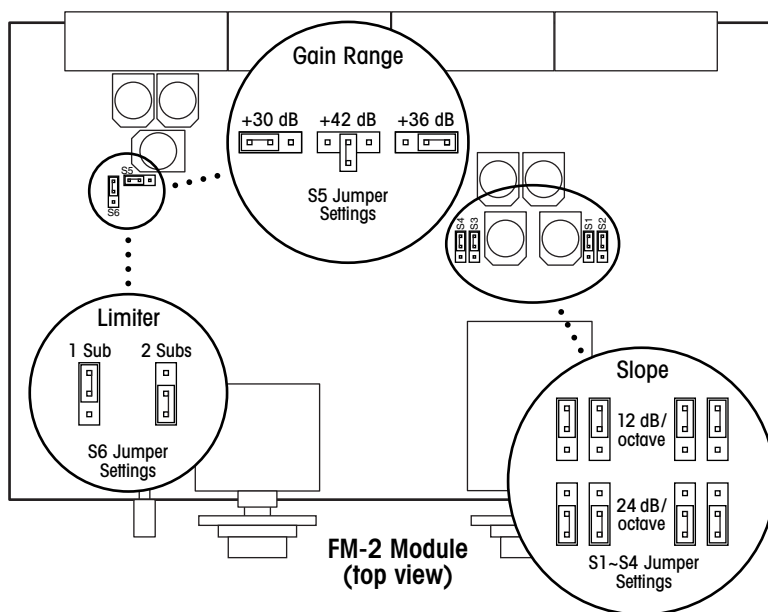


Figure 17. FM-2 Filter Module and jumper locations of low frequency gain range switch, low frequency limiter, and crossover slope settings.

LOW FREQUENCY LIMITER SETTING

The ULTIMA LE-1 incorporates a limiter circuit on the FM-2 Filter Module to reduce possible sudden and unexpected low frequency effects that could overdrive an ULTIMA LE-1 and its connected ULTIMA SUB-15(s).

Unlike conventional subwoofer protection circuits, the ULTIMA LE-1 limiter circuit has no effect whatsoever until signal conditions are such that the amplifier would otherwise “clip.” The circuit includes two settings whose selection is dependent on whether the ULTIMA LE-1 is connected to one or two subwoofers.

The factory setting is one (1) subwoofer. To change it to two (2) subwoofers, perform the steps as described in the previous section, except in step 4 locate the limiter jumper, S6, and move it to the desired setting.

WARNING



The S6 jumper MUST be set to either position for the ULTIMA LE-1 to work properly; if it is removed completely, the maximum output level will be limited to a very low level.

CROSSOVER FREQUENCY AND SLOPE SELECTION

The FM-2 Filter Module also features adjustments for frequencies below which the subwoofer is the predominant source and above which the other speakers in the system “take over.” The adjustments, labeled LOW PASS FREQUENCY and HIGH PASS FREQUENCY respectively (see Figure 7 on page 14), are set at the factory to 80 Hz, the frequency most commonly used in multi-channel audio systems. Different values for high or low crossover frequencies may be more appropriate in a given system. Your Revel dealer can assist you in selecting the optimum high- and low-pass crossover settings.

Moreover, the FM-2 Filter Module can accommodate the use of different front-channel speakers with an appropriate selection a high-pass filter slope of 12 dB per octave (two poles) or 24 dB per octave (four poles). This setting should only be changed if the front speakers are changed. Either your dealer or, in the case of non-Revel front speakers, the speaker manufacturer should be consulted for the proper setting of these adjustments. To change the crossover slope setting, perform the steps below:

1. Turn off all audio system power.
2. On the ULTIMA LE-1 rear panel (see Figure 7 on page 14), locate the FM-2 Filter Module, and remove the thumbscrews.
3. Gripping the two handles on the module, pull the FM-2 out of the chassis.
4. On the module, find the four small, black removable jumpers at positions S1, S2, S3, and S4 (see Figure 17 on page 30). For 12 dB per octave slope (the default setting), the jumpers should be positioned so that they bridge the two pins closer to the row of 40 connectors (along the rear edge of the FM-2 board). For 24 dB per octave slope, move the jumpers so that they bridge the two pins closer to the panel at the front of the FM-2 board.

NOTE: All four headers must be in the same position; either closer to the rear or the front of the board.

5. Reinsert the FM-2 Filter Module and firmly press it in. Tighten the thumbscrews.
6. Turn on all audio system power.

IMPORTANT



CABINET CARE

The ULTIMA SUB-15 subwoofer cabinet has a paint finish and does not require any routine maintenance. Use a soft cloth, dampened with water only, to remove any fingerprints or to wipe off dust. Clean the grille by gentle vacuuming, or use a lint remover or two-sided tape. For wood side panels, occasionally use a household furniture polish to maintain the beauty of the hardwood veneers. For aluminum side panels, use a soft cloth, dampened with soapy water only, and wipe them in the same direction as the grain.

AMPLIFIER CARE

The ULTIMA LE-1 does not require any routine maintenance. If desired, use a soft cloth to remove any fingerprints or to wipe off dust.

Do not use any liquids to clean the ULTIMA LE-1's finish.

TROUBLESHOOTING

If the ULTIMA SUB-15/LE-1 sounds distorted, stops playing, or otherwise seems to be malfunctioning, first determine whether the problem is in the subwoofer, the wiring, and/or other audio components. If the problem also affects the main speakers, the cause is most likely in your electronics. If it is only noticed in the subwoofer, make sure that all connecting cables are correct and in proper working condition. Make sure the subwoofer is plugged in and turned on.

If the front panel LED display shows an error code, use the chart (on the next page) to determine the probable cause and solution.

NOTE: An error code will be briefly displayed each time the unit is turned on or off, by any means. This is normal and is not a fault.

If the ULTIMA LE-1 does not respond to commands from the ULTIMA LE-1 Remote Control, try replacing the two AAA batteries (located in compartment on backside) with new ones.

If everything seems to be in good working order and the subwoofer still malfunctions, contact your Revel dealer for assistance (see *Obtaining Service* on page 35).

Do not attempt to repair the ULTIMA SUB-15/LE-1 yourself.

WARNING



...continued on next page

TROUBLESHOOTING (Continued)

ULTIMA LE-1 ERROR CODES

CODE	CAUSE(S)	SOLUTION
ACF	Power frequency is not compatible.	Turn unit off. Contact your Revel dealer to update unit.
ACL	Line voltage is low.	If cause (e.g., brown out) clears within 10 minutes, normal operation resumes.
	Power voltage is not compatible.	After 10 minutes, unit enters standby mode. Contact your Revel dealer to update unit.
ACH	Line voltage is high.	If cause (e.g., line surge) clears within 10 minutes, normal operation resumes.
	Power voltage is not compatible.	After 10 minutes, unit enters standby mode. Contact your Revel dealer to update unit.
E1 or E2	Over temperature or dc offset in output stage(s).	Unit automatically shuts off; if condition clears within 10 minutes, normal operation resumes. If after 10 minutes unit enters stand-by mode, contact your Revel dealer for help.
No display	No power.	Check ac power connections.
	“MOMS” switch is set to off.	Set to standby power; see pages 13 and 29.
	Unit is in standby; any above error not cleared in 10 minutes.	Contact your Revel dealer for help.

OBTAINING SERVICE

We take great pride in our dealers. Experience, dedication, and integrity make these professionals ideally suited to assist with our customers' service needs.

If your Revel component requires service, please contact your dealer. Your dealer will then decide whether the problem can be remedied locally, or whether to contact Revel for further service information or parts, or to obtain a Return Authorization. If needed, call the Revel Customer Service Department at:

1-818-830-8777 on any business day, from 9 A.M. to 5 P.M. PST.

The Revel Customer Service Department works closely with your dealer to solve your service needs expediently.

Return Authorization must be obtained through your dealer BEFORE a unit is shipped for service.

It is extremely important that information about a problem be explicit and complete. A specific, comprehensive description of the problem helps your dealer and the Revel Customer Service Department locate and repair the difficulty as quickly as possible.

A copy of the original bill of sale will serve to verify warranty status. Please include it with the component when it is brought in for warranty service.

All returned units must be properly packaged in their original packing material, and the proper return authorization numbers must be marked on the outer carton for identification. If the packaging to protect the unit is, in our opinion or that of our dealer, inadequate to protect the unit, we reserve the right to repackage it for return shipment at the owner's expense. Neither Revel nor your dealer can be responsible for shipping damage due to improper (i.e., non-original) packaging.

Your dealer can order a new set of shipping materials for you if you need to ship your component and no longer have the original materials, or if they are in poor condition. There will be a charge for this service. We strongly recommend saving all packing materials in case you need to ship your unit some day.

IMPORTANT



WARNING



SPECIFICATIONS

Revel utilizes proprietary measurement methods in the design and specification of our loudspeakers. Our research has developed a series of tests that represent a great leap forward in making measurements that dramatically contribute to our goal of accurately reproducing music or film.

SUB-15

Low Frequency Extension: $-3\text{ dB @ }16\text{ Hz (up to full-rated power)}$

Frequency Response
(with LE-1): $20\text{ Hz to }f_c \pm 0.5\text{ dB}$

True Linear Volume
Displacement: 169 in^3

Dimensions: $20''\text{ H} \times 19\frac{9}{16}''\text{ W} \times 21\frac{3}{16}''\text{ D}$
 $508.0\text{ mm H} \times 496.9\text{ mm W} \times 537.5\text{ mm D}$
(includes grille – see Figure 18 below)

Weight: 95 lb (43.09 kg) net, including carton.

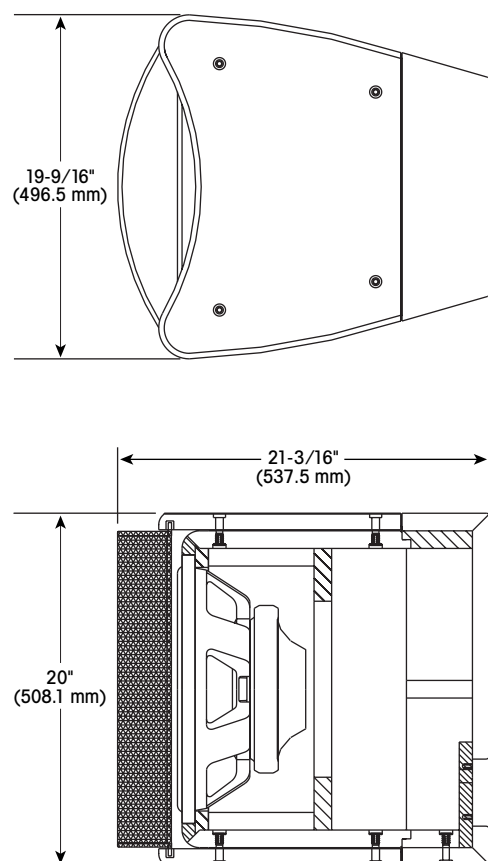


Figure 18. Overall dimensions
for the ULTIMA
SUB-15 subwoofer.

LE-1

Output Power:	<i>At least 700 W_{rms} (into single SUB-15) At least 1,200 W_{rms} (into two SUB-15s)</i>
Low-Pass Filter –	
Type:	<i>Low pass with bypass switch</i>
Slope:	<i>4th-order Butterworth (Q equal to response of two cascaded sections having a Q of 0.707 each)</i>
Crossover Frequencies:	<i>Switch-selectable at f_c of 30, 40, 50, 60, 70, and 80 Hz (all with f_c at -6 dB)</i>
High-Pass Filter –	
Type:	<i>High pass, always on</i>
Slope:	<i>Switch-selected 12 dB/octave (Q= 0.707), or 24 dB/octave (Q equal to response of two cascaded sections having a Q of 0.707 each)</i>
Crossover Frequencies:	<i>Switch-selectable at f_c of 30, 40, 50, 60, 70, and 80 Hz (f_c at -6 dB for 24 dB/octave or -3 dB for 12 dB/octave)</i>
Freq. EQ Switch:	<i>Compensates for acoustic "room gain" at very low frequencies, resulting in more accurate bass reproduction</i>
Wireless Remote Control:	<i>Infrared controls variable subwoofer level and phase and enables/disables Low Frequency Option</i>
Inputs:	<i>Left and right balanced (XLR) and unbalanced (RCA) line level</i>
Outputs:	<i>Left and right balanced (XLR) and unbalanced (RCA) high-pass line level to main amplifier; gain adjustable to +42/+36/+30 dB (on FM-2 module)</i> <i>Balanced line-level output for use with an additional ULTIMA LE-1</i> <i>Dual speaker-level outputs for connection to compatible Revel subwoofer(s)</i>
Dimensions:	<i>7"H x 17"W x 21 7/16" D (overall) 177.8 mm H x 431.8 mm W x 544.5 mm D (includes feet – see Figure 19 on the next page)</i>
Weight:	<i>103 lb (46.7 kg) net, including carton</i>

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SPECIFICATIONS

LE-1 (Continued)

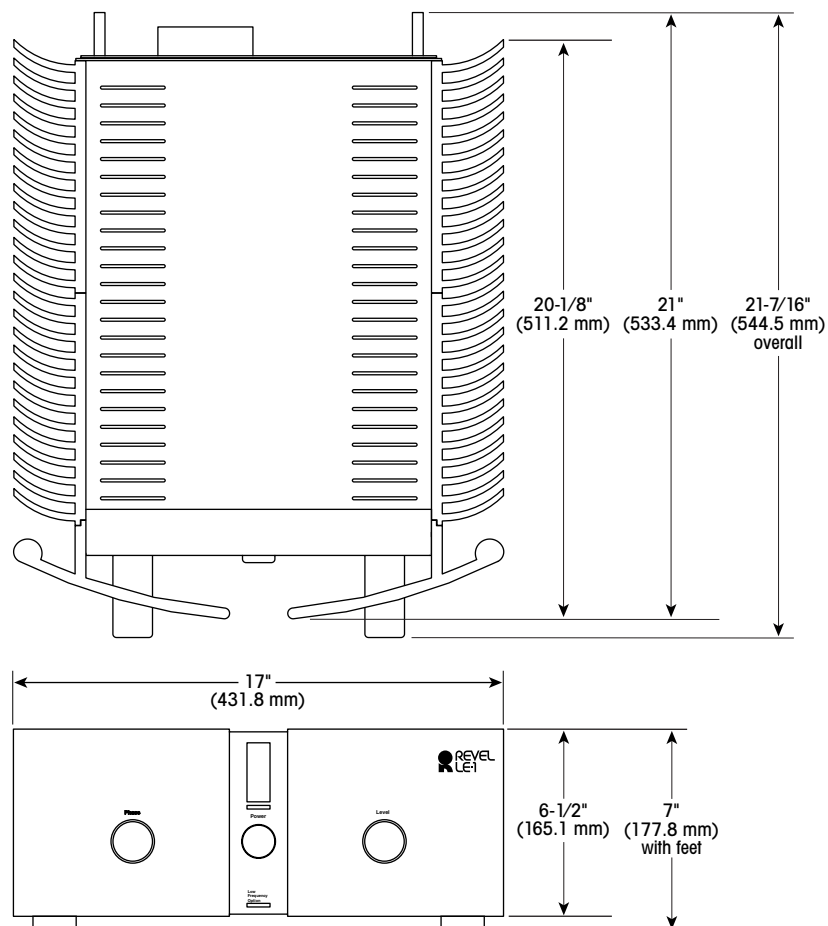


Figure 19. Overall dimensions for the ULTIMA LE-1 low-frequency amplifier.



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