KRELL

THE LEADER IN AUDIO ENGINEERING

Full Power Balanced X Series Power Amplifiers

700cx, 400cx, 300cx Stereo

750Mcx, 450Mcx, 350Mcx Monaural

with Krell CAST II Technology

Instructions for Use

Owner's Reference

Full Power Balanced
X Series Power Amplifiers

700cx, 400cx, 300cx Stereo

750Mcx, 450Mcx,
350Mcx Monaural

with Krell CAST II Technology

v 02.0

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CE

This product complies with the EMC directive (89/336/EEC) and the low-voltage directive (73/23/EEC).

WARNINGS

The Full Power Balanced amplifier must be placed on a firm, level surface where it is not exposed to dripping or splashing.

The ventilation grids on the top of the Full Power Balanced amplifier must be unobstructed at all times during operation. Do not place flammable material on top of or beneath the component.

Before making connections to the Full Power Balanced amplifier, ensure that it is off and the preamplifier is in mute or stand-by mode. Make sure all cable terminations are of the highest quality and free from frayed ends, short circuits, or cold solder joints.

The differential circuitry employed with Full Power Balanced amplifiers requires special attention when connecting speakers. Do not connect the negative speaker terminals together. Do not connect the negative speaker terminals to ground or attempt to bridge the left and right speaker binding posts of Full Power Balanced stereo amplifiers.

Do not connect a Full Power Balanced amplifier to a speaker selector device that employs a common ground scheme, as it may short-circuit the amplifier output.

THERE ARE NO USER SERVICEABLE PARTS INSIDE ANY KRELL PRODUCT.

Please contact your authorized Krell dealer, distributor, or Krell if you have any questions not addressed in this reference manual.

P/N 305976

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Introduction

The Full Power Balanced X Series consists of three stereo amplifiers, the Full Power Balanced 700cx, 400cx, and 300cx Stereo Power Amplifiers and three monaural amplifiers, the Full Power Balanced 750Mcx, 450Mcx, and 350Mcx Monaural Power Amplifiers. Installation, connection, and operation of all amplifiers in the Full Power Balanced series are identical; however, a pair of Full Power Balanced Monaural amplifiers are required for stereo operation.

Full Power Balanced amplifiers can be configured to accommodate any sophisticated music or home theater system and can be operated by an optional remote control or through the remote control of other Krell components.

This owner's reference manual contains important information on placement, installation, and operation of the Full Power Balanced amplifiers. Please read this information carefully. A thorough understanding of these details will help ensure satisfactory operation and long life for your Full Power Balanced amplifier and related system components.

Definition of Terms

Following are the definitions of key terms used in your owner's reference manual.

CONFIGURATIONS

Krell Link
A method of synchronizing remote control operation for Krell systems that include multiple preamplifiers, amplifiers, and associated components. When Krell Link in/out connections are used, the remote capabilities of the linked components are controlled from one component, called the control component. The linked components respond to stand-by and operational mode commands from the control component via MIDI cables.

INPUT AND OUTPUT CONNECTIONs

Balanced
A symmetrical input or output circuit that has equal impedance from both input terminals to a common ground reference point. The industry standard for professional and sound recording installations, balanced connections have 6 dB more gain than single-ended connections and allow the use of long interconnect cables. Balanced connections are completely immune to induced noise from the system or the environment.

Krell Current Audio Signal Transmission (CAST)
A proprietary Krell circuit technology for connecting analog components, in which the audio waveform is transmitted between components in the current rather than voltage domain. The speed and bandwidth provided by Krell CAST and the CAST circuitry update, Krell CAST II, yield accurate, realistic music reproduction. Krell components connected via CAST and CAST II perform as if they are all part of a single circuit.

Definition of Terms, *continued*

Single-ended
A two-wire input or output circuit. Use care when using single-ended connections as the ground connection is made last and broken first. Turn the system off prior to making or breaking single-ended connections. Single-ended connections are not recommended for connections requiring long cable runs.

OPERATION

Off
When the power switch on the back panel is placed in the down position and the blue power LEDs turn off, the component is off.

Operational Mode
When the power button on the front panel is pressed and the three blue power LEDs illuminate, the component is in the operational mode and ready to play music.

Stand-by Mode
A low power consumption status that keeps the audio and regulator circuits at idle. Krell recommends leaving the component in the stand-by mode when it is not playing music.

TECHNOLOGY

Krell Current Mode
A proprietary Krell circuit topology in which the audio gain stages of a component operate in the current rather than voltage domain. This unique technology provides the component with exceptional speed and a wide bandwidth.

Krell Sustained Plateau Bias III
A patented microprocessor control system that maintains Class A bias operation regardless of musical demand. Class A bias is the most accurate method used to amplify musical signals. The new Sustained Plateau Bias III software is featured in the Full Power Balanced X Series amplifiers and was developed from the algorithm utilized in the Master Reference Amplifier. Sustained Plateau Bias III maximizes an amplifier's efficiency both in power consumption and heat generation.

Revolutionary Krell CAST and CAST II Technology

Current Audio Signal Transmission, termed CAST, is a revolutionary method of connecting analog audio components for unparalleled sonic performance. CAST circuitry, and the CAST circuitry update, Krell CAST II, combine innovative engineering with existing Krell Current Mode technology to create entire CAST systems that reproduce music with incredible range, tonality, and precision.

Voltage Signal Transmission and the Traditional Audio System

Traditionally, signal is transmitted in the voltage domain between two components. In an audio system, each component is a discrete entity with unique characteristics that act upon the musical signal independently. Each component is unaware of the other components in the system. The cables that connect the components each have their own electrical characteristics, which affect the sonic presentation of the entire system.

CAST: A New Approach

CAST circuitry recognizes signal transmitted in the current domain instead of the voltage domain between each component. CAST transmission unifies the individual components and their interconnects into an electrically linked whole. The sonic presentation of the entire system remains intact.

CAST Basics

Here's how a CAST audio system works. Internally, each CAST source transfers, or amplifies, current using Krell Current Mode circuitry. This current signal is then output using CAST circuitry. When the signal is received by a CAST input, Krell Current Mode circuitry again takes over until the signal reaches the loudspeaker. By maintaining the musical signal in the current domain from beginning to end, an entire CAST system behaves as if it is one component. With CAST, anomalies of signal transmission between components are eliminated. Cable impedances and their effects on the transmitted signal are non-existent.

How CAST and Krell Current Mode Interact

While CAST is a new method of transferring the musical signal between components, its origin stems from Krell Current Mode, the technology developed to transfer the musical signal within a component. CAST combined with Krell Current Mode takes circuitry signal transmission to the next evolutionary level. In essence, Krell Current Mode maintains the integrity of the signal within the component and CAST preserves the transmitted signal between components. Together, CAST and Krell Current Mode technologies unify separate Krell components into a *single global circuit.*

CAST Cable Construction

A CAST system uses cables manufactured by Krell and other manufacturers specially licensed by Krell. Thin and flexible CAST cables are constructed with the same build quality as other Krell products and are aesthetically matched to the components that Krell manufactures. An all-metal body and locking connectors with gold contacts are part of the standard no-compromise specification developed for every CAST cable made.

The Best Musical Performance

When you operate a CAST system, you will hear significant improvements in every performance area: speed, precision, dynamic range, depth and width of the sound stage, transient impact, tonal balance, harmonic distortion, and more. The goal for CAST is the same company goal used for all Krell products. Krell strives for the delivery of the best performance of a musical event for you, using the full expression of technology to date.

Unpacking

Two people are needed to remove the Full Power Balanced amplifier from its shipping box safely and easily.

1. Open the shipping box and remove the top layer of foam. You see these items:
   1 Full Power Balanced Amplifier
   1 Packet containing the owner's reference manual and the warranty registration card
2. Orient the shipping box so that one person stands at the front of the amplifier and one person stands at the rear of the amplifier. Both people need to grab a pair of the cardboard handle cutouts (one pair located at the front of the amplifier and one pair located at the rear of the amplifier) and simultaneously lift the amplifier straight up, out of the carton.
3. Place the amplifier in a safe location and remove the protective plastic wrapping.

Notes

If any of the items mentioned above are not included in the shipping box, please contact your authorized Krell dealer, distributor, or Krell for assistance.

Save all packing materials. If you ship your Full Power Balanced amplifier in the future, repack the unit in its original packaging to prevent transit damage. See ***Return Authorization Procedure****, on page 21 for more information.*

Placement

Before you install the Full Power Balanced amplifier into your system, please follow the guidelines in this section to choose its proper location. This will facilitate a clean, trouble-free installation.

The Full Power Balanced amplifier requires at least two inches (5 cm) of clearance on each side and at least eight inches (20 cm) of clearance above the component to provide adequate ventilation.

Although Sustained Plateau Bias III circuitry reduces the high heat dissipation and heat output of traditional Class A circuitry, Full Power Balanced amplifiers still can become hot under normal operation.

When the front and rear of a cabinet are open the air space between the chassis and shelf must be unobstructed. If you place the amplifier in a closed cabinet, you may need to modify shelf spacing or use small fans to increase ventilation. For the dimensions of your Full Power Balanced amplifier, see ***Specifications,*** on pages 22–23.

Place the amplifier as close to the speakers as possible. Krell CAST technology permits you to use interconnect cables of any length, see ***Revolutionary Krell CAST and CAST II Technology*** on page 3; however, try to keep the cable length to a minimum.

All Full Power Balanced amplifiers drive the lowest impedances with ease. When impedance is added due to long speaker cable lengths, amplifier power is wasted in the cable. Long speaker cables reduce the maximum power that is delivered in the speakers.

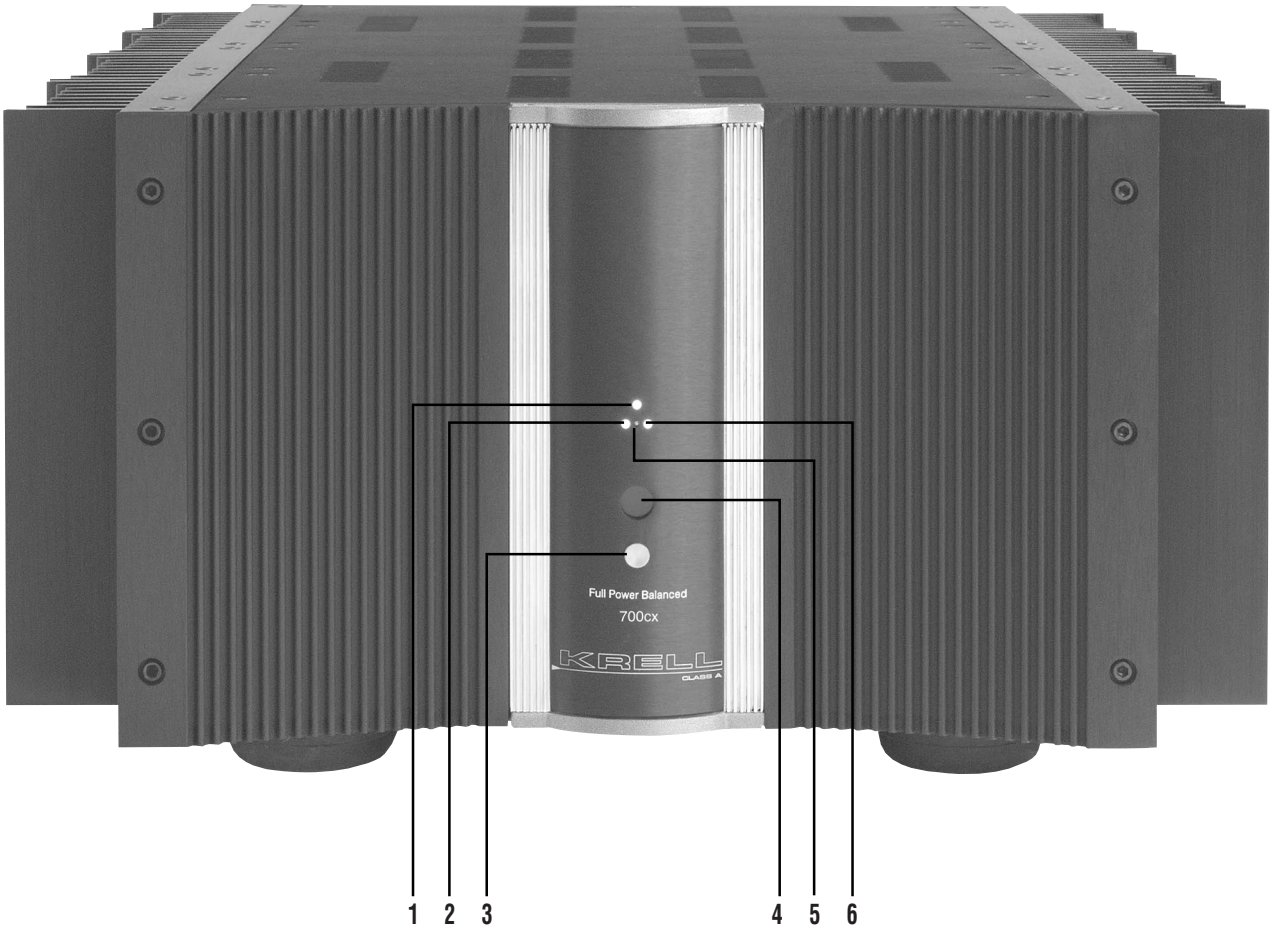
Placement, *continued*

AC POWER GUIDELINES

The Full Power Balanced 300cx and 350Mcx amplifiers need to be operated from a dedicated AC power line rated at a minimum of 15 amps. The Full Power Balanced 700cx, 750Mcx, 400cx, and 450Mcx amplifiers need to be operated from a dedicated AC power line rated at a minimum of 20 amps.

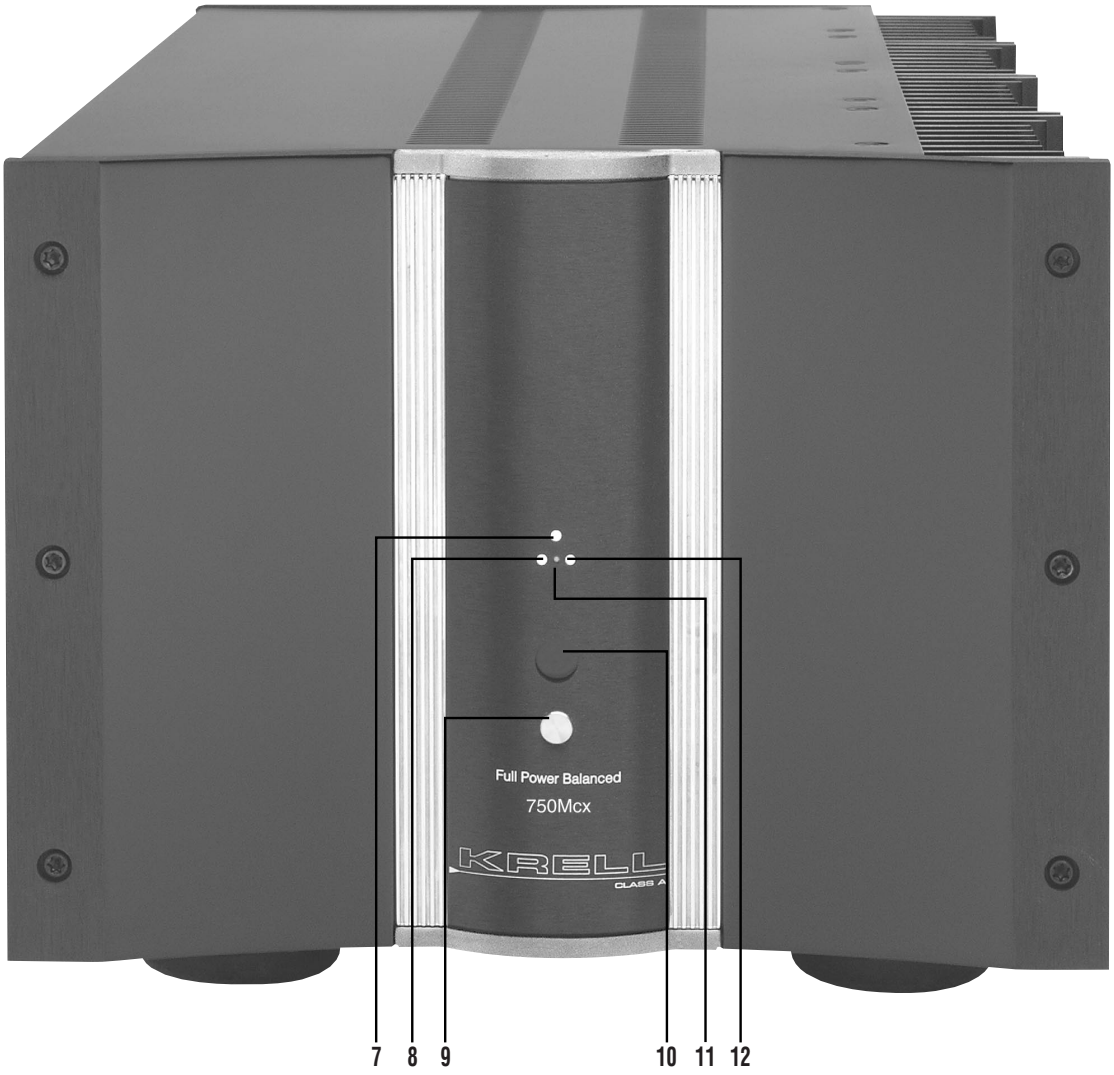
Please contact your authorized Krell dealer, distributor, or Krell before using any devices designed to alter or stabilize the AC power for Full Power Balanced amplifiers.

FIGURE 1 FULL POWER BALANCED STEREO AMPLIFIER FRONT PANEL



1 Power Stand-by LED
2 Bias LED
3 Power Button
4 Infrared Sensor
5 Krell CAST LED
6 Regulator LED

FIGURE 2 FULL POWER BALANCED MONAURAL AMPLIFIER FRONT PANEL



7 Power Stand-by LED
8 Bias LED
9 Power Button
10 Infrared Sensor
11 Krell CAST LED
12 Regulator LED

Front Panel Description

The front panel accesses power on/stand-by and infrared sensor (remote control) functions. The power stand-by, bias, regulator, and Krell CAST LEDs, arranged in a triangle on the front panel above the power button, illuminate to indicate amplifier status.

FULL POWER BALANCED 700cx, 400cx, AND 300cx STEREO POWER AMPLIFIERS

See Figure 1 on page 6

1 Power Stand-by LED
The blue power stand-by LED (top of LED triangle) illuminates when the back panel power breaker switch has been moved to on, engaging the input circuitry and placing the amplifier in stand-by mode.

2 Bias LED
The blue bias LED (lower left of triangle) illuminates after the front panel power button is pressed, indicating that the Sustained Plateau Bias III is engaged.

3 Power Button
Use the silver power button to power on the amplifier from stand-by mode.

4 Infrared Sensor
The infrared sensor receives the signal from a remote control.

5 Krell CAST LED
The red Krell CAST LED (center of triangle) illuminates when a Krell CAST input on the back panel is connected to another Krell product with a Krell CAST output.

6 Regulator LED
The blue regulator LED (lower right of triangle) illuminates after the front panel power button is used to power on from stand-by mode, indicating that the regulator is providing power to the output stage.

Note
An optional remote control is available for Full Power Balanced amplifiers.

FULL POWER BALANCED 750Mcx, 450Mcx, AND 350Mcx MONAURAL POWER AMPLIFIERS

See Figure 2 on page 7

7 Power Stand-by LED
The blue power stand-by LED (top of LED triangle) illuminates when the back panel power breaker switch has been moved to on, engaging the input circuitry and placing the amplifier in stand-by mode.

8 Bias LED
The blue bias LED (lower left of triangle) illuminates after the front panel power button is pressed, indicating that the Sustained Plateau Bias III is engaged.

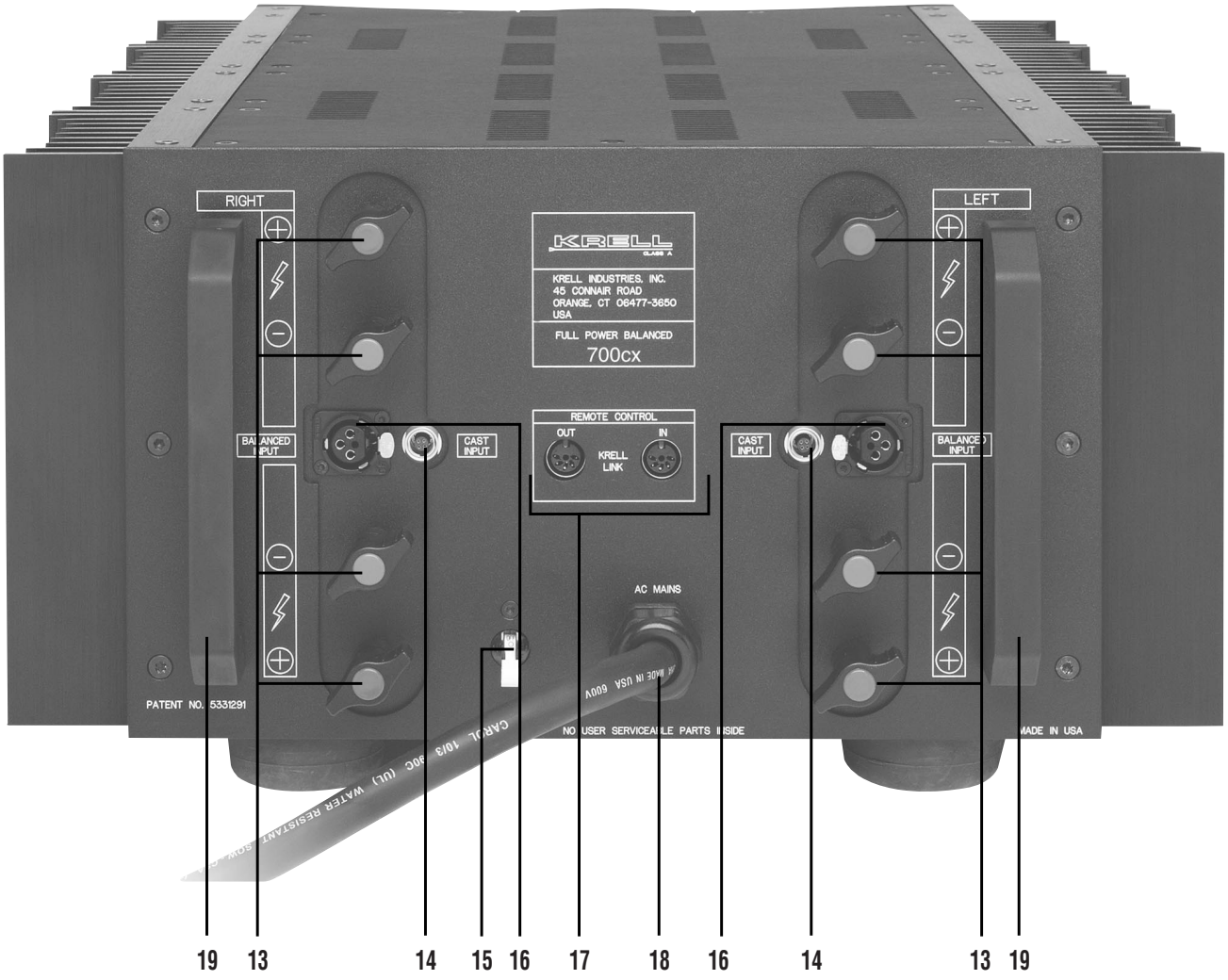
9 Power Button
Use the silver power button to power on the amplifier from stand-by mode.

10 Infrared Sensor
The infrared sensor receives the signal from a remote control.

11 Krell CAST LED
The red Krell CAST LED (center of triangle) illuminates when a Krell CAST input on the back panel is connected to another Krell product with a Krell CAST output.

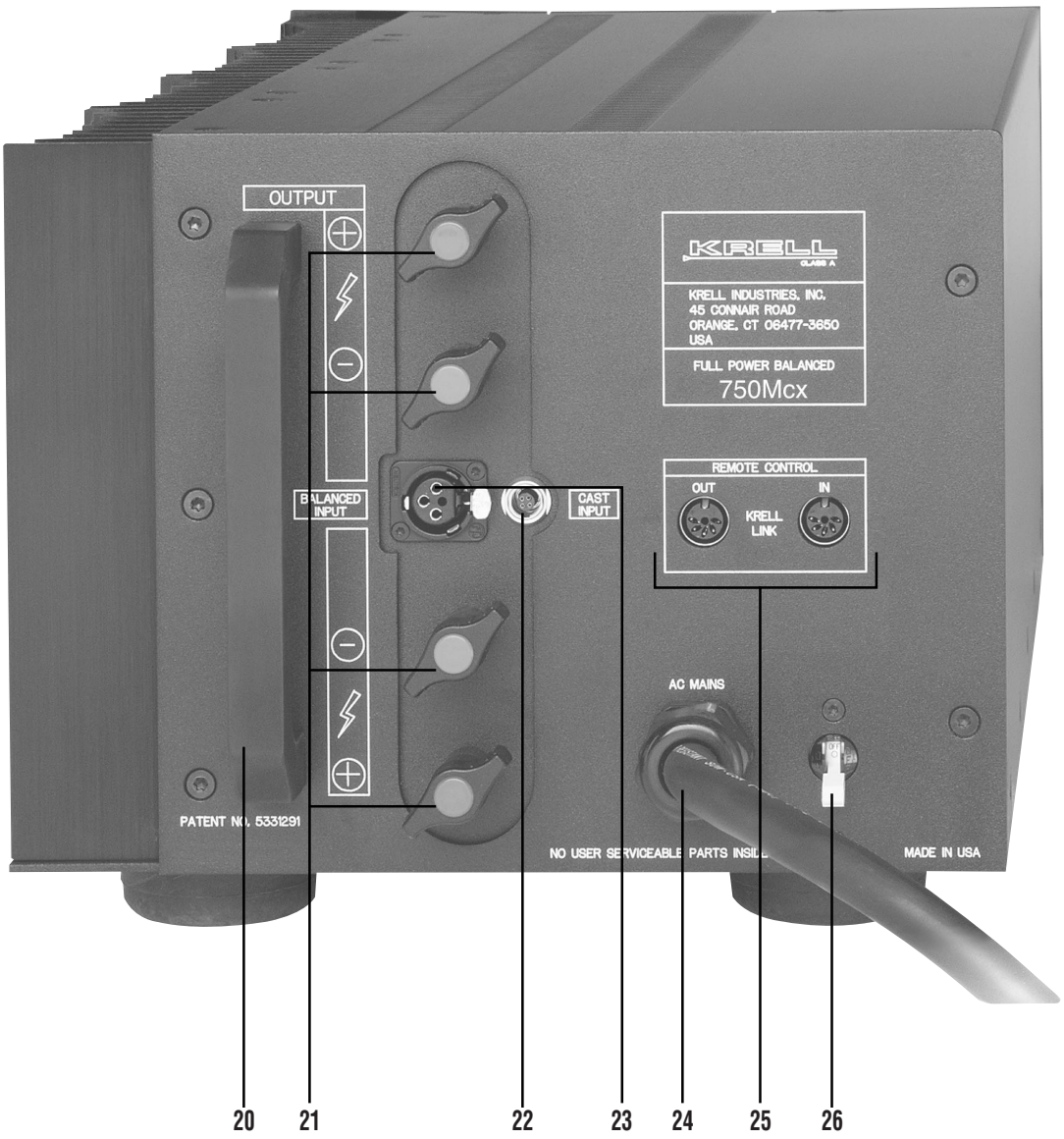
12 Regulator LED
The blue regulator LED (lower right of triangle) illuminates after the front panel power button is used to power on from stand-by mode, indicating that the regulator is providing power to the output stage.

FIGURE 3 FULL POWER BALANCED STEREO AMPLIFIER BACK PANEL



13 Left and Right Speaker Binding Posts
14 Krell CAST Inputs
15 Back Panel Power Breaker Switch
16 Left and Right Balanced Inputs
17 Krell Link Out/In
18 AC Mains Power Cord
19 Handles

FIGURE 4 FULL POWER BALANCED MONAURAL AMPLIFIER BACK PANEL



20 Handle
21 Speaker Binding Posts
22 Krell CAST Input
23 Balanced Input
24 AC Mains Power Cord
25 Krell Link Out/In
26 Back Panel Power Breaker Switch

Back Panel Description

The back panel provides connections for all inputs and outputs, power on/off, and remote control links. The back panel also has handles that allow you to safely and easily move the amplifier.

FULL POWER BALANCED 700cx, 400cx, AND 300cx STEREO POWER AMPLIFIERS

See Figure 1 on page 6

13 Left and Right Speaker Binding Posts
Full Power Balanced 700cx, 400cx, and 300cx stereo amplifiers are equipped with four pairs of speaker binding posts (upper left, lower left, upper right, and lower right).

Notes
Two pairs of speaker binding posts are used for each channel of amplification. On the stereo or monaural Full Power Balanced amplifiers, either the upper or the lower pair can be used with speakers having two pairs of binding posts. For biwiring applications, with speakers having more than one pair of binding posts, use both upper and lower pairs of speaker binding posts. See the speaker's instruction manual for biwiring connections.

Speaker binding posts for stereo and monaural amplifiers accept spade lugs only. Bare wire, banana lugs, or pins will not work. Use the red terminal for the positive connection and the blue terminal for the negative connection.

14 Krell CAST Inputs
Full Power Balanced 700cx, 400cx, and 300cx stereo amplifiers are equipped with one left Krell CAST input and one right Krell CAST input via 4-pin bayonet connectors. The Krell CAST inputs allow the Full Power Balanced amplifier to be connected to the KPS 25sc Krell Playback System and other CAST-equipped components.

15 Back Panel Power Breaker Switch
Full Power Balanced amplifiers are equipped with a back panel power breaker switch, for powering on the amplifier. Placing the back panel power breaker switch in the up position places the amplifier in stand-by mode, where it remains until the front panel power button (3) is pressed.

Note
Krell recommends that the amplifier remain on, in stand-by mode, even when not in use, once it is powered on from the back panel power breaker switch (15).

16 Left and Right Balanced Inputs
Full Power Balanced 700cx, 400cx, and 300cx stereo amplifiers are equipped with one left balanced input and one right balanced input via XLR connectors.

17 Krell Link Out/In
Full Power Balanced amplifiers are equipped with Krell Link Remote out/in connectors that allow the remote control to operate a linked amplifier configuration. See ***Krell Link Connections***, on page 13 for more information.

Note
An optional remote control is available for Full Power Balanced amplifiers.

18 AC Mains Power Cord
All Full Power Balanced amplifiers are equipped with a permanently attached AC power cord.

19 Handles
All Full Power Balanced stereo amplifiers are equipped with two handles, located beside the speaker binding posts, to help you easily and safely move the amplifier.

Back Panel Description, *continued*

FULL POWER BALANCED 750Mcx, 450Mcx, AND 350Mcx MONAURAL POWER AMPLIFIERS

See Figure 4 on page 10

20 Handle
All Full Power Balanced monaural amplifiers are equipped with a handle, located beside the speaker binding posts, to help you easily and safely move the amplifier.

21 Speaker Binding Posts
Full Power Balanced 750Mcx, 450Mcx, and 350Mcx monaural amplifiers are equipped with two pairs of speaker binding posts (one upper pair and one lower pair). For stereo operation, two monaural amplifiers are required.

22 Krell CAST Input
Full Power Balanced 750Mcx, 450Mcx, and 350Mcx monaural amplifiers are equipped with one Krell CAST input via a 4-pin bayonet connector. The Krell CAST input allows the Full Power Balanced amplifier to be connected to the KPS 25sc Krell Playback System and other CAST-equipped components.

23 Balanced Input
Full Power Balanced 750Mcx, 450Mcx, and 350Mcx monaural amplifiers are equipped with one balanced input via an XLR connector.

24 AC Mains Power Cord
All Full Power Balanced amplifiers are equipped with a permanently attached AC power cord.

25 Krell Link Out/In
Full Power Balanced amplifiers are equipped with Krell Link Remote out/in connectors that allow the remote control to operate a linked amplifier configuration. See ***Krell Link Connections,*** on page 13 for more information.

Note
An optional remote control is available for Full Power Balanced amplifiers.

26 Back Panel Power Breaker Switch
Full Power Balanced amplifiers are equipped with a back panel power breaker switch, for powering on the amplifier. Powering on using the back panel power breaker switch places the amplifier in stand-by mode, where it remains until the front panel power button is pressed.

Note
Krell recommends that, once the amplifier is powered on from the back panel power breaker switch, it remains on, in stand-by mode, even when not in use.

Connecting the Full Power Balanced Amplifier to Your System

INPUT AND OUTPUT CONNECTIONS

Krell recommends using its proprietary Krell CAST system for unparalleled sonic performance between the Full Power Balanced amplifiers and other CAST-equipped components and the KPS 25sc Krell Playback System.

Full Power Balanced amplifiers also offer balanced operation. The circuitry and connections associated with balanced operation not only can minimize sonic loss but also are immune to induced noise, especially for installations using long cables.

A one piece RCA-to-XLR adapter is available from Krell Industries, to allow single-ended operation using the balanced XLR inputs.

The following steps describe how to connect cables to the Full Power Balanced Amplifiers.

1. Neatly arrange and organize wiring to and from the amplifier and all components. Separate AC wires from audio cables to prevent hum or other unwanted noise from being introduced into the system.
2. Connect the Krell CAST cables from your CAST-enabled preamplifier/source component to the left and right Krell CAST 4-pin bayonet inputs on the amplifier back panel. For balanced operation, connect the interconnect cable from your preamplifier to the left and right balanced XLR input on the amplifier back panel.
3. Connect the speaker cables to the Full Power Balanced amplifier's speaker binding posts, located on the amplifier back panel. Speaker binding posts for both stereo and monaural amplifiers accept spade lugs only.
4. Insert the end of the AC mains power cord into the AC wall receptacle.
5. Proceed with Krell Link Connections, if desired, or turn to ***Amplifier Operation,*** on page 15.

KRELL LINK CONNECTIONS

Krell Link Remote out/in connectors on the back panel of the Full Power Balanced amplifier allow you to synchronize remote control operation for systems that include multiple amplifiers and associated components. When the Krell Link Remote out/in connectors are used, the remote capabilities of the linked components are controlled from one amplifier or preamplifier, called the control component. The linked components respond to stand-by and operational mode commands from the control component via MIDI cables.

Note
Krell Link uses standard five pin MIDI communication cables, sometimes referred to as MIDI Plus cables. MIDI cables can be purchased from your authorized distributor or dealer, or from an audio supply store.

How to Connect Components through Krell Link

1. Turn all components off, using the back panel power breaker switch. This ensures that the components are synchronized when the MIDI cable is connected.
2. Select the component to be the control component. The control component must be in plain view for proper remote control operation.
3. Connect one end of the MIDI cable to the Krell Link out connector on the back panel of the component.

4. Connect the other end of the MIDI cable to the Krell Link in connector on the next component.

   To link another component, connect a second MIDI cable to the Krell Link out connector on the back panel of the second component. Connect the remaining end of the MIDI cable to the Krell Link in connector on the back panel of a third component.
5. Link additional components, if desired, as described in Steps 3 and 4.

The components are now ready for operation with Krell Link.

DC PROTECTION CIRCUITRY

Full Power Balanced amplifiers use unobtrusive direct current (DC) protection circuitry that strips DC from the signal without corrupting sound reproduction. Full Power Balanced amplifiers feature direct coupled circuitry from input to output. This topology eliminates all coupling capacitors from the audio signal path. Coupling capacitors block damaging DC but have sonic characteristics that corrupt sound reproduction.

Note

For more information about DC protection circuitry features, see ***Amplifier Troubleshooting***, on page 17.

USING A TUBE PREAMPLIFIER

The high DC output of tube preamplifiers may exceed the DC protection circuitry of Full Power Balanced amplifiers. Excessive DC level in a signal can damage amplifiers, speakers, or both. The coupling capacitors in Full Power Balanced amplifiers must be engaged when using a tube preamplifier. An authorized Krell dealer, distributor, or Krell must activate these capacitors.

Coupling capacitors must be inserted into the signal path by your authorized Krell dealer, distributor, or Krell before you can use your Full Power Balanced amplifier with a tube preamplifier.

IMPORTANT

*Please read the **Warranty**, on page 20, to understand the warranty limitations of Full Power Balanced amplifiers when used with tube preamplifiers.*

Amplifier Operation

Full Power Balanced amplifiers are easy to install and operate. However, it is important to exercise care during operation, due to the amplifiers' enormous power output. Switching between active sources (such as a CD player, tape monitor, or VCR) without muting the preamplifier output, or bumping or miscuing a source can generate large transients at low frequencies. Full Power Balanced amplifiers may generate enough power with these transients to damage loudspeakers.

IMPORTANT

Always mute or fully attenuate the preamplifier level when switching sources.

Do not change input connections to the amplifier when the amplifier is on.

Use care when setting high playback levels. Because of their tremendous reserves of clean power, Full Power Balanced amplifiers can safely drive speakers to higher sound pressure levels than other amplifiers. Always lower the volume level at the first sign of speaker distress.

ON/OFF AND STAND-BY OPERATION

When powering on any system, turn on amplifiers last. Turn off amplifiers first.

1. Move the back panel power breaker switch to the up position to engage the input circuitry and place the amplifier into the stand-by mode. The front panel blue power stand-by LED illuminates.
2. Press the silver power button on the amplifier front panel. The blue regulator LED illuminates. Once the regulator provides power to the output stage, the blue bias LED illuminates. The Sustained Plateau Bias II system is now engaged. After the protection circuitry has confirmed that safe operating conditions exist, the input relays engage. You hear a click. The amplifier is ready for operation.

   If the Krell CAST input is being used, the Krell CAST red LED illuminates and remains illuminated at all times during the stand-by or power on modes.
3. With the preamplifier muted or volume control completely lowered, select a source. Increase the volume control to the desired listening level.
4. When turning off the system, mute or completely lower the preamplifier volume, or place the Full Power Balanced amplifier in the stand-by power mode by pressing the power button on the front panel. It is now safe to turn off the rest of the system.

Note

For best performance of Full Power Balanced amplifiers, leave the back panel power breaker switch on at all times.

KRELL LINK OPERATION

1. When all components are linked, place each component in the stand-by mode by moving the back panel power breaker switch to the up position. This ensures that all components will be synchronized when signals from the control component are sent to the linked components in the system.
2. When the components are in stand-by, switch the control component to the operational mode from the control component's front panel or by using the component's remote control.

   The linked components switch to the operational mode simultaneously.

A linked component can be switched between the operational mode and stand-by, individually, from its front panel. Switching a linked component temporarily breaks the chain of linked components. To re-establish linked operation, return all components to stand-by.

Remote Control Operation

Full Power Balanced amplifiers are compatible with the remote controls included with Krell pre-amplifiers, the Home Theater Standard 7.1, and the KPS 25sc Krell Playback System.

Please contact your authorized Krell dealer, distributor, or Krell to purchase a remote control for Full Power Balanced amplifiers.

Full Power Balanced amplifiers can be located in a room or space close to the speakers but out of sight, and powered on or off remotely from the listening room, through a control amplifier. See ***Krell Link Connections,*** on page 13.

HOW TO TURN OFF THE AMPLIFIER LEDs

The amplifier must be in the stand-by mode with the rear panel power breaker switch on. While holding the silver power button in, press the power key on the remote control. After the amplifier finishes its turn-on sequence, the front panel blue LEDs turn off. The blue LEDs remain off throughout normal operation as long as the amplifier's rear panel power breaker switch is not turned off.

HOW TO TURN ON THE AMPLIFIER LEDs

With the amplifier in the stand-by mode, turn the rear panel power breaker switch to the off position. Then turn the rear panel power breaker switch back to the on position. The next time the amplifier is powered up from the front panel or the remote control, the blue LEDs illuminate during the turn-on sequence.

HOW TO SWITCH BETWEEN KRELL CAST AND XLR INPUTS

Press the meter key on a Krell remote to switch between CAST inputs and the balanced XLR inputs.

Full Power Balanced amplifiers default to CAST operation upon startup, if the amplifier is turned off from the rear panel power breaker switch and a CAST source and cable are connected to the CAST inputs. The operational mode does not change if the Full Power Balanced amplifier is in stand-by mode.

USING A DEDICATED WALL OUTLET AND SWITCH

Full Power Balanced amplifiers can be powered on from an AC wall receptacle with a dedicated switch, rather than from the front panel power button or optional remote control.

Please contact your authorized Krell dealer, distributor, or Krell for more information before you connect your Full Power Balanced amplifier to a dedicated AC wall outlet with a switch.

Amplifier Troubleshooting

HOW TO TROUBLESHOOT SYSTEM NOISE

AC grounding becomes critical when connecting high performance audio components. When you mix and match audio components, each with its own ground potential, a low frequency hum may occur in one or both speakers. This often occurs when introducing a new component into a system.

If a low frequency hum emanates from the speakers when you place the Full Power Balanced amplifier into the system, follow these simple troubleshooting steps:

Note
During these steps, the back panel power breaker switch remains in the on position.

1. Check all input and output connections, making sure they are of sound construction. With the amplifier in stand-by mode, remove the interconnect cables, then press the front panel power button. If the hum disappears, press the power button to return to stand-by mode, and reinsert one of the interconnect cables. Press the power button again. If the hum reappears with one or both interconnects inserted, there may be a defective cable. Have the interconnect cables checked before proceeding.
2. If the interconnect cables are sound, you may be experiencing a ground loop. This can often be easily eliminated. Please contact your authorized Krell dealer, distributor, or Krell for suggestions on how to solve this problem.

HOW TO EVALUATE AMPLIFIER OPERATION

The amplifiers are protected by a series of non-intrusive circuits that constantly evaluate the amplifier's operation. This circuitry protects against damaging DC input or output and short circuits, see also ***DC Protection Circuitry,*** on page 14, and monitors regulator operation, ensuring constant voltage to the output stage. The protection circuitry in a Full Power Balanced amplifier is designed to prevent damage to the amplifiers or speakers caused by other defective components, faulty wiring, system mishandling, or amplifier failure.

In addition, when a Full Power Balanced amplifier's DC protection circuitry senses a problem within the system, it identifies, then indicates the problem by illuminating the front panel blue LEDs, as described in the following table.

Notes
The Krell CAST LED illuminates only if a Krell CAST input is being used.

There are no output fuses in Full Power Balanced amplifiers.

If the course of action listed in the table below does not correct the situation, please contact your authorized Krell dealer, distributor, or Krell.

AMPLIFIER CONDITION	POSSIBLE CAUSES	COURSE OF ACTION
The output mutes during playback and the following LEDs illuminate: Power Stand-by, and Regulator Bias	Excessive DC at the amplifier input	Have source unit and preamplifier checked for high DC output If preamplifier is a tube model, see ***Using a Tube Preamplifier,*** on page 14.
The amplifier switches to stand-by mode and the Power Stand-by LED illuminates	Electrical short in speaker cables or inside speaker	Check all speaker cables for any cuts or frayed edges that might form a connection between the positive and negative speaker binding post terminals
The amplifier switches to stand-by at high volumes and the Power Stand-by LED illuminates	Insufficient AC current from the wall outlet	Make sure the AC line is at least 15 amps for 300cx and 350Mc amplifiers; 400cx, 450Mcx, 700cx, and 750Mcx amplifiers should be operated from a dedicated 20-amp line.
	Excessive heat	Allow amplifier to cool before resuming operation. See ***Placement,*** on page 4 for ventilation requirements
The amplifier powers down completely and no LEDs illuminate	DC present at the output stage	Contact your authorized Krell dealer, distributor, or Krell
	Internal amplifier problem	Contact your authorized Krell dealer, distributor, or Krell

Questions and Answers

Q. Should I leave my Full Power Balanced amplifier on at all times?

A. For maximum amplifier performance, leave the back panel power breaker switch on at all times. This places the amplifier in stand-by mode. Full Power Balanced amplifiers are designed to be powered on and off from stand-by, using the front panel power button. This eliminates “cold start” degradations. The amplifier will operate at full performance within minutes.

Q. When I turn on the amplifier there is a loud hum through the speakers. What should I do?

A. When a new component is introduced, a low frequency hum may occur in one or both speakers. Check all input and output connections and cables, making sure they are of sound construction. See ***How to Troubleshoot System Noise*****,** on page 17. If the interconnects and cables are sound, you may be experiencing a ground loop. This can often be easily eliminated. Please contact your authorized Krell dealer, distributor, or Krell for suggestions on how to solve this problem.

Q. My system includes multiple pairs of speakers. Can I connect them to my Full Power Balanced amplifiers through a speaker selector box?

A. No. Most speaker selector boxes use a common ground scheme. The differential circuitry in Full Power Balanced amplifiers prohibits the use of these devices. **Do not connect a Full Power Balanced amplifier to a speaker selector device that employs a common ground scheme, as it may short-circuit the amplifier output.**

Q. My speakers have only one pair of binding posts, but my Full Power Balanced stereo amplifier has two pairs. Which pair of speaker binding posts should I use, the upper or the lower?

A. The upper and lower pair of speaker binding posts on Full Power Balanced stereo amplifiers are identical. You can use either the upper or lower pair; they work and sound the same. See ***Connecting the Full Power Balanced Amplifier to Your System*****,** on page 13.

Q. My speakers are rated for 150 Watts. Are the Full Power Balanced 400cx or 700cx models too powerful for them?

A. No. A speaker seldom is damaged from overdriving. More often, damage occurs when an amplifier that lacks sufficient power is asked to handle heavy demand situations such as high playback levels. These amplifiers may have very high 8 Ohm power ratings, but in heavy demand situations they can be driven into clipping (in which DC current goes to speakers due to loss of amplifier power). Clipping can damage speakers. Avoid damage to your speakers by reviewing your speaker’s specifications and exercise caution in heavy demand situations.

Warranty

This Krell product has a limited warranty of five years for parts and labor on circuitry. Should this product fail to perform at any time during the warranty, Krell will repair it at no cost to the owner, except as set forth in this warranty.

The warranty does not apply to damage caused by acts of God or nature.

The warranty on this page shall be in lieu of any other warranty, expressed or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. There are no warranties which exceed beyond those described in this document. If this product does not perform as warranted herein, the owner's sole remedy shall be repair. In no event will Krell be liable for incidental or consequential damages arising from purchase, use, or inability to use this product, even if Krell has been advised of the possibility of such damages.

IMPORTANT

The user is responsible for notifying his or her Krell dealer, distributor, or Krell that a tube preamplifier will be used with the Full Power Balanced amplifier, so that the Krell dealer, distributor, or Krell can activate the coupling capacitors. If the user does not notify the Krell dealer, distributor, or Krell and uses a tube preamplifier without the Full Power Balanced amplifier's coupling capacitor engaged, Krell reserves the right to refuse warranty related service due to DC-related damage.

Proof of purchase in the form of a bill of sale or receipted invoice substantiating that the unit is within the warranty period must be presented to obtain warranty service. The warranty begins on the date of the original retail purchase, as noted on the bill of sale or receipted invoice from an authorized Krell dealer or distributor. Previously owned equipment, when re-purchased from an authorized Krell dealer or distributor, has the balance of the original warranty, based on the original date of manufacture.

The warranty for Krell products is valid only in the country to which they were originally shipped, through the authorized Krell distributor for that country, and at the factory. There may be restrictions on or changes to Krell's warranty because of regulations within a specific country. Please check with your distributor for a complete understanding of the warranty in your country.

If a unit is serviced by a distributor who did not import the unit, there may be a charge for service, even if the product is within the warranty period.

Freight to the factory is your responsibility. Return freight within the United States (U.S.A.) is included in the warranty. If you have purchased your Krell product outside the U.S.A. and wish to have it serviced at the factory, all freight and associated charges to the factory are your responsibility. Krell will pay return freight to the U.S.A.-based freight forwarder of your choice. Freight and other charges to ship the unit from the freight forwarder to you are also your responsibility.

Krell is not responsible for any damage incurred in transit. Krell will file claims for damages as necessary for units damaged in transit to the factory. You are responsible for filing claims for shipping damages during the return shipment.

Krell does not supply replacement parts and/or products to the owner of the unit. Replacement parts and/or products will be furnished only to the distributor performing service on this unit on an exchange basis only; any parts and/or products returned to Krell for exchange become the property of Krell.

No expressed or implied warranty is made for any Krell product damaged by accident, abuse, misuse, natural or personal disaster, or unauthorized modification.

Any unauthorized voltage conversion, disassembly, component replacement, perforation of chassis, updates, or modifications performed to the unit will void the warranty.

The operating voltage of this unit is determined by the factory and can only be changed by an authorized Krell distributor or at the factory. The voltage for this product in the U.S.A. cannot be changed until six months from the original purchase date.

In the event that Krell receives a product for warranty service that has been modified in any way without Krell authorization, all warranties on that product will be void. The product will be returned to original factory layout specifications at the owner's expense before it is repaired. All repairs required after the product has been returned to original factory specifications will be charged to the customer, at current parts and labor rates.

All operational features, functions, and specifications and policies are subject to change without notification.

To register your product for warranty benefits, please complete and return the Warranty Registration Card enclosed in the shipping box within 15 days of purchase. Thank you.

Return Authorization Procedure

If you believe there is a problem with your component, please contact your dealer, distributor, or the Krell factory to discuss the problem before you return the component for repair. To expedite service, you may wish to complete and e-mail the Service Request Form in the Service Section of our website at:

www.krellonline.com

To contact the Krell Service Department

TEL	**203-799-9954** **Monday-Friday** **9:00 AM to 5:00 PM EST**
FAX	**203-799-9796**
E-MAIL	**service@krellonline.com**
WEBSITE	**www.krellonline.com**

Full Power Balanced X Series Amplifier

PRODUCT NAME

MODEL NUMBER SERIAL NUMBER

To return this product to Krell, please follow this procedure so that we may serve you better:

1. Obtain a Return Authorization Number (R/A number) and shipping address from the Krell Service Department.
2. Insure and accept all liability for loss of or damage to this product during shipment to the Krell factory and prepay all shipping charges. Please see the Warranty page in this manual, concerning liability for shipping damage and shipping charges.

This product may also be hand delivered if arrangements with the Service Department have been made in advance. Proof of purchase may be required for warranty validation at the time of hand delivery.

IMPORTANT

Use the original packaging to ensure safe transit of this product to the dealer, distributor, or factory. Krell may, at its discretion, return this product in new packaging and bill the owner for such packaging if the product received by Krell was boxed in non-standard packaging or if the original packaging was so damaged that it was unusable. If Krell determines that new packaging is required, the owner will be notified before this product is returned.

To purchase additional packaging, please contact your authorized Krell dealer, distributor, or the Krell Service Department.

Specifications

Full Power Balanced 300cx, 400cx, 700cx Stereo Amplifiers

	FPB 300cx	FPB 400cx	FPB 700cx
FREQUENCY RESPONSE	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB
SIGNAL TO NOISE RATIO **"A" WEIGHTED**	113 dB	117 dB	120 dB
GAIN	26.4 dB	26.4 dB	26.4 dB
TOTAL HARMONIC DISTORTION (THD) **ALL BALANCED, UNWEIGHTED**	1 kHz <0.03% 20 kHz <0.16%	1 kHz <0.03% 20 kHz <0.16%	1 kHz <0.03% 20 kHz <0.16%
INPUT IMPEDANCE	100 kOhms	100 kOhms	100 kOhms
INPUT SENSITIVITY	2.34 Vrms	2.71 Vrms	3.58 Vrms
OUTPUT POWER **EACH CHANNEL DRIVEN**	8 Ohms 300 W 4 Ohms 600 W 2 Ohms 1200 W	8 Ohms 400 W 4 Ohms 800 W 2 Ohms 1,600 W	8 Ohms 700 W 4 Ohms 1,400 W 2 Ohms 2,800 W
OUTPUT VOLTAGE	Peak to Peak 138 V RMS 49 V	Peak to Peak 170 V RMS 60 V	Peak to Peak 240 V RMS 84 V
POWER CONSUMPTION	Stand-by 60 W Idle 175 W Max. 1,700 W	Stand-by 75 W Idle 350 W Max. 3,000 W	Stand-by 85 W Idle 430 W Max. 6,000 W
INPUTS	1 pair balanced via XLR connectors 1 pair CAST via 4-pin bayonet connectors	1 pair balanced via XLR connectors 1 pair CAST via 4-pin bayonet connectors	1 pair balanced via XLR connectors 1 pair CAST via 4-pin bayonet connectors
OUTPUTS **SPEAKER BINDING POSTS**	4 pair (upper left, lower left, upper right lower right)	4 pair (upper left, lower left, upper right lower right)	4 pair (upper left lower left, upper right lower right)
REMOTE CONTROL	Optional	Optional	Optional
DIMENSIONS **INCHES** **CENTIMETERS**	 19.0w x 10.3h x 17.0d 48.3w x 26.2h x 43.2d	 19.0w x 10.3h x 19.7d 48.3w x 26.2h x 50.0d	 19.0w x 10.3hx 25.5d 48.3wx 26.2hx 64.8d
WEIGHT **SHIPPING** **UNIT ONLY**	 107.0 lb., 48.6 kg 90.0 lb., 40.9 kg	 127.0 lb., 57.7 kg 110.0 lb., 50.0 kg	 200.0 lb., 90.9 kg 180.0 lb., 81.8 kg

All operational features, functions, specifications, and policies are subject to change without notification.

Specifications

Full Power Balanced 350Mcx, 450Mcx, 750Mcx Monaural Amplifiers

	FPB 350Mc	FPB 450Mc	FPB 750Mc
FREQUENCY RESPONSE	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB	20 Hz to 20 kHz +0 dB, -0.05 dB 0.1 Hz to 240 kHz +0 dB, -3 dB
SIGNAL TO NOISE RATIO **"A" WEIGHTED**	114 dB	118 dB	121 dB
GAIN	26.4 dB	26.4 dB	26.4 dB
TOTAL HARMONIC DISTORTION (THD) **ALL BALANCED, UNWEIGHTED**	1 kHz <0.03% 20 kHz <0.16%	1 kHz <0.03% 20 kHz <0.16%	1 kHz <0.03% 20 kHz <0.16%
INPUT IMPEDANCE	100 kOhms	100 kOhms	100 kOhms
INPUT SENSITIVITY	2.53 Vrms	2.87 Vrms	3.71 Vrms
OUTPUT POWER **EACH CHANNEL DRIVEN**	8 Ohms 350 W 4 Ohms 700 W 2 Ohms 1,400 W	8 Ohms 450 W 4 Ohms 900 W 2 Ohms 1,800 W	8 Ohms 750 W 4 Ohms 1,500 W 2 Ohms 3,000 W
OUTPUT VOLTAGE	Peak to Peak 138 V RMS 49 V	Peak to Peak 170 V RMS 60 V	Peak to Peak 240 V RMS 84 V
POWER CONSUMPTION	Stand-by 30 W Idle 150 W Max. 1,700 W	Stand-by 37.5 W Idle 175 W Max. 3,000 W	Stand-by 42.5 W Idle 220 W Max. 6,000 W
INPUTS	1 balanced via XLR connectors 1 Krell CAST via 4-pin bayonet connectors	1 balanced via XLR connectors 1 Krell CAST via 4-pin bayonet connectors	1 balanced via XLR connectors 1 Krell CAST via 4 pin bayonet connectors
OUTPUTS **SPEAKER BINDING POSTS**	2 pair (one upper, one lower)	2 pair (one upper, one lower)	2 pair (one upper, one lower)
REMOTE CONTROL	Optional	Optional	Optional
DIMENSIONS **INCHES** **CENTIMETERS**	 12.5w x 10.5h x 16.0d 31.8w x 26.7h x 40.6d	 12.5w x 10.5h x 19.0d 31.8w x 26.7h x 48.3d	 12.5w x 10.5h x 25.0d 31.8w x 26.7h x 67.3d
WEIGHT **SHIPPING** **UNIT ONLY**	 79.0 lb., 35.9 kg 68.0 lb., 31.0 kg	 110.0 lb., 50.0 kg 98.0 lb., 44.5 kg	 155.0 lb., 70.5 kg 140.0 lb., 63.6 kg

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Full Power Balanced X Series Power Amplifiers

700cx, 400cx, 300cx Stereo

750Mcx, 450Mcx, 350Mcx Monaural

with Krell CAST II Technology

v 02.0