



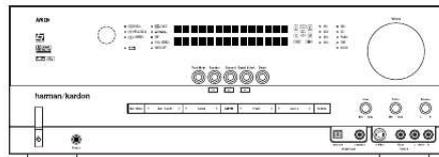
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You can read the recommendations in the user guide, the technical guide or the installation guide for HARMAN KARDON AVR 230. You'll find the answers to all your questions on the HARMAN KARDON AVR 230 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual HARMAN KARDON AVR 230
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AVR 230
AUDIO/VIDEO RECEIVER
OWNER'S MANUAL



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Manual abstract:

@@@@@ Designed to provide all the excitement and detail of movie soundtracks and every nuance of musical selections, the AVR 230 is truly a multichannel receiver for the new millennium. The AVR 230 has been engineered so that it is easy to take advantage of all the power of its digital technology.

However, to obtain the maximum enjoyment from your new receiver, we urge you to read this manual. A few minutes spent learning the functions of the various controls will enable you to take advantage of all the power the AVR 230 is able to deliver. If you have any questions about this product, its installation or its operation, please contact your retailer or custom installer. They are your best local sources of information. Description and Features The AVR 230 is versatile and multifeatured, incorporating a wide range of listening options. In addition to Dolby® Digital and DTS® decoding for digital sources, a broad choice of Matrix surround-encoded or Stereo surround modes are available for use with sources such as CD, VCR, TV broadcasts and the AVR 230's own FM/AM tuner. Along with Dolby Digital EX, Dolby Pro Logic® II, DTS Neo:6®, Dolby 3 Stereo, and Hall and Theater modes, the AVR 230 offers Harman International's exclusive Logic 7® process in both 5.1 and 7.

1 versions to create a wider, more enveloping field environment and more defined fly-overs and pans. Another exclusive is VMaX®, which uses proprietary processing to create an open, spacious sound field even when only two front speakers are available. In addition to providing a wide range of listening options, the AVR 230 is easy to configure so that it provides the best results with your speakers and specific listening-room environment. On-screen menus make it simple to enter settings for speaker configurations and bass management, and the EzSet remote measures a system's sound levels and automatically calibrates them for perfectly balanced sound field presentation. For the ultimate in flexibility, the AVR 230 features connections for five video devices, all with both composite and S-Video inputs.

Two additional audio inputs are available, and six digital inputs make the AVR 230 capable of handling all the latest digital audio sources. For compatibility with the latest HDTV video sources and progressive scan DVD players, the AVR 230 also features two-input, wide-bandwidth, low-crosstalk component video switching. The front panel offers coax and optical digital inputs for direct connection to digital recorders. Two video recording outputs, preamp-out and a color-coded eight-channel input, with complete digital bass management, make the AVR 230 virtually future-proof, with everything needed to accommodate tomorrow's new formats right onboard. The AVR 230's powerful amplifier uses traditional Harman Kardon high-current design technologies to meet the wide dynamic range of any program selection.

Harman Kardon invented the high-fidelity receiver fifty years ago. With state-of-the-art circuitry and time-honored circuit designs, the AVR 230 is the perfect combination of the latest in digital audio technology, a quiet yet powerful analog amplifier in an elegant, easy-to-use package. A wide range of digital and matrix surround modes, including Dolby® Digital, Dolby Digital EX, Dolby Pro Logic® II, DTS®, DTS-ES® Discrete and Matrix and DTS Neo:6® Six channels of high-current amplification Harman Kardon's exclusive Logic 7® processing, available for the first time with both 7.1 and 5.1 processing in a variety of modes, and two modes of VMaX® TM remote automatically sets output levels for optimum performance T High-bandwidth, HDTV-compatible component video switching Discrete front-panel coaxial and optical digital inputs for easy connection to portable digital devices and video game consoles Extensive bass management options, including three separate crossover groupings On-screen menu and display system For Canadian model This class B digital apparatus complies with Canadian ICES-003. For models having a power cord with a polarized plug: CAUTION: To prevent electric shock, match wide blade of plug to wide slot, fully insert. Modèle pour les Canadien Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Sur les modèles dont la fiche est polarisée: ATTENTION: Pour éviter les chocs électriques, introduire la lame la plus large de la fiche dans la borne correspondante de la prise et pousser jusqu'au fond. CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN CAUTION: To prevent electric shock, do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure. 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 appliance. INTRODUCTION 3 SAFETY INFORMATION Important Safety Information Verify Line Voltage Before Use Your AVR 230 has been designed for use with 120-volt AC current. Connection to a line voltage other than that for which it is intended can create a safety and fire hazard and may damage the unit. If you have any questions about the voltage requirements for your specific model, or about the line voltage in your area, contact your selling dealer before plugging the unit into a wall outlet. Do Not Use Extension Cords To avoid safety hazards, use only the power cord attached to your unit. We do not recommend that extension cords be used with this product. As with all electrical devices, do not run power cords under rugs or carpets or place heavy objects on them. Damaged power cords should be replaced immediately by an authorized service center with a cord meeting factory specifications. Handle the AC Power Cord Gently When disconnecting the power cord from an AC outlet, always pull the plug; never pull the cord. If you do not intend to use the unit for any considerable length of time, disconnect the plug from the AC outlet.

Do Not Open the Cabinet There are no user-serviceable components inside this product. Opening the cabinet may present a shock hazard, and any modification to the product will void your guarantee. If water or any metal object such as a paper clip, wire or a staple accidentally falls inside the unit, disconnect it from the AC power source immediately, and consult an authorized service center. CATV or Antenna Grounding If an outside antenna or cable system is connected to this product, be certain that it is grounded so as to provide some protection against voltage surges and static charges.



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Section 810 of the National Electrical Code, ANSI/NFPA No.

70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements of the grounding electrode.

NOTE TO CATV SYSTEM INSTALLER: This reminder is provided to call the CATV (Cable TV) system installer's attention to article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as possible. Installation Location To ensure proper operation and to avoid the potential for safety hazards, place the unit on a firm and level surface. When placing the unit on a shelf, be certain that the shelf and any mounting hardware can support the weight of the product. Make certain that proper space is provided both above and below the unit for ventilation.

If this product will be installed in a cabinet or other enclosed area, make certain that there is sufficient air movement within the cabinet. Under some circumstances a fan may be required. Do not place the unit directly on a carpeted surface. Avoid installation in extremely hot or cold locations, or in an area that is exposed to direct sunlight or heating equipment. Avoid moist or humid locations. Do not obstruct the ventilation slots on the top of the unit, or place objects directly over them. Due to the weight of the AVR 230 and the heat generated by the amplifiers, there is the remote possibility that the rubber padding on the bottom of the unit's feet may leave marks on certain wood or veneer materials. Use caution when placing the unit on soft woods or other materials that may be damaged by heat or heavy objects. Cleaning When the unit gets dirty, wipe it with a clean, soft, dry cloth. If necessary, wipe it with a soft cloth dampened with mild soapy water, then a fresh cloth with clean water.

Wipe dry immediately with a dry cloth. NEVER use benzene, aerosol cleaners, thinner, alcohol or any other volatile cleaning agent. Do not use abrasive cleaners, as they may damage the finish of metal parts. Avoid spraying insecticide near the unit. Moving the Unit Before moving the unit, be certain to disconnect any interconnection cords with other components, and make certain that you disconnect the unit from the AC outlet. Important Information for the User This equipment has been tested and found to comply with the limits for a Class-B digital device, pursuant to Part 15 of the FCC Rules. The limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that harmful interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help. This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received, including interference from authorized radio communication services. Channel Adjust Selector \hat{U} Volume Control \hat{i} Input Indicators \wedge Speaker/Channel Input Indicators \sim Upper Display Line \sim Lower Display Line Surround Mode Indicators , Remote Sensor Window $\text{\textcircled{6}}$ Speaker Selector: Press this button to begin the process of configuring the unit to match the type of speakers used in your listening room.

(See pages 1820 for more information on speaker setup and configuration.) $\text{\textcircled{7}}$ Surround Mode Group Selector: Press this button to select the top-level group of surround modes. Each press of the button will select the current or last used mode in each of the surround mode groups (e.g., Dolby, DTS, DTS Neo:6, Logic 7, DSP, Stereo).

When the button is pressed so that the name of the surround mode group appears in the on-screen display and in the Lower Display Line \textasciitilde , press the Surround Mode Selector $\text{\textcircled{8}}$ to cycle through the individual modes available. For example, press this button to select Dolby modes, and then press the Surround Mode Selector $\text{\textcircled{8}}$ to choose from the various mode options. FRONT-PANEL CONTROLS $\text{\textcircled{5}}$ FRONT-PANEL CONTROLS $\text{\textcircled{8}}$ Surround Mode Selector: Press this button to select from among the available surround mode options for the mode group selected. The specific modes will vary based on the number of speakers available, the mode group and if the input source is digital or analog. For example, press the Surround Mode Group Selector $\text{\textcircled{7}}$ to select a main mode grouping such as Dolby or Logic 7, and then press this button to see the specific mode choices available. For more information on mode selection, see page 26. $\text{\textcircled{9}}$ Tuning Selector: Press the left side of the button to tune lower-frequency stations and the right side of the button to tune higher-frequency stations. When the tuner is in the Manual mode, each tap will increase or decrease the frequency by one increment. When the tuner receives a strong enough signal for adequate reception, MANUAL TUNED will appear in the on-screen display and the Lower Display Line \textasciitilde . When the tuner is the Auto mode, press the button once, and the tuner will scan for a station with acceptable signal strength.

When the next station with a strong signal is tuned the scan will stop and the onscreen display and Lower Display Line \textasciitilde will indicate AUTO TUNED. When an FM Stereo station is tuned, the display will read AUTO ST TUNED. To switch back and forth between the Auto and Manual tuning modes, press the Tuner Mode Selector $\text{\textcircled{\&}}$. \textasciitilde Buttons: When configuring the AVR 230's settings, use these buttons to select from the available choices. $\text{\textcircled{\!}}$ Tuner Band Selector: Press this button to turn the AVR on and to select the Tuner as the input. Press it again to switch between the AM and FM frequency bands. (See page 28 for more information on the tuner.) $\text{\textcircled{\@}}$ Set Button: When making choices during the setup and configuration process, press this button to enter the desired setting into the AVR 230's memory. $\text{\textcircled{\#}}$ Digital Input Selector: Press this button to select one of the digital inputs or the analog input for any source. (See pages 2528 for more information on digital audio.

$\text{\textcircled{\$}}$ Preset Stations Selector: Press this button to scroll up or down through the list of stations that have been entered into the preset memory. (See page 28 for more information on tuner presets.) $\text{\textcircled{\%}}$ Delay Adjust Selector: Press this button to begin the steps required to enter delay settings.



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(See page 20 for more information on delay times.) ^ Input Source Selector: Press this button to change the input by scrolling up or down through the list of Input Indicators i.

& Tuner Mode Selector: Press this button to select Auto or Manual tuning. When the button is pressed so that the AUTO appears in the Lower Display Line $\bar{\text{~}}$, the tuner will search for the next station with an acceptable signal when the Tuning Selector 9u is pressed. When the button is pressed so that MANUAL appears in the Lower Display Line $\bar{\text{~}}$, each press of the Tuning Selector 9u will increase the frequency. This button may also be used to switch between Stereo and Mono modes for FM radio reception. When weak reception is encountered, press the button so that MANUAL appears in the Lower Display Line $\bar{\text{~}}$ and on the on-screen display to switch to Mono reception.

Press it again to switch back to Stereo mode. (See page 28 for more information on using the tuner.) * Optical 3 Digital Input: Connect the optical digital audio output of an audio or video product to this jack. When the input is not in use, be certain to keep the plastic cap installed to avoid dust contamination that might degrade future performance. (Coaxial 3 Digital Input: This jack is used for connection to the output of portable audio devices, video game consoles or other products that have a coax digital audio jack. Ó Video 4 Video Input Jacks: These jacks may be used for temporary connection to the composite or S-Video output of video games, camcorders or other portable video products. You may make a connection to either jack at any time, but not of both simultaneously. Ô Video 4 Audio Input Jacks: These audio jacks may be used for temporary connection to video games or portable audio/video products such as camcorders and portable audio players. Bass Control: Turn this control to modify the lowfrequency output of the left/right channels by as much as $\pm 10\text{dB}$. Ò Balance Control: Turn this control to change the relative volume for the front left/right channels.

NOTE: For proper operation of the surround modes this control should be at the midpoint or "12 o'clock" position. Ú Treble Control: Turn this control to modify the high frequency output of the left/right channels by as much as $\pm 10\text{dB}$. Û Channel Adjust Selector: Press this button to begin the process of trimming the channel output levels using an external audio source. (For more information on output level trim adjustment, see page 29.) Ü Volume Control: Turn this knob clockwise to increase the volume, counterclockwise to decrease the volume. If the AVR 230 is muted, adjusting the Volume Control Ü 38 will automatically release the unit from the silenced condition. i Input Indicators: The current selected source will appear as one of these indicators. Note that when the unit is turned on, the entire list of available modes will light briefly, and then revert to normal operation with only the active mode indicator illuminated. ^ Speaker/Channel Input Indicators: These indicators are multipurpose, indicating both the speaker type selected for each channel and the incoming datasignal configuration. The left, center, right, right surround and left surround speaker indicators are composed of three boxes, while the subwoofer is a single box.

The center box lights when a "small" speaker is selected, and the two outer boxes light when "large" speakers are selected. When none of the boxes are lit for the center, surround or subwoofer channels, no speaker has been assigned that position. (See page 18 for more information on configuring speakers.) The letters inside each box displays the active input channels. For standard analog inputs, only the L and R will light, indicating a stereo input.

For a digital source, the indicators will light to display the channels being received at the digital input. When the letters flash, the digital input has been interrupted. (See page 27 for more information on the Channel Indicators.) ~ Upper Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, this line will show current input source and which analog or digital input is in use.

When the tuner is the input, this line will identify the station as AM or FM and show the frequency and preset number, if any. $\bar{\text{~}}$ Lower Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, the current surround mode will show here. Surround Mode Indicators: The current selected surround mode will appear as one of these indicators. Note that when the unit is turned on, the entire list of available modes will light briefly, and then revert to normal operation with only the active mode indicator illuminated. , Remote Sensor Window: The sensor behind this window receives infrared signals from the remote control. Aim the remote at this area and do not block or cover it. 6 FRONT-PANEL CONTROLS REAR-PANEL CONNECTIONS 38 37 36 35 34 33 32 31 ge c a ki · j h f db ° fl j ; TM £ ¢ § ¶ · ¸ / ¨ < > fi NOTE: To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

j FM Antenna Jack TM CD Audio Inputs £ Tape Outputs ¢ Tape Inputs Remote IR Input § Remote IR Output ¶ Preamp Outputs · Subwoofer Output ° Front Speaker Outputs , Surround Back Speaker Outputs / Surround Speaker Outputs ¨ Center Speaker Outputs < Video 2 Component Video Inputs NOTE: To assist in making the correct connections for multichannel input, output and speaker connections, all connection jacks and terminals are color-coded in conformance with the CEA standards as follows: Front Left: White Front Right: Red > DVD Component Video Inputs fi Component Video Monitor Outputs fl AC Power Cord Switched AC Accessory Outlet ° Unswitched AC Accessory Outlet · Optical Digital Audio Output a Coaxial Digital Audio Output b S-Video Monitor Output c Coaxial Digital Audio Inputs d DVD S-Video Input e Video 1 S-Video Input f Optical Digital Audio Inputs g Video 1 S-Video Output Center: Surround Left: Surround Right: Surround Back Left: Surround Back Right: Subwoofer: Green Blue Gray Brown Tan Purple h Video 2 S-Video Input i Video 2 S-Video Output j 6/8-Channel Direct Inputs k Video 3 S-Video Input 31 Video Monitor Output 32 DVD Audio/Video Inputs 33 Video 1 Audio/Video Inputs 34 Video 1 Audio/Video Outputs 35 Video 2 Audio/Video Inputs 36 Video 2 Audio/Video Outputs 37 Video 3 Audio/Video Inputs 38 AM Antenna Terminals Coaxial Digital Audio: Composite Video: Component Video "Y": Component Video "Pr": Component Video "Pb": Orange Yellow Green Red Blue ; FM Antenna Jack: Connect the supplied indoor (or an optional external) FM antenna to this terminal.



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TM CD Audio Inputs: Connect these jacks to the analog audio output of a compact disc player or CD changer. £ Tape Outputs: Connect these jacks to the RECORD/INPUT jacks of an audio recorder. € Tape Inputs: Connect these jacks to the PLAY/OUT jacks of an audio recorder. Remote IR Input: If the AVR 230's front-panel IR sensor is blocked due to cabinet doors or other obstructions, an external IR sensor may be used. Connect the output of the sensor to this jack. § Remote IR Output: This connection permits the IR sensor in the receiver to serve other remote controlled devices. Connect this jack to the "IR IN" jack on Harman Kardon (or other compatible) equipment. ¶ Preamp Outputs: Connect these jacks to an optional, external power amplifier for applications where higher power is desired. REAR-PANEL CONNECTIONS 7 REAR-PANEL CONNECTIONS · Subwoofer Output: Connect this jack to the linelevel input of a powered subwoofer.

If an external subwoofer amplifier is used, connect this jack to the subwoofer amplifier input. ° Front Speaker Outputs: Connect these outputs to the matching + or - terminals on your left and right speakers. When making speaker connections always make certain to maintain correct polarity by connecting the color-coded (white for front left and red for front right) (+) terminals on the AVR 230 to the red (+) terminals on the speakers and the black (-) terminals on the AVR 230 to the black (-) terminals on the speakers. See page 13 for more information on speaker polarity. , Surround Back Speaker Outputs: These speaker terminals are normally used to power the surround back speaker in a 6.

1-channel system. / Surround Speaker Outputs: Connect these outputs to the matching + and - terminals on your surround channel speakers. In conformance with the CEA color-code specification, the blue terminal is the positive, or "+," terminal that should be connected to the red (+) terminal on the Surround Left speaker with older color-coding, while the gray terminal should be connected to the red (+) terminal on the Surround Right speaker with the older color-coding. Connect the black (-) terminal on the AVR to the matching black negative (-) terminals for each surround speaker. (See page 13 for more information on speaker polarity.

) ¢ Center Speaker Outputs: Connect these outputs to the matching + and - terminals on your center channel speaker. In conformance with the CEA color-code specification, the green terminal is the positive, or "+," terminal that should be connected to the red (+) terminal on speakers with the older colorcoding.

Connect the black (-) terminal on the AVR to the black (-) terminal on your speaker. (See page 13 for more information on speaker polarity.) < Video 2 Component Video Inputs: Connect the Y/Pr/Pb component video outputs of an HDTV set-top converter, satellite receiver or other video source device with component video outputs to these jacks. > DVD Component Video Inputs: Connect the Y/Pr/Pb component video outputs of a DVD player to these jacks. fi Component Video Monitor Outputs: Connect these outputs to the component video inputs of a video projector or monitor. When a source connected to one of the Component Video Inputs <> is selected, the signal will be sent to these jacks. fl AC Power Cord: Connect the AC power cord to a non-switched AC wall outlet. Switched AC Accessory Outlet: These outlets may be used to power any device you wish to have turned on when the AVR 230 is turned on.

° Unswitched AC Accessory Outlet: This outlet may be used to power any AC device. The power will remain on at this outlet regardless of whether the AVR 230 is on or off. NOTE: The total power consumption of all devices connected to the accessory outlets should not exceed 100 watts. · Optical Digital Audio Output: Connect this jack to the optical digital input connector on a CD-R/RW, MiniDisc or other digital recorder. a Coaxial Digital Audio Output: Connect this jack to the coaxial digital input of a CD-R/RW, MiniDisc or other digital recorder. b S-Video Monitor Output: If any of the input sources used in your system have S-Video connections to the AVR, connect this jack to the S-Video input on your television, projector or other video display. c Coaxial Digital Audio Inputs: Connect the coax digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, DTS signal or a standard PCM digital source. Do not connect the RF digital output of an LD player to these jacks. d DVD S-Video Input: Connect the S-Video output of a DVD player or other video source to this jack.

e Video 1 S-Video Input: If the product connected to the Video 1 Audio Inputs 33 has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output b is connected as described above. f Optical Digital Audio Inputs: Connect the optical digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, a DTS signal or a standard PCM digital source. g Video 1 S-Video Output: If the product connected to the Video 1 Audio/Video Outputs 34 has S-Video capability, connect this jack to the REC/IN S-Video jack on that unit. h Video 2 S-Video Input: If the product connected to the Video 2 Audio/Video Inputs 35 has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output b is connected as described above.

i Video 2 S-Video Output: If the product connected to the Video 2 Audio/Video Outputs 36 has S-Video capability, connect this jack to the REC/IN S-Video jack on that unit. j 6/8-Channel Direct Inputs: These jacks are used for connection to source devices such as DVD Audio or SACD players with discrete analog outputs. Depending on the source device in use, all eight jacks may be used, though in many cases only connections to the front left/right, center, surround left/right and LFE (subwoofer input) jacks will be used for standard 5.1 audio signals. k Video 3 S-Video Input: If the product connected to the Video 3 Audio/Video Inputs 37 has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output b is connected as described above.

l Video 3 S-Video Output: If the product connected to the Video 3 Audio/Video Outputs 38 has S-Video capability, connect this jack to the REC/IN S-Video jack on that unit. m Video 1 Audio/Video Input: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks. n Video 1 Audio/Video Output: Connect the composite or Video and L/R analog audio REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks.

o Video 2 Audio/Video Input: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks. p Video 2 Audio/Video Output: Connect the composite or Video and L/R analog audio REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks.



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35 Video 2 Audio/Video Inputs: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks. 34 33 8 REAR-PANEL CONNECTIONS REAR-PANEL CONNECTIONS 36 Video 2 Audio/Video Outputs: Connect the composite or Video and L/R analog audio REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks. 37 Video 3 Audio/Video Inputs: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks. 38 AM Antenna Terminals: Connect the AM loop antenna supplied with the receiver to these terminals. If an external AM antenna is used, make connections to the AM and GND terminals in accordance with the instructions supplied with the antenna. Note on video connections: When connecting a video source product such as a VCR, DVD player, satellite receiver, cable set-top box, personal video recorder or video game to the AVR 230, you may use either a composite or S-Video connection, but not both.

REAR-PANEL CONNECTIONS 9 MAIN REMOTE CONTROL FUNCTIONS a Power Off Button b IR Transmitter Window c Program/SPL Indicator d Power On Button e Input Selectors f AVR Selector g AM/FM Tuner Select h Dim Button i Test Button j Sleep Button k DSP Surround Mode Selector l Night Mode m Channel Select Button n / / Buttons o < / > Buttons p Set Button q Digital Select r Numeric Keys s Tuner Mode t Direct Button u Tuning Up/Down v OSD Button w Dolby Mode Selector x DTS Digital Mode Selector y Logic 7 Mode Select Button z Skip Up/Down Buttons `Transport Controls 28 Stereo Mode Select Button 29 DTS Neo:6 Mode Select 30 Macro Buttons 31 Disc Skip Button 32 Preset Up/Down 33 Clear Button 34 Memory Button 35 Delay/Prev. Ch. 36 Speaker Select 37 Spare Button 38 Volume Up/Down 39 TV/Video Selector 40 SPL Selector 41 6-Channel/8-Channel Direct Input 42 Mute 43 EzSet Sensor Microphone NOTE: · The function names shown here are each button's feature when used with the AVR 230. Most buttons have additional functions when used with other devices. See pages 3637 for a list of these functions. · To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmanardon.com. c ba 43 POWER e d f ON TM OFF MUTE 42 AVR VCR VID1 DVD TV VID2 CD CBL/SAT VID3 6/8 CH TAPE VID4 g i h j 41 DIM AM/FM SPL 40 39 k l m n o q p SLEEP CH. SURR. TEST NIGHT T/V VOL. 38 37 36 o 35 GU ID E ME N SP K R U CH . SET n r s u v LA DE Y PR I DIG EX EV 1 5 TUN-M 2 6 9 DIRECT 3 7 0 CLEAR 4 8 MEM . C H . T A L I T t TUNING OSD D.

SKIP PRESET 34 33 32 31 30 29 M1 M2 M3 M4 DTS NEO:6 w y DOLBY DTS SURR x z DOWN LOGIC 7 STEREO 28 SKIP UP `230 10 MAIN REMOTE CONTROL FUNCTIONS MAIN REMOTE CONTROL FUNCTIONS IMPORTANT NOTE: The AVR 230's remote may be programmed to control up to eight devices, including the AVR 230. Before using the remote, it is important to remember to press the Input Selector Button e that corresponds to the unit you wish to operate. In addition, the AVR 230's remote is shipped from the factory to operate the AVR 230 and most Harman Kardon CD or DVD players and cassette decks. The remote is also capable of operating a wide variety of other products using the control codes that are part of the remote. Before using the remote with other products, follow the instructions on pages 3233 to program the proper codes for the products in your system.

It is also important to remember that many of the buttons on the remote take on different functions, depending on the product selected using the Device Control Selectors. The descriptions shown here primarily detail the functions of the remote when it is used to operate the AVR 230. (See page 33 for information about alternate functions for the remote's buttons.) a Power Off Button: Press this button to place the AVR 230 or a selected device in the Standby mode. Note that this will turn off the main room functions, but if the Multiroom system is activated, it will continue to function. b IR Transmitter Window: Point this window towards the AVR 230 when pressing buttons on the remote to make certain that infrared commands are properly received. c Program/SPL Indicator: This three-color indicator is used to guide you through the process of programming the remote and it is also used as a level indicator when using the remote's EzSet capabilities. (See page 21 for more information on setting output levels, and see page 32 for information on programming the remote.) d Power On Button: Press this button to turn on the power to a device selected by pressing one of the Input Selectors e. e Input Selectors: Pressing one of these buttons will perform three actions at the same time.

First, if the AVR 230 is not turned on, this will power up the unit. Next, it will select the source shown on the button as the input to the AVR 230. Finally, it will change the remote control so that it controls the device selected. After pressing one of these buttons you must press the AVR Selector Button f again to operate the AVR 230's functions with the remote. f AVR Selector: Pressing this button will switch the remote so that it will operate the AVR 230's functions. If the AVR 230 is in the Standby mode, it will also turn the AVR 230 on. g AM/FM Tuner Select: Press this button to select the AVR 230's tuner as the listening choice. Pressing this button when the tuner is already in use will select between the AM and FM bands. h Dim Button: Press this button to activate the Dimmer function, which reduces the brightness of the front panel display, or turn it off entirely. The first press of the button shows the default state, which is full brightness by indicating DIMMER FULL in the Lower Display Line `.

Press the button again within five seconds to reduce the brightness by 50%, as indicated by DIMMER HALF showing in the Lower Display Line ` . Press the button again within five seconds and the main display will go completely dark. Note that this setting is temporary, in that regardless of any changes, the display will always return to full brightness when the AVR is turned on. In addition, the Power Indicator 2 will always remain at full brightness regardless of the setting. This is to remind you that the AVR is still turned on.

i Test Button: Press this button to begin the sequence used to calibrate the AVR 230's output levels. (See page 21 for more information on calibrating the AVR 230.) j Sleep Button: Press this button to place the unit in the Sleep mode. After the time shown in the display, the AVR 230 will automatically go into the Standby mode. Each press of the button changes the time until turn-off in the following order: 90 min 40 min 80 min 30 min 70 min 20 min 60 min 10 min 50 min OFF l Night Mode: Press this button to activate the Night mode.



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This mode is available in specially encoded digital sources, and it preserves dialogue (center channel) intelligibility at low volume levels. *m* Channel Select Button: This button is used to start the process of setting the AVR 230's output levels to an external source. Once this button is pressed, use the */* Buttons *n* to select the channel being adjusted, then press the Set Button *p*, followed by the */* Buttons *n* again, to change the level setting. (See page 29 for more information.) *n* */* Buttons: These multipurpose buttons are used to change or scroll through items in the onscreen menus, make configuration settings such as digital inputs or delay timing, or to select surround modes. When changing a setting, first press the button for the function or setting to be changed (e.g., press the DSP Surround Mode Selector *k* to select a sound field mode or the Digital Select Button *q* to change a digital input) and then press one of these buttons to scroll through the list of options or to increase or decrease a setting. The sections in this manual describing the individual features and functions contain specific information on using these buttons for each application. *o* *</>* Buttons: These buttons are used to change the menu selection or setting during some of the setup procedures for the AVR 230.

p Set Button: This button is used to enter settings into the AVR 230's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment. *q* Digital Select: Press this button to assign one of the digital inputs **cf* to a source. (See page 25 for more information on using digital inputs.) *r* Numeric Keys: These buttons serve as a 10button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when TV, Cable or SAT has been selected on the remote, or to select track numbers on a CD, DVD or LD player, depending on how the remote has been programmed. *s* Tuner Mode: Press this button when the tuner is in use to select between automatic tuning and manual tuning. When the button is pressed so that MANUAL appears in the Lower Display Line *˘*, pressing the Tuning Buttons *u9* will move the frequency up or down in single-step increments. When the FM band is in use, pressing this button when a station's signal is weak will change to monaural reception. (See page 28 for more information.)

) This button is also used to change channels on your TV when the TV is selected. When the AVR 230 remote is being programmed with the codes to operate another device, this button is also used in the "Auto Search" process. (See page 32 for more information on programming the remote.) *k* DSP Surround Mode Selector: Press this button to cycle through the DSP, VMaX and Stereo surround modes such as Hall, Theater, VMaX Near and Far, and Surround Off. This button is also used to tune channels when the TV is selected using the device Input Selector *e*.

When the AVR 230 remote is being programmed with the codes of another device, this button is also used in the "Auto Search" process. (See page 32 for more information on programming the remote.) MAIN REMOTE CONTROL FUNCTIONS 11 MAIN REMOTE CONTROL FUNCTIONS *t* Direct Button: Press this button when the tuner is in use to start the sequence for direct entry of a station's frequency. After pressing the button, simply press the proper Numeric Keys *r* to select a station. (See page 28 for more information on the tuner.)

u Tuning Up/Down: When the tuner is in use, these buttons will tune up or down through the selected frequency band. If the Tuner Mode Button *s* & has been pressed so that AUTO appears in the onscreen display and Lower Display Line *˘*, pressing and holding either of the buttons for three seconds will cause the tuner to seek the next station with acceptable signal strength for quality reception. When MANUAL appears in the Lower Display Line *˘*, pressing these buttons will tune stations in single-step increments. (See page 28 for more information.) *v* OSD Button: Press this button to activate the On-Screen Display (OSD) system used to set up or adjust the AVR 230's parameters. *w* Dolby Mode Selector: This button is used to select from among the available Dolby Surround processing modes. Each press of this button will select one of the Dolby Pro Logic II modes or Dolby 3 Stereo. When a Dolby Digital-encoded source is in use, the Dolby Digital mode may also be selected. (See page 26 for the available Dolby surround mode options.) *x* DTS Digital Mode Selector: When a DTS encoded digital source is selected, each press of this button will scroll through the available DTS modes.

The specific choice of modes will vary according to whether or not the source material contains DTS-ES 6.1 Discrete encoding. When a DTS source is not in use, this button has no function. (See page 26 for the available DTS Digital options.) *y* Logic 7 Mode Select Button: Press this button to select from among the available Logic 7 surround modes. (See page 26 for the available Logic 7 options.) *z* Skip Up/Down Buttons: These buttons do not have a direct function with the AVR 230, but when used with a compatibly programmed CD or DVD changer they will change to the previous disc in the changer or carousel. *˘* Transport Controls: These buttons do not have any functions for the AVR 230, but they may be programmed for the forward/reverse play operation of a wide variety of CD or DVD players, and audio or video cassette recorders. (See page 36 for more information.) 28 Stereo Mode Select Button: When the button is pressed so that DSP SURR OFF appears in the Lower Display Line *˘*, the AVR will operate in a bypass mode with true, fully analog, two-channel left/right stereo mode with no surround processing or bass management, as opposed to other modes where digital processing is used.

When the button is pressed so that SURROUND OFF appears in the Lower Display Line *˘*, you may enjoy a two-channel presentation of the sound along with the benefits of bass management. Depending on whether your system is configured for 5.1 or 6.1/7.1 channels, the next press of the button will cause either 5 CH STEREO or 7 CH STEREO to appear, and the stereo signal will be routed to all five (or seven) speakers.

(See page 26 for more information on stereo playback modes.) 29 DTS Neo:6 Mode Select: Press this button to select a DTS Neo:6 mode. These modes take a twochannel stereo- or matrix surround-encoded source and create a full five-, six- or seven-channel sound field. (See page 26 for the DTS Neo:6 options.) 30 Macro Buttons: Press these buttons to store or recall a "Macro", which is a preprogrammed sequence of commands stored in the remote.

(See page 32 for more information on storing and recalling macros.) 31 Disc Skip Button: This button has no direct function for the AVR 230 but is most often used to change to the next disc in a CD or DVD player when the remote is programmed for that type of device.



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(See page 36 for more information on using the remote with products other than the AVR 230.) 32 Preset Up/Down: When the tuner is in use, press these buttons to scroll through the stations programmed into the AVR 230's memory. When some source devices, such as CD players, VCRs and cassette decks, are selected using the device Input Selectors e, these buttons may function as Chapter Step or Track Advance. 33 Clear Button: Press this button to clear incorrect entries when using the remote to directly enter a radio station's frequency. 34 Memory Button: Press this button to enter a radio station into the AVR 230's preset memory. First, tune the desired station, and then press this button. Two underline indicators will flash at the right side of the Upper Display Line ~, and within five seconds press the Numeric Keys r for the preset number between 01 and 30 that you wish to assign to the station. (See page 28 for more information.)

) 35 Delay/Prev Ch.: Press this button to begin the process for setting the delay times used by the AVR 230 when processing surround sound. After pressing this button, the delay times are entered by pressing the Set Button p and then using the /⌂ Buttons n to change the setting. Press the Set Button p again to complete the process. (See page 20 for more information.) 36 Speaker Select: Press this button to begin the process of configuring the AVR 230's bass management system for use with the type of speakers used in your system. Once the button has been pressed, use the /⌂ Buttons n to select the channel you wish to set up. Press the Set Button p and then select another channel to configure. When all adjustments have been completed, press the Set Button p twice to exit the settings and return to normal operation. (See page 18 for more information.)

) 37 Spare Button: This button has no direct function for the AVR 230. 38 Volume Up/Down: Press these buttons to raise or lower the system volume. 39 TV/Video Selector: This button does not have a direct function on the AVR 230, but when used with a compatible VCR, DVD or satellite receiver, pressing this button will switch between the output of the device and the external video input. 40 SPL Selector: This button activates the AVR 230's EzSet function to quickly and accurately calibrate the AVR 230's output levels. Press and hold the button for three seconds and then release it. Press the "5" or "7" Numeric Key r to indicate whether you are using a 5.1-channel or a 6.1/7.1-channel speaker system with the AVR 230. The test tone will begin circulating, and the Program/SPL Indicator c will change colors.

During this sequence, EzSet will automatically adjust the output levels for all channels until they are equal, as shown by the Program/ SPL Indicator c lighting green for each channel. Press this button again when the adjustment is complete to turn off the test tone. (See page 21 for more information on EzSet.)

41 6-Channel/8-Channel Direct Input: Press this button to select the device connected to the 6/8-Channel Direct Inputs j. (See page 24 for more information.)

42 Mute: Press this button to momentarily silence the AVR 230 or TV set being controlled, depending on which device has been selected. When the AVR 230 remote is being programmed to operate another device, this button is pressed with the Input Selector Button e to begin the programming process. (See page 32 for more information on programming the remote.) 43 EzSet Sensor Microphone: The sensor microphone for the EzSet microphone is behind these slots.

When using the remote to calibrate speaker output levels using EzSet, be sure that you do not hold the remote in a way that covers these slots.

(See page 21 for more information on using EzSet.) 12 MAIN REMOTE CONTROL FUNCTIONS INSTALLATION AND CONNECTIONS System Installation

After unpacking the unit, locating it in a place with adequate ventilation and placing it on a solid surface capable of supporting its weight, you will need to make the connections to your audio and video equipment. **IMPORTANT NOTE:** For your personal safety and to avoid possible damage to your equipment and speakers, it is always a good practice to turn off and unplug the AVR and ALL source equipment from the AC output before making any audio or video system connections. **Audio Equipment Connections** We recommend that you use high-quality interconnect cables when making connections to source equipment and recorders to preserve the integrity of the signals. 1. Connect the analog output of a CD player to the CD Audio Inputs TM. **NOTE:** When the CD player has both fixed and variable audio outputs, it is best to use the fixed output unless you find that the input to the receiver is so low that the sound is noisy, or so high that it is distorted. 2. Connect the analog Play/Out jacks of a cassette deck, MD, CD-R or other audio recorder to the Tape Input Jacks €. Connect the analog Record/In jacks on the recorder to the Tape Output Jacks £ on the AVR 230.

3. Connect the output of any digital sources such as a CD or DVD changer or player, advanced video game, a digital satellite receiver, HDTV tuner or digital cable set-top box or the output of a compatible computer sound card to the Optical and Coaxial Digital Audio Inputs f*(. 4. Connect the coaxial or optical Digital Audio Outputs -a on the rear panel of the AVR 230 to the matching digital input connections on a CD-R or MiniDisc recorder. 5.

Assemble the AM Loop Antenna supplied with the unit so that the tabs at the bottom of the antenna loop snap into the holes in the base. Connect it to the AM Antenna Terminals 38. 7. Connect the front, center, surround and surround back speaker outputs ",/⌂ to the respective speakers. To ensure that all the audio signals are carried to your speakers without loss of clarity or resolution, we suggest that you use high-quality speaker cable.

Many brands of cable are available and the choice of cable may be influenced by the distance between your speakers and the receiver, the type of speakers you use, personal preferences and other factors. Your dealer or installer is a valuable resource to consult in selecting the proper cable. Regardless of the brand of cable selected, we recommend that you use a cable constructed of multistrand copper with a gauge of 14 or smaller. Remember that in specifying cable, the lower the number, the thicker the cable. Cable with a gauge of 16 may be used for short runs of less than 10 feet. We do not recommend that you use cables with an AWG equivalent of 18 or higher, due to the power loss and degradation in performance that will occur. Cables that are run inside walls should have the appropriate markings to indicate listing with UL, CSA or other appropriate testing agency standards. Questions about running cables inside walls should be referred to your installer or a licensed electrician who is familiar with the NEC and/or the applicable local building codes in your area. When connecting wires to the speakers, be certain to observe proper polarity.



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Note that the positive (+) terminal of each speaker connection may carry a specific color code, as noted on page 7.

However, many speakers still use a red terminal for the positive (+) connection. Connect the "negative" or "black" wire to the same terminal on both the receiver and the speaker. NOTE: While most speaker manufacturers adhere to an industry convention of using black terminals for negative and red ones for positive, some may vary from this configuration. To ensure proper phase and optimal performance, consult the identification plate on your speaker or the speaker's manual to verify polarity. If you do not know the polarity of your speaker, ask your dealer for advice before proceeding, or consult the speaker's manufacturer. We also recommend that the length of cable used to connect speaker pairs be identical. For example, use the same length piece of cable to connect the front-left and front-right or surround-left and surround-right speakers, even if the speakers are a different distance from the AVR 230. 8. Connections to a subwoofer are normally made via a line-level audio connection from the Subwoofer Output to the line-level input of a subwoofer with a built-in amplifier. When a passive subwoofer is used, the connection first goes to a power amplifier, which will be connected to one or more subwoofer speakers.

If you are using a powered subwoofer that does not have line-level input connections, follow the instructions furnished with the speaker for connection information. 9. If an external multichannel audio source with 5.1 outputs such as an external digital processor/decoder, DVD-Audio or SACD player is used, connect the outputs of that device to the 6/8-Channel Direct Inputs j. External Amplifier Connections The AVR 230's internal-power amplifier is a traditional Harman Kardon high-current/ultrawide bandwidth design.

As such, it is more than suitable for most loudspeakers. However, in some circumstances you may wish to use an optional, external power amplifier for added power. This is easily done by connecting the Preamp Output Jacks ¶ on the AVR 230 to the input jacks on the amplifier for the channels to be used. The speakers to be used with the external amplifier are then connected to the appropriate output terminals on the power amplifier, not those on the AVR. Since the AVR 230 is designed with a full seven-channel audio path for use with modes such as Dolby Digital EX and Logic 7/7.

1, you may also wish to use an optional, external amplifier to include both back surround channels in your system. This is done by connecting the SBL and SBR Preamp Out Jacks ¶ on the AVR to the input jacks on the power amplifier. As is the case with the use of any external amplifier, the speakers are then connected to the appropriate output terminals on the external amplifier. When an external amplifier is used for the Surround Back channels, no special adjustments are needed to the AVR, other than to make certain that the Surround Back speakers are properly configured to "Large" or "Small," as shown in the Speaker Setup section on page 18 of this manual. This is necessary to tell the AVR's digital processing system that 6.1/7.1 modes should be activated, as opposed to the default setting of 5.1 modes. We also recommend that when an external amplifier is used for the Surround Back channels you use a stereo amplifier to feed both channels, although a single, mono amplifier may be used for one channel (e.g.

, SBL), while the AVR's internal amplifier feeds the other channel (e.g., SBR). The use of a stereo amplifier ensures that the two back channels will be fed with equal power. 6. Connect the supplied FM antenna to the FM (75ohm) Connection j. The FM antenna may be an external roof antenna, an inside powered or wire-lead antenna or a connection from a cable TV system. If the antenna or connection uses 300-ohm twin-lead cable, you must use the 300-ohm-to-75-ohm adapter supplied with the unit to make the connection. INSTALLATION AND CONNECTIONS 13 INSTALLATION AND CONNECTIONS Video Equipment Connections Video equipment is connected in the same manner as audio components. Again, the use of high-quality interconnect cables is recommended to preserve signal quality.

1. Connect a VCR's, personal video recorder's or other video source's audio and video Play/Out jacks to the Video 1/Video 2 Audio/Video and/or S-Video Input Jacks eh 33 35 on the rear panel. The Audio and Video Record/In jacks on the VCR should be connected to the Video 1/Video 2 Audio/Video and/or S-Video Output Jacks gi 34 36 on the AVR 230. 2. Connect the analog audio and video outputs of a satellite receiver, cable TV converter, television set or any other video source to the Video 3 Audio/Video and S-Video Input Jacks k 37 .

3. Connect the analog audio and video outputs of a DVD or laser disc player to the DVD Audio/Video and S-Video Inputs d 32 . 4. Connect the digital audio outputs of a DVD player, satellite receiver, cable box or HDTV converter to the appropriate Optical or Coaxial Digital Inputs cf*(. 5.

Connect the Video and/or S-Video Monitor Output b 31 jacks on the receiver to the composite or S-Video input of your television monitor or video projector.

6. If your DVD player and monitor both have component video connections, connect the component outputs of the DVD player to the DVD Component Video Inputs >. Even when component video connections are used, the audio connections should still be made to either the analog DVD Audio Inputs 32 or any of the Optical or Coaxial Digital Input Jacks cf*(. 7. If another device with component video outputs is available, connect it to the Video 2 Component Video Inputs <. The audio connections for this device should be made to either the Video 2 Audio Inputs 35 or any of the Optical or Coaxial Digital Input Jacks cf*(.

8. If the component video inputs are used, connect the Component Video Monitor Outputs fi to the component video inputs of your TV, projector or display device. 9.

If you have a camcorder, video game or other audio/video device that is connected to the AVR on a temporary rather than permanent basis, connect the audio, video and digital audio outputs of that device to the Front-Panel Inputs *(Ó. A device connected here is selected as the Video 4 input, and the digital inputs must be assigned to the Video 4 input. (See page 17 for more information on input configuration.) Video Connection Notes: · When the component video jacks are used, the onscreen menus are not visible and you must switch to the standard composite or S-Video input on your TV to view them. · The AVR 230 will accept either standard composite, S-Video or Y/Pr/Pb component video signals. However, it will not convert composite or S signals to component video. · When connecting a video source to the AVR 230, you may use either composite, component or S-Video, but only one type of video may be connected for each device.



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· When more than one video format is used, it is necessary to make a separate connection from the AVR to your video display for each format. For example, if both composite and component sources are connected to the AVR 230, both the composite and component video monitor outputs fi 31 must be connected to the appropriate inputs on your video display. AC Power Connections This unit is equipped with two accessory AC outlets.

They may be used to power accessory devices, but they should not be used with high-current-draw equipment such as power amplifiers. The total power draw to each outlet may not exceed 100 watts. The Switched AC Accessory Outlet will receive power only when the unit is on. This is recommended for devices that have no power switch or a mechanical power switch that may be left in the "ON" position. NOTE: Many audio and video products go into a Standby mode when they are used with switched outlets, and cannot be fully turned on using the outlet alone without a remote control command.

The Unswitched AC Accessory Outlet ° will receive power as long as the unit is plugged into a powered AC outlet. Once the AC Power Cord fl is connected, you are almost ready to enjoy the AVR 230's incredible power and fidelity! System and Power Connections The AVR 230 is designed for flexible use with multiroom systems, external control components and power amplifiers. Remote Control Extension If the receiver is placed behind a solid or smoked glass cabinet door, the obstruction may prevent the remote sensor from receiving commands. In this event, an optional remote sensor may be used. Connect the output of the remote sensor to the Remote IR Input jack.

If other components are also prevented from receiving remote commands, only one sensor is needed. Simply use this unit's sensor or a remote eye by running a connection from the Remote IR Output § jack to the Remote IR Input jack on Harman Kardon or other compatible equipment. 14 INSTALLATION AND CONNECTIONS SYSTEM CONFIGURATION When all audio, video and system connections have been made, there are a few configuration adjustments that must be made. A few minutes spent to correctly configure and calibrate the unit will greatly add to your listening experience. Speaker Selection and Placement The placement of speakers in a multichannel home theater system can have a noticeable impact on the quality of sound reproduced. No matter which type or brand of speakers is used, the same model or brand of speaker should be used for the left front, center and right front speakers. This creates a seamless front soundstage and eliminates the possibility of distracting sonic disturbances that occur when a sound moves across mismatched front-channel speakers. Rear surround speaker mounting locations will vary according to the requirements of your specific system. If you are using the AVR 230's internal amplifiers only, the rear surround speaker should be mounted as close as possible to the center of the rear wall for a "6.1" system.

If an optional, external power amplifier is available so that both the Surround Back Left and Surround Back Right channels are in use, place the speakers on the rear wall, as shown in the diagram below left. The rear wall location may also be used in place of side-wall mounting in 5.1 systems when it is not practical to place the main surround speakers at the sides of the room. As with the side speakers, rear surround speakers should be located so that the bottom of the cabinet is at least two feet higher than the listeners' ears. The speakers should be no more than six feet behind the rear of the seating area. If dipole-type speakers are used on either the side or rear walls of the room, please note that if there are arrows on the speakers they should face the front of the room for the side speakers, or toward the center of the wall for the rear speakers. Subwoofers produce nondirectional sound, so they may be placed almost anywhere in a room. Actual placement should be based on room size and shape and the type of subwoofer used. One method of finding the optimal location for a subwoofer is to begin by placing it in the front of the room, about six inches from a wall, or near the front corner of the room. Another method is to temporarily place the subwoofer at your normal listening position, and then walk around the room until you find a spot where the subwoofer sounds best.

Place the subwoofer in that spot. You should also follow the instructions of the subwoofer's manufacturer, or you may wish to experiment with the best location for a subwoofer in your listening room. A) Front-channel speaker installation with direct-view TV sets or rear-screen projectors TV or Projection Screen Left Front Speaker Center Front Speaker Right Front Speaker Speaker Placement Depending on the type of center channel speaker in use and your viewing device, place the center speaker either directly above or below your TV, or in the center behind a perforated front projection screen. Once the center channel speaker is installed, position the front left and front right speakers so that they are as far away from one another as the center channel speaker is from the preferred listening position. Ideally, the front channel speakers should be placed so that their tweeters are no more than 24" above or below the tweeter in the center channel speaker.

Depending on the specifics of your room acoustics and the type of speakers in use, you may find that imaging is improved by moving the left front and right front speakers slightly forward of the center channel speaker. If possible, adjust all front loudspeakers so that they are aimed at ear height when you are seated in the listening position. Using these guidelines, you'll find that it takes some experimentation to find the correct location for the front speakers in your particular installation. Don't be afraid to move things around until the system sounds correct. Optimize your speakers so that audio transitions across the front of the room sound smooth, and sounds from all speakers appear to arrive at the listening position at the same time (without delay from the center speaker compared to the left and right speakers).

When the AVR 230 is used in 5.1-channel operation, the preferred location for surround speakers is on the side walls of the room, at or slightly behind the listening position. In a 6.1-channel system, both side surround speakers and a back surround speaker are required. The center of the speaker should face into the room. The speakers should be located so that No more than 6 feet when rear-mounted speakers are used Rear-Wall Mounting 7.1 6.1 7.1 B) Rear-wall speaker mounting using the positions marked "7.1" is an alternate location for 5.

1 systems, and it should also be used for full 7.1 systems when an optional, external power amplifier is used to power the rear speakers. When the AVR's internal amplifier only is used for a 6.



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