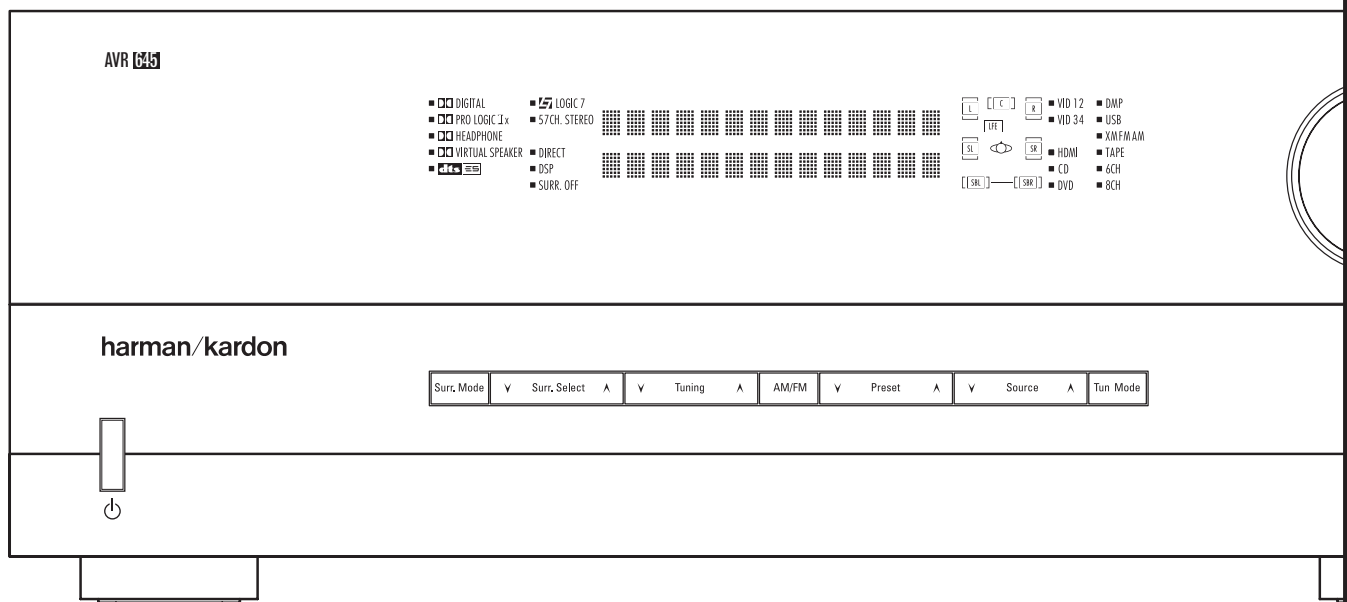


AVR 645 Audio/Video Receiver

OWNER'S MANUAL



harman/kardon®

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Declaration of Conformity



We, Harman Consumer Group, Inc.
2, route de Tours
72500 Château-du-Loir,
FRANCE

declare in own responsibility, that the product described in this owner's manual is in compliance with technical standards:

EN 55013:2001+A1:2003

EN 55020:2002+A1:2003

EN 61000-3-2:2000

EN 61000-3-3:1995+A1:2001

EN 60065:2002

Jurjen Amsterdam
Harman Consumer Group, Inc.
07/06

Typographical Conventions

In order to help you use this manual with the remote control, front-panel controls and rear-panel connections, certain conventions have been used.

EXAMPLE – (bold type) indicates a specific remote control or front-panel button, or rear-panel connection jack

EXAMPLE – (OCR type) indicates a message that is visible on the front-panel information display

EXAMPLE – (Synchro type) indicates a message that is displayed on the remote control's LCD screen

1 – (number in a square) indicates a specific front-panel control

1 – (number in a circle) indicates a rear-panel connection

1 – (number in an oval) indicates a button or indicator on the remote

A – (letter in an oval) indicates a button on the Zone II remote

The appearance of the text or cursor for your receiver's on-screen menus may vary slightly from the illustrations in this manual. Whether the text appears in all uppercase or upper- and lowercase characters, performance and operation remain the same.

Introduction

Thank you for choosing Harman Kardon!

With the purchase of a Harman Kardon AVR 645 you are about to begin many years of listening enjoyment.

The AVR 645 has the most extensive range of audio and video processing, control and connectivity options ever offered by Harman Kardon, enabling it to provide the best possible audio and video reproduction with any type of source material. Teaming advanced processing circuitry with proprietary technologies such as EzSet/EQ, the AVR 645 seamlessly integrates every component in your entertainment system to deliver the best possible sound and images.

Some of the leading-edge features that are available with the AVR 645, such as HDMI™ connectivity, are new to even the most experienced home theater enthusiast.

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 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 645 serves as the hub of your home entertainment system, providing a wide range of listening possibilities for almost any audio or video program source, whether it is the broadcast of a movie or sporting event in HDTV or a vintage mono or stereo recording. When playing digital audio sources from either the conventional optical and coaxial inputs, or through the HDMI 1.1 compliant connections, the AVR 645 decodes Dolby Digital, Dolby Digital EX, DTS and DTS-ES data streams. Two-channel stereo and matrix surround sources benefit from all current Dolby Pro Logic IIx modes and DTS Neo:6. The latest version of our proprietary Logic 7® process is on-board to create a wider, more enveloping sound field and more defined surround channel positioning, regardless of the type of source material. Additional audio playback and processing options include a direct connection to compatible computer-based sources through a direct USB connection.

The AVR 645 takes the “video” part of its name seriously. Along with two HDMI inputs and three 100MHz analog component video inputs, the AVR 645 converts incoming analog signals to an HDMI output or converts composite and S-video to component for single wire connections. Tying audio and video together, the AVR 645 provides A/V sync delay so that the lip sync errors – commonly seen when digital video processing is used in a source, program or video display – are eliminated.

Coax and optical digital outputs are available for direct connection to digital recorders, and both the front panel analog audio/video and coaxial digital jacks may be switched to outputs for use with portable recorders – a Harman Kardon exclusive. Two video recording outputs, preamp-out and a color-coded eight-channel input make the AVR virtually future-proof, with everything needed to accommodate tomorrow’s new formats right on board.

The AVR 645’s flexibility and power extend beyond your main home theater or listening room. The AVR includes a sophisticated multi-zone control system that allows you to select one source for use in the main room and a different one (Audio) in a second room. Complete control over volume is possible with a separate infrared control link. To make it easy to operate the AVR from a remote room, a separate “ZR 10” remote is included.

Additional multiroom options include the option to assign two of the AVR’s output channels to the multiroom system and the ability to link the AVR to innovative A-BUS® keypads for multiroom operation without the need for external amplifiers.

The AVR 645’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 more than fifty years ago. With state-of-the-art circuitry and time-honored circuit designs, the AVR is the perfect combination of the latest in digital audio technology, a quiet yet powerful analog amplifier in an elegant, easy-to-use package.

- **Dolby* Digital, Dolby Digital EX and Dolby Pro Logic* IIx Decoding, and the full suite of DTS® modes, including DTS-ES® 6.1 Discrete & Matrix and Neo:6® and DTS 96/24**
- **Seven channels of high-current amplification with two channels assignable to either surround back or multiroom applications**
- **Harman Kardon’s exclusive Logic 7® processing, along with a choice of Dolby Virtual Speaker processing for use when only two speakers are available**
- **Dolby Headphone to create spacious, open sound fields when using headphones**
- **USB connectivity for audio playback with compatible computers and quick system upgrades**
- **Two HDMI™ 1.1 and three assignable high-bandwidth analog component inputs for compatibility with the latest high-definition video sources**
- **Harman Kardon’s advanced EzSet/EQ automatically configures speaker settings and sets room equalization for quick, easy and accurate system setup**
- **High-bandwidth, HDTV-compatible component video switching**
- **Front panel analog A/V inputs, switchable to outputs**
- **Front panel digital inputs with coax digital output capability for easy connection to portable digital devices and the latest video game consoles**
- **Multiple digital inputs and outputs**
- **On-screen menu and display system**
- **Extensive multiroom options, including a standard Zone II remote, assignable amplifier channels and A-BUS/READY® capability for listening to a separate source in a remote zone**
- **6-Channel/8-Channel Direct Input and Preamp Outputs for Easy Expansion and Use with Future Audio Formats**
- **Extensive bass management options, including Quadruple Crossover**
- **A/V Sync delay adjustable for each input delivers perfect lip sync with digital programs or video displays**

Introduction / Safety Information

Important Safety Information

READ THIS BEFORE OPERATING YOUR UNIT.

Do not install this equipment in a confined space such as a case or similar – away from direct sunlight, heat sources, vibration, dust, moisture, and/or cold.

Avoid installing this unit where foreign object may fall onto this unit and/or this unit may be exposed to liquid dripping or splashing. On the top of this unit, do not place:

- Burning objects (i.e. candles), as they may cause fire, damage to this unit, and/or personal injury.
- Containers with liquid in them, as they may fall and liquid may cause electrical shock to the user and/or damage to this unit.

Do not cover this unit with a newspaper, tablecloth, curtain, etc. in order not to obstruct heat radiation. If the temperature inside this unit rises, it may cause fire, damage to this unit, and/or personal injury.

Install this unit near the AC outlet and where the AC power plug can be reached easily.

This unit is not disconnected from the AC power source as long as it is connected to the wall outlet, even if this unit itself is turned off. This state is called the standby mode. In this state, this unit is designed to consume a very small quantity of power.

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

Verify Line Voltage Before Use

Your AVR 645 has been designed for use with 220-240-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 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 depot 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 station.

Installation Location

- To assure 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 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.

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

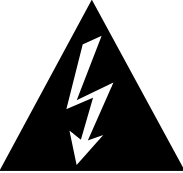



Before moving the unit, be certain to disconnect any interconnection cords with other components, and make certain that you disconnect the unit from the AC outlet.

Unpacking

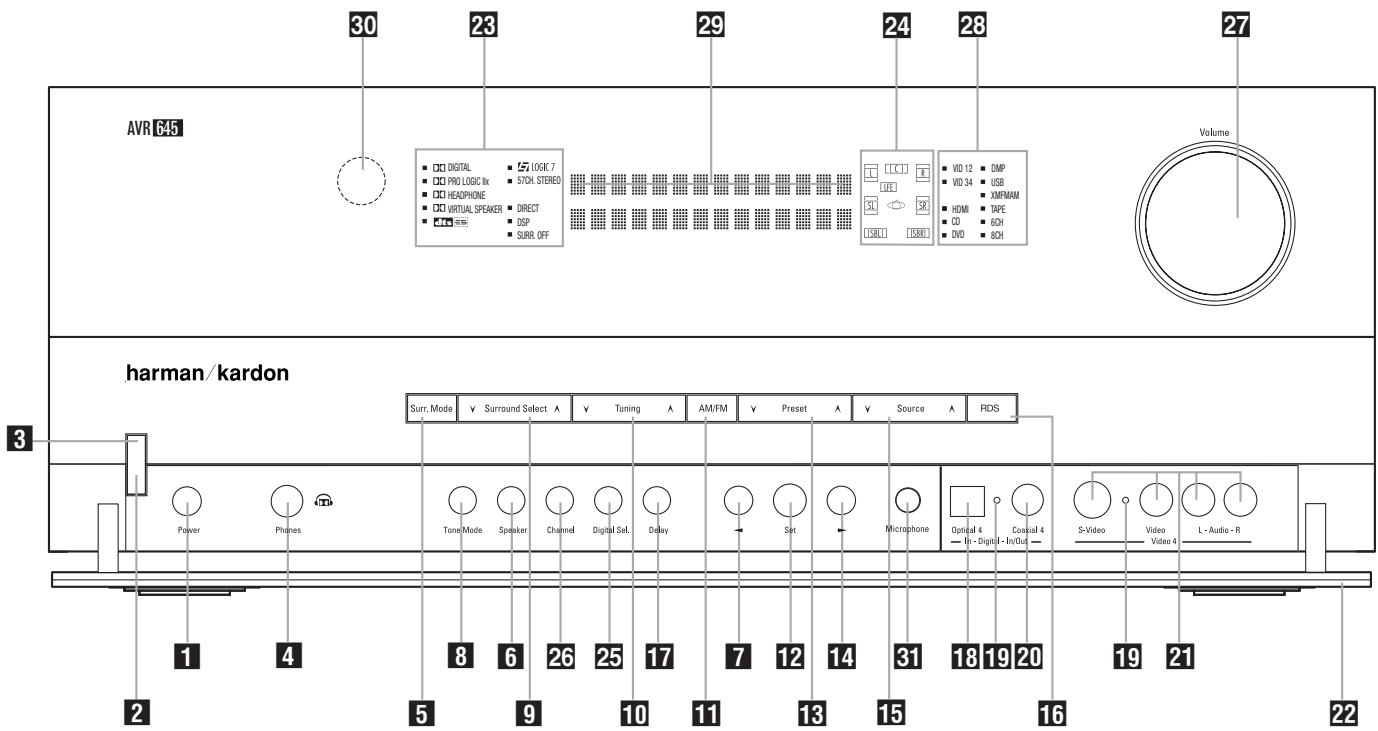
The carton and shipping materials used to protect your new receiver during shipment were specially designed to cushion it from shock and vibration. We suggest that you save the carton and packing materials for use in shipping if you move, or should the unit ever need repair.

To minimize the size of the carton in storage, you may wish to flatten it. This is done by carefully slitting the tape seams on the bottom and collapsing the carton. Other cardboard inserts may be stored in the same manner. Packing materials that cannot be collapsed should be saved along with the carton in a plastic bag.

If you do not wish to save the packaging materials, please note that the carton and other sections of the shipping protection are recyclable. Please respect the environment and discard those materials at a local recycling center.

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.		
	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.		
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.		

Front Panel Controls



- 1** Main Power Switch
- 2** System Power Control
- 3** Power Indicator
- 4** Headphone Jack
- 5** Surround Mode Group Selector
- 6** Speaker Selector
- 7** ◀ Button
- 8** Tone Mode
- 9** Surround Mode Selector
- 10** Tuning Selector
- 11** Tuner Band Selector
- 12** Set Button
- 13** Preset Station Selector
- 14** ▶ Button
- 15** Input Source Selector
- 16** RDS Selector
- 17** Delay Adjust Selector
- 18** Digital Optical 4 Input
- 19** Input/Output Status Indicators
- 20** Digital Coax 4 Jack
- 21** Video 4 Input/Output Jacks
- 22** Front Panel Control Door
- 23** Surround Mode Indicators
- 24** Speaker/Channel Input Indicators
- 25** Digital Select Button
- 26** Channel Select Button
- 27** Volume Control
- 28** Input Indicators
- 29** Main Information Display
- 30** Remote Sensor Window
- 31** EzSet/EQ Microphone Jacks

1 Main Power Switch: Press this button to apply power to the AVR. When the switch is pressed in, the unit is placed in a Standby mode, as indicated by the orange **LED 3** surrounding the **System Power Control 2**. This button **MUST** be pressed in to operate the unit. To turn the unit off completely and prevent the use of the remote control, this switch should be pressed until it pops out from the front panel so that the word "OFF" may be read at the top of the switch.
NOTE: This switch is normally left in the "ON" position.

2 System Power Control: When the **Main Power Switch 1** is "ON," press this button to turn on the AVR; press it again to turn the unit off (to Standby). Note that the **Power Indicator** surrounding the switch **3** will turn blue when the unit is on.

3 Power Indicator: This LED will be illuminated in orange when the unit is in the Standby mode to signal that the unit is ready to be turned on. When the unit is in operation, the indicator will turn blue.

4 Headphone Jack: This jack may be used to listen to the AVR's output through a pair of headphones. Be certain that the headphones have a standard 6.3 mm stereo phone plug. Note that the main room speakers and all **Preamp Outputs** will automatically be turned off when the headphone jack is in use.

5 Surround Mode Group Selector: Press this button to select the top-level group of surround modes. Each press of the button will select a major mode grouping in the following order: Dolby Modes → DTS Digital Modes → DSP Modes → Stereo Modes → Logic 7 Modes
 Once the button is pressed so that the name of the desired surround mode group appears in the on-screen display and in the **Lower Display Line 29**, press the **Surround Mode Selector 9** to cycle through the individual modes available. For example, press this button to select Dolby modes, and then press the **Surround Mode Selector 9** to choose from the various mode options.

6 Speaker Selector: Press this button to begin the process of configuring the AVR for the type of speakers it is being used with. For complete information on configuring the speaker settings using the front-panel controls see page 33.

7 ◀ Button: When an adjustment is being made using the **Channel Select 26** or **Digital Select 25** buttons, this button may be pressed to scroll through the available options.

8 Tone Mode: Pressing this button enables or disables the Balance, Bass and Treble tone controls. When the button is pressed so that the words **TONE IN** appear in the **Main Information Display 29**, the settings of the **Bass** and **Treble** controls and of the **Balance** control will affect the output signals. When the button is pressed so that the words **TONE OUT** appear in the **Main Information Display 29**, the output signal will be "flat," without any balance, bass or treble alteration, no matter how the actual **Controls** are adjusted. (For more information, see page 41).

Front Panel Controls

9 Surround Mode Selector: Press this button to cycle through the individual surround modes available after the **Surround Mode Group Selector 5** was pressed (see item **5** above). Note that depending on the type of input, some modes are not always available. (See page 38 for more information about surround modes).

10 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 a station with a strong signal is reached, **MANUAL TUNED** or **AUTO TUNED** will appear in the **Main Information Display 29** (see page 51 for more information on tuning stations).

11 Tuner Band Selector: Pressing this button will automatically switch the AVR to the Tuner mode. Pressing it again will switch between the AM and FM frequency bands, holding it pressed for some seconds will switch between stereo and mono receiving and between automatic and manual tuning mode (See page 51 for more information on the tuner).

12 Set Button: When making choices during the setup and configuration process, press this button to enter the desired setting as shown in the **Main Information Display 29** into the AVR's memory.

13 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 51 for more information on tuner programming.)

14 ▶ Button: When an adjustment is being made using the **Channel Select 26** or **Digital Select 25** buttons, this button may be pressed to scroll through the available options.

15 Input Source Selector: Press this button to change the input by scrolling through the list of input sources.

16 RDS Select Button: Press this button to display the various messages that are part of the RDS data system of the AVR's tuner. (See page 51 for more information on RDS).

17 Delay Adjust Selector: Press this button to begin the process of adjusting the delay settings for Dolby surround modes. See page 35 for more information on delay adjustments.

18 Digital Optical 4 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.

19 Input/Output Status Indicators: These LED indicators will normally light green to show that the front panel Video 4 A/V **21** jacks or the Coaxial 4 digital **20** jack is operating as an input. When either of these jacks has been configured for use as an output, the indicator will turn red to show that the jack may be used for recording. (See page 45 for more information on configuring the front panel jacks as outputs, rather than inputs.)

20 Digital Coax 4 Jack: This jack is normally used for connection to the output of portable audio devices, video game consoles or other products that have a coax digital jack. It may also be configured as an output jack, to feed a digital signal to a CD-R, MiniDisc or other digital recording device. (See page 45 for information on configuring the Digital Coax 4 Jack to an output.)

21 Video 4 Input/Output Jacks: These audio/video jacks may be used for temporary connection to video games or portable audio/video products such as camcorders and portable audio players. They may also be configured as output jacks (also S-Video) to feed a signal to any recording Audio or Video device (see page 45 for more information).

22 Front-Panel Control Door: To open the door so that the front-panel jacks and controls behind this door may be accessed, gently pull the door down and towards you using either upper corner of the door.

23 Surround Mode Indicators: The current selected mode or function 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.

24 Speaker/Channel Input Indicators: These indicators are multipurpose, indicating either the speaker type selected for each channel or the incoming data-signal 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 selected for that position. (See page 33 for more information on configuring speakers.) The letters inside each of the center boxes display active input channels. For standard analog inputs, only the L and R will light, indicating a stereo input. When a digital source is playing, the indicators will light to display the channels begin received at the digital input. When the letters flash, the digital input has been interrupted. (See page 44 for more information on the Channel Indicators).

25 Digital Select Button: When playing a source that has a digital output, press this button to select between the **Optical 18 31** and **Coaxial 20 32 Digital** inputs (See page 43 for more information).

26 Channel Select Button: 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 46).

27 Volume Control: Turn this knob clockwise to increase the volume, counterclockwise to decrease the volume. If the AVR is muted, adjusting volume control will automatically release the unit from the silenced condition.

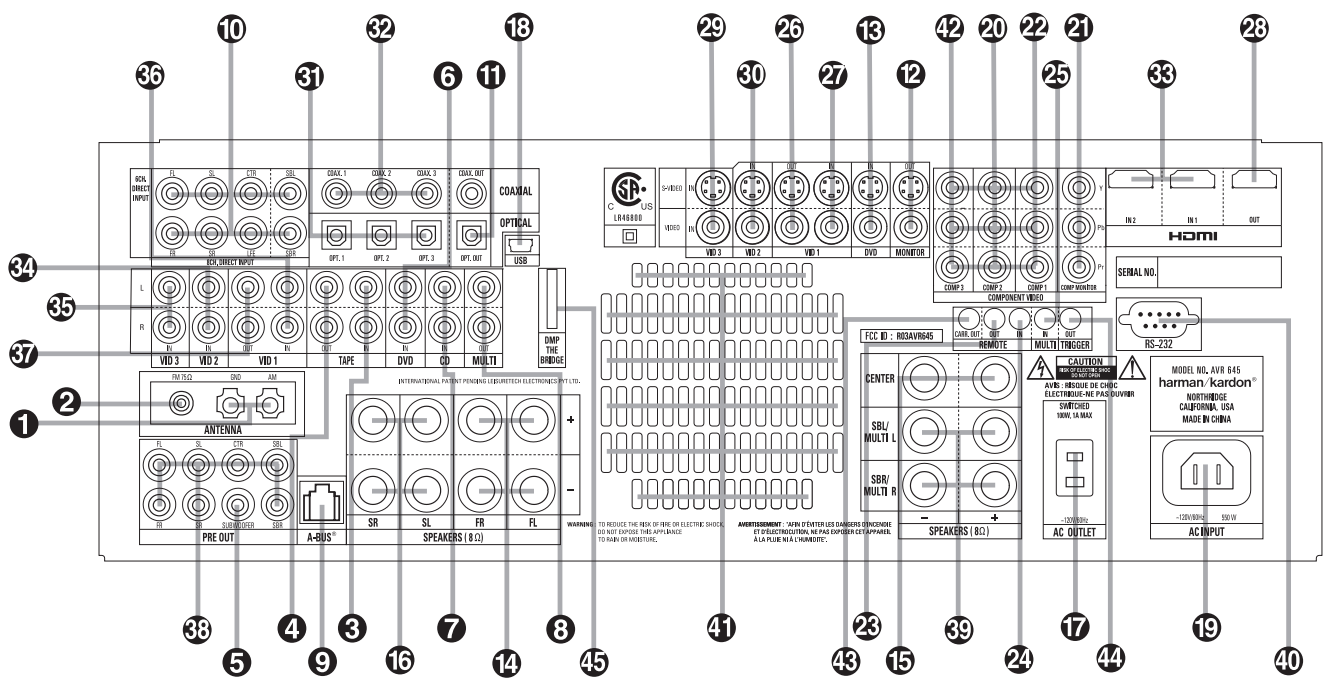
28 Input indicators: The current selected mode or function will appear as one of these indicators. Note that when the unit is turned on, the entire list of available modes will light briefly, and then revert to normal operation with only the active mode indicator illuminated.

29 Main Information Display: This display delivers messages and status indications to help you operate the receiver.

30 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 unless an external remote sensor is installed.

31 EzSet/EQ Microphone Jack: Before starting the EzSet/EQ automated setup process, plug the microphone into this jack. The microphone does not need to be plugged in at other times.

Rear Panel Connections



- 1 AM Antenna
- 2 FM Antenna
- 3 Tape Inputs
- 4 Tape Outputs
- 5 Main Subwoofer Output
- 6 DVD Audio Inputs
- 7 CD Inputs
- 8 Multiroom Audio Outputs
- 9 A-BUS Connector
- 10 8-Channel Direct Inputs
- 11 Digital Audio Outputs
- 12 Video Monitor Outputs
- 13 DVD Video Inputs
- 14 Front Speaker Outputs
- 15 Center Speaker Outputs
- 16 Surround Speaker Outputs
- 17 Switched AC Accessory Outlet
- 18 USB Connector
- 19 AC Power Cord Jack
- 20 Video 2 Component Video Inputs
- 21 Component Video Outputs
- 22 Video 1 Component Video Inputs
- 23 Remote IR Output
- 24 Remote IR Input
- 25 Multiroom IR Input
- 26 Video 1 Video Outputs
- 27 Video 1 Video Inputs
- 28 HDMI Output
- 29 Video 3 Video Inputs
- 30 Video 2 Video Inputs
- 31 Optical Digital Inputs
- 32 Coaxial Digital Inputs
- 33 HDMI Inputs
- 34 Video 2 Audio Inputs
- 35 Video 3 Audio Inputs
- 36 Video 1 Audio Inputs
- 37 Video 1 Audio Outputs
- 38 Preamp Outputs
- 39 Surround Back/Multiroom Speaker Outputs
- 40 RS-232 Port
- 41 Fan Vents
- 42 DVD/Video 3 Component Video Inputs
- 43 Remote IR Carrier Output
- 44 Trigger 1 Output
- 45 The Bridge™ Bridge Digital Media Player (DMP) Input

NOTE: To assist in making the correct connections for multichannel input/output and speaker connections, all connection jacks and terminals have been color coded in conformance with the latest CEA standards as follows:

Front Left:	White
Front Right:	Red
Center:	Green
Surround Left:	Blue
Surround Right:	Gray
Surround Back Left:	Brown
Surround Back Right:	Tan
Subwoofer (LFE):	Purple
Digital Audio:	Orange
Composite Video:	Yellow
Component Video "Y":	Green
Component Video "Pr":	Red
Component Video "Pb":	Blue

- 1 **AM Antenna:** 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.
- 2 **FM Antenna:** Connect the supplied indoor or an optional external FM antenna to this terminal.
- 3 **Tape Inputs:** Connect these jacks to the **PLAY/OUT** jacks of an audio recorder.
- 4 **Tape Outputs:** Connect these jacks to the **RECORD/INPUT** jacks of an audio recorder.
- 5 **Main Subwoofer Output:** Connect this jack to the line-level input of a powered subwoofer. If an external subwoofer amplifier is used, connect this jack to the subwoofer amplifier input. If only one subwoofer is used in your system, connect it here.

- 6 **DVD Audio Inputs:** Connect these jacks to the analog audio jacks on a DVD or other audio or video source.
- 7 **CD Inputs:** Connect these jacks to the analog output of a compact disc player or CD changer or any other audio source.
- 8 **Multiroom Audio Outputs:** Connect these jacks to an optional audio power amplifier to listen to the source selected by the multiroom system in a remote room.
- 9 **A-BUS Connector:** Connect this jack to an optional A-BUS-certified remote room keypad or amplifier to extend the multiroom capabilities of your AVR. See page 20 for more information on A-BUS.

Rear Panel Connections

10 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.

11 Digital Audio Outputs: Connect these jacks to the matching digital input connector on a digital recorder such as a CD-R or MiniDisc recorder.

12 Video Monitor Outputs: Connect this jack to the composite and/or S-Video input of a TV monitor or video projector to view the on-screen menus and the output of any standard Video or S-Video source selected by the receiver's video switcher.

13 DVD Video Inputs: Connect these jacks to the composite or S-Video output jacks on a DVD player or other video source.

14 Front Speaker Outputs: Connect these outputs to the matching + or – terminals on your left and right speakers. In conformance with the new CEA color code specification, the White terminal is the positive, or "+" terminal that should be connected to the red (+) terminal on Front Left speaker with the older color coding, while the Red terminal is the positive, or "+" terminal that should be connected to the red (+) terminal on Front Right speaker. Connect the black (–) terminals on the AVR to the black (–) terminals on the speakers. See page 16 for more information on speaker polarity.

15 Center Speaker Outputs: Connect these outputs to the matching + and – terminals on your center channel speaker. In conformance with the new 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 color coding. Connect the black (–) terminal on the AVR to the black negative (–) terminal on your speaker. (See page 16 for more information on speaker polarity.)

16 Surround Speaker Outputs: Connect these outputs to the matching + and – terminals on your surround channel speakers. In conformance with the new 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 16 for more information on speaker polarity.)

17 Switched AC Accessory Outlet: This outlet may be used to power any device that you wish to have turn on when the AVR is turned on with the **System Power Control** switch **2**.

18 USB Connector: Connect a cable with a USB "Mini B" connector to the AVR and the other end to a compatible computer running Windows® 2000, Windows® XP or higher with the latest service packs installed, to use this port to listen to audio from the computer through the AVR 645. This connection is also used to connect a compatible computer to the AVR for firmware upgrades, when available. See page 43 for more information on playback of computer audio with the AVR. Instructions for upgrades will accompany the upgrade file download package.

19 AC Power Cord Jack: Connect the AC power cord to this jack when the installation is complete. To ensure safe operation, use only the power cord supplied with the unit. If a replacement is required it must be of the same type and capacity.

20 Component Video 2 Inputs: These inputs may be used with any video source device equipped with analog Y/Pr/Pb or RGB component video outputs. The factory default is for these jacks to be a linked to the Video 2 input, but you may change the setting at any time through the **IN/OUT SETUP** menu. See page 16 for more information on configuring the component video inputs.

21 Monitor Component Video Outputs: Connect these outputs to the component video inputs of a video projector or monitor. When a source connected to one of the two **Component Video Inputs 20/22** is selected the signal will be sent to these jacks.

22 Component Video 1 Inputs: These inputs may be used with any source device equipped with analog Y/Pr/Pb or RGB component video outputs. The factory default is for these jacks to be a linked to the Video 1 input, but you may change the setting at any time through the **IN/OUT SETUP** menu. See page 16 for more information on configuring the component video inputs.

Note: All component inputs/outputs can be used for RGB signals too, in the same way as described for the Y/Pr/Pb signals, then connected to the jacks with the corresponding color. RGB connection is not possible if the source outputs a separate sync signal (see page 17).

23 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.

24 Remote IR Input: If the AVR'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.

25 Multiroom IR Input: Connect the output of an IR sensor in a remote room to this jack to operate the AVR's multiroom control system.

26 Video 1 Video Outputs: Connect these jacks to the **RECORD/INPUT** composite or S-Video jack on a VCR.

27 Video 1 Video Inputs: Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on a VCR or other video source.

28 HDMI Output: Connect this jack to the HDMI input on a compatible HDMI-equipped video display.

29 Video 3 Video Inputs: Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on any video source.

30 Video 2 Video Inputs: Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on a second VCR or other video source.

31 Optical Digital Inputs: Connect the optical digital output from a DVD player, HDTV receiver, LD player, MD player or CD player to these jacks. The signal may be either a Dolby Digital signal, a DTS signal, a 2 channel MPEG 1 signal, an HDCD data stream or a standard PCM digital source.

Rear Panel Connections

32 Coaxial Digital Inputs: Connect the coax digital output from a DVD player, HDTV receiver, LD player, MD player or CD player to these jacks. The signal may be either a Dolby Digital signal, DTS signal, a 2 channel MPEG 1 signal, an HDCD data stream or a standard PCM digital source. Do not connect the RF digital output of an LD player to these jacks.

33 HDMI Inputs: Connect the HDMI output of video sources such as a DVD player, set-top box or HDTV tuner to either of these jacks.

34 Video 2 Audio Inputs: Connect these jacks to the **PLAY/OUT** audio jacks on a second VCR or other audio or video source.

35 Video 3 Audio Inputs: Connect these jacks to the **PLAY/OUT** audio jacks on any audio or video source.

36 Video 1 Audio Inputs: Connect these jacks to the **PLAY/OUT** audio jacks on a VCR or other audio or video source.

37 Video 1 Audio Outputs: Connect these jacks to the **RECORD/INPUT** audio jacks on a VCR or any other Audio recorder.

38 Preamp Outputs: Connect these jacks to an optional, external power amplifier for applications where higher power is desired.

39 Surround Back/Multiroom Speaker Outputs: These speaker terminals are normally used to power the surround back left/surround back right speakers in a 7.1 channel system. However, they may also be used to power the speakers in a second zone, which will receive the output selected for a multiroom system. To change the output fed to these terminals from the default of the Surround Back speakers to the Multiroom Output, you must change a setting in the Multiroom Menu of the OSD system. See page 49 for more information on configuring this speaker output. In normal surround system use, the brown and black terminals are the surround back left channel positive (+) and negative (-) connections and the tan and black terminals are the surround back right positive (+) and negative (-) terminals. For multiroom use, connect the brown and black SBL terminals to the red and black connections on the left remote zone speaker and connect the tan and black SBR terminals to the red and black terminals on the right remote zone speaker.

40 RS-232 Port: This jack may be used to control the AVR 645 over a bi-directional RS-232 serial control link to a compatible computer or programmable remote control system. Due to the complexity of programming RS-232 commands we strongly recommend that connections to this port for control purposes be made by a trained and qualified technician. This jack may also link to a compatible computer to upgrade the software and operating system of the AVR 645 when appropriate upgrades are available.

41 Fan Vents: These ventilation holes are the output of the AVR's airflow system. To ensure proper operation of the unit and to avoid possible damage to delicate surfaces, make certain that these holes are not blocked and that there is at least three inches of open space between the vent holes and any wooden or fabric surface.

42 DVD/Video 3 Component Video Inputs: These inputs may be used with any source device equipped with analog Y/Pr/Pb or RGB component video outputs. The factory default is for these jacks to be a linked to the DVD input, but you may change the setting at any time through the **IN / OUT SETUP** menu. See page 16 for more information on configuring the component video inputs.

43 Remote IR Carrier Output: The output of this jack is the full signal received at the **Remote Sensor Window 30** or input through the **Remote IR Input 24** including the carrier frequency that is removed from signals at the **Remote IR Output 23**. Use this output to extend IR remote signals to the input of compatible products by direct connection or through the use of optional, external IR "blasters". If you are in doubt as to which of the two IR Output jacks to use, we recommend that you consult with your dealer or installer, or check with the manufacturer of the external equipment you wish to control.

44 Trigger 1 Output: Connect this jack to the "Trigger In" jack of an optional external component such as an audio power amplifier that you want to be controlled to mirror the power state of the AVR 645. When this connection is used, the AVR 645 will automatically send a low-voltage signal to the connected device that turns it on when the AVR 645 is on and off when the AVR 645 is placed in the Standby Mode. The connected component must respond to 6-volt presence as the control signal.

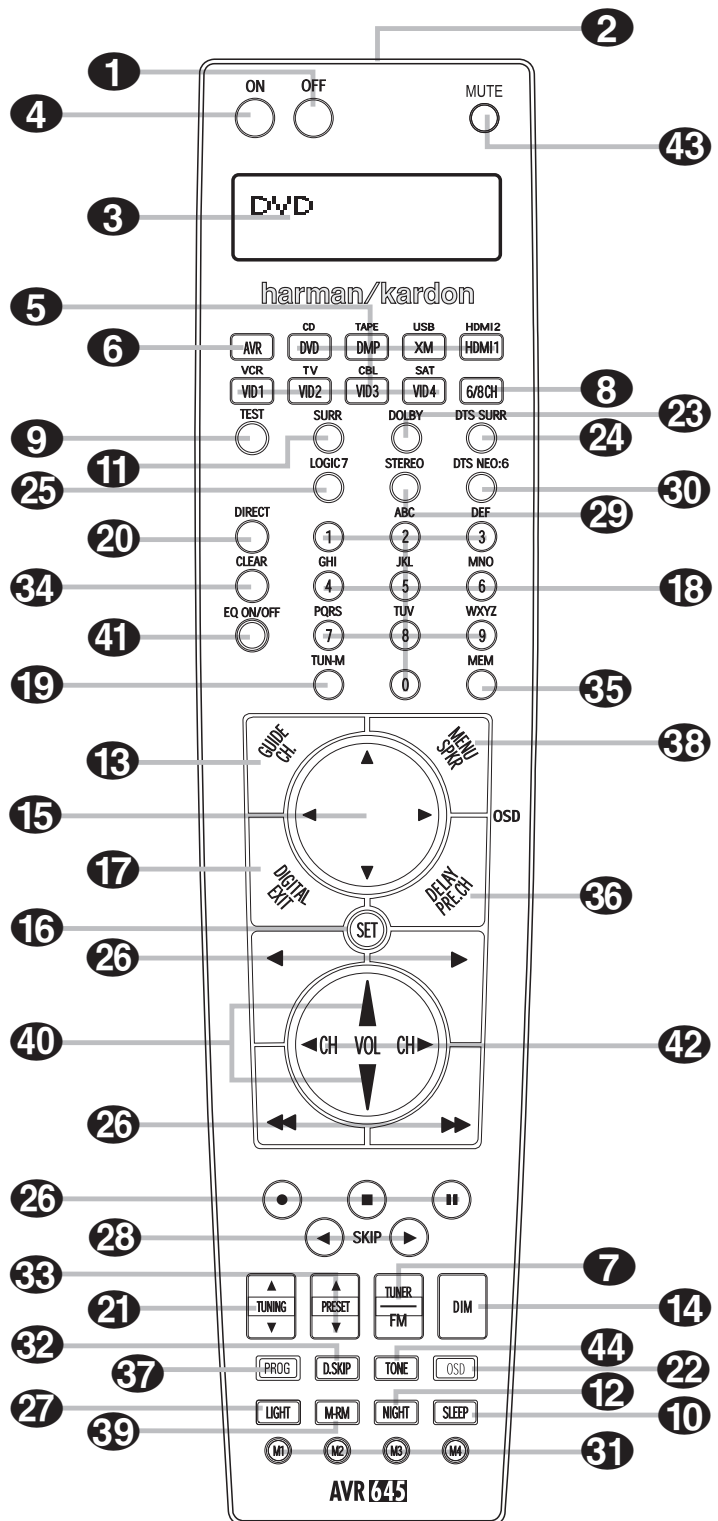
45 TheBridge™ Digital Media Player (DMP) Connector: With the AVR 645 turned off, connect one end of the optional Harman Kardon **TheBridge™** to this proprietary connector, and the other to your compatible Apple iPod. When the Digital Media Player source is selected, you may view your iPod's control and navigation messages on your video display (if one is connected to one of the **Video Monitor Outputs 12**), and in the **Upper and Lower Display Lines 29**. You may navigate the iPod and select tracks for playback using the **▲▼◀▶ Buttons 15 F**, the **Set Button 16 Q** and **Transport Controls 26 P** on your AVR remote. See page 45 for more information.

Main Remote Control Functions

- 1 Power Off Button
- 2 IR Transmitter Window
- 3 LCD Information Display
- 4 Power On Button
- 5 Input Selectors
- 6 AVR Selector
- 7 AM/FM Tuner Select
- 8 6-Channel/8-Channel Direct Input
- 9 Test Button
- 10 Sleep Button
- 11 Surround Mode Selector
- 12 Night Mode
- 13 Channel Select Button
- 14 Dim Button
- 15 Navigation Button
- 16 Set Button
- 17 Digital Select
- 18 Numeric Keys
- 19 Tuner Mode
- 20 Direct Button
- 21 Tuning Up/Down
- 22 OSD Button
- 23 Dolby Mode Select Button
- 24 DTS Digital Mode Selector
- 25 Logic 7 Mode Select Button
- 26 Transport Controls
- 27 Light Button
- 28 Skip Up/Down Buttons
- 29 Stereo Mode Select Button
- 30 DTS Neo:6 Mode Select
- 31 Macro Buttons
- 32 Disc Skip Button
- 33 Preset Up/Down
- 34 Clear Button
- 35 Memory Button
- 36 Delay/Prev. Ch.
- 37 Program Button
- 38 Speaker Select
- 39 Multiroom
- 40 Volume Up/Down
- 41 EzSet/EQ On/Off Button
- 42 Channel Up/Down Selector
- 43 Mute
- 44 Tone Control Button

NOTE: The function names shown here are each button's feature when used with the AVR. Most buttons have additional functions when used with other devices.

The jack on the upper right side of the remote is reserved for future use. Do not remove the plug provided or connect any device to the jack.



Main Remote Control Functions

IMPORTANT NOTE: The AVR 645's remote may be programmed to control up to seven devices, including the AVR. Before using the remote, it is important to remember to press the **Input Selector** button **5** that corresponds to the unit you wish to operate. In addition, the AVR's remote is shipped from the factory to operate the AVR 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 or by learning commands from other remotes. Before using the remote with other products, follow the instructions on pages 53-54 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 **Input Selector Button 5**. The descriptions shown here primarily detail the functions of the remote when it is used to operate the AVR.

1 Power Off Button: Press this button to place the AVR or a selected device unit in the Standby mode. Note that when the AVR is switched off this will turn off the main room functions, but if the Multiroom system is activated, it will continue to function.

2 IR Transmitter Window: Point this window towards the AVR when pressing buttons on the remote to make certain that infrared commands are properly received.

3 LCD Information Display: This two-line screen displays various information depending on the commands that have been entered into the remote.

4 Power On Button: Press this button to turn on the power to a device selected by pressing one of the **Input Selectors 5** (except Tape).

5 Input Selectors: Pressing one of these buttons will perform three actions at the same time. First, if the AVR 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. Finally, it will change the remote control so that it controls the device selected.

The buttons labeled DVD, DMP and HDMI 1 are each used to select either of two input sources:

- The first press of the DVD Button selects the component connected to the DVD inputs. A second press of this button selects the component connected to the CD inputs.
- The first press of the button labeled DMP selects The Bridge as the input. A second press of this button selects the device connected to the Tape inputs.
- The first press of the HDMI 1 button selects the device that is connected to the HDMI 1 jack. A second press selects the device connected to the HDMI 2 jack.

In normal operation, the remote will revert to controlling the AVR when no button is pressed for 6 seconds. This allows the remote to automatically return to control of important functions such as volume, mute and surround mode selection after you have used the remote to control another device. If you wish to change the length of time that the remote operates another device, or to have the remote remain active for control of the other device (such as a DVD player or set-top box) until you manually return control to the AVR by pressing the **AVR Selector 6**, follow the instructions on page 40.

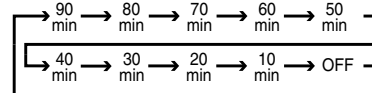
6 AVR Selector: Pressing this button will switch the remote so that it will operate the AVR's functions. If the AVR is in the Standby mode, it will also turn the AVR on.

7 AM/FM Tuner Select: Press this button to select the AVR's tuner as the listening choice. Pressing this button when the tuner is in use will select between the AM and FM bands.

8 6-Channel/8 Channel Direct Input: Press this button to select the device connected to the **6-Channel Direct Inputs** or the **8-Channel Direct Inputs 10** (the input available will depend on the selection 5.1 or 6.1/7.1 made in the surround mode setting, see page 27 for more information).

9 Test Tone: Press this button to begin the sequence used to calibrate the AVR's output levels. (See page 27 for more information on calibrating the AVR.)

10 Sleep Button: Press this button to place the unit in the Sleep mode. After the time shown in the display, the AVR will automatically go into the Standby mode. Each press of the button changes the time until turn-off in the following order:



Hold the button pressed for two seconds to turn off the Sleep mode setting.

Note that this button is also used to change channels on your TV, VCR and Sat receiver when the appropriate source is selected, using the device **Input Selectors 5**.

11 Surround Mode Selector: Press this button to select any of the HALL, THEATER surround modes. Note that depending on the type of input, some modes are not always available. (See page 33 for more information about surround modes.) Note that this button is also used to tune channels on your TV, VCR and Sat receiver when the appropriate source is selected using the device **Input Selector 5**.

12 Night Mode: Press this button to activate the Night mode. This mode is available only with Dolby Digital encoded sources, and it preserves dialog (center channel) intelligibility at low volume levels (See page 23 for more information).

13 Channel Select Button: This button is used to start the process of setting the AVR's output levels with an external source. Once this button is pressed, use the **▲/▼ buttons 15** to select the channel being adjusted, then press the **Set button 16**, followed by the **▲/▼ buttons 15** again, to change the level setting. (See page 40 for more information.)

14 Dim Button: Press this button to activate the Dimmer function, which reduces the brightness of the front-panel display, or turns it off entirely. Press the button once to change the display to reduce the brightness by 50%, and press it again within five seconds and the main display will go completely dark. Note that this setting is temporary; regardless of any changes, the display will always return to full brightness when the AVR is turned on. The blue illumination around the **Standby/On Button 1** will always remain at full brightness regardless of the setting to remind you that the AVR is still turned on. The blue accent lighting inside the volume control will also remain at full brightness when the panel is at 50%, but go out when the panel lights are fully dimmed.

Main Remote Control Functions

15 Navigation Button: This single disc-like button is used to change or scroll through items in the on-screen menus or on the front panel or to make configuration settings such as digital inputs or delay timing. When changing a setting, first press the button for the function or setting to be changed (e.g., press the **Digital Select Button 17** 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.

16 Set Button: This button is used to enter settings into the AVR's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment.

17 Digital Select: Press this button to assign one of the digital inputs **5 18 20** to a source. (See page 43 for more information on using digital inputs.)

18 Numeric Keys: These buttons serve as a ten-button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when **TV**, **VCR** or **Sat** receiver 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.

19 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 **MANUAL** appears in the **Main Information Display 29**, pressing the **Tuning buttons 21 10** will move the frequency up or down in single-step increments. When the FM band is in use and **AUT** appears in the **Main Information Display 29**, pressing this button will change to monaural reception making even week stations audible. (See page 51 for more information.)

20 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 18** to select a station (See page 51 for more information on the tuner).

21 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 19** has been pressed or the **Band button 11** on the front panel was held pressed so that **AUT** appears in the **Main Information Display 29**, pressing either of the buttons will cause the tuner to seek the next station with acceptable signal strength for quality reception. When the **MANUAL** appears in the **Main Information Display 29**, pressing these buttons will tune stations in single-step increments. (See page 52 for more information.)

22 OSD Button: Press this button to activate the On Screen Display (OSD) system used to set up or adjust the AVR's parameters.

23 Dolby Mode Selector: This button is used to select one of the available Dolby Surround processing modes. Each press of this button will select one of the Dolby Pro Logic II modes, Dolby 3 Stereo or Dolby Digital. Note that the Dolby Digital mode is only available with a digital input selected and the other modes only as long as a Dolby Digital source is not playing (except Pro Logic II with Dolby Digital 2.0 recordings, see Note on page 42). See page 28 for the available Dolby surround mode options.

24 DTS Digital Mode Selector: When a DTS source is in use the AVR will select the appropriate mode automatically and no other mode will be available. Pressing this button will display the mode currently selected by the AVR's decoder, depending on the surround material played and the speaker setting (see item **6**, page 5). When a DTS source is not in use, this button has no function. (See page 28, 33 for the available DTS options.)

25 Logic 7 Selector: Press this button to select one of the available Logic 7 surround modes. (See page 38 for the available Logic 7 options.)

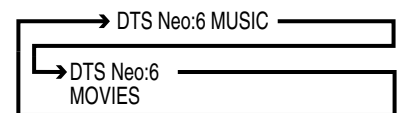
26 Transport Control Buttons: These buttons do not have any functions for the AVR, but they may be programmed for the forward/reverse play operation of a wide variety of CD or DVD players, and audio or video- cassette recorders. (See page 53 for more information on programming the remote.)

27 Light Button: Press this button to activate the remote's built-in backlight for better legibility of the buttons in a darkened room.

28 Skip Up/Down Buttons: These buttons do not have a direct function with the AVR, but when used with a compatibly programmed CD or DVD player/changer they will change the tracks on the disc currently being played.

29 Stereo Mode Selector: Press this button to select a stereo playback mode. When the button is pressed so that **DSP SURR OFF** appears in the **Main Information Display 29**, 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 **Main Information Display 29**, you may enjoy a two-channel presentation of the sound along with the benefits of bass management. When the button is pressed so that **5 CH STEREO** or **7 CH STEREO** appears, the stereo signal is routed to all five speakers, if installed. (See page 39 for more information on stereo playback modes).

30 DTS Neo:6 Mode Selector: Pressing this selector button cycles the AVR through the various DTS Neo:6 modes, which extract a five- or seven-channel surround field from two-channel program material (from PCM source or analog input signal). The first press selects the last DTS Neo:6 surround mode that was in use, and each subsequent press selects the next mode in the following order:



31 Macro Buttons: Press these buttons to store or recall a "Macro", which is a pre-programmed sequence of commands stored in the remote. (See page 56 for more information on storing and recalling macros.)

32 Disc Skip Button: This button has no direct function for the AVR 645 but may be used to change the disc in a CD or DVD changer when the remote is programmed for that type of device.

Main Remote Control Functions

33 Preset Up/Down: When the tuner is in use, press these buttons to scroll through the stations programmed into the AVR's memory. When CD or DVD is selected using the **Input Selector** button **5**, these buttons may function as Slow Fwd/Rev (DVD) or "+10" (CD, CDR).

34 Clear Button: Press this button to clear incorrect entries when using the remote to directly enter a radio station's frequency.

35 Memory Button: Press this button to enter a radio station into the AVR's preset memory. Two underline indicators will flash at the right side of the **Main Information Display 29**, you then have five seconds to enter a preset memory location using the **Numeric Keys 18**. (See page 51 for more information.)

36 Delay Select Button: This button selects adjustments to the A/V Sync Delay and the individual channel displays. The first press of the button displays an **A / V SYNC DELAY** message in the **Lower Display Line 29** and in the on-screen display, which means that you may change the amount of time that all channels are delayed together behind the video. This enables you to compensate for the loss of lip sync that may be caused by digital video processing in your display or by television stations. To change the A/V Sync Delay, press the **Set Button 16** while the **A / V SYNC DELAY** message is visible and then use the **▲/▼ Navigation Button 15** to change the setting so that the sound and the video image are in sync. To change the delay for an individual output channel, press the **▲/▼ Navigation Button 15** until the desired channel name is shown, and then press the **Set Button 16**. Use the **▲/▼ Navigation Buttons 15** to change the delay amount. (See page 35 for more information on delay options.)

37 Program Button: This button is used to begin the process of programming the remote. Press and hold this button for three seconds to place the remote in the programming mode. Once the red LED under the **Set Button 16** lights, release the button. You may then select from the desired option. (See pages 53-61 for more information on configuring the remote.)

38 Speaker Select: Press this button to begin the process of configuring the AVR's Bass Management System for use with the type of speakers used in your system. Once the button has been pressed, use the **▲/▼** buttons **15** to select the channel you wish to set up. Press the **Set Button 16** and then select the speaker type (Large, Small or None) appropriate with the speaker in use. (See page 21 for more information.)

39 Multi-Room: Press this button to activate the Multiroom system or to begin the process of changing the input or volume level for the second zone. (See page 49 for more information on the Multiroom system.)

40 Volume Up/Down: Press these buttons to raise or lower the system volume.

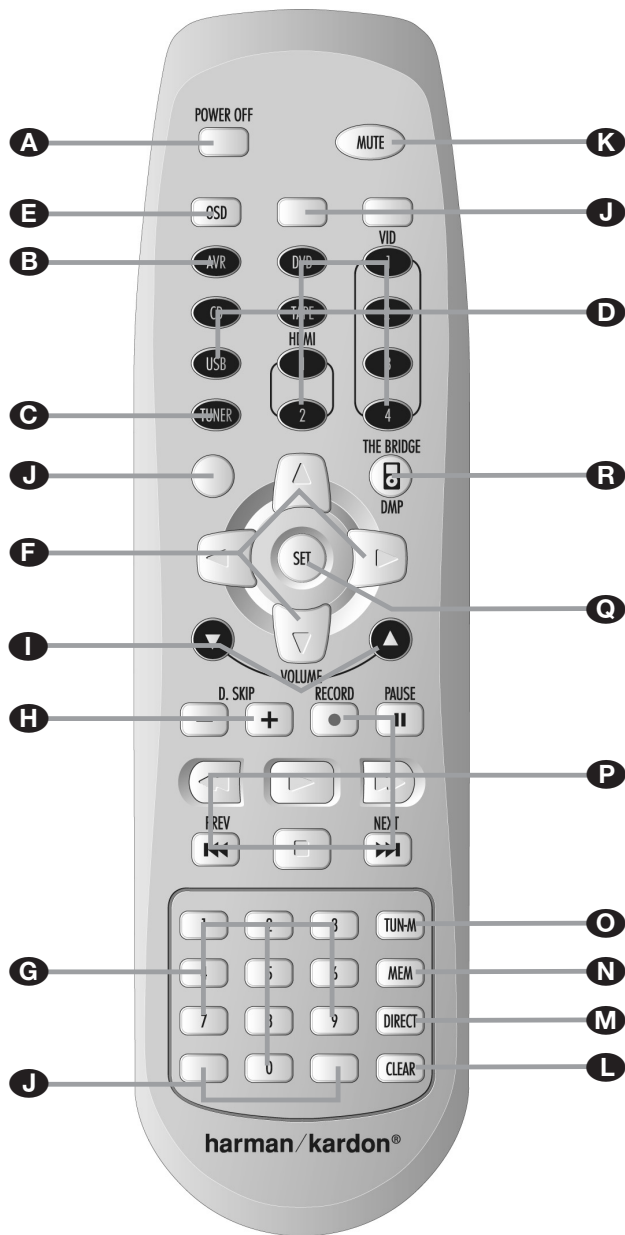
41 EzSet/EQ Button: Press this button to turn the filters used by EzSet/EQ on or off. This allows you to hear the difference in system performance when EzSet/EQ is engaged or out of the signal path.

42 Channel Up/Down Selector: This button has no function when the AVR is being controlled, but when programmed for use with a VCR, TV, cable box, satellite receiver or other similar product it will change the channel up or down. See pages 53-61 for more information on programming the remote.

43 Mute: Press this button to momentarily silence the AVR or TV set being controlled, depending on which device has been selected. When the AVR remote is being programmed to operate another device, this button is pressed with the **Input Selector** button **5** to begin the programming process. (See page 53 for more information on programming the remote.)

44 Tone Control Button: This button controls the tone mode settings, enabling adjustment of the bass and treble boost/cut. You may also use it to take the tone controls out of the signal path completely for "flat" response. The first press of the button displays a **TONE IN** message in the **Lower Display Line 29** and in the on-screen display. To take the controls out of the signal path press either of the **▲/▼ Navigation Buttons 15** until the display reads **TONE OUT**. To change the bass or treble settings, press the button again until the desired option appears in the **Lower Display Line 29** and in the on-screen display and then press either of the **▲/▼ Navigation Buttons 15** to enter the desired boost or cut setting. See page 27 for more information on the tone controls.

Zone II Remote Control Functions



- A** Power Off
- B** AVR Selector
- C** AM/FM Tuner Select
- D** Input Selectors
- E** OSD Button
- F** Navigation Controls
- G** Numeric Keys
- H** Disc Skip
- I** Volume Up/Down
- J** Blank Buttons
- K** Mute
- L** Clear Button
- M** Direct Button

- N** Memory Button
- O** Tuner Mode Button
- P** Transport Controls
- Q** Set Button
- R** The Bridge [™]Bridge /DMP Selector

NOTE: The Zone II remote may be used in either the same room where the AVR is located, or it may be used in a separate room with an optional infrared sensor that is connected to the AVR's **Multi IR** input jack 25. When it is used in the same room as the AVR, it will control the functions of the AVR or any compatible Harman Kardon

The Zone II remote may be used in either the same room where the AVR is located, or it may be used in a separate room with an optional infrared sensor that is connected to the AVR's **Multi IR** input jack 25.

We strongly recommend that the ZR 10 remote be used for the initial configuration and setup process for the AVR 645.

A Power Off: When used in the room where the AVR is located, press this button to place the unit in Standby. When it is used in a remote room with a sensor that is connected to the **Multi IR** jack 25, this button turns the Multi-Room system off.

B AVR Selector: Press this button to turn on the AVR. The input in use when the unit was last on will be selected.

C AM/FM Tuner Select: Press this button to select the Tuner as the input to the Multiroom system. Press it again to change between the AM and FM bands.

D Input Selectors: When the AVR is off, press one of these buttons to turn the unit on and to select a specific input. When the unit is already in use, pressing one of these buttons will change the input.

E OSD Button: Press this button to activate the On Screen Display (OSD) system used to set up or adjust the AVR's parameters.

F Navigation Controls: Depending on the menu or function in use, pressing these buttons will navigate through menus, scroll through option lists or configuration choices, or move the cursor position. Press the left, right, up or down button, as appropriate to the adjustment being made.

products in that room. When it is used in a separate room via a sensor connected to the **Multi IR** Jack 25, the buttons for power, input source, volume and mute will control the source and volume for the second zone, as connected to the Multi Out Jacks 8. (See page 49 for complete information on using the Multiroom system.)

Zone II Remote Control Functions

G Numeric Keys: These buttons serve as a ten-button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when **TV**, **VCR** or **Sat** receiver 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.

H Disc Skip: Press this button to change discs on compatible Harman Kardon CD or DVD changers.

I Volume Up/Down: When used in the room where the AVR is located, press this button to raise or lower the volume in that room. When it is used in a remote room with a sensor that is connected to the **Multi IR Jack** 25, this button will raise or lower the volume in the remote room.

J Blank Buttons: These buttons are not active. Pressing them will not change or control any function on the AVR 645 or other IR devices.

K Mute: When used in the room where the AVR is located, press this button to temporarily silence the unit. When it is used in a remote room with a sensor that is connected to the Multi IR Jack 25, this button will temporarily silence the feed to the remote room only. Press the button again to return to the previous volume level.

Important Note: No matter in which room the Zone II remote is used, as with the main remote it is important to remember to press the **Input Selector** button **D** that corresponds to the unit you wish to operate before you change the device to be controlled.

L Clear Button: Press this button to clear incorrect entries when using the remote to directly enter a radio station's frequency.

M 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 G** to select a station (See page 51 for more information on the tuner).

N Memory Button: Press this button to enter a radio station into the AVR's preset memory. Two underline indicators will flash at the right side of the **Main Information Display** 29, you then have five seconds to enter a preset memory location using the **Numeric Keys G**. (See page 51 for more information.)

O 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 **MANUAL** appears in the **Main Information Display** 29, pressing the **Tuning** buttons 21 will move the frequency up or down in single-step increments. When the FM band is in use and **AUT** appears in the **Main Information Display** 29, pressing this button will change to monaural reception making even weak stations audible. (See page 51 for more information.)

P Transport Control Buttons: These buttons do not have any functions for the AVR, but they are programmed for the forward/reverse play operation of a wide variety of Harman Kardon CD or DVD players, and audio- or video-cassette recorders.

Q Set Button: This button is used to enter settings into the AVR's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment.

R The Bridge Digital Media Player (DMP) Selector: When Harman Kardon's **The Bridge Digital Media Player (DMP) Connector** 45 and a compatible Apple® iPod® is docked in **The Bridge**, pressing this selector will select the iPod as the audio source input device for the AVR 645. In addition, if a video display is connected to one of the **Video Monitor Outputs** 42, the iPod's messages will appear on screen, and in the **Upper and Lower Display Lines** 29. The **▲/▼/◀/▶ Buttons** 15 **F**, the **Set Button** 16 **Q** and the **Transport Controls** 26 **P** may be used to navigate the iPod and to operate many functions. See page 45, and the manuals for The Bridge and your iPod for more information.

Installation and Connections

After unpacking the unit, 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.

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.

When making connections to audio source equipment or speakers it is always a good practice to unplug the unit from the AC wall outlet. This prevents any possibility of accidentally sending audio or transient signals to the speakers that may damage them.

1. Connect the analog output of a CD player to the **CD** inputs **7**.

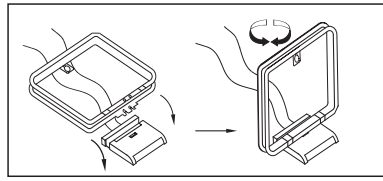
NOTE: When the CD player has both fixed and variable audio outputs it is best to use the fixed output unless you find that the input to the receiver is so low that the sound is noisy, or so high that the signal is distorted.

2. Connect the analog Play/Out jacks of a cassette deck, MD, CD-R or other audio recorder to the **Tape Input** jacks **3**. Connect the analog Record/In jacks on the recorder to the **Tape Output** jacks **4** on the AVR.

3. Connect the digital 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 Inputs** **31 32 18 20**.

4. Connect the **Coaxial or Optical Digital Outputs** **11** on the rear panel of the AVR to the matching digital input connections on a CD-R or MiniDisc recorder.

5. Assemble the AM Loop Antenna supplied with the unit as shown below. Connect it to the **AM** and **GND** screw terminals **1**.



6. Connect the supplied FM antenna to the **FM (75 ohm)** connection **2**. The FM antenna may be an external roof antenna, an inside powered or wire lead antenna or a connection from a cable system. Note that if the antenna or connection uses 300-ohm twin-lead cable, you should use a 300-ohm-to-75-ohm adapter to make the connection.

7. Connect the front, center and surround speaker outputs **14 15 16 39** 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 fine, multistrand copper with an area greater than 2 mm².

Cable with an area of 1.5 mm² may be used for short runs of less than 4 m. We do not recommend that you use cables with an area less than 1 mm² 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 any 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 applicable local building codes in your area.

When connecting wires to the speakers, be certain to observe proper polarity. Note that the positive (+) terminal of each speaker connection now carries a specific color code as noted on page 7. However, most speakers will 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 manufacturers may vary from this configuration. To assure 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.

8. Connections to a subwoofer are normally made via a line level audio connection from the **Subwoofer Output** **5** 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 multi-channel audio source with 5.1 or 7.1 outputs such as an external digital processor/decoder, DVD-Audio or SACD player is used, connect the outputs of that device to the **8-Channel Direct Inputs** **10**.

Analog Video Equipment Connections

Analog 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 audio and video Play/Out jacks to the **Video 1** or **Video 2 In** jacks **27 30 34 35** on the rear panel. The Audio and Video Record/In jacks on the VCR should be connected to the **Video 1 Out** jacks **26 37** on the AVR.

Installation and Connections

2. Connect the analog audio and video outputs of a satellite receiver, cable TV converter or television set or any other video source to the **Video 3** 29 35 jacks.

3. Connect the analog audio and video outputs of a DVD or laser disc player to the **DVD** jacks 6 13.

4. If any of the video source devices has analog component video (Y/Pr/Pb) outputs, but not HDMI, connect them to **Component Video Inputs** 20 22. The chart on page 64 has the default settings for various source devices, but you may make any connection and change the configuration setting using the **IN / OUT SETUP** menu, as described on page 24.

5. The default video connection for a DVD player is to use the **Component Video Input 3 Jacks** 42 on the AVR, but you may change this assignment in the **IN / OUT SETUP** menu (see page 24). A DVD player's composite and S-video outputs may also be connected to the **DVD Video Inputs** 13.

6. The default audio connection for a DVD player is to link the coaxial digital audio output on the DVD player to the **Coaxial 1 Digital Audio Input** 32, but you may also make a connection to either the **Coaxial** 32 or **Optical** 31 digital inputs, or the **Analog DVD Audio Inputs** 6. You may change the assignment in the **IN / OUT SETUP** menu as described on page 24, or by using the front-panel **Digital Input Selector** 25.

7. If you wish to use a portable audio/video product such as a camcorder, portable media player or digital still camera with the AVR, or make a connection to a video game console or other source that may not always be connected to the AVR, connect the video outputs of the source to the **Video 4 Input/Output Jacks** 21 that are behind the **Front-Panel Door** 22. If the source has digital audio outputs, connect them to the **Optical 4 Digital Input** 18 or the **Coaxial 4 Digital Jack** 20.

Connection Notes:

When making connections to the **Component Video Inputs** 20 22 42 or the **Coaxial** 32 or **Optical** 31 digital audio inputs, it is a good idea to make note of which jacks are connected to which source, using the Worksheet in the Appendix. This will help simplify the configuration process.

NOTE: When connecting a device such as a digital cable box or other set-top tuner product with a digital audio output, we recommend that you connect both the digital and analog outputs of the product to your AVR. The audio input polling feature of the AVR will then be able to make certain that you have a constant audio feed, since it will automatically switch the audio input to the analog jacks if the digital feed is interrupted or not available for a particular channel.

8. 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** 18 20 21. A device connected to the **Video 4 jacks** 21 is selected as the Video 4 input, and connected to the digital jacks 18 20 it is selected as "Optical 4" or "Coaxial 4" input. (See page 45 for more information on input configuration.)

9. Connect the AVR to your video display using one of the following connections:

- If you have a video display with an HDMI or DVI input, make the connection using the **HDMI Output** 28, as described in the next section.
- If your video display has component video inputs (Y/Pr/Pb), connect the **Component Video Outputs** 21.
- If your display does not have digital or component video inputs, connect the **Video Monitor Output** 12 on the AVR to the matching input on your display. Only one connection is needed, and S-video is the higher quality signal.

HDMI Connections

HDMI™ is the abbreviation for High-Definition Multimedia Interface, which is quickly becoming the standard connection point between advanced video/audio source products and displays, particularly for high-definition video signals. HDMI is a digital connection, eliminating the need to convert signals back and forth from digital to analog to deliver a higher quality signal when used with digital sources. The signals carried on HDMI may, but do not always, include audio, offering the possibility of a complete one-wire connection from a source to the AVR. However, it is important to note that there are a number of different versions of the HDMI standard in use. Before connecting any HDMI products to your AVR, it is helpful to find out in advance their level of HDMI connectivity.

Some source or display components in your system may use DVI (Digital Video Interface) for digital video connections. DVI carries the same digital video signals as HDMI but uses a larger connector and does not transport audio or control signals. In most cases, you may mix and match DVI and HDMI digital video connections by using optional connector adapters. Note, however, that some DVI-equipped video displays are not compatible with the HDCP copy protection coding that is increasingly carried with signals connected via HDMI. If you have an HDMI source and a DVI-equipped display, you may occasionally be unable to view a program if the display does not include HDCP. This is not the fault of the AVR or your source; it simply indicates that the video display is not compatible.

HDMI Input Connections

The different "Version" levels of HDMI define which type of audio signals it is compatible with. Based on the lowest level of HDMI among your sources, the connections to the AVR should be made as follows:

- **HDMI 1.0** sources carry digital video and multichannel or 2-channel PCM audio signals only. Connect the HDMI output of a 1.0 source to either of the **HDMI Inputs** 33 on the AVR. If the product is a DVD-Audio player or other source that has multichannel analog audio outputs, connect them to the **8-Channel Direct Inputs** 10. With an HDMI 1.0 source, particularly a DVD player, make certain that the menus in the source device are set to "Bitstream Out" or "Original" so that 5.1 digital audio is available. If you find that 5.1 Dolby Digital or DTS audio is not available on the HDMI connection, it will be necessary to make an additional connection between the source and the AVR 645 to either the **Coaxial** 32 20 or **Optical** 31 18 **Digital Inputs**.
- **HDMI 1.1** sources carry the multichannel digital audio output from DVD-Audio players in addition to the digital video. If you have an HDMI 1.1-equipped product, the only connection needed for listening in the main room is from the HDMI output of the source to either of the **HDMI Inputs** 33 on the AVR. If the player has SACD capability, you will need to connect the analog outputs of the source to the **8-Channel Direct Inputs** 10.
- **HDMI 1.2** (and higher) sources should be connected as shown above for HDMI 1.1, except that a separate analog connection is not needed for SACD players.

Installation and Connections

- It is not possible to feed an analog composite or S-video signal to a recorder or the AVR's multizone system when an HDMI input is in use. If an HDMI-equipped source also has analog audio and video outputs, connect them to the **Video 2** or **Video 3 Video 29/30** and **Audio 34/35** on the AVR.
- In some instances, HDMI-equipped sources will not permit more than one video output at a time, and thus you cannot use the same source in the main listening room and with the recorder or remote zone at the same time. This is not a fault of the AVR, but rather a function of the content protection systems that are part of the HDMI standard.

HDMI Output Connections

Connect the **HDMI Output 28** to an HDMI input on your video display. Thanks to the AVR 645's video processing system, all video input signals are converted to an HDMI output, so only one connection is required between the AVR and your display.

SCART A/V Connections

For the connections described above your video device needs RCA (cinch) connectors or/and S-Video connectors for all Audio and Video signals: Any normal video device (Not SVHS or High 8) for only playback needs 3 RCA jacks, VCRs for record and playback even 6 RCA jacks. Any S-Video device (SVHS, High 8) needs 2 RCA (Audio) and 1 S-Video jack (Video), if it's a playback unit, or 4 RCA (Audio In/Out) and 2 S-Video (Video In/Out) jacks, if it's a recording VCR.

Many European video devices are equipped with RCA (Cinch) or S-Video jacks only partially, not for all audio and video in/outputs needed as described above, but with a so called Scart or Euro-AV connector (almost rectangular jack with 21 pins, see drawings on next page).

In that case the following Scart to Cinch adapters or cables are needed:

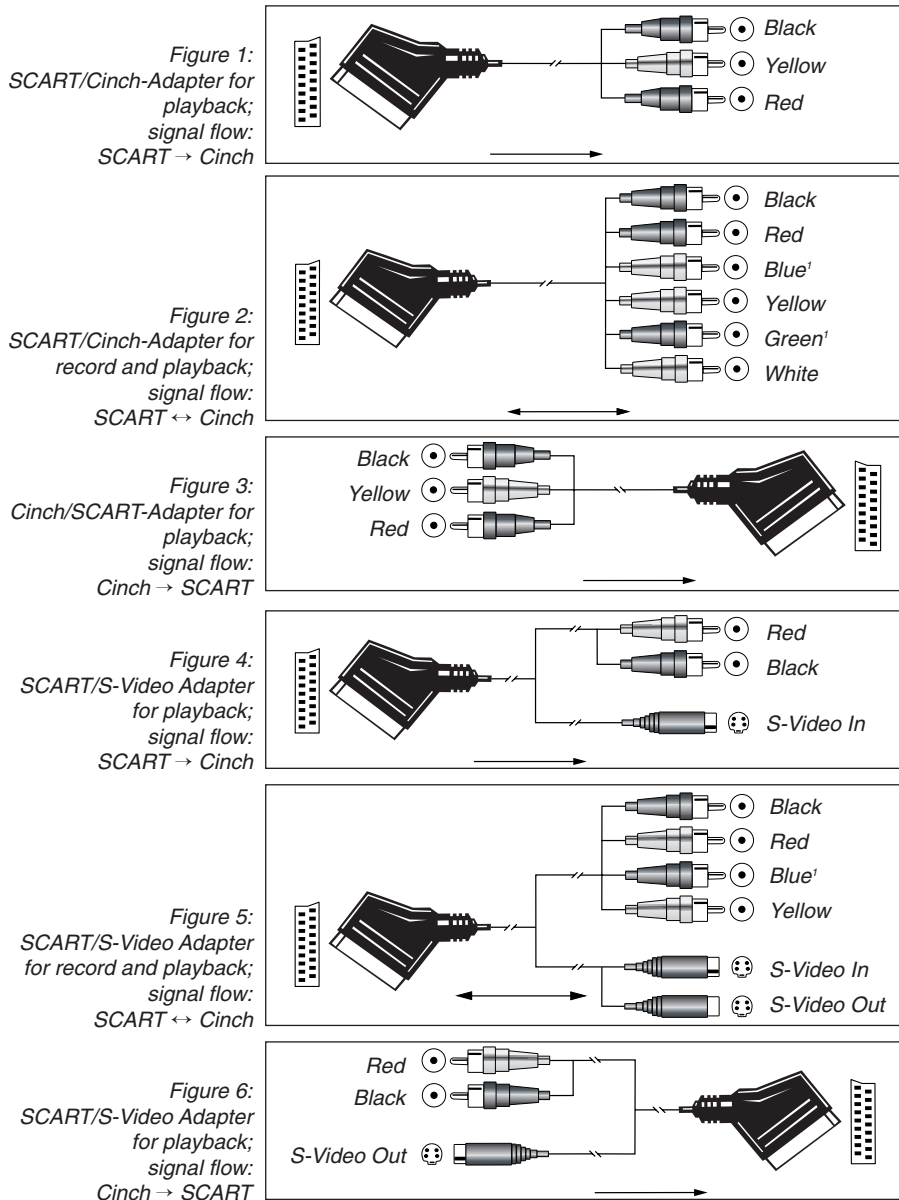
- Units for playback, such as satellite receivers, camcorders, DVD or LD players, need an adapter from Scart to 3 RCA plugs, see fig. 1 (normal video devices) or from Scart to 2 RCA+1 S-Video plugs, see fig. 4 (S-Video devices).
- HiFi VCRs need an adapter from Scart to 6 RCA plugs, see fig. 2 (normal video), or from Scart to 4 Audio+2S-Video jacks, see fig. 5 (S-Video VCR). Read carefully the instruction attached to the adapter to find which of the six plugs is used for the record signal to the VCR (connect with the AVR's Out jacks) and for the playback signal from the VCR (connect with the AVR's In jacks). Do not misconnect Audio and Video signals. Don't hesitate to consult your dealer, if you are uncertain.
- If you use only normal video devices the TV monitor needs an adapter from 3 RCA plugs to Scart (fig. 3) only. If also S-Video devices are used an adapter from 2 RCA+1S-Video plugs to Scart is needed additionally (fig. 6), connected to the SCART input on your TV that is provided for S-Video.

Note that only the video plugs (the "yellow" cinch plug in fig. 3 and the S-Video plug in fig. 6) must be connected to the **TV Monitor Output 12**, and the volume on the TV must be reduced to minimum.

Important Note for Adapter Cables:

If the cinch connectors of the adapter you'll use are labeled, connect the Audio and Video "In" plugs with the corresponding Audio and Video "In" jacks on the AVR (and with a VCR connect the "Out" plugs to the "Out" jacks on the AVR). Note that with some adapter types it may be just turned around: If no signal is audible/ visible when the VCR is playing connect the "Out" plugs to the "In" jacks on the AVR and turned around. If the adapter plugs are not labeled in that way, pay attention to the signal flow directions as shown in the diagrams above and in the instruction attached to the adapter. If uncertain, don't hesitate to consult your dealer.

Installation and Connections



¹ Also other colours possible, e.g. brown and grey.

Important Note for the Use of SCART-Cinch Adapters:

When video sources are connected to the TV directly with a SCART cable, specific control signals apart from Audio/Video signals will be fed to the TV. These specific signals are: With all video sources, the signal for automatic input selection that switches the TV automatically to the appropriate input as soon as the video source is started. And with DVD players, the signals automatically turning the TV to 4:3/16:9 format (with 16:9 TVs or with 4:3 TVs with selectable 16:9 format) and turning the RGB video decoder of the TV on or off, depending on the DVD player's setting. With any adapter cable, these control signals will be lost and the appropriate setting of the TV must be made manually.

Note for RGB signal with SCART:

If you use a unit providing RGB signals on a SCART output (as e.g. most DVD players do) and you want to use that RGB signal, this SCART output must be connected directly to your TV. Although the AVR can switch three-way video signals (like component signals Y/Pb/Pr), most TVs need separate sync signals for RGB (also with SCART) that cannot be switched and provided by the AVR.

RGB signals can be pathed through the AVR only when no separate sync signal is needed (see last "Video Connection Note" on page 16).

Installation and Connections

System and Power Connections

The AVR 645 is designed for flexible use with multiroom systems, external control components and power amplifiers.

Main Room 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, the remote sensor of any Harman Kardon or other compatible device, not covered by the door, or an optional remote sensor may be used. Connect the **Remote IR Output** of that device or the output of the remote sensor to the **Remote IR Input** jack 24.

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 23 to the **Remote IR Input** jack on Harman Kardon or other compatible equipment.

Multiroom IR Link

The key to remote room operation is to link the remote room to the AVR's location with wire for an infrared receiver and speakers or an amplifier. The remote room IR receiver (this can be an optional IR receiver or any other remotable Harman Kardon device in the remote room with IR sensor integrated) should be connected to the AVR via standard coaxial cable. Connect the **Remote IR Output** of the device or of the optional sensor with the **Multiroom IR Input** jack 25 on the AVR's rear panel.

If other Harman Kardon compatible source equipment is part of the main room installation, the **Remote IR Output** jack 23 on the rear panel should be connected to the IR IN jack on that source device. This will enable the remote room location to control source equipment functions.

When a remote IR sensor is used to control non-Harman Kardon source equipment, we recommend that you make a direct connection or use an optional, external IR "blaster" connected to the **Remote IR Carrier Output Jack** 43. If you are in doubt as to which IR Output jack to use for the equipment in your system, contact your dealer or installer, or the manufacturer's support site and ask whether the unit to be controlled uses "full carrier" or "stripped" carrier IR commands. When "full carrier commands" are used, make the connection to the **Remote IR Carrier Output Jack** 43. Otherwise, make the connection to the **Remote IR Output Jack** 23 as noted above.

NOTE: All remotely controlled components must be linked together in a "daisy chain". Connect the **IR OUT** jack of one unit to the **IR IN** of the next to establish this chain.

Multiroom Audio Connections

Depending on your system's requirement and distance from the AVR to the remote room, three options are available for audio connection:

Option 1: Use high-quality, shielded audio interconnect phono cable from the AVR's location to the remote room. In the remote room, connect the interconnect cable to a stereo power amplifier. The amplifier will be connected to the room's speakers. At the AVR, plug the audio interconnect cables into the **Multiroom Output Jacks** 8 on the AVR's rear panel.

Option 2: Place the amplifier that will provide power to the remote location speakers in the same room as the AVR, and connect the **Multiroom Output** jacks 8 on the rear panel of the AVR to the audio input of the remote room amplifier. Use the appropriate speaker wire to connect the optional power amplifier to the remote speakers. High-quality wire of at least 2.5 mm² is recommended for long multiroom connections.

Option 3: Taking advantage of the AVR's built-in seven-channel amplifier, it is possible to use two of the amplifier channels to power speakers in the remote room. When using this option you will not be able to use the full 7.1-channel capabilities of the AVR in the main listening room, but you will be able to add another listening room without additional external power amplifiers. To use the internal amplifiers to power a remote zone, connect the speakers for the remote room location to the **Surround Back/Multiroom Speaker Outputs** 49. Before using the remote room you will need to configure the amplifiers for surround operation by changing a setting in the Multiroom menu, following the instructions shown on page 49.

NOTE: For all options, you may connect an optional IR sensor (Harman Kardon He 1000) in the remote room to the AVR via an appropriate cable. Connect the sensor's cable to the **Multiroom IR Input** 25 on the AVR and use the Zone II remote to control the room volume. Alternatively, you may install an optional volume control between the output of the amplifiers and the speakers.

A-BUS Installation Connections

The AVR is among the very few receivers available today that offers built-in A-BUS/READY® operation. When used with an optional A-BUS keypad or control module, you have all the benefits of remote zone operation without the need for an external power amplifier.

To use the AVR with an approved A-BUS product, simply connect the keypad or module that is in the remote room to the AVR using standard "Category 5" wiring that is properly rated for the inwall use specific to the installation. Terminate the wiring at the receiver end to a standard RJ-45 jack in compliance with the instructions furnished with the A-BUS module.

No further installation or adjustment is needed, as the A-BUS connector on the AVR routes the signals in and out of the keypad to their proper destination for power, signal source and control. The output fed to the A-BUS jack is determined by the AVR's multiroom system, and the menus may be used as is.

RS-232 Connections

The AVR is equipped with an **RS-232 Serial Connection Port** 40 that may be used for two purposes. When the port is connected to a compatible, optional, external computer, keypad or control system the AVR is capable of bi-directional communications that enable the external system to control the AVR, and for the AVR to report status and handshake data back to the controller. Use of the RS-232 port for this type of control requires specific technical knowledge, and we recommend that any connection and programming for control be made by a trained installer or technician familiar with the equipment being used.

The physical connection to the AVR's RS-232 port is a standard D-9 connection but to assure compatible and proper operation, specific software commands and pin wiring schemes may be required.

Installation and Connections

USB Connections

The AVR 645 is one of the few A/V receivers to offer a USB connection that may be used for both playback of compatible audio content from a computer and for loading of system updates (when available).

The physical connection between a computer and the AVR is a simple one, requiring only a cable with a USB "A" type connector on one side and a USB "Mini B" on the other.

Connect the larger, "A" connector on the cable to your computer or a USB hub and the end with the "Mini" USB connector to the **USB Jack 13** on the AVR's rear panel.

NOTES ON USB:

- The USB jack on the AVR is for connection to a computer, or to a hub connected to a computer, only. DO NOT connect it directly to other devices such as card readers, USB memory storage devices, external hard drives, USB accessories, digital cameras or cellular phones. Connection to these devices may cause damage to the device and/or the AVR that is not covered by the AVR's warranty.
- The AVR's USB connection may only be used for audio playback and system upgrades. It may not be used for other purposes, such as system control, video or still-image playback.

Trigger Jack Connection

The AVR is equipped with a low-voltage **Amp Trigger Jack 44** that may be used to activate optional, external power amplifiers, screen motors, motorized blinds or other compatible products that may be part of a home theater installation. Once the connections are made, operation is seamless in that the low-voltage control signal is sent to the screen, blinds or other device when the AVR is turned on, and it is turned off along with the AVR. **Due to the complexity of interfacing with power-controlled devices, we strongly recommend that the installation be done by a qualified installer.**

The AVR's trigger jack is a 3.5mm mono plug that delivers a 5-volt DC signal to the center pin ("tip") of the plug (+) with the outer shaft ("ring") of the plug as the negative (-) or ground connection.

AC Power Connections

This unit is equipped with an accessory AC outlet. It may be used to power accessory devices, but should not be used with high-current draw equipment such as power amplifiers. The total power draw to the **Switched Outlet 17** must not exceed 100 watts.

The **Switched 17** outlet will receive power only when the unit is on completely. 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 AVR features a removable power cord that allows wires to be run to a complex installation so that the unit, itself, need not be installed until it is ready for connection. When all connections described above have been made, connect the AC Power cord to the **AC Power Cord Jack 49**.

The AVR draws significantly more current than other household devices such as computers that use removable power cords. For that reason, it is important that only the cord supplied with the unit (or a direct replacement of identical capacity) be used.

Once the power cord is connected, you are almost ready to enjoy the AVR's incredible power and fidelity!

Speaker Selection

No matter which type or brand of speakers is used, the same model or brand of speaker should be used for the front-left, center and front-right speakers. This creates a seamless front sound-stage and eliminates the possibility of distracting sonic disturbances that occur when a sound moves across mismatched front-channel speakers.

Speaker Placement

The placement of speakers in a multichannel home-theater system can have a noticeable impact on the quality of sound reproduced.

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 left-front and right-front 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 60cm above or below the tweeter in the center-channel speaker.

They should also be at least 0.5 meter from your TV set unless the speakers are magnetically shielded to avoid colorings on the TV screen. Note that most speakers are not shielded, even with complete surround sets only the Center speaker may be.

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 front-left and front-right 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.

When the AVR 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 7.1-channel system, both side surround and back surround speakers are required. The center of the speaker should face you (see below).

A 6.1 surround speaker adds an additional center back surround speaker to the system, enabling you to enjoy the benefits of advanced surround modes such as Dolby Digital EX, DTS-ES and Harman Kardon's proprietary Logic 7/7.1 processing.

To step up to a 6.1 system, first place the speakers for a 5.1 system. The "sixth" speaker should ideally be placed at the center of the room's rear wall, pointing directly toward the front center channel speaker.

Installation and Connections

Note: The 6.1-channel configuration is not recommended for the AVR. We strongly recommend a 7.1-channel installation as described below. When 6.1-channel materials are played through a 7.1-channel system, the same surround back channel information is played through both the left and right surround back speakers.

If you are only able to install a single surround back speaker at this time, you will not be able to run the full EzSet/EQ 7.1-channel calibration procedure. In that case, we suggest you install all of your speakers except the surround back speaker, and run the EzSet/EQ procedure for a 5.1-channel system (see page 31). After EzSet/EQ has finished, connect the single surround back speaker to the **left Surround Back Speaker Outputs 16**. Then follow the instructions starting on page 33 to manually configure your surround back speaker.

We recommend that you consider adding a second surround back speaker as soon as possible.

Rear surround speakers are required when a full 7.1-channel system is installed, and they may also be used in 5.1 channel mode as an alternative mounting position when it is not practical to place the main surround speakers at the sides of the room. Speakers may be placed on a rear wall, behind the listening position. As with the side speakers, the center of the rear surrounds should face you. The speakers should be no more than 2 meters behind the rear of the seating area.

The additional Surround Back Left/Right speakers are placed at about 150 degrees on the circle, pointing inward, toward the listening area. The easiest way to visualize the placement of these speakers is to place the surround back left speaker directly opposite the right front speaker and to place the surround back right speaker directly opposite the left front speaker.

Subwoofers produce largely 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 15cm from a wall, or near the front corner of the room. Another method is to temporarily place the subwoofer in the spot where you will normally sit, 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.

For more information on subwoofer placement, as well as a variety of topics relating to audio and home theater, visit the Technology section of our Web site at www.harmankardon.com. Links are provided there to informative white papers written by the acoustic and electronics experts at Harman Kardon and at our parent company, Harman International Industries, Inc.

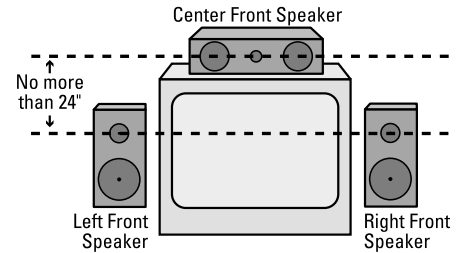
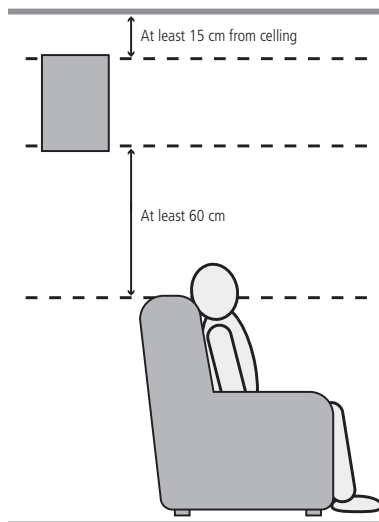
Notes on speaker placement:

1. The limitations of your listening room, including the placement of walls and furniture, may make it difficult to follow the speaker placement suggestions shown above. Depending on the specific layout of the room, here are some ways to compensate for unusual conditions:

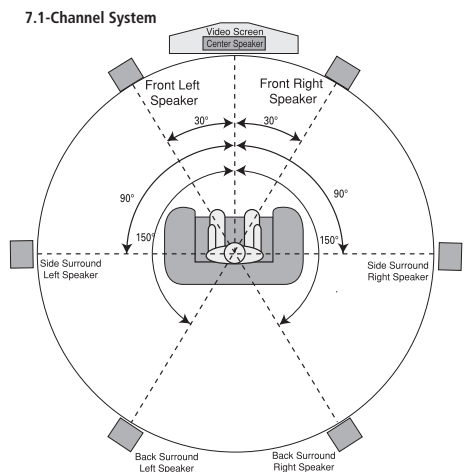
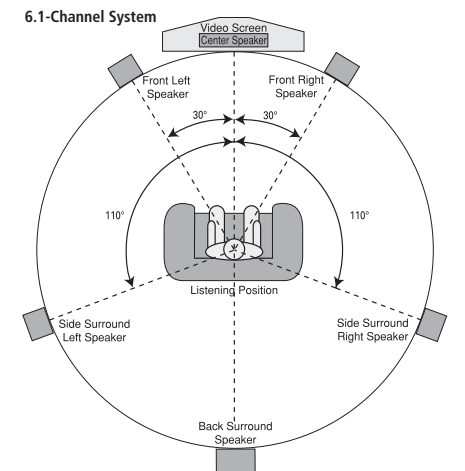
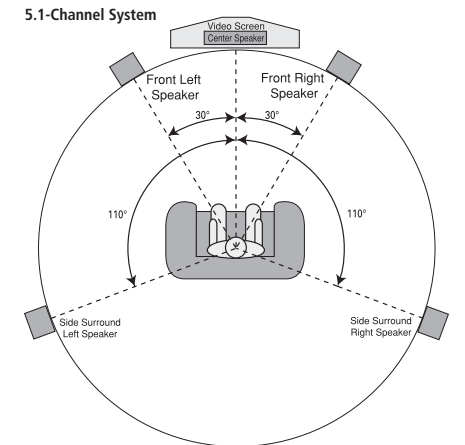
- Try to follow the suggested placement, but move the speakers within a meter from the preferred locations.
- Regardless of where they are placed, always try to make certain that the main surround speakers are the same distance from the front speakers. (For example, try not to have the right surround speaker further back into the room than the left surround speaker.)
- If it is not possible to wall-mount or place speakers on a shelf, consider the use of optional floor stands, available for many speakers.

2. When using ceiling-mounted in-wall speakers, follow the same guidelines shown for conventional floorstanding or shelf-mounted speakers.

3. When you have reassigned the surround back channels for use in a multiroom system, follow the speaker placement instructions for a 5.1-channel system for your main listening area (see page 20).



A) Front Channel Speaker Installation with Direct-View TV Sets or Rear-Screen Projectors



System Configuration

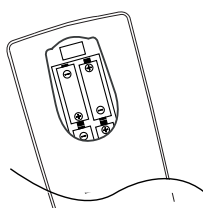
Once the speakers have been placed in the room and connected, the remaining steps are to program the system configuration memories.

Although it is necessary to assign input/output settings and surround mode choices manually, we recommend that you take advantage of the power and precision of EzSet/EQ to automatically select and enter the settings for all other audio parameters. This will not only save you time; it will ensure that your room is calibrated and equalized with an accuracy not possible when these settings are made manually. You are now ready to power up the AVR 645 to begin these final adjustments.

First Turn On

You are now ready to power up the AVR to begin these final adjustments.

1. Make certain that the AC power cord is firmly inserted in to the **AC Power cord Receptacle 19** and plug the cord into an unswitched AC outlet. To maintain the unit's safety rating, DO NOT substitute the power cord for one with lower current capacity.
2. Press the **Main Power Switch 1** in until it latches and the word "OFF" on the top of the switch disappears inside the front panel. Note that the **Power Indicator 3** will turn orange, indicating that the unit is in the Standby mode.
3. Remove the protective plastic film from the main front-panel lens. If left in place, the film may affect the performance of your remote control.
4. Install the four supplied AAA batteries in the remote as shown. Be certain to follow the (+) and (-) polarity indicators that are on the top of the battery compartment.



5. Turn the AVR on either by pressing the **System Power Control 2** or the **Input Source Selector 15** on the front panel, or via the remote by pressing the **Power On Button 4**, **AVR Selector 6** or any of the **Input Selectors 5 7** on the remote. The **Power Indicator 3** will turn blue to confirm that the unit is on, and the **Main Information Display 29** will also light up.

NOTE: After pressing one of the **Input Selector buttons 5** to turn the unit on, press the **AVR Selector 6** to have the remote control the AVR functions.

Using the On-Screen Display

When making the following adjustments, you may find them easier to make via the unit's on-screen display system. These easy-to-read displays give you a clear picture of the current status of the unit and facilitate speaker, delay, input or digital selection you are making.

To view the on-screen displays, make certain you have made a connection video or HDMI on the rear panel to the appropriate matching input of your TV or projector. In order to view the AVR's displays, the correct video input must be selected on your video display.

IMPORTANT NOTE: When viewing the on-screen menus using a CRT-based projector, plasma display or any direct-view CRT monitor or television, it is important that they not be left on the screen for an extended period of time. As with any video display, but particularly with projectors, constant display of a static image such as these menus or video game images may cause the image to be permanently "burned into" the CRT. This type of damage is not covered by the AVR warranty and may not be covered by the projector TV set's warranty.

The AVR has two on-screen display modes, "Semi-OSD" and "Full-OSD." When making configuration adjustments, it is recommended that the Full-OSD mode be used. This will place a complete status report or option listing on the screen, making it easier to view the available options and make the settings on the screen. The Semi-OSD mode uses one-line displays only.

Note that when the full OSD system is in use, the menu selections are not shown in the **Information Display 29**. When the full OSD menu system is used, OSD ON will appear in the **Upper Display Line 29**.

When the semi-OSD system is used in conjunction with the discrete configuration buttons, the on screen display will show a single line of text with the current menu selection. That selection will also be shown in the **Upper or Lower Display Line 29**.

The full OSD system can always be turned on or off by pressing the **OSD button 22**. When this button is pressed the **MASTER MENU** (Figure 7) will appear, and adjustments are made from the individual menus. Note that the menus will remain on the screen for 20 seconds after the latest action was made on the screen menu, then they will "time-out" and disappear from the screen. The time-out may be increased to as much as 50 seconds by going to the **ADVANCED SELECT** menu, and changing the item titled **FULL OSD TIME OUT**.

The semi-OSD system is also available as a system default, although it may be turned off by using the **ADVANCED SELECT** menu. (See page 48). With the semi-OSD system, you may make adjustments directly, by pressing the buttons on the front panel or remote control for the specific parameter to be adjusted. For example, to change the digital input for any of the sources, press the **Digital Select Button 25 17** and then any of the **Selector buttons <|> 7 14** or **▲/▼ 15** on the front panel or remote.

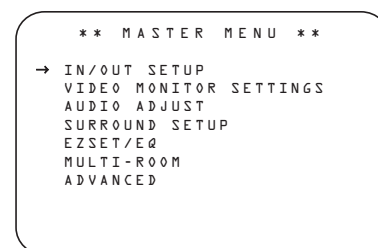


Figure 7

The full-OSD menus remain on the screen for twenty seconds after the last button press, after which they "time out" and disappear from the screen. The length of time menus remain on the screen before the time-out may be increased to as long as fifty seconds by adjusting the settings for **FULL OSD TIME OUT** in the **ADVANCED SELECT** menu, as shown on page 48.

NOTE: Semi-OSD messages are not available when a 480p or any high definition image is being viewed.

System Setup

The AVR features an advanced memory system that enables you to establish different configurations for component video assignment, digital input, surround mode for each input source. To ease the speaker setting, the same speaker setting can also be made for all inputs. This flexibility enables you to custom tailor the way in which you listen to each source and have the AVR memorize them. This means, for example, that you may associate different surround modes and analog or digital inputs with different sources. Once these settings are made, they will automatically be recalled whenever you select that input.

To simplify initial configuration and operation, the AVR has been preconfigured with input settings that are typical for home theater systems. These settings are detailed in the worksheets in the Appendix. Before adjusting the input settings, it is a good idea to compare your input connections to the defaults so that you may see where changes need to be made.

System Configuration

Before using the unit, you will probably want to change the settings for some inputs so that they are properly configured to reflect the use of digital or analog inputs and the surround mode associated with the input. Remember that since the AVR memorizes the settings for each input individually, you will need to make these adjustments for each input used. However, once they are made, further adjustment is only required when system components are changed.

To make this process as quick and as easy as possible, we suggest that you use the full-OSD system with the on-screen menus, and step through each input.

In/Out Setup

The first step in configuring the AVR is to select an input, i.e. to associate an analog or digital input with each input source in use, e.g. **CD** or **DVD**. Note that once an input is selected, all settings for the Digital Input, Speaker Configuration and Surround Mode will "attach" themselves to that input and be stored in a non-volatile memory. This means that once made, the selection of an input will automatically recall those settings. For that reason, the procedures described below must be repeated for each input source so that you have the opportunity to custom tailor each source to your specific listening requirements. However, once made they need not be changed again unless you need to alter a setting.

When using the full-OSD system to make the setup adjustments, press the **OSD** button **22** once so that the **MASTER MENU** (Figure 7) appears. Note that the \rightarrow cursor will be next to the **IN/OUT SETUP** line. Press the **Set** button **16** to enter the menu and the **IN/OUT SETUP** menu (Figure 8) will appear on the screen. Press the $\blacktriangleleft/\blacktriangleright$ buttons **15** until the desired input name appears in the highlighted video, as well as being indicated in the front panel **Input Indicators** **28**.

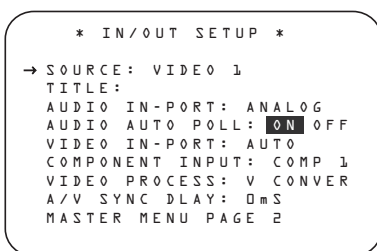


Figure 8

When any input other than the tuner, 8-channel inputs or USB input, is selected as the source, you have the option of renaming the input as it appears in the on-screen and front panel messages. This is helpful if you have more than one VCR, if you wish to associate a specific product brand name with the input, or to simply enter any name that will help you to remember which source is being selected.

To change the input name, press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** on the remote so that the \rightarrow cursor is pointing to **TITLE**. Next, press and hold the **Set Button** **16** for a few seconds until a flashing box appears to the right of the colon. Immediately release the **Set Button** **16**, as you are now ready to enter the device name.

Press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** and note that a complete set of alpha-numeric characters will appear with the start of the alphabet in capital letters followed by the lower-case letters and then numbers and symbols. When you press the \blacktriangledown **Navigation Button** **15**, a series of symbols and numbers will appear, followed by a reverse list of the alphabet in lower-case letters. Press the button either way until the first letter of the desired name appears. If you wish to enter a blank space as the first character, press the \blacktriangleright **Navigation Button** **15**.

When the desired character appears, press the \blacktriangleright **Navigation Button** **15** and repeat the process for the next letter, and continue until the desired name is entered, up to a maximum of fourteen characters.

Press the **Set Button** **16** to enter the input name into the system memory and to proceed with the configuration process.

The audio input defaults for all sources except the Tuner, USB and 6/8-Channel Direct inputs are shown in the table in the Appendix. If your system configuration follows the default table, no changes are needed and you may press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** **F** to move to the next line.

With the cursor pointing to **AUDIO IN-PORT**, press the $\blacktriangleleft/\blacktriangleright$ **Navigation Button** **15** **F** to change the default to a different audio input connection. When the name of the desired input appears, press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** **F** to move to the next line.

In normal operation, when a digital audio stream is interrupted, the unit will automatically switch to the analog inputs associated with that source. This is particularly useful with cable set-top boxes where the input is normally digital, but occasionally changes to analog. If you wish to configure an input so that the auto-poll circuit is turned off, while the on-screen cursor is pointing to the **AUDIO AUTO POLL** line, simply press the $\blacktriangleleft/\blacktriangleright$ **Navigation Button** **15** **F** so that **OFF** (rather than **ON**) is in a white video highlight.

When the desired auto-poll setting is entered, press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** **F** to move to the next line.

When the cursor is at the **VIDEO IN-PORT** line, you are able to select an alternative to the default input setting for the video input associated with any source. For the Video 1 and Video 4 inputs, the factory default of **AUTO** will select either composite or S-video, depending on which has an active signal. For the Video 2, Video 3 and DVD inputs, the **AUTO** setting will normally select the default component input, but if it is not in use, the system will revert to a composite or S-video output if either one is active.

To have the AVR always look to a specific source connection when an input is selected, make certain that the on-screen cursor is pointing to the **VIDEO IN-PORT** line, and then press the $\blacktriangleleft/\blacktriangleright$ **Navigation Button** **15** **F** until the name of the desired input appears. The default setting for HDMI inputs is **AUTO** and normally need not be changed. However, in systems where the HDMI connection is used for multichannel audio only (e.g., HDMI 1.1), but the video connection is component, due to limitations on the video display, the setting here should be changed to **COMPONENT**.

When the desired video input setting has been made, press the $\blacktriangle/\blacktriangledown$ **Navigation Button** **15** **F** to move to the next line.

If your system includes any sources that are equipped with Y/Pr/Pb component video outputs, the AVR is able to switch them to send the proper signals to your video display. Each of the **Component Video Inputs** **20** **22** **42** is assigned to a default source, as shown in the table in the Appendix, but if you have connected your system differently than the factory settings, you may select any of the three inputs for any source except the HDMI inputs or the Tuner. If your system does not include component video at this time, or if you do not need to change these defaults, press the \blacktriangledown **Navigation Button** **15** **F** to go to the next setting.

System Configuration

To change the Component Video assignment, first make certain that the → cursor is pointing to the **COMPONENT IN** line on the menu screen, and then press the ◀▶ **Navigation Button 15 F** until you see the desired input in the highlighted video.

When the desired component input has been selected, press the ▼ **Navigation Button 15 F** go to the next setting.

At the **VIDEO PROCESS** line, you are able to select whether video format conversion, is to be used with the input source being configured. If you do not need to change the setting, simply press the ▲/▼ **Navigation Button 15 F** to move to the next line.

The **V-CONVERSION** setting will not apply any video enhancement or processing to the incoming video signal, but it will output it in one of the following ways, depending on the input source.

- A standard-definition (480i or 576i) analog signal (composite, S-video or component) will be converted so that it is available as an HDMI signal at its input resolution, as well as at the standard composite, S-video or component analog video outputs. The signal will also be available at the record outputs.
- An analog component high-definition signal will be digitized and output at its input resolution through the HDMI outputs and as an analog component signal, but not through the analog composite or S-video monitor or record outputs.
- HDMI input signals, regardless of their resolution, will be output through the HDMI outputs.

The **BYPASS** setting will not apply any video enhancement or processing to the incoming video signal, but it will output it in one of the following ways, depending on the input source.

- Analog signals (composite, S-video or component) will output only in the resolution and format that matches the input for both the main "Monitor" connection as well as for the record outputs.
- HDMI input signals, regardless of their resolution, will be output through the HDMI outputs.

When any needed change to the video processing setting has been made, press the ▲/▼ **Navigation Button 15 F** to move to the next line.

At the **A/V SYNC DELAY** line, you are able to enter a setting that delays the audio output slightly behind the video so that the loss of lip sync that may occur due to digital video processing in the transmission of a program, in the playback unit or in the display is corrected. This lack of lip sync is not a fault of the sources; rather, it is a by-product of video signal processing. In most cases, we recommend that the delay adjustment be made using the direct-access controls on the remote so that you may more accurately adjust the delay while viewing the on-screen image, following the instructions shown on page 35, but you may also make it here using the menu system. As the amount of delay needed may vary from one source to another, we strongly recommend that you adjust it for each input.

To adjust the A/V sync delay time from the **IN/OUT SETUP** menu, make certain that the cursor is pointing to the **A/V SYNC DELAY** line, and then press the ◀▶ **Navigation Button 15 F** until the desired amount of delay is applied so that the on-screen video matches the audio.

When all configuration adjustments on this menu screen have been made, press the ▲/▼ **Navigation Button 15 F** until the on-screen cursor is pointing to **PAGE 2** and then press the **Set Button 16 Q** to move to the second screen of input/output settings. If all settings for input configuration are complete, press the ▲/▼ **Navigation Button 15 F** until the on-screen cursor is pointing to **MASTER MENU** and then press the **Set Button 16 Q** to return to the main menu screen.

The second page of the **IN/OUT SETUP** menu (Figure 9) allows you to further configure the AVR 645 for special custom features.

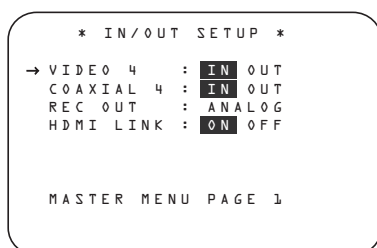


Figure 9

An exclusive Harman Kardon feature is the ability to switch front panel jacks from their normal use as inputs to output connections so that portable recording devices may easily be connected. The front panel analog **Video 4 Jacks 21** are normally set as an input for use with camcorders, video games and other portable audio/video products, but they may be switched to an output for connection to portable audio/video recorders. To temporarily switch them to outputs, select the **IN/OUT SETUP** menu. Press the ▼ button **15 F** until the on-screen → cursor is pointing to the **VIDEO 4** line. Press the ▶ button **15 F** so that the word **OUT** is highlighted. Note that the **Input/Output Status Indicator 19** between the S and Composite video jacks will turn red, indicating that the analog **Video 4 jacks 21** are now record outputs.

On the AVR, the **Coaxial 4 Digital Jack 20** is normally an input, but it may also be switched to a digital output for use with CD-R/RW decks, MD recorders or other digital audio recorders. To change the jack to an output, press the ▲/▼ buttons **15 F** while the **IN/OUT SETUP** menu is on the screen so that the → cursor is next to **COAXIAL 4**. Then press the ◀▶ buttons **15 F** so that the word **OUT** is highlighted. Note that the **Digital Coax 4 Status Indicator 19** will turn red, indicating that the jack is now a record output.

Note: A signal will be sent to this jack only when the input selected for use by the AVR is digital. Digital signals will be passed through regardless of their format, and which digital input (optical or coax) they are fed from. However, analog signals are not converted to digital, and the format of the signal (e.g., PCM, Dolby Digital or DTS) may not be changed. Selection of the jacks as an output will remain effective as long as the AVR is on. However, once the unit is turned off, the jack will revert to its normal use as an input when the unit is turned on again.

The **REC OUT** line enables you to select what the audio output is at the analog record outputs for the input source being configured. Press the ◀▶ **Navigation Button 15 F** to choose one of the following if you wish to change the default setting:

- **ANALOG** selects an unprocessed pass-through of an analog source and is the default setting for most inputs.
- **DSP DOWNMIX** selects a two-channel downmix of a multichannel digital input.

System Configuration

When the adjustment has been made, or if no adjustment is required and all settings on this page are complete, press the **▲/▼ Navigation Button 15 F** until the on-screen cursor is pointing to **PAGE 1** and then press the **Set Button 16 Q** to return to the main **IN/OUT SETUP** menu to configure another input, or if no further input configuration adjustments are needed, press the **▲/▼ Navigation Button 15 F** until the on-screen cursor is pointing to **MASTER MENU** and then press the **Set Button 16 Q** to return to the main menu screen.

Video Monitor Settings

The **VIDEO MONITOR SETTINGS** menu (Figure 10) is unique in that it contains a mix of information display lines that detail status information about the AVR 645's video system settings, along with a few lines where a specific parameter may be changed. With the **MASTER MENU** on the screen, press the **▲/▼ Navigation Button 15 F** until the on-screen cursor is pointing to **VIDEO MONITOR SETTINGS** and then press the **Set Button 16 Q** to move to the menu screen.

```
*VIDEO MONITOR SETTINGS*
IN VIDEO FORMAT: 1080i
IN VIDEO COPY PROT: ON
VIDEO PROCESS: V CONVERS
→ COMPONENT OUT: OFF
S-VIDEO OUT: OFF
COMPOSITE OUT: OFF
DISPLAY INTER: HDMI/DVI
HDMI AUDIO OUT: NO
BACK TO MASTER MENU
```

Figure 10

The **IN VIDEO FORMAT** line is an informational display of the resolution of the incoming video stream, and may not be adjusted.

The **IN VIDEO COPY PROT** line is an informational display that shows whether or not an incoming video signal contains copy protection encoding, and may not be adjusted.

The **VIDEO PROCESS** line is an informational display of the setting made in the **IN/OUT SETUP** menu indicating how incoming video is processed for the input being viewed, and may not be adjusted.

The **COMPONENT OUT** line is an informational display of whether or not the Component Video outputs are **ENABLED** or **OFF**, based on the input signal type and resolution, and whether or not the incoming video signal has HDCP content protection. It may not be adjusted.

The **S-VIDEO OUT** line is an informational display of whether or not the S-video outputs are available at a 576i resolution (or **OFF**), based on the input signal type and resolution and whether or not the incoming video signal has HDCP content protection. It may not be adjusted.

The **DISPLAY INTER** line allows you to choose between an **ANALOG** video output default value and an **HDMI/DVI** output by pressing the **◀/▶ Navigation Button 15 F** to make the desired selection. When the setting is **ANALOG**, the HDMI output is placed in a Standby mode so that it automatically switches to HDMI when an HDMI signal is detected. If a high-definition input source is not HDCP-content-protected, it may be output through the component jacks; otherwise, it will be sent only to the HDMI outputs. The **HDMI/DVI** setting routes all converted or processed video to the HDMI outputs.

The **HDMI AUDIO OUT** line allows you to choose whether a two-channel downmix of the audio that accompanies the selected source is sent over the HDMI connection (**YES**) at the maximum bit rate the display's audio system is capable of handling, or not (**NO**). To change the setting, press the **◀/▶ Navigation Button 15 F** to make the desired selection.

When required adjustments have been made for this input, or if no adjustment is required, press the **▲/▼ Navigation Button 15 F** until the on-screen cursor is pointing to **BACK TO MASTER MENU** and then press **Set Button 16 Q** to return to the main menu screen.

Audio Setup

This menu allows you to configure the tone controls. If you do not wish to change any of those settings at this time, proceed to the next menu screen. However, to make configuration changes to those parameters, make certain that the **MASTER MENU** is on the screen with the **→** cursor pointing to the **AUDIO SETUP** line, and press the **Set Button 16 Q**. The **AUDIO SETUP** menu (Figure 12) will appear.

```
* AUDIO SETUP *
```

→ TONE	:	IN	OUT
BASS	:	0	
TREBLE	:	0	

BACK TO MASTER MENU

Figure 12

The first line controls whether or not the bass/treble tone controls are in the signal path. The normal default is for them to be in-line, but if you wish to remove them from the circuit for "flat" response, first make certain that the **→** cursor is pointing to the **TONE** line on the menu and press the **◀/▶ Navigation Button 15 F** so that **OUT** is highlighted in reverse video.

If you wish to leave the tone controls in the signal path, the amount off boost or cut for bass and treble may be adjusted by pressing the **▲/▼ Navigation Button 15 F** so that the **→** cursor is next to the line for the setting you wish to adjust. Next, press the **◀/▶ Navigation Button 15 F** until the desired setting is shown.

When all desired changes have been made on this menu, press the **▲/▼ Navigation Button 15 F** so that the **→** cursor is next to the **BACK TO MAIN MENU** line and press the **Set Button 16 Q**.

System Configuration

Surround Setup

The next step for that input is to set the surround mode you wish to use with that input. Since surround modes are a matter of personal taste, feel free to select any mode you wish – you may change it later. The Surround Mode chart on page 38 may help you select the mode best suited to the input source selected. For example you may select Dolby Pro Logic II or Logic 7 for most analog inputs and Dolby Digital for inputs connected to digital sources. In the case of inputs such as a CD Player, Tape Deck or Tuner, you may wish to set the mode to Stereo, if that is your preferred listening mode for standard stereo sources, where it is unlikely that surround encoded material will be used. Alternatively, the 5 Channel Stereo or Logic 7 Music mode may also be a good choice for stereo-only source material.

It is easiest to complete the surround setup using the full-OSD on-screen menus. From the **MASTER** menu (Figure 7), press the **▲/▼** buttons **15 F** until the **→** cursor is next to the **SURROUND SELECT** menu. Press the **Set Button 16 Q** so that the **SURROUND SELECT** menu (Figure 13) is on the screen.

```

** SURROUND SETUP **
→ SOURCE: VIDEO 1
AUDIO IN PORT: ANALOG
AUDIO IN: PCM 44.1kHz
ADC SAMPLING: 48K 96K
SURR MODE: LOGIC 7
SURR SELECT: MUSIC 5.1
DEFAULT SURR: LAST
SURROUND CONFIG
DOLBY SURR SETUP
BACK TO MASTER MENU
  
```

Figure 13

The first line on the menu allows you to select the input for which the specific surround settings will be applied. Press the **◀▶** **Navigation Buttons 15 F** to select the input source to be configured.

The **AUDIO IN-PORT** and **AUDIO IN** lines are for display only and may not be changed through the **SURROUND SETUP** menu. The **AUDIO IN-PORT** displays the physical connection source for the current active input, and the **AUDIO IN** line shows the signal type present. Note that an **UNLOCK** message in the **AUDIO IN** line indicates that a digital physical input source has been selected, but that no data stream is present.

When the input selection has been made, press the **▲/▼** **Navigation Button 15 F** to move to the next configuration line.

The **ADC SAMPLING** line is where you determine whether the unit's upsampling feature is turned on or off. The default setting of 48kHz puts the feature in a bypass, or "off," mode and will pass digital audio data through the DSP at its native sample rate. To process incoming 44.1kHz signals at a higher resolution, upsampled 96kHz sample rate, press the **◀▶** **Navigation Buttons 15 F** once so that 96kHz is highlighted.

When the desired setting has been made, or if no adjustment is required at this line, press the **▲/▼** **Navigation Button 15 F** to move to the next configuration line.

The **SURR MODE** and **SELECT** lines are related, as they guide you to the choice of the surround mode that will be activated whenever the input being configured is selected.

At the **SURR MODE** line, press the **◀▶** **Navigation Buttons 15 F** to select the surround mode group (such as Dolby modes, DTS modes, Logic 7 modes, and DSP or Stereo modes) that is applicable to the input source. After making a selection, press the **▲/▼** **Navigation Button 15 F** to move to the **SELECT** line.

At the **SELECT** line, you are able to choose the specific mode to be used from within the major surround mode group. The choice of modes is governed by the input type (as some modes such as Dolby Digital or DTS-ES are not available for analog sources), as well as by the speaker configuration, since some modes are only available when a full 7.1 speaker complement is present. The full list of available modes is detailed in the surround mode chart on page 38. In addition, you may also use the settings in the **SURROUND CONFIG** menus to delete modes you do not normally use from the available choices.

When both a surround mode group and a specific surround mode have been selected, press the **▲/▼** **Navigation Button 15 F** to move to the next configuration line.

The **DEFAULT SURR** mode line is where you choose the mode that is activated when a digital source is selected. The factory default setting of **LAST** will activate the last-used mode for any digital source. If you prefer to always have a digital source switch to the specific mode encoded by digital data flags in the incoming audio data stream, press the **◀▶** **Navigation Buttons 15 F** so that **ORIGINAL** appears.

Before proceeding to the **SURROUND CONFIG** line, it is worth noting that the settings in the submenus attached to that line may require a considerable amount of time to complete. Although they are useful in that they allow you to customize the list of surround modes that appear in normal use of the AVR, you may wish to bypass those settings at this time so that you may complete the configuration process. You may return to this menu line at a later time, once you have had a chance to listen to the various surround modes and determine which you want to "keep" and which you do not want to use. The settings in this line are not primary controls and do not impact the way the AVR "sounds."

To proceed to the **SURROUND CONFIG** line, press the **▲/▼** **Navigation Button 15 F** to move to that line; otherwise, press it again to move to the **DOLBY SURR SETUP** line and skip to the instructions for that setting.

The **SURROUND CONFIG** line is your gateway to a broad range of surround mode configurations. To continue, press the **Set Button 16 Q** to go to the main **SURROUND CONFIG** menu (Figure 14).

```

** SURROUND CONFIG **
→ LOGIC 7 GLOBAL: OFF
DOLBY MULTI CONFIG
DOLBY 2.0 CONFIG
DTS CONFIG
PCM 44.1/48kHz CONFIG
PCM 96K CONFIG
BACK TO SURROUND CONFIG
  
```

Figure 14

The **LOGIC 7 GLOBAL** line is the only item on this menu page that is menu-specific, and it allows you to select whether or not Logic 7 will be the default surround mode for any incoming audio signal. The default setting is **OFF**, which chooses the native mode. Press the **◀▶** **Navigation Buttons 15 F** so that **ON** appears, to activate the global Logic 7 setting for this input.

The remaining five items in this menu are global settings that take you to a submenu listing the individual surround modes available within the selected mode group. To select a surround mode list, press the **▲/▼** **Navigation Button 15 F** until the on-screen cursor is pointing to the desired mode, and then press the **Set Button 16 Q**. Within each menu, press the **▲/▼** **Navigation Button 15 F** to move the cursor up and down through the list, and then press the **◀▶** **Navigation Buttons 15 F** to turn the mode "ON" or "OFF."

System Configuration

- When a mode is **ON**, the mode will appear in all menu selections whenever you are changing the surround mode.
- When a mode is **OFF**, the mode will not appear.
- Some modes, such as Dolby Digital, DTS and the Stereo mode in the PCM menus, are not defeatable.

A complete list of the AVR's surround modes may be found on page 38, but here are some items that will help you decide which modes you want included in your setup, and which modes you may wish to turn off.

- The **DOLBY MULT CONFIG** group contains the surround modes available when a multichannel Dolby Digital, encoded source is present. This includes both the native Dolby Discrete mode, which cannot be turned off, as well as other modes which may be applied as post-processing on the source and system speaker configuration.
- The **DOLBY 2 . 0 CONFIG** group contains the surround modes available when a two-channel Dolby Digital-encoded source is present. This includes both the native Dolby Discrete mode, which cannot be turned off, as well as other modes which may be applied as post-processing on the source and system speaker configuration.
- The **DTS CONFIG** group contains the surround modes available when a DTS-encoded digital source is present. This includes both the native DTS Discrete mode, which cannot be turned off, as well as other modes which may be applied as post-processing on the source and system speaker configuration.
- The **PCM 44 . 1 / 48KHZ CONFIG** group contains the surround modes available when a PCM digital data stream is present. This includes not only PCM sources from DVD or CD players, but also all two-channel analog sources that are in use, as they are converted to PCM within the AVR 645. The modes available include the proprietary Dolby modes (including Dolby Headphone and Dolby Virtual Speaker), DTS processing, our own Logic 7 modes, the conventional "DSP" modes (such as "Hall" and "Theater") and the "Stereo" modes.

- The **PCM 96KHZ CONFIG** group contains the surround modes available when a PCM digital data stream is present. This includes not only 96kHz PCM sources from DVD or CD players, but also all two-channel analog sources when 96kHz is chosen in the **ADC SAMPLING** mode line in the **SURROUND SETUP** menu. The modes available include the proprietary Dolby mode (including Dolby Headphone and Dolby Virtual Speaker), DTS processing, our own Logic 7 modes, the conventional "DSP" modes (such as "Hall" and "Theater") and the "Stereo" modes.

Note: When a Dolby Digital or DTS source is selected and playing, the AVR will select the appropriate surround mode automatically, no matter which surround mode was selected for that input as default. Then no other surround modes will be available, except all Pro Logic II modes with Dolby Digital 2 channel (2.0) recordings.

On the **Dolby** menu (Figure 15), the selection choices include Dolby Digital, Dolby Pro Logic II and IIx Music, Dolby Pro Logic II and IIx Cinema, Dolby Pro Logic, Dolby Virtual Speaker Reference and Wide, and Dolby 3 Stereo. A complete explanation of these modes is found on Page 38. The Dolby Digital EX mode is only available when the system is set for 6.1/7.1 operation by configuring the Surround Back speakers to "Small" or "Large" as described on page 33. When a disc is playing that contains a special "flag" signal in the digital audio data stream, the EX mode will be selected automatically. It may also be selected using this menu or through the front panel or remote controls. A complete explanation of these modes is found on page 38.

When all surround modes that are not required have been turned off, press the **▲/▼ Navigation Button 15 F** until the on-screen cursor is pointing to **BACK TO SURROUND CONFIG**; then press the **Set Button 16 Q**.

The final item on the **SURROUND SETUP** menu is the **DOLBY SURR SETUP** line. When the on-screen cursor is at this line, press the **Set Button 16 Q** to call the **DOLBY SURROUND** menu (Figure 13) up on the screen.

When the **→** cursor is pointing to the **MODE** line, press the **◀▶ Navigation Buttons 15 F** to select the desired Dolby surround mode, again remembering that the choice of available modes will vary with the type of program material being played and the number of speakers in your system configuration.

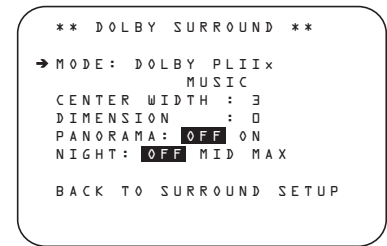


Figure 15

When Dolby Pro Logic II Music or Dolby Pro Logic IIx Music is selected as the listening mode, three special settings are available to tailor the sound field to your listening room environment and your individual taste and preferences. (When other Dolby Surround modes are selected, dotted lines will indicate that these settings are not active.)

- **Center Width:** This setting adjusts the balance of the vocal information in the front soundstage between the center and front left/right speakers. The lower settings spread the center channel sound more broadly into the left and right channels. A higher number (up to "7") produces a tighter center channel presentation.
- **Dimension:** This setting alters the perceived depth of the surround field by creating a shallower presentation that appears to move sounds toward the front of the room, or a deeper presentation that appears to move the center of the sound field toward the back of the room. The setting of "0" is a neutral default, with the range of adjustment shown as "R-3" for a deeper, rear-oriented sound to "F-3" for a shallower, front-oriented sound.
- **Panorama:** Switch this setting on or off to add an enveloping wrap-around presentation that increases the perception of sound along the sides of the room.

To change these parameters, press the **▲/▼ Navigation Buttons 15 F** while the **DOLBY SURROUND** menu is on the screen until the **→** cursor is pointing to the line on the menu with the parameter you wish to change. Then, press the **◀▶ Navigation Buttons 15 F** to alter the setting to your taste.

Note that when the Dolby Digital mode is selected there are additional settings available for the Night mode that are associated with the surround mode only, not with the input. That's why these settings must be made only once, not with each input in use.

System Configuration

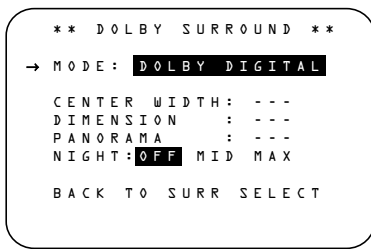


Figure 16

Night Mode Settings

The Night mode is a feature of Dolby Digital that uses special processing to preserve the dynamic range and full intelligibility of a movie sound track while reducing the peak level. This prevents abruptly loud transitions from disturbing others, without reducing the sonic impact of a digital source. Note that the Night mode is only available when the Dolby Digital surround mode is selected.

To adjust the Night mode setting from the menu press the **OSD Button 22 E** so that the **MASTER** menu appears. Then press the **Navigation Button 15 F** to access the **SURROUND SETUP** and press the **Set Button 16 Q** to select the **SURROUND SETUP** menu. Press **Set 16 Q** to select the **DOLBY SURR SETUP** menu (see fig. 15).

To adjust the Night mode setting, make certain that the **►** cursor is on the **NIGHT** line of the **DOLBY** menu. Next, press **◀▶ Buttons 15 F** to choose between the following settings.

OFF: When **OFF** is highlighted, the Night mode will not function.

MID: When **MID** is in the highlighted video, a mild compression will be applied.

MAX: When **MAX** is in the highlighted video, a more severe compression algorithm will be applied.

When you want to use the Night mode feature, we recommend that you select the **MID** setting as a starting point and change to the **MAX** setting later, if desired.

Note that the Night mode may be adjusted directly any time that Dolby Digital surround mode is selected by pressing the **Night** button **12**. When the button is pressed, the words **D-RANGE** followed by the current setting (**MID**, **MAX**, **OFF**) will appear in the lower third of the video screen and in the **Main Information Display 29**. Press the **▲/▼** buttons **15 F** within five seconds to select the desired setting, then press the **Set Button 16 Q** to confirm the setting.

When all settings on the **DOLBY SURROUND** menu have been completed, press the **▲/▼ Navigation Button 15 F** until the cursor is next to **BACK TO SURROUND SETUP** and press the **Set Button 16 Q**. You may then make any additional changes to the available options from that screen, or use **▲/▼ Navigation Button 15 F** to move the cursor to the **BACK TO SURROUND CONFIG** menu and press the **Set Button 16 Q** again to back up one menu.

At the main **SURROUND SETUP** menu, you may change the **SOURCE** to make adjustments to another input, or when all input sources have been configured, use **▲/▼ Navigation Button 15 F** to move the cursor to the **BACK TO MASTER MENU** and press the **Set Button 16 Q** to return to the main menu so that you may move to the next step in configuring your AVR 645.

Using EzSet/EQ

The AVR uses Harman Kardon's EzSet/EQ technology to automatically configure your system to deliver the best possible performance based on your specific speaker selection, where the speakers are placed in the room and the acoustic influences in your listening room. By using a series of test signals and the processing power of the Texas Instruments DA 610 digital signal processor, EzSet/EQ eliminates the need for manual adjustment of speaker "size", crossover, delay and output level settings while it adds the power of a multi-band parametric equalizer to smooth out the frequency settings for optimal sound reproduction.

In addition to making system setup quick and easy, EzSet/EQ is more precise than manual settings. With EzSet/EQ you are able to calibrate your system in a fraction of the time it would take to enter the settings manually, and with results that rival those achieved with expensive test equipment and time consuming procedures. The end result is a system calibration profile that enables your new receiver to deliver the best possible sound no matter what type of speakers you have or what the dimensions of your listening room are.

We recommend that you take advantage of the precision of EzSet/EQ to calibrate your system, but if desired you may also make any of the configuration settings manually, or trim the settings provided by EzSet/EQ by following the instructions on pages 32-35.

Before starting the EzSet/EQ process, make certain that you have connected all speakers for your system and that you have both the EzSet/EQ microphone and the extender rod handy. If you have a standard camera tripod, attach the extender rod to the tripod, and then screw the microphone to the top of the rod. Place the tripod at your primary listening position, at least one meter from the nearest speaker and adjust it so that microphone is at least one meter above ear level. If you do not have a tripod, simply screw the extender rod into the bottom of the EzSet/EQ microphone.

Next, plug the microphone into the **EzSet/EQ Microphone Jack 31** located behind the **Front Panel Control Door**. The microphone cable is approximately 6 meters long, which should accommodate most listening room situations. If required, you may use an optional extension cable, available at most electronics stores, for use in larger rooms. However, we recommend that you make every effort to avoid using extension cords for the microphone cable as they may adversely affect the test results.

Finally, before going further, make certain that the program volume is at -35dB. If there is a volume or "level" control on your subwoofer, make certain that it is set to at least the mid-point, if not a bit higher

You are now ready to start the EzSet/EQ process by following these steps:

Step 1. Navigate to the **EZSET/EQ MODE** menu (Fig. 17a) by first pressing the **OSD Button 22** on the remote. Press the **Navigation Button 15** until the **→** cursor is pointing to **EZSET/EQ** in the **MASTER MENU**. Press the **Set Button 16** to bring the menu to the screen.

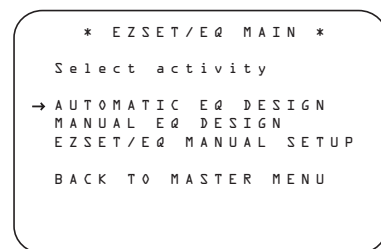


Figure 17a

System Configuration

Step 2. Select one of the two options shown based on the way you wish to have the system settings entered:

- In most cases, you will want to use the Automatic mode, which calibrates the system for speaker presence, speaker "size", speaker crossover, channel output level, speaker-to-listener delay time and room equalization. To choose this mode simply press the **Set Button 16**, as the cursor is already pointing to **AUTOMATIC EQ DESIGN** when the menu appears on the screen.

Then press the **Set Button 16** again when the **AUTOMATIC EZSET/EQ** menu appears, to continue to Step 3.

- If you wish to enter the speaker crossover frequencies yourself, but want to have the EzSet/EQ system test for and calibrate all the other functions listed above, press the **Navigation Button 15** to point the cursor at **EZSET/EQ SETUP** and then press the **Set Button 16**. Once the **MANUAL SETUP** menu (Fig. 18) appears, follow the instructions on page 32 to enter your desired settings for the Crossover Frequencies, and then return to the **EZSET/EQ MAIN** menu. Press the **Navigation Button 15** again so that the cursor is pointing to **MANUAL EQ DESIGN** and then press the **Set Button 16**. When the interim message screen appears to remind you to set the crossovers, make sure that the cursor is pointing to **CONTINUE** and press the **Set Button 16** again since you have already set the crossovers.

Step 3. The **FAR FIELD MEASURE** screen (Figure 17b) will appear with instructions to place the microphone, if you have not already done so. This screen is also the place to set the master volume level. As noted on the screen, use the **Volume Control 27/40** to adjust the volume level to -35dB , as shown on the line that appears at the bottom of the menu when the volume is adjusted. Press the **Set Button 16** when the volume is set to the proper level.

```

* FAR FIELD MEASURE *
Place mic at ear level
near the listening
position at least 3 ft/
1m from any hard
surface.
Set volume to -35dB
-> CONTINUE
BACK TO EZSET/EQ MAIN
BACK TO MASTER MENU
VOLUME: -35dB
    
```

Figure 17b

Step 4. The final menu screen before the EzSet/EQ process starts is a warning screen (Figure 17c) that serves as a reminder to keep the room as quiet as possible while the system is in use. Extraneous noise of any kind may adversely affect the accuracy of the system's results. Do not talk while the test tones are circulating, and if possible, turn off any ventilation systems if the noise from the air flow is loud enough for you to hear. Should an outside noise such as a phone ringing occur during the test process, we recommend that you rerun EzSet/EQ. If you do not wish to start the test process at this time, press the **Navigation Button 15** to return to either the EzSet/EQ menu or the Master Menu, and press the **Set Button 16**. To begin the EzSet/EQ Near Field measurements, press the **Navigation Button 15** so that **ON** is highlighted in reverse video, and press the **Set Button 16**.

NOTE: Once the EzSet/EQ process starts, the volume control and Standby/Off switches are temporarily disabled while the tests are in progress. Do not adjust the volume or turn the unit off until you see the on-screen message change to indicate that EzSet/EQ is finished.

```

WARNING !!

During measurement
please maintain silence
while several sound
bursts are heard.

-> START : OFF ON
BACK TO EZSET/EQ MODE
BACK TO MASTER MENU
    
```

Figure 17c

Step 5. At this point you will begin to hear a series of test tones circulate among all the speakers in your system. While this is happening, the AVR is reading the signal to determine which speaker positions are active, what type of speaker is present at each active position, what the distance is from the listening position to each speaker, and to begin to build a profile of the impact of the room's acoustics on the quality of audio reproduction. When the test is completed you will hear the tones stop, and the system will pause for as long as a minute while the processor makes its calculations. Do not be alarmed if the "WARNING" message remains on the screen after tones stop until a results message is displayed as shown in Step 6 or 7, below.

NOTE: While these tests detect whether a speaker is connected to a particular output, they cannot determine whether the speaker is in the correct position. (For example, it can tell whether a speaker is connected to the Surround Right output, but it cannot tell whether the speaker is on the right or left side of your listening room.) For that reason, we strongly recommend that you try to listen as the tone circulates, matching the name shown for each channel to the location of the speaker. If a tone is heard from a speaker position that does not match the on-screen message, make a note of the incorrect speaker connections. When the test process stops you will see a message indicating the they Far Field measurements are complete, but since there is a connection error press the **Navigation Button 15** so that the on-screen cursor in Fig. 7 is pointing to **RETURN TO MASTER MENU** and press the **Set Button 16**. At this point, exit all menus and turn the receiver off. Check all speaker wire connections and then rerun EzSet/EQ.

Step 6. When the Far Field tests are complete a message screen will appear to confirm if the procedure was successful or not. In most cases there will not be any problems and you will see the message shown in Figure 17d on your screen. If the speaker positions shown match the actual speaker layout in your system, press the **Set Button 16** to complete EzSet/EQ by performing the Near Field Measurements. Continue the EzSet/EQ process by pressing the **Set Button 16** to take the Near Field measurements from the front left, center and right speakers. By taking this separate set of measurements, the AVR is able to complete its view of the room's sonic signature and apply equalization as needed to correct spikes and dips in the system's response. Continue these instructions with Step 8.

```

* FAR FIELD COMPLETE *
EQ successful
Speaker config detected
FL : YES      SBR: YES
CEN : YES     SBL: YES
FR : YES      SL : YES
SR : YES      SUB: YES

-> DO NEAR FIELD
BACK TO MASTER MENU
    
```

Figure 17d

System Configuration

Step 7a. If the measurements are not successful due to a missing or malfunctioning speaker, the **FAR FIELD EQ ERROR** message will appear as shown in Figure 17e. EzSet/EQ is programmed to look for speaker pairs at the front left/front right, surround left/surround right and surround back left/surround back right positions. If the test results indicate that one, but not both of the speakers in any of these pairs is present, the menu will show **NO** next to the speaker position where the tests did not report back that a speaker is present. Should this message appear, make note of the suspect speaker location, exit all menus and turn the receiver off. Check all speaker wire connections and then rerun EzSet/EQ.

```
* FAR FIELD EQ ERROR *
Detected speaker config
FL : YES   SBR: YES
CEN : YES   SBL: YES
FR : YES   SL : YES
SR : NO    SUB: YES
Verify spkr connections
Verify mic position
Reduce background noise
→ BACK TO MASTER MENU
```

Figure 17e

Step 7b. In some cases, the system may not function properly due to overly high output levels. When this occurs, you will see the message shown in Figure 17f. If you see this message verify that that the microphone is in the correct position, and not too close to any one speaker. Then press the **Set Button 16** to go back to the **MASTER MENU**. From there, return to the EzSet/EQ system and when you are once again at the **FAR FIELD MEASURE** screen, reduce the system volume level by 3dB before trying EzSet/EQ again.

```
* EZSET/EQ ERROR *
An overload was
detected. Please
verify mic position.
Reduce the volume by
3dB and repeat the
procedure.
→ BACK TO MASTER MENU
```

Figure 17f

Step 8. When the Far Field measurements are completed, the system will ask you to take three Near Field measurements, one at each front speaker position. These measurements enable EzSet/EQ to produce the most accurate settings for both high and low frequency equalization. The Near Field measurements are similar to the Far Field tests, except that the system will "listen" to only one speaker at a time, rather than sending the test signals to all speakers in rotation.

At the **NEAR FIELD EQ SELECT** menu (Figure 17g) that should be on your screen after completing the instructions in Step 6, press the **Set Button 16** to start the near field measurements with the front left speaker. If you are repeating the setup process, you may also use the **▲/▼ Navigation Button 15** to select any of the three speaker positions shown.

```
* NEAR FIELD EQ SELECT *
Please select
→ 1. FL Speaker
  2. C Speaker
  3. FR Speaker
BACK TO MASTER MENU
```

Figure 17g

At the **NEAR FIELD EQ SELECT** menu (Figure 17g), you will see an instruction to place the microphone in a different position than the one used for the initial Far Field measurements. This time, place the microphone close to the speaker to be measured, at a distance of about 60 cm. In addition, the top of the microphone should be pointed towards the speaker, rather than pointing up as was done for the Far Field tests. For the first measurement, place the microphone so that it is close to, and pointing towards, the front left speaker, and with the on-screen **→** cursor pointing to **1. FL SPEAKER**, and press the **Set Button 16**.

Step 9. You will now see a Warning message similar to the one shown in Figure 17c except that it will contain an option to return to the **NEAR FIELD EQ SELECT** menu (Figure 17g) as well as the ability to return to the **MASTER MENU**. If you are ready to proceed with the test, make certain that the microphone is properly pointed toward the speaker selected for calibration, press the **► Navigation Button 15** so that **ON** is highlighted and press the **Set Button 16**.

Step 10. One short test signal will be sent to the speaker position being calibrated and after a slight pause from the system to calculate the test results, you will see either a "Near Field Complete" message or a "Near Field Error" message. In most cases, the "Complete" message will appear, in which case you should proceed to Step 11, if an "Error" message appears, go to Step 12.

Step 11. If the test results were successful, the message shown in Figure 17h will appear. In order to properly calibrate the system, you will need to run the Near Field tests for all three front channel speakers (left, center and right). After running the test for the front left speaker, make certain that the cursor is pointing towards **BACK TO NEAR FIELD** and press the **Set Button 16**. When you are taken back to the Near Field Select menu (Figure 17g) where you should repeat Steps 8 through 11 until all three front speakers have been calibrated. When that is done the EzSet/EQ process is complete and you should press the **▼ Navigation Button 15** to return to the Master Menu.

```
* NEAR FIELD COMPLETE *
EZSET/EQ has success-
Fully performed
Near Field Eq for
the selected speaker.
→BACK TO NEAR FIELD
BACK TO MASTER MENU
```

Figure 17h

Step 12. If a "Near Field Error" message appears, as shown in Figure 17i, you should check to make certain that the microphone is about 60 cm from the speaker being tested and that the top of the microphone unit is pointing towards the speaker. You may also have to raise or lower the master volume to achieve accurate readings. After checking these two items, as needed, make certain that the cursor is pointing to the **BACK TO NEAR FIELD** line and press the **Set Button 16**. This will return you to the **NEAR FIELD EQ SELECT** menu (Figure 17g) where you should repeat Steps 8 through 11, adjusting the mike placement and volume level as needed until the **NEAR FIELD COMPLETE** menu (Figure 17h) appears after the test tone stops.

System Configuration

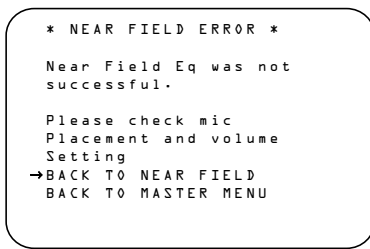


Figure 17i

When both the Far Field and Near Field measurements have been successfully completed your system is ready for use. Thanks to EzSet/EQ, the settings for speaker "size", speaker crossover, channel output and individual channel delay time have been automatically set and require no further adjustment. In addition, EzSet/EQ also performs a complete room equalization that tailors the system's performance for the best possible sound with your combination of speakers, speaker placement and room acoustics. The next few pages in this manual detail the procedure for manually entering system data, but unless you want to view the setting information and make an adjustment, you are now ready to enjoy the finest in home theater and music reproduction. Go to page 40 for complete information on operating your AVR.

Manual Setup

In most cases it is simpler, easier and more accurate to let EzSet/EQ take care of entering the system parameters for speaker "size", speaker crossover, channel output and individual channel delay time. However, if you feel that your listening room or system components are best suited to manual entry of these settings, the AVR 645 also allows you to enter or trim any of these traditional system parameters. Even if you do make the settings manually, we recommend that you run the EzSet/EQ tests first so that a baseline setting is established, and then make your adjustments from there. Note that once EzSet/EQ has been run you do not need to adjust all system settings, only those that you want to adjust.

To view or change the current settings, press the **OSD Button** **22** on the remote to bring up the **MASTER MENU** (Figure 7). Next, press the **Navigation Button** **15** as needed until the cursor is on the **EZSET/EQ** line. Navigate to the **EZSET/EQ MANUAL SETUP** line. Press the **Set Button** **16** to view the **MANUAL SETUP** menu (Figure 18).

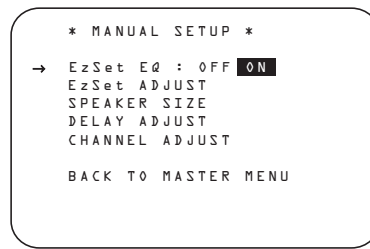


Figure 18

If you have already run the EzSet/EQ calibration system, the first line of the menu enables you to hear the difference between the settings established by EzSet/EQ. The default setting is **OFF**, which plays the incoming source with the EzSet/EQ settings. To hear the system in a Bypass mode, with none of the equalization filters in the circuit path, press the **Navigation Button** **15** so that **OFF** is highlighted. Note that once changed, this setting will remain until you change it again in this menu. While you may want to use this menu option to hear the difference that EzSet/EQ makes, we recommend that you leave the setting on to take advantage of the benefits of EzSet/EQ's advanced room correction technology.

The **EZSET ADJUST** line on the menu enables you to set the system's Tilt, or high-frequency boost. To make this adjustment, first make sure that **EZSET EQ** line is set to **ON**, as this item is not available when EzSet EQ is not in the signal path. When the cursor is on the **EZSET ADJUST** line, press the **Set Button** **16**, and then press the **Navigation Button** **15** to enter the desired setting. When you have completed your adjustment, press the **Navigation Button** **15** to move the cursor down to the **BACK TO MANUAL SETUP** line and press the **Set Button** **16**.

Note on Manual Setup Menus: Each of the four major manual setup menus (Speaker Size, Speaker Crossover, Delay Adjust and Channel Adjust) includes a line that reads **EZSET SETTINGS**. When the default setting of **OFF** is shown you are able to make any required adjustments that are available on that menu. However, you may change the setting to **ON** at any time to recall the settings established when EzSet/EQ was last run. It is also important to note that when the EzSet/EQ settings are in use, the AVR will not allow any changes to be made. To trim the settings press the **Navigation Button** **15** until the cursor is on the **EZSET SETTINGS** line on the menu in use and press the **Navigation Button** **15** to change the setting to **OFF**. This will allow you to make changes to the settings on that menu.

Speaker Size Menu

Although most listeners will prefer to take advantage of the accuracy and speed of EzSet/EQ to make all of the necessary speaker adjustments, advanced users may wish to experiment with how different combinations of settings sound in their home theater environment or to use settings other than those calculated by EzSet/EQ, to accommodate personal listening preferences.

The menu system used in your AVR differs somewhat from conventional speaker setup menus in that it consolidates the speaker "size" and crossover into one convenient menu. Even if you are familiar with making these adjustments, it is strongly recommended that you read the following section of this manual.

On the **SPEAKER SIZE** menu (Figure 19) you have the option to change the type of speaker configured for each of the four position groups, to change the crossover setting for any one of those speakers, to adjust the setting point for the low-pass filter that determines which frequencies are sent to the subwoofer for low-frequency effects (LFE) signals, to change the subwoofer bass redirection mode when the Front Left/Right speakers are set to Large and to change the setting for the subwoofer size. If, as recommended, you have first run the EzSet/EQ system, as shown on pages 29-32, the settings established by EzSet/EQ will be displayed as a starting point for any manual adjustments. You may reestablish those settings at any time during an adjustment on this menu by pressing the **Navigation Button** **15** until the cursor is on the **EZSET SETTINGS** line of the menu and then pressing the **Navigation Button** **15** so that **ON** is highlighted in reverse video. Note, however, that once this is done, any manual adjustments made will be lost and must be reentered.

Speaker Size

At each of the four speaker group positions, you have the ability to select the speaker "size" and, when a "Small" speaker is selected, the frequency below which low-frequency information is sent to the subwoofer, as opposed to the speakers for the channel being adjusted. For that reason, before making the adjustments on the **FRONT L/R**, **CENTER**, **SIDE SURR** and **BACK SURR** menu lines, it is important to know the frequency range for the speaker. This information is typically found in the "Specifications" section of the speaker's owner's manual. If you cannot find the specification for the lowest frequency the speaker can handle, start with the settings entered by running EzSet/EQ and then try one setting above or below the existing entry. We do not recommend changing the crossover point more than that due to the possible impact

System Configuration

that will have on the speaker's performance. If you do not have access to the owner's manual for a particular speaker, you should be able to obtain the needed information from the Web site or customer service department of the speaker's manufacturer.

To manually adjust the speaker settings, go to the **SPEAKER SIZE** menu by pressing the **OSD Button** **22** on the remote and when the **MASTER MENU** (Figure 7) appears, press the **▲/▼ Navigation Button** **15** until the cursor is on the **MANUAL SETUP** line and press the **Set Button** **16**. When the **MANUAL SETUP** menu (Figure 18) appears, press the **▲/▼ Navigation Button** **15** again until the cursor is on the **SPEAKER SIZE** line and press the **Set Button** **16**.

On the **SPEAKER SIZE** menu (Figure 19) you will see a display of either the settings that were established when EzSet/EQ was run, or the factory default settings if you have not yet run the automated system.

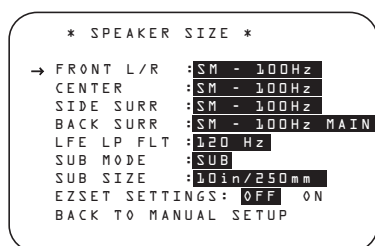


Figure 19

To change the setting for any of the four speaker positions, press the **▲/▼ Navigation Button** **15** until the cursor points to the line where you wish to make the change. Press the **◀▶ Navigation Button** **15** to change the setting, but note that when you do this for the first time in the menu, a warning message (Figure 20) will appear in the on-screen display reminding you to rerun EzSet/EQ after you are finished with any speaker configuration changes. This is necessary to make any level output adjustments needed after the setting changes so that the new configuration will be properly integrated.

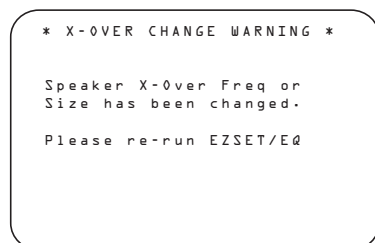


Figure 20

The warning message will remain for four seconds and then the **SPEAKER SIZE** menu will return to the screen. At this point you may change the settings to the "size" or crossover for any of the four speaker positions using the **Navigation Buttons** **15** as shown above. The information below details the settings available for each of the speaker configurations.

At each of the four speaker position lines, you have the option to set the speaker size and crossover. Note that the "size" does not refer to the speaker's actual physical size, but rather to the ability of the speaker to reproduce low-frequency information. If your speakers at any position are traditional full-range models capable of handling the full audio spectrum, select **LARGE**. These speakers are called "large" since the low-frequency drivers required to play bass without strain or distortion are typically eight to fifteen inches in diameter, in turn making the speaker cabinet larger than those with small (or no) low-frequency drivers. When the speakers at a particular position are smaller frequency-limited speakers that do not have the ability to properly reproduce low-frequency sounds, select **SMALL**.

At all speaker positions except for the front left/right speakers, you may also select **NONE**. This setting tells the system that no speakers are present at that position, allowing the AVR to select the correct surround modes that are compatible with the number of speakers installed. For example, in order to use the Dolby Digital EX, Dolby Pro Logic IIx, DTS-ES, Logic 7/7- channel and "7 Stereo" modes, you must have either **LARGE** or **SMALL** speakers entered as the setting for the **BACK SURR** channels.

When **LARGE** is selected for any channel, a full-range signal will be sent to the speaker outputs for that channel. For all speaker positions except the front left/right, when **LARGE** is chosen, no derived sound will be sent to the subwoofer output, although in all cases the special low-frequency effects (LFE) signals available on 5.1 or 6.1 digital programs will always be sent to the subwoofer output.

When **SMALL** is selected for any channel, you may also enter a setting for the crossover frequency at which sound is divided between the frequency above which sound is sent to the channel's speakers and below which sound is sent to the subwoofer. When configuring a "small" speaker, choose the setting that has the frequency closest to that of the lowest frequency the speakers in question are capable of handling. If one of the six available crossover points does not match, select the one that is above, but closest to, the speaker's low-frequency limit.

When there are no speakers available at a specific position, select **NONE**. When this option is chosen for the Center or Side Surround speakers, the sound that would normally be sent to these channels will be split between the front left and right speakers. Note that when your system does not include Center or Surround speakers, the use of Dolby Virtual Speaker as a surround mode may provide a sound field that simulates the presence of these speakers. (See page 39 for more information on the Dolby Virtual Speaker mode.)

Note that when **NONE** is selected for the Back Surround speakers, the 6.1/7.1 channel surround modes are not available. When this is the case for your system you may wish to take advantage of the availability of the unused amplifier channel pair to power a second set of speakers in another room. See page 33 for more information on amplifier configuration.)

Once any desired changes have been made to the speaker size and/or crossover, press the **▲/▼ Navigation Button** **15** to move the cursor to any other line on this menu to make a setting change, or go to the **BACK TO MANUAL SETUP** menu and then press the **Set Button** **16** to continue with overall configuration.

LFE Low-Pass-Filter Setting

The **LFE LP FLT** line selects the frequency setting below which sounds that may be available from a special low-frequency effects (LFE) track are sent to the subwoofer. In most cases, this setting will be set accurately by EzSet/EQ but, should you wish to make a change from that setting or the 120Hz frequency that is most commonly used in the creation of LFE channels by motion picture sound mixers, after making sure that the **SPEAKER SIZE** menu (Figure 19) is on the screen, press the **▲/▼ Navigation Button** **15** so that the cursor is pointing to **LFE LP FLT**. Press the **◀▶ Navigation Button** **15** to begin the selection process, and note that the warning message (Figure 20) will appear reminding you to rerun EzSet/EQ after all changes have been made.

When the **SPEAKER SIZE** menu returns to the screen, press the **◀▶ Navigation Button** **15** to make your selection. When the desired setting appears, press the **▲/▼ Navigation Button** **15** to move the cursor to any other line on this menu where you wish to make a setting change, or go to the **BACK TO MANUAL SETUP** menu and then press the **Set Button** **16** to continue with overall configuration.

System Configuration

Sub Mode Setting

When the Front Left/Right speakers are configured as "Large" and a subwoofer is detected by EzSet/EQ or manually configured as being available, additional options are available to further customize bass redirection. To change these settings, first make sure that the **SPEAKER SIZE** menu (Figure 19) is on the screen, and then press the **▲/▼ Navigation Button 15** so that the cursor is pointing to **SUB MODE**. Press the **◀▶ Navigation Button 15** to begin the selection process, and note that the warning message (Figure 20) will appear reminding you to rerun EzSet/EQ after all changes have been made.

The following options are available:

- The default setting for Large front left/right speakers when a subwoofer is present is **SUB L/R + LFE**. In this mode, all sounds below the crossover point set on the **LFE L P F L T** line will be sent to BOTH the subwoofer and the front left/right speakers.
- To send only the LFE channel information to the subwoofer, but have all other ("derived") low-frequency sounds sent to the front left/right speakers, select the **SUB (LFE)** setting.
- To have low-frequency information sent to the subwoofer only when Large speakers are selected, choose **SUB (L/R)**. This option is only available when the unit is set to **SURROUND OFF** so that a pure analog audio path is provided.
- When no subwoofer is present and Large speakers are configured for the front left/right position, select **NONE**. This will route all low-frequency information to the front left/right speakers.

When the **SPEAKER SIZE** menu returns to the screen, replacing the warning message, press the **◀▶ Navigation Button 15** to make your selection. When the desired setting appears, press the **▲/▼ Navigation Button 15** to move the cursor to any other line on this menu where you wish to make a setting change, or go to the **BACK TO MANUAL SETUP** menu and then press the **Set Button 16** to continue with overall configuration.

Subwoofer Size

The final setting on the **SPEAKER SIZE** menu enables you to change the setting for the subwoofer size. In the event that EzSet/EQ did not accurately enter the correct size, or if you wish to experiment with a different setting, first make sure that the **SPEAKER SIZE** menu (Figure 19) is on the screen; then press the **▲/▼ Navigation Button 15** so that the cursor is pointing to **SUB SIZE** and then press the **◀▶ Navigation Button 15** to begin the selection process. Note that a warning message will appear for 4 seconds to remind you to rerun EzSet/EQ after all changes have been made.

Select a setting that best matches the diameter of your subwoofer's driver, or which provides the appropriate high-pass filter setting for your system. In each case, the frequency of the high-pass filter determines the frequencies below which no information is sent to the subwoofer:

- The setting for an 8-inch/200mm driver activates a 38Hz subwoofer high-pass filter.
- The setting for a 10-inch/250mm driver activates a 30Hz subwoofer high-pass filter.
- The setting for a 12-inch/305mm driver activates a 20Hz subwoofer high-pass filter.
- The setting for a 15-inch/380mm driver activates a 15Hz subwoofer high-pass filter.

When all changes to Speaker-related settings have been made, press the **▲/▼ Navigation Button 15** until the cursor is on the **BACK TO MANUAL SETUP** menu and then pressing the **Set Button 16** so that you may make any other adjustments to the system parameters. It is also important to remember to rerun the EzSet/EQ system if any changes have been made to the settings on this menu, following the instructions shown on page 33 for using the Manual mode.

The Speaker Configuration may also be changed at any time without using the full-OSD on-screen menu system by pressing the **Speaker Selector 6** on the front panel or **38** on the remote control. Once the button is pressed, **FRONT SPEAKER** will appear in both the lower third of the video display and the **Main Information Display 29**.

Within five seconds, either press the **◀▶** buttons **7 14** on the front panel or the **▲/▼** buttons **15** on the remote to select a different speaker position, or press the **Set Button 12 16** to begin the adjustment process for the front left and right speakers.

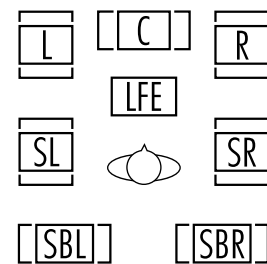
When the **Set button 12 16** has been pressed and the system is ready for a change to the front speaker setting, the on-screen display and **Main Information Display 29** will read **FRONT LARGE** or **FRONT SMALL** depending on the current setting. Press the **◀▶** buttons **7 14** on the front panel or the **▲/▼** buttons **15** on the remote until the desired setting is shown, using the instructions for "large" or "small" shown earlier, then press the **Set button 12 16**.

If another speaker position needs to be changed, press the **◀▶** buttons **7 14** on the front panel or the **▲/▼** buttons **15** on the remote until the correct speaker setting is shown and press the **Set button 12 16** again to confirm the selection.

To assist in making these settings, the icons in the **Speaker/Channel Input Indicators 24** will change as the speaker type is selected at each position. When only the inner icon box is lit, the speaker is set for "small." When the inner box and the two outer boxes with circles inside them are lit, the speaker is set for "large." When no indicator appears at a speaker location, that position is set for "none" or "no" speaker.

Note: These icons are available only when making setup changes without the use of the full OSD mode.

As an example, in the Figure below, all speakers are set for "large," and a subwoofer is set.



Delay Settings

Due the different distances between the listening position for the front channel speakers and the surround speakers, the amount of time it takes for sound to reach your ears from the front or surround speakers is different. You may compensate for this difference through the use of the delay settings to adjust the timing for the specific speaker placement and acoustic conditions in your listening room or home theater.

System Configuration

To re-synchronize the front, center and surround channels at first measure and note the distance from the listening/viewing position to the front, center, surround and surround back (if any) speakers in meters.

If you have already calibrated your system using Ezset/EQ the delay settings shown will reflect the results of the measurements made by Ezset/EQ. No further changes are needed unless you wish to change an item to reflect your taste or a non-standard system configuration. To change the settings, follow the instructions below to enter the distance between the speaker's location and your main listening position. The measurements need not be accurate to the inch, as the system is designed to accommodate typical listening rather than a specific "sweet spot" position.

The Delay setting for all speakers configured for your system will be available only (with 5.1 or with 6.1/7.1 configuration) when any Dolby surround mode is selected (except Dolby-3-Stereo). In addition they are selectable with these modes only, with all other modes the delay times are fixed. Note that the Delay settings are "Global" for all inputs, using those Dolby modes, and need not to be repeated with any input.

To view or change the current delay settings, make sure the **EZSET/EQ MAIN** menu (Figure 17a) is on the screen. Press the **▲/▼ Navigation Button 15 F** to move the cursor to **DELAY ADJUST** and then press the **Set Button 16 Q**. The **DELAY ADJUST** menu (Figure 21) will appear on the screen.

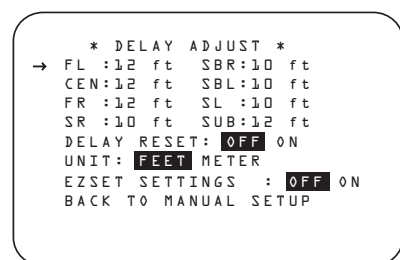


Figure 21

Next move the **→** cursor to the **UNIT** line and select the unit for distances you prefer to enter, feet or meter. Then move the **→** cursor to the **FL** line where the first adjustment is made. Now press the **◀/▶ Buttons 15 F** until the distance from the front left speaker to the preferred listening position is entered. Next press the **▼ Button 15 F** once to move to the next line.

If you wish to reset all delay settings to the factory defaults, as shown in Figure 21, press the **▲/▼ Navigation Button 15 F** until the cursor is pointing to the **DELAY RESET** line. Next, press the **◀/▶ Navigation Button 15 F** so that **OFF** is highlighted in reverse video. The settings will reset, and you may now continue to make any needed changes following the instructions shown below. Once you make the first change to the default settings, the setting on the **DELAY RESET** line will return to **OFF**, indicating that the factory defaults are no longer in effect.

Now the **→** cursor will be at the **CEN** line so that the delay for the center speaker may be set. Press the **◀/▶ Buttons 15 F** until the distance from the main listening position to the center speaker is entered. Repeat the procedure for all active speaker positions by pressing the **▼ Button 15 F** again and use the **◀/▶ Buttons 15 F** to change the setting.

If you have already run Ezset/EQ, return to the settings established by the automated system by pressing the **▲/▼ Navigation Button 15 F** until the cursor is pointing to the **EZSET SETTINGS** line. Next, press the **◀/▶ Navigation Button 15 F** so that **OFF** is highlighted in reverse video. The settings will be reset to the values calculated by Ezset/EQ, and the menu will be locked so that the settings may not be changed. To go back into the menu and make any manual changes to one or more channels, you must first return the cursor to the **EZSET SETTINGS** line and press the **◀/▶ Navigation Button 15 F** so that **OFF** is highlighted in reverse video. This will unlock the menu to allow changes.

When the delay time for all speaker positions has been set you may return to the master menu by pressing the **▲/▼ Navigation Button 15 F** until the **→** cursor is pointing to **BACK TO MANUAL SETUP** and then pressing the **Set Button 16 Q**.

Note that the delay settings may also be adjusted at any time when the Dolby Digital or Dolby Pro Logic II modes are in use by pressing the **Delay** button on the remote **36**. Then press the **▲/▼ 15** buttons on the remote to select the Center or Rear channels for adjustment, followed by a press of the **Set** button **16**. Next, press the **▲/▼** buttons **15** on the remote until the desired figure appears in the **Main Information Display 29** and press the **Set** button **16** twice to confirm the setting and return to the normal display.

When the delay settings are complete, press the **▼ Button 15 F** once so that the cursor is next to the **BACK TO MANUAL SETUP** menu line and press **Set Button 16 Q** to return to the **MANUAL SETUP** menu.

Output Level Adjustment

Output level adjustment is a key part of the configuration of any surround-sound product. It is particularly important for a digital receiver such as the AVR, as correct outputs ensure that you hear sound tracks with the proper directionality and intensity.

In most cases, you will not need to make any adjustments to the output level, as the settings made by running Ezset/EQ are as accurate as those made manually. However, you are able to use the **CHANNEL ADJUST** menu to trim the settings to suit your personal preferences or to configure the system so that the output settings are different from one input source to another. The ability to make individual output level adjustments on a per-input basis is useful for listeners who may prefer different settings for the subwoofer or an individual channel group such as the front speakers when playing musical selections via the CD input as opposed to the movie soundtracks more frequently used with the DVD input. This menu also allows you to adjust the output levels using external sources such as a test disc or other program material that you use as a standard, rather than the system's test tone.

NOTE: Listeners are often confused about the operation of the surround channels. While some assume that sound should always be coming from each speaker, most of the time there will be little or no sound in the surround channels. This is because they are only used when a movie director or sound mixer specifically places sound there to create ambience, a special effect or to continue action from the front of the room to the rear. When the output levels are properly set, it is normal for surround speakers to operate only occasionally. Artificially increasing the volume to the rear speakers may destroy the illusion of an enveloping sound field that duplicates the way you hear sound in a movie theater or concert hall.

Before beginning the output level adjustment process, make certain that all speaker connections have been properly made. The system volume should be turned down at first.

To view or change the current Channel Output settings, make certain that the **EZSET/EQ MAIN** menu (Figure 17a) is on the screen. Press the **▲/▼ Navigation Button 15 F** to move the cursor next to **CHANNEL ADJUST** and then press the **Set Button 16 Q**. The **CHANNEL ADJUST** menu (Figure 22) will appear on the screen.

System Configuration

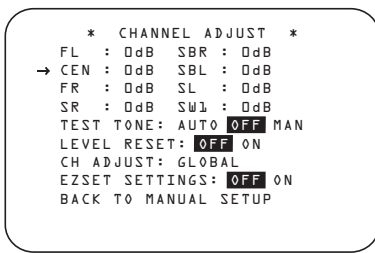


Figure 22

To provide the maximum flexibility, channel output level adjustments may be made either with or without the internal test tone, and when the tone is in use, it may be programmed to automatically circulate among the active channels or to only move from one channel to the next on your command. When the **CHANNEL ADJUST** menu appears, we recommend that you first run the test tone once in the automatic mode to verify that the speakers have been properly connected. To do this, press the **▲/▼ Navigation Button 15 F** again until the cursor is on the **TEST TONE** line and then press the **◀▶ Navigation Button 15 F** until **AUTO** is in highlighted video. The test tone will then circulate among all channels for five seconds at each position.

IMPORTANT NOTE: Because this test noise will have a much lower level than normal music, the volume must be lowered after the adjustment for all channels is made, but **BEFORE** you return to the main menu and the test tone turns off.

NOTE: Remember to verify that the speakers have been properly connected. As the test noise circulates, listen to make certain that the sound comes from the speaker position shown in the **Main Information Display 29**. If the sound comes from a speaker location that does NOT match the position indicated in the display, turn the AVR off using the **Main Power Switch 1** and check the speaker wiring or connections to external power amplifiers to make certain that each speaker is connected to the correct output terminal.

After checking for speaker placement, let the test noise circulate again, and listen to see which channels sound louder than the others. Using the front left speaker as a reference, press the **◀▶ Buttons 15 F** on the remote to bring all speakers to the same volume level. When one of the **◀▶** buttons is pushed, the test noise circulation will pause on the channel being adjusted to give you time to make the adjustment. When you release the button, the circulation will resume after five seconds. The on-screen cursor **→** and the test noise can also be moved directly to the speaker to be adjusted by pressing the **▲/▼ buttons 15 F** on the remote.

Continue to adjust the individual channels until the volume level sounds the same from each speaker. Note that adjustments should be made with the **◀▶ Buttons 15 F** on the remote only, NOT the main volume controls.

If you are using a sound-pressure level (SPL) meter for precise level adjustment with the test tone, open the main **Volume Control 40** to -15dB and set the individual output level for each channel so that the meter reads 75dB, C-Weighted Slow. After all settings are made turn the main volume down.

You may also make these same adjustments with complete manual control over the channel being adjusted by pressing the **▲/▼ Navigation Button 15 F** until the **→** cursor is pointing to the **TEST TONE** line on the menu and then using the **◀▶ Navigation Button 15 F** to select **MAN** in the highlighted video. In the **MAN** mode, the test tone will also start immediately, but the tone will only be moved to another channel by pressing the **▲/▼ Navigation Button 15 F**. When the manual sequencing mode is active, the tone is turned off by pressing the **▲/▼ Navigation Button 15 F** until the **→** cursor is pointing to the **TEST TONE** line and the **◀▶ Navigation Button 15 F** is then pressed to select **OFF** in the highlighted video.

The final option for tone adjustment using the menu system is to not use the internal test tone at all. To do this, simply use the **▲/▼ Navigation Button 15 F** to change the channel and then use the **▲/▼ Navigation Button 15 F** to change the output level. When making channel output adjustments without the internal test tone we strongly recommend that you use a test disc in the "repeat" mode on your DVD or CD player so that the signal being used is constant throughout the adjustment process.

NOTE: The subwoofer output level is not adjustable using the test tone. To change the subwoofer level, follow the steps for Output Level Trim Adjustment on page 46.

When all channels have an equal volume level, the adjustment is complete. Now turn the **Volume 40** down to about -40dB, otherwise the listening level may be too high as soon as the source's music starts to play. To exit this menu, press the **▲/▼ buttons 15 F** until the on-screen **→** cursor is next to the **BACK TO MANUAL SETUP** line, and then press the **Set Button 16 Q** to return to the **MANUAL SETUP**.

The output levels may also be adjusted at any time using the remote control and semi-OSD system. To adjust the output levels in this fashion, press the **Test Button 9**. As soon as the button is pressed, the test tone will begin to circulate as indicated earlier. The correct channel from which the test noise should be heard will be shown in the lower third of the video screen and in the **Main Information Display 29**. While the test noise is circulating, the proper channel position will also be indicated in the **Speaker/Channel Input Indicators 24** by a blinking letter within the correct channel. Turn up the **Volume 40** until you can hear the test noise clearly.

To adjust the output level, press the **▲/▼ buttons 15** until the desired level is shown in the display or on screen. Once the buttons are released, the test noise will begin to circulate again in five seconds.

IMPORTANT NOTE: The Output level adjustment made will be effective for all inputs, but only for the actual surround mode selected. To be effective for any other mode select that mode (with any input) and repeat the level adjustment described above. This will also allow you to compensate level differences between speakers, that may be different with each surround mode, or to increase or decrease the level of certain speakers intentionally, depending on the surround mode selected.

Note: Output level adjustment is not available for the Surround Off mode, as no surround speakers are used (so level differences between the speakers in the room cannot occur). But to compensate level differences between stereo and other surround modes (independently from the input selected) the outputs can be adjusted with the Level Trim Adjustment procedure, see page 46, also for the Surround Off (Stereo) modes.

In addition to the controls for selecting channels and the test tone operation, the settings on this menu also allow you to reset the level settings to either the factory default of 0dB or to re-establish the settings that were entered by running Ezset/EQ.

To reset all channel levels to 0dB press **▲/▼ Navigation Button 15 F** so that the cursor is pointing to the **LEVEL RESET** line and then press the **▲/▼ Navigation Button 15 F** once so **ON** appears in highlighted video.

System Configuration

To return to the settings established by Ezset/EQ, even if you have made manual changes to the output trims using the steps shown above, press **▲/▼ Navigation Button 15 F** so that the cursor is pointing to the **EZSET SETTINGS** line and then press the **▲/▼ Navigation Button 15 F** once so **DN** appears in highlighted video. Remember that after turning the Ezset/EQ settings back on you must turn return to this menu line and change the setting to **OFF** if you wish to make any manual trim adjustments.

The final setting in this menu enables you to have the output levels remain the same for all inputs or to be adjusted differently for each (or any) input. While most listeners prefer to keep the same output levels for all sources, you may wish to raise or lower some channels, particularly the subwoofer output for a specific source such as a CD that is primarily used for music playback.

To enter individual settings for a specific channel, first make sure that you have either run Ezset/EQ and/or made any desired manual trim adjustments to set a baseline for all channels. After that is done, press the **OSD Button E** to exit the menu system and then select the input for which you wish to enter different level settings by using either the **Input Source Selectors 15** on the front panel or the buttons on the remote that are used to select an input source **B C D R**. Next, return to the **CHANNEL OUTPUT** submenu using the steps outlined above.

At the **CHANNEL OUTPUT** menu press **▲/▼ Navigation Button 15 F** until the cursor is pointing to the **LEVEL TRIM** line and then press the **▲/▼ Navigation Button 15 F** once so that **INDEPENDENT** appears in highlighted video. When this setting is active you may change the channel output levels for any input without changing the settings previously established for another.

When all changes to the Channel Output levels and the associated level trim settings have been made press the **▲/▼ Navigation Button 15 F** until the cursor is on the **BACK TO MANUAL SETUP** menu and then pressing the **Set Button 16 Q** so that you may make any other adjustments to the system parameters. If the changes just made complete the manual adjustments needed, press the **OSD Button E** to exit the menu system and resume normal system operation.

Additional Input Adjustments

After one input has been adjusted for Surround mode, digital input (if any), speaker type, and output levels, go back to the **IN/OUT SETUP** line on the **MASTER MENU** (Figure 7) and enter the settings for each input that you will use. In most cases, only the digital input and surround mode will be different from one input to the next, while the speaker type, crossover frequency, Night mode and output level settings will usually be the same and may be quickly entered by entering the same data used for the original input.

Once the settings outlined on the previous pages have been made, the AVR is ready for operation. While there are some additional settings to be made, these are best done after you have had an opportunity to listen to a variety of sources and different kinds of program material. These advanced settings are described on pages 47 to 48 of this manual. In addition, any of the settings made in the initial configuration of the unit may be changed at any time. As you add new or different sources or speakers, or if you wish to change a setting to better reflect your listening taste, simply follow the instructions for changing the settings for that parameter as shown in this section.

Having completed the setup and configuration process for your AVR, you are about to experience the finest in music and home theater listening. Enjoy!

Operation

Surround Mode Chart

MODE	FEATURES
DOLBY DIGITAL	Available only with digital input sources encoded with Dolby Digital data. It provides up to five separate main audio channels and a special dedicated Low Frequency Effects channel.
DOLBY DIGITAL EX	Available when the receiver is configured for 6.1/7.1 channel operation, Dolby Digital EX is the latest version of Dolby Digital. When used with movies or other programs that have special encoding, Dolby Digital EX reproduces specially encoded soundtracks so that a full 6.1/7.1 soundfield is available. When the receiver is set for 6.1/7.1 operation and a Dolby Digital signal is present, the EX mode is automatically selected. Even if specific EX encoding is not available to provide the additional channel, the special algorithms will derive a 6.1/7.1 output.
DTS 5.1	When the speaker configuration is set for 5.1-channel operation, the DTS 5.1 mode is available when DVD, audio-only music or laserdiscs encoded with DTS data are played. DTS 5.1 provides up to five separate main audio channels and a special dedicated low-frequency channel.
DTS-ES 6.1 Matrix DTS-ES 6.1 Discrete	When the speaker configuration is set for 6.1/7.1 operation, playback of a DTS-encoded program source will automatically trigger the selection of one of the two DTS-ES modes. Newer discs with special DTS-ES discrete encoding will be decoded to provide six discrete, full-bandwidth channels plus a separate low-frequency channel. All other DTS discs will be decoded using the DTS-ES Matrix mode, which creates a 6.1-channel sound field from the original 5.1-channel soundtrack.
DOLBY PRO LOGIC II MOVIE MUSIC DOLBY PRO LOGIC GAME	Dolby Pro Logic II is the latest version of Dolby Laboratory's benchmark surround technology that decodes full-range, discrete left, center right, right surround and left surround channels from matrix surround encoded programs and conventional stereo sources when an analog input or a digital input with PCM or Dolby Digital 2.0 recordings is in use. The Dolby Pro Logic II Movie mode is optimized for movie soundtracks that are recorded with matrix surround, by creating separate center, rear left and rear right signals. While the Pro Logic II Music mode should be used with musical selections that are recorded with matrix surround or even with normal stereo mode, creating separate rear left and rear right signals in any case. The Pro Logic II mode creates compelling five-channel surround sound from conventional stereo recordings. Game mode ensures that special effects are routed to the surround channels, while delivering their full impact using the subwoofer, thus fully immersing the game player in the universe of the video game.
DOLBY PRO LOGIC IIx MUSIC MOVIE GAME	Dolby Pro Logic IIx is the latest extension of Dolby Pro Logic II technology that creates a discrete 6.1 and 7.1 sound field from matrix surround or two-channel stereo sources in systems configured for surround back speakers. Both Movie and Music versions of Pro Logic IIx are available. Movie, Music and Game versions of Pro Logic IIx are available. Game mode ensures that special effects are routed to the surround channels, while delivering their full impact using the subwoofer, thus fully immersing the game player in the universe of the video game.
Logic 7 Cinema Logic 7 Music	Exclusive to Harman Kardon for AV receivers, Logic 7 is an advanced mode that extracts the maximum surround information from either surround-encoded programs or conventional stereo material. Depending on the number of speakers in use and the selection made in the SURROUND SELECT menu, the "5.1" versions of Logic 7 modes are available when the 5.1 option is chosen, while the "7.1" versions of Logic 7 produce a full sound field presentation, including back surround speakers when the "6.1/7.1" option is chosen. The Logic 7 C (or Cinema) mode should be used with any source that contains Dolby Surround or similar matrix encoding. Logic 7 C delivers increased center-channel intelligibility, and more accurate placement of sounds with fades and pans that are much smoother and more realistic than with former decoding techniques. The Logic 7 M or Music mode should be used with analog or PCM stereo sources. Logic 7 M enhances the listening experience by presenting a wider front soundstage and greater rear ambience. Both Logic 7 modes also direct low-frequency information to the subwoofer (if installed and configured) to deliver maximum bass impact. Logic 7 adds additional bass enhancement that circulates low frequencies in the 40Hz to 120Hz range to the front and surround speakers to deliver a less localized soundstage that appears broader and wider than when the subwoofer is the sole source of bass energy.

Operation

Surround Mode Chart

MODE	FEATURES
DTS Neo:6 Cinema DTS Neo:6 Music	These two modes are available when any analog source is playing to create a six-channel surround presentation from conventional Matrix-encoded and traditional Stereo sources. Select the Cinema version of Neo:6 when a program with any type of analog Matrix surround encoding is present. Select the Music version of Neo:6 for optimal processing when a nonencoded, two-channel stereo program is being played.
DTS 96/24	DTS 96/24 is a high-resolution format that uses a 96kHz sampling rate with 24 bits to produce extended information that improves the harmonics of the source material. The AVR is capable of automatically detecting and decoding DTS 96/24 materials and delivering them as the artist intended.
THEATER	The THEATER mode creates a sound field that resembles the acoustic feeling of a standard live performance theater, with stereo and even pure mono sources.
HALL 1 HALL 2	The two Hall modes create sound fields that resemble a small (HALL 1) or medium sized (HALL 2) concert hall, with stereo and even pure mono sources.
Dolby Virtual Speaker Reference Wide	Dolby Virtual Speaker technology uses a next-generation advanced algorithm to reproduce the dynamics and surround sound effects of a precisely placed 5.1-channel speaker system using only front left and right speakers. In the Reference Mode, the apparent width of the sound across the front image is defined by the distance between the two speakers. The Wide Mode provides a wider, more spacious front image when the two speakers are close together.
5-Channel Stereo 7-Channel Stereo	This mode takes advantage of multiple speakers to place a stereo signal at both the front and back of a room. Depending on whether the AVR has been configured for either 5.1 or 6.1/7.1 operation, one of these modes, but not both, is available at any time. Ideal for playing music in situations such as a party, this mode places the same signal at the front-left and surround-left, and at the front-right and surround-right speakers. The center channel is fed a summed mono mix of the in-phase material of the left and right channels.
SURROUND OFF (STEREO)	This mode turns off all surround processing and presents the pure left- and right-channel presentation of two-channel stereo programs.
Dolby Headphone	Dolby Headphone enables ordinary stereo headphones to portray the sound of a five-speaker surround-playback system.

Operation

Basic Operation

Once you have completed the setup and configuration of the AVR, it is simple to operate and enjoy. The following instructions should be followed for you to maximize your enjoyment of your new receiver:

Turning the AVR On or Off

- When using the AVR for the first time, you must press the **Main Power Switch 1** on the front panel to turn the unit on. This places the unit in a Standby mode, as indicated by the amber color of the **Power Indicator 3**. Once the unit is in Standby, you may begin a listening session by pressing the **System Power Control 2** or the **Source** button **15** on the front panel or the **AVR Selector 6 B**. Note that the **Power Indicator 3** will turn blue. This will turn the unit on and return it to the input source that was last used. The unit may also be turned on from Standby by pressing any of the **Source Selector** buttons on the remote **5 6 7 8 B C D** or the **Source** button **15** on the front panel.

To turn the unit off at the end of a listening session, simply press the **System Power Control 2** on the front panel or the **Power Off Button 4 A** on the remote. Power will be shut off to any equipment plugged into the rear panel **Switched AC Outlets 17** and the **Power Indicator 3** will turn orange.

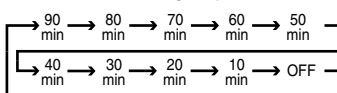
When the remote is used to turn the unit "off" it is actually placing the system in a Standby mode, as indicated by the orange color of the **Power Indicator 3**.

When you will be away from home for an extended period of time it is always a good idea to completely turn the unit off with the front panel **Main Power Switch 1**.

NOTE: All preset memories may be lost if the unit is left turned off with the **Main Power Switch 1** for more than two weeks.

Using the Sleep Timer

- To program the AVR for automatic turn-off, press the **Sleep Button 10** on the remote. Each press of the button will increase the time before shut down in the following sequence:



The sleep time will be displayed in the **Lower Display Line 29** and it will count down until the time has elapsed.

When the programmed sleep time has elapsed, the unit will automatically turn off (to Standby mode). Note that the front panel display will dim to one half brightness when the Sleep function is programmed. To cancel the Sleep function, press and hold the **Sleep Button 10** until the information display returns to normal brightness and the Sleep indicator numbers disappear and the words **SLEEP OFF** appear in the **Main Information Display 29**.

Source Selection

- To select a source, press any of the **Source Selector** buttons on the remote **5 7 8 C D**.

NOTE: After pressing one of the **Input Selector** buttons **5 D** to turn the unit on, press the **AVR Selector 6 B** to have the remote control the AVR functions.

- The input source may also be changed by pressing the front-panel **Input Source Selector** button **15**. Each press of the button will move the input selection through the list of available inputs.

- As the input is changed, the AVR will automatically switch to the digital input (if selected), surround mode component video input, A/V Sync Delay and Night Mode configurations that were in effect the last time that input was used.

- The front-panel **Video 4 Inputs 21**, **Optical Digital 4 Input 18** or the **Coaxial Digital 4 Input 20** may be used to connect a device such as a video game or camcorder to your home entertainment system on a temporary basis. When they are configured as outputs (see page 25) you can also connect an audio or video recorder (composite or S-Video) for recording the source selected.

- As the input source is changed, the new input name will appear momentarily as an on-screen display in the lower third of the video display. The input name will also appear in the **Main Information Display 29**.

- When a pure audio input (CD, Tuner, Tape, 6/8 Channel Input) is selected, the last video input used remains routed to the **Video Outputs 26 28** (except from its own Video 1/ source) and **Video Monitor Output 12**. This permits simultaneous viewing and listening to different sources.

- When a Video source is selected, its audio signal will be fed to the speakers and the video signal for that input will be routed to the appropriate **Monitor Output Jack 12** and will be viewable on a TV monitor connected to the AVR. If a component video source is connected to the **DVD 42** or **Video 1 or 2 20 22 Component Video Outputs 21**, it will be routed to the **Component Video Outputs 21**. Make certain that your TV is set to the proper input to view the appropriate video signal (composite, S-Video or component video).

6-Channel/8-Channel Direct Input

- There are four input choices available for use with sources such as a DVD-Audio or SACD player that are connected to the **8-Channel Direct Inputs 10**. Select the appropriate input according to the way your system and source equipment is configured:

- The 6 CH DIRECT input should be used when the SBR and SBL inputs are NOT in use and the input source device has its own internal bass management system. This input passes the input from the source directly through to the volume control without any analog to digital conversion and it mutes the unused input jacks to prevent unwanted noise from interfering with system performance.

- The 6 CH DVD AUDIO input should be used when the SBR and SBL inputs are NOT in use and the input source device does NOT have its own internal bass management system. When this input is in use the analog source is converted to digital so that you may use the same Quadruple Crossover bass management options for the direct input as you do with all other inputs. This input also mutes the unused input jacks to prevent unwanted noise from interfering with system performance.

- The 8 CH DIRECT INPUT should be used when an input is connected to all eight **8-Channel Direct Inputs 10** and when the input source device has its own internal bass management system. This input passes the input from the source directly through to the volume control without any analog to digital conversion.

- The 8 CH DVD AUDIO input should be used when an input is connected to all eight **8-Channel Direct Inputs 10** and the input source device does NOT have its own internal bass management system. When this input is in use the analog source is converted to digital so that you may use the same Quadruple Crossover bass management options for the direct input as you do with all other inputs.

Operation

Note that when the 6-Channel or 8-Channel Input is in use, you may not select a surround mode, as the external decoder determines the processing in use. In addition, there is no signal at the record outputs or bass management when the 6-Channel or 8-Channel Direct Input is in use and the tone or balance controls will not function.

Controls and Use of Headphones

- Adjust the volume to a comfortable level using the front panel **Volume Control** 27 or remote **Volume Up/Down** 40 1 buttons.
- To temporarily silence all speaker outputs press the **Mute** button 43 K. This will interrupt the output to all speakers and the headphone jack, but it will not affect any recording or dubbing that may be in progress. When the system is muted, the word **MUTE** will blink in the **Main Information Display** 29. Press the **Mute** button 43 K again to return to normal operation.
- During a listening session you may wish to adjust the **Bass Control** and **Treble Control** to suit your listening tastes or room acoustics. Note that these controls (and Balance) will not function when the 6/8 channel direct input is in use.
- To set the output of the AVR so that the output is "flat," with the tone and balance controls deactivated, press the **Tone Mode** button 8 44 once or twice so that the words **Tone Out** appear momentarily in the **Main Information Display** 29. To return the tone controls to an active condition, press the **Tone Mode** 8 button once or twice so that the words **Tone In** momentarily appear in the **Main Information Display** 29.
- When the tone controls are active, the amount of bass and treble boost/cut may be adjusted by first pressing the **Tone Mode Button** on the front panel 8 or the remote 44 two or three times until the desired setting (**BASS MODE** or **TREBLE MODE**) appears in the on-screen display and the **Lower Display Line** 29. Next, use the **▲/▼ Navigation Button** 15 on the remote or the **◀▶ Button** on the front panel 7 14 to change the setting as desired. The unit will return to normal operation within five seconds after the setting is changed.
- For private listening, plug the 6.3 mm stereo phone plug from a pair of stereo headphones into the front panel **Headphone Jack** 4. Note that when the headphone's plug is connected, the speakers will automatically mute and a two-channel stereo signal will be sent to the headphones. The **Lower Display Line** 29 will read **DOLBY H: B P**, indicating that the headphone output is in the Bypass mode, and to confirm that no processing is being used.

- When the headphones are in use, you may take advantage of the Dolby Headphone modes to bring added spaciousness to headphone listening. Press the **Dolby Mode Select Button** 23 or the **Surround Mode Group Selector** 5 to cycle through the three Dolby Headphone modes to select the one that you prefer.

Surround Mode Selection

One of the most important features of the AVR is its ability to reproduce a full multichannel surround sound field from digital sources, analog matrix surround encoded programs and standard stereo or even mono programs.

Selection of a surround mode is based on personal taste, as well as the type of program source material being used. For example, CDs, motion pictures or TV programs bearing the logo of one of the major surround-encoding processes, such as Dolby Surround should be played in either the Dolby Pro Logic II Movie (with movies) or Music (with music) surround mode, with any DTS NEO:6 mode or with Harman Kardon's exclusive Logic 7 Movie Mode, to create a full range 5.1 channel or (with Logic 7 and DTS NEO:6) even 7.1 channel surround signal from surround encoded programs, with a stereophonic left and right rear signal, just as it was recorded (e.g. sound being recorded from left rear side will be heard from that side only, for more details see chart on page 38).

When no rear speakers are in use, the Dolby 3 Stereo mode should be selected with all surround recordings.

Note that when Dolby Digital 2.0 signals (e.g. "D.D. 2.0" tracks from DVD), that are encoded with Dolby Pro Logic information, are received via any digital input, the Dolby Pro Logic II Movie mode will be selected automatically (in addition to the Dolby Digital mode) and will decode a full range 5.1 channel surround sound even from those recordings (see also "Dolby Digital" on page 42).

To create wide, enveloping sound field environments and defined pans and flyovers with all analog stereo recordings select the Dolby Pro Logic II Music or Emulation mode or Harman Kardon's exclusive Logic 7 Music mode for a dramatic improvement in comparison to the Dolby Pro Logic (I) mode of former times.

NOTE: Once a program has been encoded with matrix surround information, it retains the surround information as long as the program is broadcast in stereo. Thus, movies with surround sound may be decoded via any of the analog surround modes such as Pro Logic II Cinema, Logic 7 Cinema or DTS Neo:6 Cinema, when they are broadcast via conventional TV stations, cable, pay-TV and satellite transmission. In addition, a growing number of made-for-television programs, sports broadcasts, radio dramas and music CDs are also recorded in surround sound. You may view a list of these programs at the Dolby Laboratories Web site at www.dolby.com.

Even when a program is not listed as carrying intentional surround information, you may find that the Dolby Pro Logic II, Dolby Pro Logic IIx, DTS NEO:6 Music or Logic 7 Music or Enhanced modes often deliver enveloping surround presentations through the use of the natural surround information present in all stereo recordings.

However, for stereo programs without any surround information the Theater, Hall and 5/7CH Stereo modes should be tried (effective particularly with old "extreme" stereo recordings) and for mono programs, we suggest that you try the Theater or Hall modes.

Surround modes are selected using either the front panel controls or the remote. To select a new surround mode from the front panel, first press the **Surround Mode Group Selector Button** 5 until the desired major surround mode group such as Dolby, DTS or Logic 7 is selected. Next, press the **Surround Mode Selector Button** 9 to choose the specific individual surround mode.

To select a surround mode using the remote control, press the button for the major surround mode group that includes the mode you wish to choose from: **Dolby** 23, **DTS Surround** 24, **DTS Neo:6** 30, **Logic 7** 25, **Stereo** 29 or **DSP Surround** 11. The first press of the button will show the current mode from that group if it is already in use, or the first available mode if you are currently using another mode. To cycle through the available modes in that group press the button again until the desired mode appears in the **Lower Display Line** 29 and the on-screen display.

To select from the DSP modes (Hall 1, Hall 2, Theater) press the **Surround Mode Selector** 11 repeatedly to scroll through the list of available modes.

Operation

Note that the Dolby Digital or DTS modes may only be selected when a digital input is in use. In addition, when a digital source is present, the AVR will automatically select and switch to the correct mode (Dolby Digital or DTS), regardless of the mode that has been previously selected. For more information on selecting digital sources, see the following section of this manual.

When the 6-Channel/8-Channel direct inputs are in use there is no surround processing, as these inputs take the analog output signals from an optional, external DVD-Audio or SACD player, or another source device and carry them straight through to the volume control.

To listen to a program in traditional two-channel stereo, using the front left and front right speakers only (plus the subwoofer, if installed and configured), press the **Stereo Button** **5** **29** until **SURR OFF** appears in the **Main Information Display** **29**.

Digital Audio Playback

Digital audio is a major advancement over older analog surround processing systems such as Dolby Pro Logic. It delivers five or six discrete channels: left front, center, right front, left surround and right surround and with DTS ES (see below) even surround back (with identical signals for left and right). Each channel reproduces full frequency range (20Hz to 20kHz) and offers dramatically improved dynamic range and significant improvements to signal-to-noise ratios. In addition, digital systems have the capability to deliver an additional channel that is specifically devoted to low-frequency information. This is the ".1" channel referred to when you see these systems described as "5.1," "6.1" or "7.1". The bass channel is separate from the other channels, but since it is intentionally bandwidth-limited, sound designers have given it that unique designation.

Dolby Digital

Dolby Digital (originally known as AC-3®) is a standard part of DVD, and is available on specially encoded LD discs and satellite broadcasts and it is a part of the new high-definition television (HDTV) system.

Note that an optional, external RF demodulator is required to use the AVR to listen to the Dolby Digital sound tracks available on laser discs. Connect the RF output of the LD player to the demodulator and then connect the digital output of the demodulator to the **Optical** or **Coaxial** inputs **31** **32** **18** **20** of the AVR. No demodulator is required for use with DVD players or DTS-encoded laser discs.

In order to provide maximum playback compatibility with DVDs, the AVR 645 receiver will always default first to the playback mode embedded in a disc's digital "flag" information. For Dolby Digital discs, the following playback modes are initially selected after the AVR locks to the incoming digital audio data stream to identify the selected:

- When a 5.1 audio stream is detected, the Dolby Digital 5.1 format will be selected, regardless of the number of speakers in your system, in compliance with Dolby Laboratories licensing requirements.
- When a disc with the Dolby Digital EX format flag is played, your system will automatically switch to the EX mode when seven main channel speakers are available.
- When a disc with Dolby Digital data, but only 2.0 audio is detected, the default mode is Dolby Digital with Pro Logic II post-processing when you have a 5.1 speaker system, or Dolby Digital with Pro Logic IIx post-processing when you have a 7.1 speaker system.
- Depending on the number of speaker channels available in your system, once the AVR locks to the digital signal, you may select any surround mode or post-processing option that is available, based on the incoming data stream's possible restrictions and the number of speakers in your system. For example, when a 5.1 or 2.0 audio stream is in use, you may select alternate postprocessing such as Logic 7/7-Channel Movie Mode post-processing to create the rear surrounds in 7.1 speaker systems.

DTS

DTS is another digital audio system that is capable of delivering 5.1, 6.1 or 7.1 audio. Although both DTS and Dolby Digital are digital, they use different methods of encoding the signals, and thus they require different decoding circuits to convert the digital signals back to analog.

DTS-encoded sound tracks are available on select DVD and LD discs, as well as on special audio-only DTS CDs. You may use any LD, DVD or CD player equipped with a digital output to play DTS-encoded special audio-only CDs with the AVR, but DTS-LDs can be played on LD players and DTS-DVDs on DVD players only. All that is required is to connect the player's digital output to either the **Optical** or **Coaxial** input on the rear panel **31** **32** or front panel **18** **20**.

In order to listen to DVDs encoded with DTS sound tracks, the DVD player must be compatible with the DTS signal as indicated by a DTS logo on the player's front panel. Note that early DVD players may not be able to play DTS-encoded DVDs. This does not indicate a problem with the AVR, as some players cannot pass the DTS signal

through to the digital outputs. If you are in doubt as to the capability of your DVD player to handle DTS DVDs, consult the player's owner's manual.

Please note that some DVD players are shipped with their output set for Dolby Digital only. To insure that DTS data is being sent to the AVR, please check the setup menu system on your DVD player to make certain that DTS data output is enabled.

PCM Audio Playback

PCM (Pulse Code Modulation) is the non-compressed digital audio system used for compact discs, Non-Dolby Digital/DTS Laserdiscs and some special PCM encoded DVDs. The digital circuits in the AVR are capable of high quality digital-to-analog decoding, and they may be connected directly to the digital audio output of your CD/DVD or LD player (LD only for PCM or DTS programs, for Dolby Digital laser discs an RF adapter is needed, see "Dolby Digital" above).

Connections may be made to either the **Optical** or **Coaxial** inputs **31** **32** on the rear panel or the front panel **Digital Inputs** **18** **20**.

To listen to a PCM digital source, first select the input for the desired source (e.g., CD) to feed its video signal (if any) to the TV monitor and to provide its analog audio signal for recording. Next press the **Digital Select** button **25** **17** and then use the **▲/▼** buttons **15** on the remote, or the **Selector** buttons **7** **14** on the front panel, until the desired choice appears in the **Lower Display Line** **29**, then press the **Set** button **12** **16** to confirm the choice.

In most cases this will be **4 8 KHZ**, though in the case of specially mastered, high-resolution audio discs you will see a **9 6 KHZ** indication.

The **PCM 4 8 KHZ** indication will also appear when modes or inputs are changed for analog sources. In those cases the system is telling you the sampling frequency used internally at the output of the analog-to-digital converters that change the incoming signal from a VCR, tape deck, the tuner, or other ana-log source to digital.

During PCM playback the unit automatically will turn to the default surround mode or to the **LOGIC 7** mode but you also may select any surround mode except Dolby Digital or DTS.

Operation

Selecting a Digital Source

To utilize either digital mode you must have properly connected a digital source to the AVR. Connect the digital outputs from DVD players, HDTV receivers, satellite systems or CD players to the **Optical** or **Coaxial** inputs on the rear or front panel **31 32 18 20**. In order to provide a backup signal and a source for analog stereo recording, the analog outputs provided on digital source equipment should also be connected to their appropriate inputs on the AVR rear panel (e.g., connect the analog stereo audio output from a DVD to the **DVD Audio inputs 6** on the rear panel when you connect the source's digital outputs).

To select a digital source such as DVD, first select its input using the remote or front panel **Input Selector 5 15** as outlined in this manual in order to feed its video signal (if any) to the TV monitor and to provide its analog audio signal for recording. When the digital input associated with the input selected (e.g. "DVD") is not selected automatically (due to the input settings made earlier during the system configuration, see page 23), select the digital source by pressing the **Digital Input Selector** button **17 25** and then using the **▲/▼** buttons **15** on the remote or the **Selector** buttons **7 14** on the front panel to choose any of the **OPTICAL** or **COAXIAL** inputs, as they appear in the **Upper Display Line 29** on on-screen display.

When the digital source is playing, the AVR will automatically detect whether it is a multichannel Dolby Digital or DTS source, MP3 or conventional PCM signal, which is the standard output from CD players.

Note that a digital input (e.g. coaxial) remains associated with any analog input (e.g. DVD) as soon as it is selected, thus the digital input need not be re-selected each time the appropriate input choice (e.g. DVD) is made.

Digital Bitstream Indicators

When a digital source is playing, the AVR senses the type of bitstream data that is present. Using this information, the correct surround mode will automatically be selected. For example, DTS bitstreams will cause the unit to switch to DTS decoding, and Dolby Digital bitstreams will enable Dolby Digital decoding. When the unit senses PCM data, from CDs and LDs and some music DVDs or certain tracks on normal DVDs, it will allow the appropriate surround mode to be selected manually. Since the range of available surround modes depends on the type of digital data that is present, the AVR uses a variety of indicators to let you know what type of signal is present. This will help you to understand the choice of modes and the input channels recorded on the disc.

When a digital source is playing, the AVR will display a variety of messages to indicate the type of bitstream received. These messages will appear shortly after an input or surround mode is changed, and will remain in the **Main Information Display 29** for about five seconds before the display returns to the normal surround mode indication.

For Dolby Digital and DTS sources, a three digit indication will appear, showing the number of channels present in the data. An example of this type of display is 3/2/.1.

The first number indicates how many discrete front channel signals are present.

- A 3 tells you that separate front left, center and front right signals are available. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs.
- A 2 tells you that separate front left and right signals are available, but there is no discrete center channel signal. This will be displayed for Dolby Digital bit streams that have stereo program material.
- A 1 tells you that there is only a mono channel available in the Dolby Digital bitstream.

The middle number indicates how many discrete surround channel signals are present.

- A "3" tells you that separate, discrete left surround, center surround and right surround signals are present. This is available only on discs with DTS-ES digital audio.
- A 2 tells you that separate surround left and right signals are available. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs.
- A 1 tells you that there is only a single, surround encoded surround channel. This will appear for Dolby Digital bit streams that have matrix encoding.
- A 0 indicates that there is no surround channel information. This will be displayed for two-channel stereo programs.

The last number indicates if there is a discrete Low Frequency Effects (LFE) channel. This is the ".1" in the common abbreviation of "5.1" sound and it is a special channel that contains only bass frequencies.

- A .1 tells you that an LFE channel is present. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs, as available.

- A 0 indicates that there is no LFE channel information available. However, even when there is no dedicated LFE channel, low frequency sound will be present at the subwoofer output when the speaker configuration is set to show the presence of subwoofer.
- The information in the right side of the display will tell you if the digital audio data contains a special flag signal that will automatically activate the appropriate 6.1 or 7.1 mode. This will be shown as EX-ON or EX-OFF for Dolby Digital bitstreams and ES-ON or ES-OFF for DTS bitstreams.

When Dolby Digital 3/2/.1 or DTS 3/2/.1 signals are being played, the AVR will automatically switch to the proper surround mode, and no other processing may be selected. When a Dolby Digital signal with a 3/1/0 or 2/0/0 signal is detected you may select any of the Dolby surround modes.

It is always a good idea to check the readout for the channel data to make certain that it matches the audio logo information shown on the back of a DVD package. In some cases you will see indication for "2/0/0" even when the disc contains a full 5.1, or 3/2/.1 signal. When this happens, check the audio output settings for your DVD player or the audio menu selections for the specific disc being played to make certain that the player is sending the correct signal to the AVR.

USB Playback

The AVR 645 is among the very few A/V receivers capable of direct connection to a computer for audio playback. Once the AVR is connected, audio streams and playback are possible through your AVR, with all the power and performance of the high-current amplifier, your own speakers, and the enhanced multichannel playback made possible through the use of Logic 7, Dolby Pro Logic II/IIx or DTS Neo:6 processing.

The AVR's USB connectivity may be used with PC-compatible computers running either Microsoft® Windows® 2000 with Service Pack 4 or higher installed, or Windows XP® or Windows XP Media Center Edition with Service Pack 1 or higher installed. Connect one of the available USB jacks on your computer or a USB hub to the **USB Jack 18** on the AVR using a cable with a standard USB plug on one side and a USB "Mini B" plug on the other side.

Operation

In addition, you will need to have a media player installed on the computer. The AVR has been tested for operation with Windows Media Player® Version 8.0 and above, but it is also compatible with many other popular players such as iTunes®, WinAmp® and Real Player®. In most cases, it is best to always make certain that you have the latest version of the player installed to ensure the best compatibility.

When the connection between a computer and the AVR is made for the first time, or if the USB connection is plugged into a different USB jack on a computer or hub that has not been previously connected to the AVR, you will see a series of pop-up messages from Windows to indicate that the computer is configuring itself for the new device. Since the AVR provides a number of different functions, you may see the "Found New Hardware" message up to four times, one each for "AV Receiver," "Compatible Device," "Audio Receiver" and "Human Interface Device." When all messages have appeared and then cleared the screen, you are almost ready to begin.

Before selecting the USB input, first make certain that one of the media players listed above has been opened on the computer. Then you may select the USB input in any of the following ways:

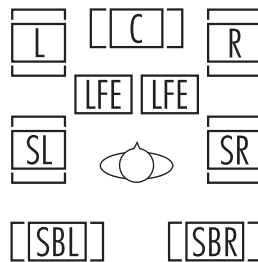
- To select USB as a source from the front panel, press the Input **Source Selector Button 15** until **USB** appears as the input name in the Upper **Display Line 29** and in the semi-OSD display, if available. The **USB Input Source Indicator 28** will also light up on the front panel.
- To select USB as the input using the main remote press the **Input Selector 5** with DMP printed on the button twice.
- To select USB as an input using the ZR 10 remote, press the **USB Input Selector D**.

When the USB input is selected and the AVR is connected to a compatible computer with one of the media players mentioned above open, you may then use either remote's transport controls to start and stop playback, as well as move to the next track. Activity of the Transport buttons may vary from one media player to another, but at the very least you will be able to use the Play and Stop buttons. You may also control the media player on a connected computer using the **Transport Controls P** on the ZR 10 remote.

Once playback is started, the audio from a USB source is treated the same as any other two-channel audio source, and you may apply any of the appropriate surround processing modes. When playing back audio from a computer via the USB connection, the internal speakers in a laptop computer are often muted.

Speaker/Channel Indicators

In addition to the **Bitstream Indicators**, the AVR features a set of unique channel-input indicators that tell you how many channels of digital information are being received and/or whether the digital signal is interrupted.



These indicators are the L/C/R/LFE/SL/SR/SBL/SBR letters that are inside the center boxes of the **Speaker/Channel Input Indicators 24** in the front panel **Main Information Display 29**.

When a standard analog stereo or matrix surround signal is in use, only the "L" and "R" indicators will light, as analog signals have only left and right channels.

Digital signals, however, may have one, two, five, six or seven separate channels, depending on the program material, the method of transmission and the way in which it was encoded. When a digital signal is playing, the letters in these indicators will light in response to the specific signal being received. It is important to note that although Dolby Digital, for example, is referred to as a "5.1" system, not all Dolby Digital DVDs or audio tracks selected on DVD or other Dolby Digital programs are encoded for 5.1. Thus, it is sometimes normal for a DVD with a Dolby Digital soundtrack to trigger only the "L" and "R" indicators.

NOTE: Many DVD discs are recorded with both "5.1" and "2.0" versions of the same soundtrack. When playing a DVD, always be certain to check the type of material on the disc. Most discs show this information in the form of a listing or icon on the back of the disc jacket. When a disc does offer multiple soundtrack choices, you may have to make some adjustments to your DVD player (usually with the "Audio Select" button or in a menu screen on the disc) to send a full 5.1 feed to the AVR or to select the appropriate audio track and thus language. It is also possible for the type of signal feed to change during the

course of a DVD playback. In some cases the previews of special material will only be recorded in 2.0 audio, while the main feature is available in 5.1 audio. As long as your DVD player is set for 6-channel output, the AVR will automatically sense changes to the bitstream and channel count and reflect them in these indicators.

Important Note: When a digital surround source (Dolby Digital, DTS) is played, the letters SBL/SBR for the Surround Back channels will appear only when a DTS ES DISCRETE 6.1 source is played. Then this surround mode will be indicated in the front display and on-screen display. With all other recordings the icons for the surround back speakers may light (when those speakers have been configured) to indicate that a signal will be fed to them (Matrix decoded with NEO:6, LOGIC 7 or 7 CH Stereo), but no letters inside will light as the unit will not receive an input signal for the surround back channels.

The letters used by the **Speaker/Channel Input Indicators 24** also flash to indicate when a bitstream has been interrupted. This will happen when a digital input source is selected before the playback starts, or when a digital source such as a DVD is put into a Pause mode. The flashing indicators remind you that the playback has stopped due to the absence of a digital signal and not through any fault of the AVR. This is normal, and the digital playback will resume once the playback is started again.

Night Mode

A special feature of Dolby Digital is the Night mode, which enables Dolby Digital input sources to be played back with full digital intelligibility while reducing the maximum peak level and lifting the low levels by 1/4 to 1/3. This prevents abruptly loud transitions from disturbing others without reducing the impact of the digital source. The Night mode is available only when the Dolby Digital mode is selected.

The Night mode may be engaged when a Dolby Digital DVD is playing by pressing the **Night Button 12** on the remote. Next, press the **▲/▼** buttons **15** to select either the middle range or full compression versions of the Night mode. To turn the Night mode off, press the **▲/▼** buttons **15** until the message in the lower third of the video display and the **Lower Display Line 29** reads **D - RANGE OFF**.

The Night mode may also be selected to always be on as soon as the Dolby Digital mode is activated at either level of compression using the options in the **Surround Select** menu. See page 27 for information on using the menus to set this option.

Operation

IMPORTANT NOTES ON DIGITAL PLAYBACK:

- When the digital playback source is stopped, or in a pause, fast forward or chapter search mode, the digital audio data will momentarily stop, and the channel position letters inside the **Speaker/Channel Indicators 24** will flash. This is normal and does not indicate a problem with either the AVR or the source machine. The AVR will return to digital playback as soon as the data is available and when the machine is in a standard play mode.


- Although the AVR will decode virtually all DVD movies, CDs and HDTV sources, it is possible that some future digital sources may not be compatible with the AVR.

- Note that not all digitally encoded programs and not all audio tracks on a DVD contain full 5.1 or 6.1 channel audio. Consult the program guide that accompanies the DVD or laser disc to determine which type of audio has been recorded on the disc. The AVR will automatically sense the type of digital surround encoding used, indicate it in the **Channel Input Indicators 24** and adjust to accommodate it.

- When a Dolby Digital or DTS source is playing, you normally may not be able to select some of the analog surround modes such as Dolby Pro Logic II, Dolby 3 Stereo, Hall, Theater, 5CH/7CH Stereo or Logic 7, except with specific Dolby Digital 2.0 recordings that can be played with the Pro Logic II modes too (see page 42).

- When a digital source is playing, it is possible to make an analog recording using the **Tape 4** or **Video 1** or **Video 2** or **3/37** record outputs, even if the source is connected to any digital input of the AVR only, as long as "Surround Off" mode is selected (possible with a PCM source only). But the analog two channel signal, even of a Dolby Digital (not DTS) source, the "Downmix" to Stereo or Dolby Surround, can be recorded by connecting its analog audio outputs to the appropriate analog inputs (e.g. DVD) of the AVR. Additionally, the digital signals will be passed through to the **Digital Audio Outputs 11**.

Using

The AVR 645 is equipped for use with Harman Kardon's optional  iPod docking station.

When The Bridge is connected to the AVR and an iPod properly docked, you may use either remote to control the iPod for audio playback, while using the front-panel display and on-screen semi-OSD messages to help you locate tracks or view information about the track being played. In addition, connecting an iPod to the AVR through The Bridge also charges the iPod's battery. Using the **DMP AUTO POWER** menu option, as

described on page 48, you may even have the AVR automatically turn on with your iPod as a playback source whenever the iPod is turned on.

To select The Bridge as the AVR's input source:

- From the front panel, press the Input Source Selector **7** on the front panel as needed.
- From the main remote, press the Input DMP Selector **4**.
- From the ZR 10 remote, press the /DMP Selector **R**.

When The Bridge is connected and a compatible iPod properly docked, the iPod's menu will be replaced with "harman/kardon" at the top of the iPod's screen and the front panel display and semi-OSD message will show messages that will guide you through the menu and content selection. If the **Lower Display Line 29** shows an **UNPLUGGED...** message, please check to see that the correct iPod adapter is used in The Bridge and that the iPod is properly seated.

The AVR's front-panel controls may also be used to access a limited number of iPod functions. Press the **AM/FM 11** to play or pause the current track. The **Tuning Selector 10** may be used to search in reverse (left side of button) or forward (right side of button) through the tracks. Press the **Tuner Band Selector 11** to call up the iPod's menu. Press the **Preset Station Selectors 18** to scroll and the **Set Button 12** to select. For complete information on using the remote or front-panel controls to operate an iPod, see the instructions that are included with The Bridge.

Tape Recording

In normal operation, the audio or video source selected for listening through the AVR is sent to the record outputs. This means that any program you are watching or listening to may be recorded simply by placing machines connected to the outputs for **Tape Outputs 4** or **Video 1** or **2 Outputs 26 28 33 37** in the record mode.

When a digital audio recorder is connected to any of the **Digital Audio Outputs 11**, you are able to record the digital signal using a CD-R, MiniDisc or other digital recording system. Note that all digital signals will be passed through to both, coaxial and optical, digital outputs simultaneously, no matter which kind of digital input was selected.

Front Panel In/Outputs

In addition to the rear panel digital outputs, the AVR offers Harman Kardon's exclusive configurable front panel output jack feature. For easy connection of portable devices, you may switch the front panel **Digital Coax 4 jack 20** or the **Video 4 jack 21** from an input to an output by following these steps:

1. Press the **OSD button 22** to view the **MASTER MENU** (Figure 7).
2. Press the **Set button 16** to enter the **IN / OUT SETUP** menu (Figure 8).
3. Press the **▼ button 15** so that the on-screen **→** cursor is next to **VIDEO 4** or **COAXIAL 4** depending on which input you wish to change to an output. Either input, or both may be changed at any time.
4. Press either of the **◀/▶ buttons 15** so that the word **OUT** is highlighted.
5. Press the **OSD button 22** to exit the menus and return to normal operation.

Note that once the setting is made, the appropriate **Input/Output Status Indicator 19** will turn red, indicating that the selected analog or digital jacks are now an output, instead of in the default setting as an input. Once changed to an output, the setting will remain as long as the AVR is turned on, unless the setting is changed in the OSD menu system, as described above. Note, however, that once the AVR is turned off, the setting is cancelled. When the unit is turned on again, the front panel jacks will return to their normal default setting as an input. If you wish to use the jacks as an output at a future time, the setting must be changed again using the OSD menu system, as described above.

NOTES:

- The digital outputs are active only when a digital signal is present, and they do not convert an analog input to a digital signal, or change the format of the digital signal (e.g. Dolby Digital to PCM or vice versa, but coaxial digital signals are converted to optical signals and vice versa). In addition, the digital recorder must be compatible with the output signal. For example, the PCM digital output from a CD player may be recorded on a CD-R or MiniDisc, but Dolby Digital or DTS signals may not.

- To make an analog recording from a digital source is possible, but only from a PCM source (not Dolby Digital or DTS) and correctly only with "Surround Off" mode (with any Surround mode only the L/R front signals will be fed to the record outputs).

Operation

Output Level Adjustment With Source Signals

Normal output level adjustment for the AVR is established using the test tone, as outlined on page 36. In some cases, however, it may be desirable to adjust the output levels using program material such as a test disc, or a selection you are familiar with. Additionally, the output level for the subwoofer and those for the Stereo modes can only be adjusted using this procedure. Note that all adjustments made with any input will be effective with all inputs selected, just as it is the case with the adjustment using the test tone.

To adjust the output levels using program material, first select the surround mode for which you want to trim the speakers (see NOTE below), start your program material source and set the reference volume for the front left and front right channels using the **Volume Control** 40 1.

Once the reference level has been set, press the **Channel Select** button 13 26 and note that **FRONT LEVEL** will appear in the **Lower Display Line** 29. To change the level, first press the **Set** button 16 12, and then use the **Selector** buttons 7 14 or the **▲/▼** buttons 15 to raise or lower the level. DO NOT use the volume control, as this will alter the reference setting.

Once the change has been made, press the **Set** button 16 12 and then press the **Selector** buttons 7 14 or the **▲/▼** buttons 15 to select the next output channel location that you wish to adjust. To adjust the subwoofer level, press the **Selector** buttons 7 14 or the **▲/▼** buttons 15 until **W O O F E R L E V E L** appears in the **Main Information Display** 29 or on-screen display (only available if the subwoofer is turned on).

Press the **Set** button 16 12 when the name of the desired channel appears in the **Main Information Display** 29 and on-screen display, and follow the instructions shown above to adjust the level.

Repeat the procedure as needed until all channels requiring adjustment have been set. When all adjustments have been made and no further adjustments are made for five seconds, the AVR will return to normal operation.

The channel output may also be adjusted using the full-OSD on-screen menu system. First, set the volume to a comfortable listening level using the **Volume Control** 27 40 1. Then, press the **OSD** button 22 to bring up the **MASTER MENU** (Figure 7). Press the **▼** Button 15 four times until the on-screen **→** cursor is next to the **MANUAL SETUP** line. Press the **Set**

Button 16, select the **CHANNEL ADJUST** line and press the **Set** Button 16 to activate the **CHANNEL ADJUST** menu (Figure 22).

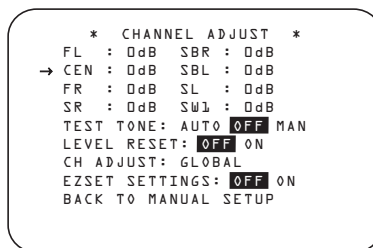


Figure 22

When the menu appears, the internal test tone will be turned off. This will allow you to use your external test disc or other source material as the test signal. Then, use the **▲/▼** Buttons 15 to select the channels to be adjusted. At each channel position use the **◀/▶** Buttons 15 to change the output level.

Remember, when you are using a disc with test signal (e.g. pink noise) or an external signal generator as the source, the goal is to have the output level at each channel be equal when heard at the listening position, with any surround mode selected. When your test source is a normal disc with music signals, you may adjust the level for each channel and surround mode as you prefer, e.g. you may lower the center channel level when you find it to be too high or increase the level of the rears when you find it to be too low with specific surround modes.

If you wish to reset all the levels to their original factory default of 0dB offset, press the **▲/▼** Buttons 15 so that the on-screen cursor is next to the **LEVEL RESET** line and press the **◀/▶** Buttons 15 so that the word **ON** is highlighted. After the levels are reset, resume the procedure outlined above to reset the levels to the desired settings. When all adjustments are done, press the **▲/▼** Buttons 15 to move the on-screen **→** cursor so that it is next to **BACK TO MANUAL SETUP** and then press the **Set** Button 16 if you wish to go back to the main menu to make other adjustments. If you have no other adjustments to make, press the **OSD** Button 22 to exit the menu system.

NOTE: The output levels may be separately trimmed for each digital and analog surround mode. If you wish to have different trim levels for a specific mode, select that mode and then follow the instructions in the steps shown above.

With Stereo modes the adjustment procedure described above is the only way to trim the output level, e.g. to match the Stereo level with other modes.

EzSet/EQ On/Off

If you wish to turn the filter settings established by EzSet/EQ on or off to demonstrate the impact EzSet/EQ has on the sound of your system, simply press the **EzSet/EQ On/Off** button 41. Using this feature does not change the settings; it merely puts them in or out of the signal path.

Dim Function

Since the AVR will often be used when movies or other video programming is viewed under low-light conditions, you may wish to lower the brightness of the front-panel displays and indicators so that they do not distract from the video presentation. You may dim the displays using the menu system, as shown on page 47, or you may control the brightness directly from the remote.

Simply press the **Dim** Button 14 once to dim the front panel to half the normal brightness level; press it again to turn the displays off. Note that when the displays are dimmed or turned off, the blue lighting around the **Standby/On** Switch 3 will continue to stay lit as a reminder that the AVR is still turned on.

The accent lighting for the **Volume Control** 27 will remain at its normal level, rather than dim when the panel displays are at half brightness.

Note that all changes to the front-panel brightness level are temporary; the displays will return to full brightness after the AVR is turned off and then on again. To return the displays to full brightness without turning the unit off, press the **Dim** Button 14 as needed until the displays are on.

In addition to lowering the brightness of the displays or turning them off completely, you may wish to have them appear whenever a button on the remote or front panel is pushed, and then gradually fade out after a set time period. You may do this by making the appropriate settings in the **VFD FADE TIME OUT** line of the **ADVANCED SELECT** menu, as shown on page 47.

Memory Backup

This product is equipped with a memory backup system that preserves tuner presets and system configuration information if the unit is turned off completely, accidentally unplugged or subjected to a power outage. This memory will last for approximately two weeks, after which time all information must be reentered.

Advanced Features

The AVR is equipped with a number of advanced features that add extra flexibility to the unit's operation. While it is not necessary to use these features to operate the unit, they provide additional options that you may wish to use.

Front-Panel-Display Fade

In normal operation, the front-panel displays and indicators remain on at full brightness, although you may also dim them or turn them off as shown on page 46. As an additional option, you may also set the AVR so that the displays are on whenever a button is pressed on the front panel or remote, but then fade out after a set period of time.

To set the front-panel displays to the Fade mode, press the **OSD Button 22** to bring the Master Menu to the screen. Press the **▲/▼ Navigation Button 15** so that the **→** cursor is pointed to the **ADVANCED** line, and press the **Set Button 16** to enter the **ADVANCED SELECT** menu (Figure 23).

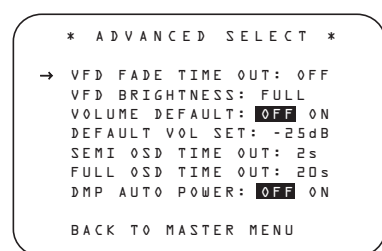


Figure 23

With the **ADVANCED SELECT** menu on your video display, press the **▲/▼ Navigation Button 15** so that the **→** cursor is pointed to the **VFD FADE TIME OUT** line. Next, press the **◀/▶ Navigation Button 15** so that the amount of time that you wish the displays to fade out after a button is pressed is shown.

Once this time is set and the unit returned to normal operation, the displays will remain on for the time period selected whenever a button is pressed on the front panel or remote. After that time they will gradually fade out, with the exception of the lighting surrounding the **Standby/On Switch 3**, which remains on to remind you that the AVR is turned on. Note that if the displays have been turned completely off using the Dim Button, as shown on page 46, the Fade function will not operate.

If you wish to make adjustments to other items on the **ADVANCED SELECT** menu, press the **▲/▼ Navigation Button 15** to place the **→** cursor next to the desired item, or place the **→** cursor next to the **BACK TO MASTER MENU** line and press the **Set Button 16** to make an adjustment to another menu. If you have completed all adjustments, press the **OSD Button 22** to exit the menu system.

Display Brightness

The AVR's front panel **Main Information Display 29** is set at a default brightness level that is sufficient for viewing in a normally lit room. However, in some home theater installations, you may wish to occasionally lower the brightness of the display, or turn it off completely.

To change the display brightness setting for a specific listening session, you will need to make an adjustment in the **ADVANCED SELECT** menu. To start the adjustment, press the **OSD button 22** to bring the **MASTER MENU** to the screen. Press the **▲ Button 15**, until the on-screen **→** cursor is next to the **ADVANCED** line. Press the **Set Button 16** to enter the **ADVANCED SELECT** menu (Figure 23).

To change the brightness setting, at the **ADVANCED SELECT** menu, make certain that the on-screen **→** cursor is next to the **VFD** line, and press the **▶ Button 15** until the desired brightness level is highlighted in the video display. When **FULL** is highlighted, the display is at its normal brightness. When **HALF** is highlighted, the display is at half the normal brightness level. When **OFF** is highlighted, all of the indicators in the **Main Information Display 29** will go dark. Note, however, that the **Power Indicator 3**, will always remain lit to remind you that the unit is turned on.

If you wish to make other adjustments in the menu, press the **▲/▼ Buttons 15** until the on-screen **→** cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **Set button 16**. If you have no other adjustments to make, press the **OSD Button 22** to exit the menu system.

The display brightness may also be changed by pressing and holding the **Set button 12** on the front for three seconds until the message in the **Main Information Display 29** reads **VFD FULL**. Within five seconds, press the front panel **Selector buttons 7/14** until the desired brightness display level is shown. At that point, press the **Set button 12** again to enter the setting.

Once the desired brightness level is selected, it will remain in effect until it is changed again or until the unit is turned off.

Turn On Volume Level

As is the case with most audio/video receivers, when the AVR is turned on, it will always return to the volume setting in effect when the unit was turned off. However, you may prefer to always have the AVR turn on at a specific setting, regardless of what was last in use when the unit was turned off. To change the default condition so that the same volume level is always used at turn-on, you will need to make an adjustment in the **ADVANCED SELECT** menu. To start the adjustment, press the **OSD button 22** to bring the **MASTER MENU** (Figure 7) to the screen. Press the **▲ button 15**, until the on-screen **→** cursor is next to the **ADVANCED** line. Press the **Set button 16** to enter the **ADVANCED SELECT** menu (Figure 23).

At the **ADVANCED SELECT** menu make certain that the on-screen **→** cursor is next to the **VOLUME DEFAULT** line by pressing the **▲/▼ buttons 15** as needed. Next, press the **→ button 15** so that the word **ON** is highlighted in the video display. Next, press the **▼ button 15** once so that the on-screen **→** cursor is next to the **DEFAULT VOL SET** line. To set the desired turn-on volume, press the **◀/▶ buttons 15** or hold them pressed until the desired volume level is shown on the **DEFAULT VOL SET** line. Note that this setting may NOT be made with the regular volume controls.

NOTE: Since the setting for the turn-on volume cannot be heard while the setting is being made, you may wish to determine the setting before making the adjustment. To do this, listen to any source and adjust the volume to the desired level using the regular volume controls **40/1**. When the desired volume level to be used at turn-on is reached, make a note of the setting as it appears in the lower third of the video screen or in the **Main Information Display 29**. A typical volume level will appear as a negative number such as -25dB. When making the adjustment, use the **◀/▶ buttons 15** to enter this setting.

Unlike some of the other adjustments in this menu, the turn-on volume default will remain in effect even when the unit is turned off completely, unless it is changed or turned off in this menu.

If you wish to make other adjustments in the menu, press the **▲/▼ Buttons 15** until the on-screen **→** cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **Set button 16**. If you have no other adjustments to make, press the **OSD Button 22** to exit the menu system.

Advanced Features

Semi-OSD Settings

The semi-OSD system places one line messages at the lower third of the video display screen whenever the Volume, Input Source, Surround mode or tuner frequency of any of the configuration settings are changed. The semi-OSD system is helpful in that enables you to have feedback on any control changes or remote commands using the video display when it is difficult to view the front-panel displays. However, you may occasionally prefer to turn these displays off for a particular listening session. You may also want to adjust the length of time the displays remain on the screen. Both of those options are possible with the AVR.

To turn off the semi-OSD system, you will need to make an adjustment in the **ADVANCED SELECT** menu (Figure 23). To start the adjustment, press the **OSD** button **22** to bring the **MASTER MENU** to the screen. Press the **▲** Button **15**, until the on-screen **→** cursor is next to the **ADVANCED** line. Press the **Set** Button **16** to enter the **ADVANCED SELECT** menu.

At the **ADVANCED SELECT** menu make certain that the on-screen **→** cursor is next to the **SEMI OSD** line by pressing the **▲/▼** buttons **15** as needed. Next, press the **▶** button **15** so that the word **OFF** is highlighted in the video display.

Note that this setting is temporary and will remain active only until it is changed or until the AVR is turned off. Once the unit is turned off, the semi-OSD displays will remain activated, even if they were switched off for the previous listening session.

To change the length of time that the semi-OSD displays remain on the screen, go to the **ADVANCED SELECT** Menu as outlined earlier, and press the **▲/▼** buttons **15** as needed, until the on-screen **→** cursor is next to the **SEMI-OSD TIME OUT** line. Next, press the **◀▶** Buttons **15** until the desired time in seconds is displayed. Note that unlike most of the other options in this menu, this is a permanent setting change, and the time-out entry will remain in effect until it is changed, even when the unit is turned off.

If you wish to make other adjustments in the menu, press the **▲/▼** Buttons **15** until the on-screen **→** cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **Set** button **16**. If you have no other adjustments to make, press the **OSD** Button **22** to exit the menu system.

Full-OSD Time Out Adjustment

The **FULL OSD** menu system is used to simplify the setup and adjustment of the AVR using a series of on-screen menus. The factory default setting for these menus leaves them on the screen for 20 seconds after a period of inactivity before they disappear from the screen or Time Out. This Time Out is a safety measure to prevent the menu text from burning into the CRTs in your monitor or projector, which might happen if they were left on indefinitely. However, some viewers may prefer a slightly longer or shorter period before the Time Out display.

To change the Full-OSD Time Out, you will need to make an adjustment in the **ADVANCED SELECT** menu (Figure 23). To start the adjustment, press the **OSD** button **22** to bring the **MASTER MENU** to the screen. Press the **▲** button **15**, until the on-screen **→** cursor is next to the **ADVANCED** line. Press the **Set** Button **16** to enter the **ADVANCED SELECT** menu (Figure 23).

At the **ADVANCED SELECT** menu make certain that the on-screen **→** cursor is next to the **FULL OSD TIME OUT** line by pressing the **▲/▼** Buttons **15** as needed. Next, press the **◀/▶** buttons **15** until the desired time is displayed in seconds. Note that unlike most of the other options in this menu, this is a permanent setting change, and the time-out entry will remain in effect until it is changed, even when the unit is turned off.

If you wish to make other adjustments in the menu, press the **▲/▼** Buttons **15** until the on-screen **→** cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **Set** button **16**. If you have no other adjustments to make, press the **OSD** Button **22** to exit the menu system.

DMP/ ^{The Bridge} Auto Power

When using Harman Kardon's optional ^{The Bridge} iPod docking station, the normal operation is to have the iPod selected as the input source only when it is specifically chosen. However, you may set the AVR so that whenever the iPod is turned on, the AVR will also turn on automatically and set The Bridge as the input.

To change the setting, first make certain that the **ADVANCED SELECT** menu (Figure 23) is on the screen, and then press the **▲/▼** **Navigation Buttons** **15 F** until the cursor is pointing to **DMP AUTO POWER**. Press the **▲/▼** **Navigation Buttons** **15 F** so that **ON** is highlighted to have the AVR turn on in sync with an iPod, or **OFF** for standard operation.

Multiroom Operation

Multiroom Operation

The AVR is fully equipped to operate as the control center for a complete multiroom system that is capable of sending one source to a second zone in the house while separate source is listened to in the main room. In addition to providing for control over the selection of the remote source and its volume, the AVR offers a comprehensive range of options for powering the speakers in the second zone.

- Using the line-level **Multiroom Audio Outputs** 8, the selected source may be fed to optional, external power amplifiers that may be matched to the specifics of the installation.
- When the main room system is configured for 5.1 operation, the Surround Back Left/Right amplifier channels may be used to power the remote zone so that no additional amplifiers are required.
- Using built-in A-BUS/*READY*® technology, optional A-BUS modules may be connected to the AVR via a single Category Five wire, so that remote zone speakers may be powered directly from the module or keypad without the need for additional power, IR sensor or volume control wires to be run to the second zone.

In addition, the AVR includes a remote IR sensor input so that remote control commands from the Zone II remote included with the unit may be transmitted to the unit, while standard IR input/output jacks allow the remote zone's commands to be sent to compatible IR-controlled source devices.

Installation

Although simple remote room systems may be installed by the average do-it-yourself hobbyist, the complexity of your multizone/multiroom system involves running wires inside of walls where the services of a specially trained installer may be required. Regardless of who does the work, please remember that local building codes may govern in-wall electrical work, including proper specification of any wiring used and the way in which it is connected. You are responsible for making certain that all Multiroom installation work is done properly and in compliance with all applicable codes and regulations.

For standard installations, follow the instructions shown on page 16 and 18 for the connection of speaker wire and IR remote wiring to the AVR.

For installations where the Surround Back Left/Right amplifier channels are used to power the remote zone, make certain that the system is configured for that type of operation, as shown on page 49.

For installations where A-BUS modules are used, follow the instructions provided with the A-BUS remote modules or keypads. Additional information will also be made available through the Harman Kardon Web Site at www.harmankardon.com.

RS-232 Control

The AVR is rare among A/V receivers in that it provides the capability for full remote control from compatible computers or specialized remote control systems. RS-232 programming requires specialized programming knowledge and for that reason we recommend that it only be done by qualified installers.

NOTE: The RS-232 port on this product is for use by authorized service personnel ONLY.

For more information on using the RS-232 port for remote control, visit the Harman Kardon Web site at www.harmankardon.com or contact our customer service department.

Multiroom Setup

Once the audio and IR link connections have been made, the AVR needs to be configured for multiroom operation using the steps below. Press the **OSD** button 22 to bring the **MASTER MENU** (Figure 7) to the screen. Press the **▲** button 15 twice, until the on-screen → cursor is next to the **MULTI - ROOM** line. Press the **Set** button 16 to enter the **MULTI - ROOM** menu (Figure 24).

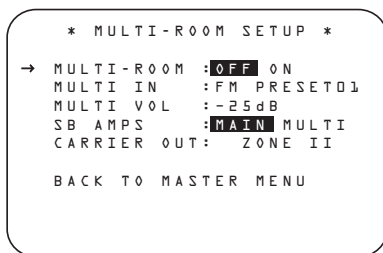


Figure 24

When the **MULTI - ROOM** menu appears, the on-screen → cursor will be at the **MULTI - ROOM** line. Since this line is used to turn the system on and off, do not make an adjustment here unless you wish to turn the system on at this time. To turn the system on, press the **▶** button 15 so that **ON** is highlighted. If you do not wish to turn the system on at this time or to proceed to the next step, press the **▼** Button 15 once so that the → on-screen cursor is next to the **MULTI IN** line.

At the **MULTI IN** line, press the **◀▶** buttons 15 until the desired Audio/Video input to the multi-room system appears in the highlighted video. When the selection has been made, press the **▼** button 15 once so that the → on-screen cursor is next to the **MULTI VOL** line.

At the **MULTI VOL** line, press the **◀▶** buttons 15 or hold them pressed until the desired volume level for the multi-room system is entered. DO NOT use the regular volume control knobs for this setting. When all settings for the multiroom setup have been made, press the **▼** buttons 15 once so that the on-screen → cursor is next to the **BACK TO MASTER MENU** line and press the **Set** button 16. If you have no other adjustments to make, press the **OSD** button 22 to exit the menu system.

Surround Amplifier Channel Assignment

The AVR is equipped with seven full-power amplifier channels to allow for complete 7.1-channel operation without the need for additional external amplifiers. However, in some installations you may wish to use the traditional 5.1-channel configuration for the main listening room, which allows the surround back left/right amplifier channels to be used to power speakers placed in a remote zone location.

If you wish to use the Surround Back channel amplifiers to power the remote zone, you must change a setting in the **MULTIROOM SETUP** menu. To make that change, first call up the menu system by pressing the **OSD** Button 22 to bring the **MASTER MENU** (Figure 7) to the screen. Next, press the **▼** Button 15 until the → cursor is next to the **MULTI ROOM** line. Press the **Set** Button 16 to enter the **MULTIROOM SETUP** menu.

To change the setting so that the Surround Back amplifiers are fed by the source selected through the Multiroom system, press the **◀▶** Buttons 15 so that **MULTI** is highlighted in reverse video and press the **Set** Button 16.

Remember that once this setting is made you will not be able to take advantage of any of the 6.1/7.1-channel decoding or processing modes, and no Surround Back speakers must be selected in the speaker setup procedure outlined earlier. In addition the speakers used for the remote zone must be connected to the **Surround Back/Multiroom Speaker Outputs** 49. The volume for these speakers is set by the multiroom system, as explained on page 50 of this manual.

Multiroom Operation

Infrared Output Selection

The AVR enables you to select which IR input will be used to feed the **Full Carrier IR Output 43**. The factory default setting is the IR signal that is fed to the **Multiroom IR Input 25**, but you may select other options.

To change this setting, first make sure the **MULTI-ROOM SETUP** menu is on the screen, and then press the **▲/▼ Navigation Buttons 15 F** so that the cursor is next to **CARRIER OUT**; then press the **Set Button 16 Q**. Press the **▲/▼ Navigation Buttons 15 F** to select one of these options:

- **Z R 1 0** feeds the signal present at the **Multiroom IR Input 25** to the **Full Carrier IR Output 43**.
- **A - BUS** feeds the signal carried back from an optional A-Bus module connected to the AVR to the **Full Carrier IR Output 43**.
- **FRONT** feeds the received through the front-panel **Remote Sensor Window 30** to the **Full Carrier IR Output 43**.

When all needed adjustments to the **MULTI-ROOM SETUP** menu have been made, press the **▲/▼ Navigation Buttons 15 F** until the cursor is pointing to **BACK TO MASTER MENU** to make changes to other menus, or press the **OSD Button 22 E** to exit the menu system and return to normal operation.

Multiroom Operation

When operating the AVR from a remote room location where an IR sensor link has been connected to the AVR's rear panel **Multiroom IR Input 25**, you may use either the Main remote control or the ZR 10 remote buttons **B C D**. Press the **AVR Selector B** to turn the unit on to the last source, or any of the other Selector buttons to turn on to a specific source.

With the remote pointing toward an IR sensor or A-Bus module in the remote room, you may turn on the second zone system by pressing the **AVR Selector Button B** on the ZR 10 remote to turn the system on with the last used source for the multiroom system active, or you may press one of the **Input Selectors D** or the **Tuner Selector C** or the **Bridge Selector R** to turn the multiroom system on directly to a specific source.

When the multiroom system is turned on, you may use the same buttons on either remote that would normally be used to control an AVR function such as volume, source selection, tuner control or the operation of an iPod docked to The Bridge. If any of the input devices are connected to the **IR Output 23** or **Full Carrier IR Output 43**, by either a hard-wire connection or through an optional IR "blaster," you may use the **Transport Controls P** on the ZR 10 to operate compatible Harman Kardon products.

To turn the system off from the remote room, press the **Power-Off button 1 A**. Remember that the AVR may be turned on or off from the remote room regardless of the system's operation or status in the main room.

NOTE: When the tuner is selected as the source for the remote zone, any change to the frequency or preset will also change the station being listened to in the main room, if the tuner is in use there. Similarly, if someone in the main room changes the station, the change will also impact the remote room.

To activate the feed to the remote room, press the **Multiroom button 39** on the remote. Next, press the **Set button 16**. When the **MULTI ON/OFF** message appears in the on-screen display and the **Lower Display Line 29**, press the **Set Button 16** and then press the **▲/▼ Navigation Button 15** so that display changes to **MULTI ON**. Press the **Set Button 16** again to activate the setting. Note that this method may be used to turn the Multiroom system on or off even when the AVR is in the Standby mode in the main listening room.

IMPORTANT NOTE: When an A-BUS module is connected, the AVR's Multiroom system must be turned on before the A-BUS module is able to communicate with the AVR. Once turned on using the instructions in the preceding paragraph, the Multiroom system must remain on in order for the A-BUS module to operate.

When the unit is in the Standby mode, but ready for Multiroom or A-BUS operation, the lighting around the **Standby/On Switch 3** remains blue and a **MULTI ON** message appears in the **Lower Display Line 29**, even though the unit is "off" in the main listening room.

When the multiroom system is turned on, the input selected using the Multiroom Menu will be fed to the **Multiroom Output jacks 8** on the rear panel as well as the **A-BUS Jack 9**. The volume will be as set in the same menu, although it may also be adjusted using an optional IR sensor and the Zone II remote in the remote location or on the optional audio power amplifier connected to the **Multiroom Output jacks 8**.

Although changes to the input source or remote room volume will normally be made using an IR sensor in the remote room that is connected to the AVR, it is also possible to change those settings from the main listening room. This is useful for situations where some or all of the remote rooms do not have an IR sensor, or to take control over the remote room without actually being in that room.

In addition to using the **MULTI-ROOM** menu, as shown on the previous page, you may change the source or volume in the remote zone using the remote. Press the **Multiroom Button 39** on the remote, and when the **MULTI ON/OFF** message appears in the on-screen display and the **Lower Display Line 29**, press the **Set Button 16** and then press the **▲/▼ Navigation Button 15** to toggle past that message to **MULTI LEVEL** or **MULTI INPUT**.

To change the remote room's input source, when **MULTI INPUT** appears, press the **Set Button 16**, and then press the **▲/▼ Navigation Button 15** until the desired input appears in the on-screen display and in the **Lower Display Line 29**. Remember that only analog or PCM input sources may be selected for use with the Multiroom system. Dolby Digital or DTS sources are not available to the Multiroom system.

To change the remote room's volume, when **MULTI LEVEL** appears, press the **Set Button 16**, and press the **▲/▼ Navigation Button 15** to change the volume setting. Note that this volume adjustment controls the level for the output to the **Multiroom Audio Outputs 8** and for any speakers connected to the Surround **Back/Multiroom Speaker Outputs 39** when the Surround Back amplifier channels are configured for Multiroom use, as shown on page 49. This adjustment does NOT change the volume level for any room where an ABUS module is used, as that setting is only adjustable using the A-BUS module's volume control or built-in IR sensor.

Once the multiroom system is turned on, it will remain on even if the AVR is placed in the Standby mode in the main room by pressing the **Power Off Button 1** or the **System Power Control 2** on the front panel. To turn off the multiroom system from the main listening room, when the AVR is on press the **Multiroom button 39** and then the **Set button 16**. Press the **▲/▼ buttons 15** so that the **Main Information Display 29** or OSD will display **MULTI OFF**.

Even when the AVR is turned off (to Standby mode) and the multiroom system is turned off too, the multiroom system may be turned on at any time by pressing the **Multiroom button 39**, or any of the **Selector buttons B C D** in the remote room.

Tuner Operation

Basic Tuner Operation

The AVR's tuner is capable of tuning AM, FM and FM Stereo broadcast stations and receiving RDS data. Stations may be tuned manually, or they may be stored as favorite station presets and recalled from a 30 position memory.

Station Selection

1. Press the **AM/FM Tuner Select** button **7** on the remote to select the tuner as an input. The tuner may be selected from the front panel by either pressing the **Input Source Selector** **15** until the tuner is active or by pressing the **Tuner Band Selector** **11** at any time.

2. Press the **AM/FM Tuner Select** button **7** or **Tuner Band Selector** **11** again to switch between AM and FM so that the desired frequency band is selected.

3. Press the **Tuner Mode** button **19** on the remote or hold the **Band Selector** **11** on the front panel pressed for 3 seconds to select manual or automatic tuning.

When the button is pressed so that **AUTO** appears in the **Main Information Display** **29** each press of the **Tuning Selectors** **10** **21** will put the tuner in a scan mode that seeks the next higher or lower frequency station with acceptable signal strength. An **AUTO ST TUNED** indication will momentarily appear when the station stops at a stereo FM station, and an **AUTO TUNED** indication will momentarily appear when an AM or monaural FM station is tuned. Press the Tuning buttons again to scan to the next receivable station.

When the button is pressed so that **MANUAL** appears in the **Main Information Display** **29** each tap of the Selector will increased or decrease the frequency by one increment. When the tuner receives a strong enough signal for adequate reception, **MANUAL TUNED** will appear in the **Main Information Display** **29**.

4. Stations may also be tuned directly by pressing the **Direct** button **20**, and then pressing the **Numeric Keys** **18** that correspond to the station's frequency. Note that for entering numbers higher than 100 you need to enter only the "1" rather than "10", the first "0" will be added automatically. The desired station will automatically be tuned after the latest number is entered. If you press an incorrect button while entering a direct frequency, press the **Clear** button **34** to start over.

NOTE: When the FM reception of a stereo station is weak, audio quality will be increased by switching to Mono mode by pressing the **Tuner Mode** button **19** on the remote or holding the **Band Selector** **11** on the front panel so that **MANUAL** appears momentarily in the **Main Information Display** **29** and then goes out.

Preset Tuning

Using the remote, up to 30 stations may be stored in the AVR's memory for easy recall using the front panel controls or the remote.

To enter a station into the memory, first tune the station using the steps outlined above. Then:

1. Press the **Memory** button **35** on the remote. Note that two underscore lines will appear in the **Main Information Display** **29**.

2. Within five seconds, press the **Numeric Keys** **18** corresponding to the location where you wish to store this station's frequency. Once entered, the preset number will appear in the **Main Information Display** **29**.

3. Repeat the process after tuning any additional stations to be preset.

Recalling Preset Stations

- To manually select a station previously entered in the preset memory, press the **Numeric Keys** **18** that correspond to the desired station's memory location.
- To manually tune through the list of stored preset stations one by one, press the **Preset Stations Selector** buttons **13** **33** on the front panel or remote.

RDS Operation

The AVR is equipped with RDS (Radio Data System), which brings a wide range of information to FM radio. Now in use in many countries, RDS is a system for transmitting station call signs or network information, a description of station program type, text messages about the station or specifics of a musical selection, and the correct time.

As more FM stations become equipped with RDS capabilities, the AVR will serve as an easy-to-use center for both information and entertainment. This section will help you take maximum advantage of the RDS system.

RDS Tuning

When an FM station is tuned in and it contains RDS data, the AVR will automatically display the station's call sign or other program service in the **Main Information Display** **29**.

RDS Display Options

The RDS system is capable of transmitting a wide variety of information in addition to the initial station call sign that appears when a station is first tuned. In normal RDS operation the display will indicate the station name, broadcast network or call letters. Pressing the **RDS** button **16** **32** enables you to cycle through the various data types in the following sequence:

- The station's call letters (with some private stations other information too).
- The station's frequency (**FREQ**).
- The Program Type (**PTY**) as shown in the list below.

NOTE: Many stations do not transmit a specific PTY. The display will show **NONE**, when such a station is selected and PTY is active.

- A "text" message (Radiotext, **RT**) containing special information from the broadcast station. Note that this message may scroll across the display to permit messages longer than the eight positions in the display. Depending on signal quality, it may take up to 30 seconds for the text message to appear; in that time, the word **TEXT** will flash in the Information Display when RT is selected.
- The current time of day (**CT**). Note that it may take up to two minutes for the time to appear, in that time the word **TIME** will flash in the information display when CT is selected. Please note that the accuracy of the time data is dependent on the radio station, not the AVR.

Some RDS stations may not include some of these additional features. If the data required for the selected mode is not being transmitted, the **Main Information Display** **29** will show a **NO TYPE**, **NO TEXT** or **NO TIME** message after the individual time out.

In any FM mode the RDS function requires a strong enough signal for proper operation.

Tuner Operation

Program Search (PTY)

An important feature of RDS is its capability of encoding broadcasts with Program Type (PTY) codes that indicate the type of material being broadcast. The following list shows the abbreviations used to indicate each PTY, along with an explanation of the PTY:

- **(RDS ONLY)**
- **(TRAFFIC)**
- **NEWS:** News
- **AFFAIRS:** Current Affairs
- **INFO:** Information
- **SPORT:** Sports
- **EDUCATE:** Educational
- **DRAMA:** Drama
- **CULTURE:** Culture
- **SCIENCE:** Science
- **VARIED:** Varied Speech Programs
- **POPM:** Popular Music
- **ROCKM:** Rock Music
- **M-O-R-M-:** Middle-of-the-Road Music
- **LIGHTM:** Classical Music
- **CLASSICS:** Serious Classical Music
- **OTHERM:** Other Music
- **WEATHER:** Weather Information
- **FINANCE:** Financial Programs
- **CHILDREN:** Children's Programs
- **SOCIAL A:** Social Affairs Programs
- **RELIGION:** Religious Broadcasts
- **PHONE IN:** Phone-In Programs
- **TRAVEL:** Travel and Touring
- **LEISURE:** Leisure and Hobby
- **JAZZ:** Jazz Music
- **COUNTRY:** Country Music
- **NATIONAL:** National Music
- **OLDIES:** Oldies Music
- **FOLK M:** Folk Music
- **DOCUMENT:** Documentary Programs
- **TEST:** Emergency Test
- **ALARM:** Emergency Broadcast Information

You may search for a specific Program Type (PTY) by following these steps:

1. Press the **RDS** button **16** **42** until the current PTY is shown in the **Main Information Display 29**.
2. While the PTY is shown, press the **Preset Up/Down** button **13** **43** or hold them pressed to scroll through the list of available PTY types, as shown above starting with the PTY currently received. To simply search for the next station transmitting any RDS data, use the **Preset Up/Down** button **13** **43** until **RDS ONLY** appears in the display.
3. Press any of the **Tuning Up/Down** buttons **10** **21**, the tuner begins to scan the FM band upwards or downwards for the first station that has RDS data that matches the desired selection, and acceptable signal strength for quality reception.
4. The tuner will make up to one complete scan of the entire FM band for the next station that matches the desired PTY type and has acceptable reception quality. If no such station is found, the display will read **NONE** for some seconds and the tuner will return to the last FM station in use before the search.

NOTE: Some stations transmit constant traffic information. These stations can be found by selecting **TRAFFIC**, the option in front of **NEWS** in the list. The AVR will find the next appropriate station, even if it is not broadcasting traffic information when the search is made.

Programming the Remote

Configuring the Remote

The AVR 645 remote is factory-programmed for all functions needed to operate the unit. In addition, it is also preprogrammed to operate most recent Harman Kardon DVD players and changers, CD players and changers, CD recorders and cassette decks. The codes for other brand devices may be programmed into the AVR 645 remote using its extensive library of remote codes or a head-to-head learning process for codes not in the internal library.

Thanks to the remote's advanced technology and two-line LCD display, it is no longer necessary to look up cumbersome codes when programming the remote; following the steps outlined below, you simply search for the brand name from the remote's memory. We recommend that you first try the preprogrammed code entry method. If that procedure is not successful, then try the code learning method.

Preprogrammed Code Entry

The easiest way to program the AVR remote for operation with a source device from another brand is to follow these steps:

1. Turn on the power to the device you wish to program into the AVR remote. This is important, as in a later step you will need to see whether the device turns off to determine whether the remote has been programmed for the proper remote codes.
2. Press and hold the **Program Button 37** for about three seconds while the message shown in Figure 25 appears in the remote's LCD **Information Display 3**. Release the button when the red light under the **Set Button 16** appears.

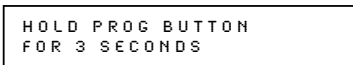


Figure 25

3. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button 16** will remain illuminated in red. Press the **Set Button 16** to begin the process of selecting a device and locating the proper remote codes.

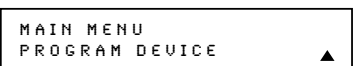


Figure 26

4. **SELECT A DEVICE** will appear in the LCD display (Figure 27). Press the **Navigation Buttons 15** to scroll through the list of device categories and press the **Set Button 16** when the device you wish to set the codes for appears.

For this example, we will select "TV" to enter the codes needed to operate your TV.

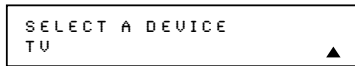


Figure 27

NOTE: The codes for hard-drive recorder products (PVR) such as TiVo and Replay are programmed by selecting VCR as the device. For satellite-based TiVo products, check under the brand name of the product.

5. At the next menu screen on the remote (Figure 28) press the **Set Button 16** to enter the Manual mode, which means that you will select the brand name of the device from the list programmed into the remote's memory.




Figure 28

6. The next menu screen on the remote (Figure 29) will show the start of the list of available brands. Press the **Navigation Buttons 15** until the brand name of the device you are programming into the remote appears on the lower line of the display and then press the **Set Button 16**.



Figure 29

NOTE: If the brand name for the product you wish to program does not appear in the list, the codes may still be available, as some manufacturers share codes. If the desired brand is not listed, press the **Clear Button 34** to exit the programming process, and skip to the instructions shown on page 54 for the "Automatic" method of programming the remote. If desired, or if the codes for your brand are not part of the remote's library at all, you may still use the AVR remote to program most infrared-controlled products by "learning" the commands from the product's original remote into the AVR remote. The instructions for Learning Commands are on page 54.

7. The next step is important, as it determines which codes will operate the source device or display. Point the AVR remote at the device being programmed and, following the instructions shown in the remote's **LCD Information Display 3**, press and release the **Numeric Keys 18** shown on the menu screen (Figure 30) one at a time, starting with the "1" button. After you press the "1" **Button 18**, the remote's LCD screen will briefly go blank as the code is being transmitted, but you will see the "transmit" icon  in the upper right corner of the display to serve as confirmation that the remote is sending out commands.

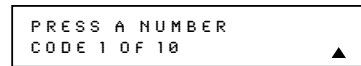


Figure 30

8. After you press and release the number key, watch the device being programmed to see whether it turns off. As shown in the instructions that will appear on the next menu screen (Figure 31), if your device has turned off, press the **Set Button 16**, and then skip to Step 10. If the unit does not turn off, proceed to the next step.

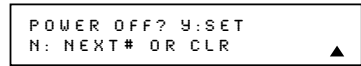


Figure 31

9. If the device being programmed into the AVR remote does not turn off after you have pressed the "1" key, continue Steps 8 and 9 by pressing the available numeric keys shown until the device turns off. If the device still does not turn off after all choices have been tried, or if there is only one number key shown as available to try, the code for this specific device is not in the AVR remote library under that brand name. If that is the case, press the **Clear Button 34** to exit the manual programming mode. Remember that the codes may still be stored in the AVR remote's library under another brand, and you can have the remote control search for them by following the instructions below for automatic programming. You may also manually "learn" the codes for most devices into the AVR remote by following the Learning Commands instructions on page 54.
10. When the device being programmed does turn off after a numeric key has been pressed, you must press the **Set Button 16** within five seconds to enter the setting into the remote's memory. After you press the Set button, the top line of the LCD display will read **SAVING...** and then the word **SAVED** will flash four times in the center of the bottom line.
11. When the codes are saved the remote will return to normal operation, and whenever you press the **Input Selector Button 5** that was just programmed, the codes for the new device will be used. If no further buttons are pressed, the remote will revert back to the default setting for AVR commands.

NOTE: Some brands share a common remote control code for "Power Off" for many models. For that reason it is possible that even though the remote appears to be properly programmed, you may find that some buttons do not appear to issue the correct command. If this is the case, repeat the procedure outlined above, but if more than one numeric key selection is suggested in Step 7, try a different number to see whether the remote operates correctly.

Programming the Remote

Although the AVR remote is preprogrammed with an extensive library of codes for many major brands, it is also possible that you may have attempted to program a product that is too new or too old, and thus not all of its commands will be in the code library. You may fill in the codes for any button that does not operate properly by using the learning technique shown on page 54.

Automatic Code Entry

In addition to manual code selection using the brand name list, it is also possible to automatically search through all the codes that are stored in the AVR remote's library to see whether a device will respond even if it is not listed among the brands that appear when you program the remote manually. To automatically search through the codes that are available for a specific device type (e.g., DVD, VCR), follow these steps:

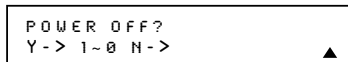
1. Turn on the power to the device you wish to program into the AVR remote. This is important, as in a later step you will need to see whether the device turns off to determine whether the remote has been programmed for the proper remote codes.
2. Press and hold the **Program Button 37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display 3**. Release the button when the red light under the **Set Button 16** appears.
3. The remote's **MAIN MENU** message (Figure 26) will appear in the LCD display and the **Set Button 16** will remain illuminated in red. Press the **Set Button 16** to begin the process of selecting a device and locating the proper remote codes.
4. **SELECT A DEVICE** will appear in the LCD display (Figure 27). Press the **▲▼ Navigation Buttons 15** to scroll through the list of device categories and press the **Set Button 16** when the device for which you wish to set the codes appears. For this example, we will select "TV" to enter the codes needed to operate your TV.
5. At the next menu screen on the remote (Figure 28), press the **▲ Navigation Buttons 15** so that the bottom line of the LCD display reads **AUTO** (Figure 32) and then press the **Set Button 16** to enter the Automatic programming mode.



```
PROGRAM DEVICE
AUTO
```

Figure 32

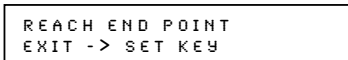
6. As instructed on the next menu screen, press the **▲ Navigation Buttons 15** to begin the automatic code search process. Your confirmation that the remote is sending out commands is the movement of a square block across the top line of the LCD display screen while the bottom line reads **PLEASE WAIT....** You will also see the transmit icon in the upper right corner of the LCD display's top line to remind you that the remote is working even though you may not see anything happening to the device being programmed.
7. It will take a few seconds for the remote to send out the first group of commands, after which you will see a new display in the LCD screen, as shown in Figure 33. Following the instructions, if the device being programmed has NOT turned off, press the **▲ Navigation Buttons 15** again to send another group of codes. If the device being programmed has turned off, skip to Step 9.



```
POWER OFF?
Y-> 1~0 N->
```

Figure 33

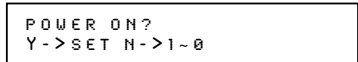
8. By pressing the **▲ Navigation Buttons 15** again, the remote will send out a new set of commands. When it pauses, follow the instructions shown in Step 7. Depending on how many codes are stored for a specific device type, you may have to repeat this process as many as fifteen times. Remember, if the device turns off, skip to Step 9. When all the codes for the device being programmed have been tried, the instruction shown in Figure 34 will appear. This means that the codes for the product you are trying to program are not in the AVR remote library and you will have to "learn" them into the remote following the instructions shown on page 54. Press the **Set Button 16** as instructed to exit the programming process.



```
REACH END POINT
EXIT -> SET KEY
```

Figure 34

9. If the device being programmed does turn off after following the instructions in Step 7, you will need to verify the code set by pressing the **Numeric Keys 18** in sequence, as instructed in Figure 33. Point the remote at the device being programmed, and press the **"1" Button 18** to see whether the device turns back on.
10. After pressing and releasing the **"1" Button 18**, check to see whether the device has turned back on. If it has, skip to Step 12. If it does not turn on, press the **"2" Button 18**, or the next button in the numeric sequence if you are repeating the procedure, as instructed by the LCD screen in Figure 35.



```
POWER ON?
Y-> SET N-> 1~0
```

Figure 35

11. When pressing the **"1" Button 18** does not turn the device being programmed back on, repeat the procedure by trying the remainder of the **Numeric Keys 18** in sequence, each time pressing and then releasing the button to see whether the new device turns back on. When it does, skip to the next step. However, if you try all 10 numeric keys and find that the unit will not turn on, you won't be able to use this method to program the device. Press the **Clear Button 34** to exit the programming process. You'll need to follow the Learning Commands instructions below to enter the codes for this device into the AVR remote.
12. When pressing one of the numeric keys in Step 10 or 11 causes the device being programmed to turn back on, follow the instructions shown in Figure 32 and press the **Set Button 16** within five seconds of the device turning on. After you press the Set button, the top line of the LCD display will read **SAVING...** and then the word **SAVED** will flash four times in the center of the bottom line.
13. When the codes are saved, the remote will return to normal operation, and whenever you press the **Input Selector Button 5** that was just programmed, the codes for the new device will be used. If no further buttons are pressed, the remote will revert back to the default setting for AVR commands.

Learning Commands

On occasions when the AVR remote does not contain the codes for a particular product's remote in its built-in library, or when you wish to program a missing or special function into one button of a device, the AVR remote's learning capability allows you to do that. To teach commands from one product's remote into the AVR remote, follow these steps:

The process requires that both the device's original remote and the AVR remote be available. Before pressing any buttons on either remote, place them so that the IR transmitter on the remote from the device to be programmed is facing the **Infrared Lens 2** on the AVR's remote. The two remotes should be no more than an inch apart, and there should not be any direct sunlight or other bright light source near the remotes.

1. Press and hold the **Program Button 37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display 3**. Release the button when the red light under the **Set Button 16** appears.

Programming the Remote

- The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button 16** will remain illuminated in red. Press the **▲ Navigation Buttons 15** once so that **Learn** appears on the bottom line of the LCD screen, as shown in Figure 36. Press the **Set Button 16** to begin the process of learning commands from another device's remote into the AVR remote.

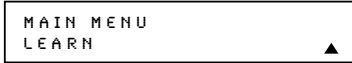


Figure 36

- The **SELECT A DEVICE** message will appear in the LCD display (Figure 27). Press the **▲▼ Navigation Buttons 15** to scroll through the list of device categories and press the **Set Button 16** when the device for which you wish to set the codes appears. For this example, we will select "TV" to enter the codes needed to operate your TV.
- The next menu screen (Figure 37) will prompt you to select the button, or "key," on the AVR remote that you wish to program. Press that button on the AVR remote.

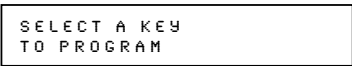


Figure 37

- Once you press the button to be programmed on the AVR remote, press and hold the button on the remote control for the device to be programmed within five seconds, as instructed on the next menu screen (Figure 38).

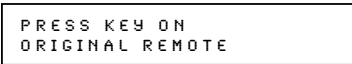


Figure 38

- Continue to hold the button on the original remote until the menu on the AVR remote's LCD screen changes. If the code is successfully learned you will see the display shown in Figure 39. If you see that menu, proceed to Step 9. If the code is not successfully learned, you will see the display shown in Figure 40. If that menu appears, proceed to Step 7.



Figure 39

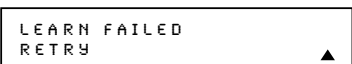


Figure 40

- If the message shown in Figure 36 appears in the display, press the **Set Button 16** to try programming the button again. When the remote prompts you to press and hold the key on the original remote again by showing the display shown in Figure 38, immediately press the button on the source remote again. To avoid another failed attempt, make certain that the windows on the two remotes are facing one another.

- Continue to hold the button on the original remote until the AVR's display changes again. If the code was successfully learned, you will see the display shown in Figure 35. In that case, skip to the next step. If the **LEARN FAILED** display (Figure 40) appears again you may either try to program the key again, or press the **▲ Navigation Buttons 15** to stop the process. It is possible that some remotes may use code sequences or infrared frequencies that are not compatible with the AVR remote, and those codes cannot be learned. When the display shown in Figure 41 appears, press the **Set Button 16** to exit the Learning system.

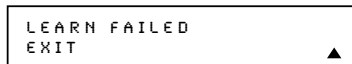


Figure 41

- When a code has been learned successfully, you have three options. When the display shown in Figure 39 is on the LCD screen on the AVR remote, you may press the **Set Button 16** to learn additional codes from the buttons on a remote into the AVR remote. Follow Steps 4 through 8 as often as needed to complete the code-learning process.

- If you wish to change the name that appears in the LCD display when the button that has just had a new code learned is pressed, press the **▲ Navigation Buttons 15** so that the display shown in Figure 42 appears in the LCD display. Press the **Set Button 16** to open the **RENAME KEY** menu. Enter the new name for the key following the instructions shown in the Renaming Individual Keys section of this manual on page 60. If you find it more convenient to rename the buttons at a later time, you may do that separately by following the instructions on page 59.

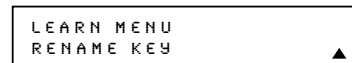


Figure 42

- When you have programmed all keys for the desired device, press the **▲ Navigation Buttons 15** twice when the **LEARN MENU** (Figure 39) appears so that you see the display show in Figure 43. The remote will return to normal operation.

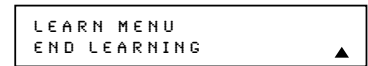


Figure 43

- If you wish to program the codes for another device, repeat the procedure outline above, but select a different device in Step 3.

Learning Codes for an Input Selector

The AVR 645's remote allows you to learn a specific code to be attached to one of the **Input Selectors 5** so that whenever that button is pressed, you will not only be selecting that device as the AVR's input and telling the remote to use the remote codes that have been programmed to belong to that device, it also allows you to have that special code transmitted, as well. This allows you to have an input (or other command) sent to a display so that when video sources are directly connected to the display, you can automatically command it to switch to the same input selected for the AVR.

To learn a remote code into one of the **Input Selectors 5**, follow the same steps shown above for learning the keys for an entire device remote with the following exceptions:

- In Step 3, press the **▲/▼ Navigation Button 15** until **LEARN DEVICE** appears in the bottom line of the LCD display.
- When the **SELECT A DEVICE** message (Figure 36) appears, as described in Step 4, press the specific **Input Selector Button 5** that you wish to have transmit a special code when it is pressed.
- When the **RENAME DEVICE** option is offered by the remote after the code is programmed, you will be changing the name that is shown in the remote's LCD display every time that Input Selector is pressed.

Device Priority

After having programmed or learnt the different sources, you can set the Device Priority. The default setting is that after pressing one of the Input Selectors and any of its function keys, the remote control defaults back to controlling the AVR functions after 6 seconds. You can either extend this time to 12 seconds, or leave the remote control to control the last used source, by following the steps below.

- Press and hold the **Program Button 37** until the **MAIN MENU** appears.
- Press the **▼ Navigation Button 15** until **DEVICE PRIORITY** appears. Press the **Set Button 16**.
- Press the **▲/▼ Navigation Button 15** to select the requested setting. Confirm the setting by pressing the **Set Button 16**.

Programming the Remote


Changing Devices

In the factory default settings, the AVR remote is programmed so that the commands transmitted correspond to the device selected by pressing one of the **Input Selectors** 5. This is logical, as you want the remote to control the device you have selected. However, in some circumstances you may have configured your system so that the devices connected to the AVR do not correspond to the default device settings and the legends printed on the remote. For example, if your system has two VCRs you may connect the second VCR to the VID 2 input. There is no problem in doing that, but in normal operation the commands issued after selecting the VID 2 input are for a television, not a VCR.

The AVR remote allows you to correct that situation through the "Changing Devices" process. That enables you to assign the codes from one type of device to a different button. For example, in the steps below, we will explain how to program the VID 2 buttons to provide the commands to operate a VCR. Of course, you may program the remote to have any of the devices take on the code set of any other device, as your system requires. And, with the AVR remote's "Rename" function, you can even change the way the name of the device appears on the remote's LCD display so that you see exactly which commands are being sent.

To program the buttons normally assigned to one device for the commands of another, follow these steps:

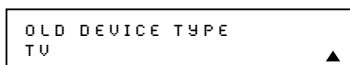
1. Press and hold the **Program Button** 67 for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 twice so that **CHANGE DEVICE** appears on the bottom line of the LCD screen, as shown in Figure 44. Press the **Set Button** 16 to begin the process of reassigning the commands used for a particular device.



MAIN MENU
CHANGE DEVICE

Figure 44

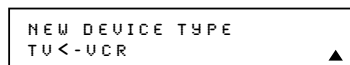
3. The next menu display is where you select the Input Select, or device, that you wish to change. When the display shown in Figure 45 appears, press the **Navigation Buttons** 15 to scroll through the list to find the device you wish to use for another function. In this case we will select "TV," and show how to change it to take on the codes for operating a VCR. When that device's name appears, press the **Set Button** 16.



OLD DEVICE TYPE
TV

Figure 45

4. Once the "old" device type has been selected, you need to tell the remote which set of remote codes to use as a replacement for the device just selected. When the instructions shown in Figure 46 appear, press the **Navigation Buttons** 15 to scroll through the list of device categories to find the name of the device that you wish to use. The old device name will remain on the left side of the LCD screen, while the replacement device list will scroll to its right. For example, press the **Navigation Buttons** 15 until the display screen reads **TU<-VCR** to have the VID 2/TV Button transmit the commands used to control a VCR. Press the **Set Button** 16 when the desired device combination appears.



NEW DEVICE TYPE
TU<-VCR

Figure 46

5. Once the new device is selected, the remainder of the process will select the codes for the specific brand to be used, and for that reason they are identical to the way a device is programmed using manual entry. Continue the process as outlined in the next few steps, remembering that if the codes for your specific device are not found you may select any brand and then "learn" the proper codes into the AVR remote using the process outlined on page 54. To begin the process, start by selecting the brand of device, as shown in Figure 29. Press the **Navigation Buttons** 15 until the brand name of the device you are programming into the remote appears on the lower line of the display and then press the **Set Button** 16.
6. The next step is important, as it determines which codes will operate the source device or display. Point the AVR remote at the device being programmed and, following the instructions shown on the remote's **LCD Information Display** 3, press and release the **Numeric Keys** 18 one at a time, starting with the "1" button. After you press the "1" **Button** 18 the remote's LCD screen will briefly go blank as the code is being transmitted, but you will see the "transmit" icon in the upper right corner of the display to serve as confirmation that the remote is sending out commands.
7. After you press and release the number key, watch the device being programmed to see whether it turns off. As shown in the instructions that will appear on the next menu screen (Figure 31), press the **Set Button** 16, and then skip to Step 9. If the unit does not turn off, proceed to the next step.

8. If the device being programmed into the AVR remote does NOT turn off after you have pressed the "1" key, continue Steps 6 and 7 by pressing the available numeric keys shown until the device turns off. If the device still does not turn off after all choices have been tried, the code for this specific device is not in the AVR remote library under that brand name. If that is the case, we suggest that you press the **Set Button** 16 to accept the codes from another brand so that the programming is completed, but remember that you will then have to program the remote manually by following the Learning Commands instructions on page 54.
9. When the device being programmed does not turn off after a numeric key has been pressed, you must press the **Set Button** 16 within five seconds to enter the setting into the remote's memory. After you press the Set button, the top line of the LCD display will read **SAVING...** and then the word **SAVED** will flash four times in the center of the bottom line.
10. When the codes are saved the remote will return to normal operation, and whenever you press the **Input Selector Button** 5 that was just programmed, the display will show the original device type code at the far left side of the display, with the name of the new code set type in brackets. For example, the display will read **TU<-VCR** in our example of replacing the TV codes with those for a VCR.

Macro Programming

Macros enable you to easily repeat frequently used combinations of multiple remote control commands with the touch of a single button. Once a macro is programmed you may send up to 20 commands with one press of the Power On or Macro buttons. This will greatly simplify the process of turning on your system, changing devices or other common tasks. Thanks to the remote's two-line display, it is easier than ever for you to take advantage of the power of macro commands.

Recording a Macro

To record a macro into the remote's memory, follow these steps:

1. Press and hold the **Program Button** 67 for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 three times so that **MACRO** appears on the bottom line of the LCD screen, as shown in Figure 47. Press the **Set Button** 16 to enter the main macro menu branch.

Programming the Remote

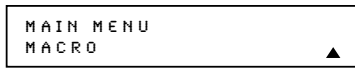


Figure 47

- At the next menu screen (Figure 48) press the **Set Button 16** to begin recording a macro.



Figure 48

- The next display screen (Figure 49) is where you select the button that will be used to recall the macro. The choices are the **Power On Button 4** or one of the discrete **Macro Buttons 31**. Press the **Navigation Buttons 15** until the name of the button you wish to program the macro into is shown. For this example we will show how to program a series of commands that will automatically be sent out every time the Power button is pressed.

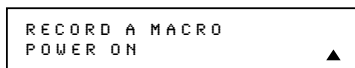


Figure 49

- The next screen that appears (Figure 50) is where you select the device for the first command that will be sent out as part of the macro. Press the **Navigation Buttons 15** until the name of the device appears on the left side of the lower line in the LCD display. For this example, the first button we want to have the macro "press" is the Power On button, so the AVR device is selected. Press the **Set Button 16** when the desired device name appears to move to the next programming step.

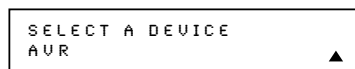


Figure 50

- The next display (Figure 51) is where you begin entering the individual commands for the macro, in the order you wish them to be transmitted. Remember that when you want to change devices, you must first press the **Input Selector 5 6** for that button, and then press the Command or Function key. Since we want to program a series of events that occur each time the Power On button is pressed, press the AVR button. In your specific macro, this is the first command button.



Figure 51

- The next display (Figure 52) and the subsequent screens are where the actual macro programming take place. The words at the left side of the top line of the display show the button that is being programmed (e.g., the **Power On Button 4** or one of the **Macro Buttons 31**) and the indication at the right side of the top line shows the number of macro steps available of 20 possible steps. Following the instructions on the remote's LCD screen, press the first key you wish to be transmitted in the macro. In our example, we first want the AVR to turn on, so the **Power Button 4** should be pressed.

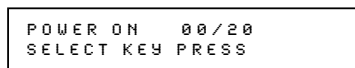


Figure 52

- Once the first command button for the macro has been pressed, continue to press the buttons you wish to be part of the macro, in the order they will be used. Press each button within five seconds of the last button, remembering to press the **Input Selector 5 6** when you are changing device functions. As the buttons on the remote are pressed, the remote's display screen will show the steps in the macro as they are programmed (Figure 53).

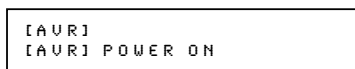


Figure 53

- For our example, we first want the AVR Power On button pressed, followed by the TV Power On, followed by the Cable Box On, followed by the selection of the Logic 7 mode. To do that, press the buttons in this order:

- Power On **4**
- VID 2/TV **5**
- Power On **4**
- VID 3/Cable **5**
- Power On **4**
- AVR **6**
- Logic 7 **25**

As each button is pressed to enter it into the macro you will see the button names appear and then scroll up on the LCD display as your confirmation of the key entry (Figure 53).

- When all commands for the macro have been entered, press the **Set Button 16** to save the macro. The display screen will show the button to which the macro has been programmed and the number of steps used, and the word **SAVED** will blink four times in the lower line of the LCD display. When the display returns to normal, the macro has been entered and the remote is ready for operation.

- If a macro has been programmed into the **Power On Button 4**, it will play back anytime the Power On button is pressed. As the macro plays, you will see the steps appear in the remote's LCD display. Macros programmed into one of the four discrete Macro buttons may be activated at any time by pressing the appropriate button.

Erasing a Macro

Once a macro has been created and stored in the AVR remote's memory, you have the option of erasing it. You may do this at any time by following these steps:

- Press and hold the **Program Button 37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display 3**. Release the button when the red light under the **Set Button 16** appears.
- The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button 16** will remain illuminated in red. Press the **Navigation Buttons 15** three times so that **MACRO** appears on the bottom line of the LCD screen, as shown in Figure 47. Press the **Set Button 16** to enter the main macro menu branch.
- At the next menu screen (Figure 54) press **Navigation Buttons 15** until the bottom line in the remote's LCD display reads **ERASE A MACRO**, as shown in Figure 54. Press the **Set Button 16** to begin the process of erasing a macro.

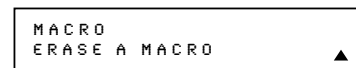


Figure 54

- The next display screen (Figure 55) is where you select which macro will be erased. Press the **Navigation Buttons 15** until the number of the macro you wish to erase appears. For this example we will erase the Power On macro created in the previous section. When the name of the macro to be erased appears, press the **Set Button 16**.

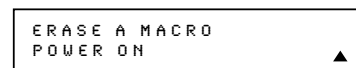


Figure 55

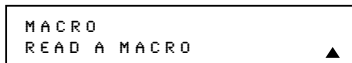
- The word **ERASED** will flash four times in the bottom line of the remote's LCD display, and then the display will return to its normal condition. When that happens the macro is erased and the remote is returned to normal operation.

Programming the Remote

Read a Macro

To check the commands stored in the remote's memory for one of the buttons, follow these steps:

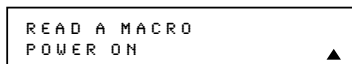
1. Press and hold the **Program Button** 37 for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 three times so that **MACRO** appears on the bottom line of the LCD screen, as shown in Figure 47. Press the **Set Button** 16 to enter the main macro menu branch.
3. At the next menu screen (Figure 56) press the **Navigation Buttons** 15 until the bottom line in the remote's LCD display shows **READ A MACRO**, as shown in Figure 56. Press the **Set Button** 16 to begin the process of erasing a macro.



MACRO
READ A MACRO

Figure 56

4. The next display screen (Figure 57) is where you select the macro to be read. Press the **Navigation Buttons** 15 until the name of the macro you wish to read appears. For this example, we will read back the Power On macro created in the previous section. When the name of the macro to be erased appears, press the **Set Button** 16.



READ A MACRO
POWER ON

Figure 57

5. As soon as the Set button is pressed, the first two steps in the macro will be appear in the remote's LCD screen. You may then use the **Navigation Buttons** 15 to step up or down through the list of commands stored as the macro. As you read the display, you will see **Device Selector Buttons** 5 6 appear in brackets, (e.g., [AUR]). When the step in the macro is a function, navigation or any other button, it will appear next to the bracketed read-out of the underlying device (e.g., [AUR] POWER ON).
6. When you are finished reviewing the macro's contents, press the **Set Button** 16 to return the remote to normal operation.

Punch-Through Configuration

Punch-through is a capability of the remote that allows the Volume controls, Channel Up/Down buttons or Transport keys (Play, Stop, Record, Fast Forward and Reverse, and Skip Up/Down) to link to a different device. For example, if your TV, cable box or satellite receiver is connected through the AVR you will most likely want to use the AVR's volume control commands even when the remote has been set to issue all other commands for the video device. "Punch-through" enables you to easily program the remote to do this.

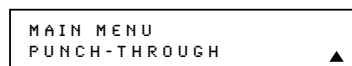
Volume Punch-Through

Follow these steps to enable the Volume Up/Down and Mute controls from one device to be used when the remote is otherwise programmed for a different device.

Note for Volume Punch-Through:

The remote's default settings are for the AVR's volume controls to be used when any input or device is selected with the exception of the VID 2/TV button. There is no need to program the remote for volume punch-through for the AVR's controls with other sources, such as DVD. To have the AVR's volume commands used when the TV device is selected, follow these steps:

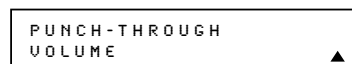
1. Press and hold the **Program Button** 37 for about three seconds while the message shown in Figure 25 appears in the remote's LCD Information Display 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 until **PUNCH-THROUGH** appears on the bottom line of the LCD screen, as shown in Figure 58. Press the **Set Button** 16 to enter the main punch-through menu branch.



MAIN MENU
PUNCH-THROUGH

Figure 58

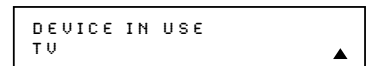
3. At the next menu screen (Figure 59) press the **Set Button** 16 to begin programming the remote for Volume punch-through.



PUNCH-THROUGH
VOLUME

Figure 59

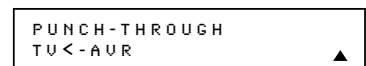
4. The next display screen (Figure 60) is where you select the device that will receive the punch-through commands. In our example, that is the VID 2/TV button, as that is where we want the AVR's volume controls to be active. Press the **Navigation Buttons** 15 until the name of the base device appears and then press the **Set Button** 16.



DEVICE IN USE
TV

Figure 60

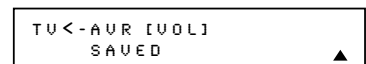
5. At the next display screen (Figure 61), you will select the device whose Volume Up/Down and Mute commands will be used. Press the **Navigation Buttons** 15 until the desired device's name appears to the right of the device in use. In our example, that is the AVR (indicated by **AUR**). When the desired combination of devices appears, press the **Set Button** 16.



PUNCH-THROUGH
TV < AUR

Figure 61

6. When the Set button is pressed, the display will change to show you that the new combination of control commands is being saved to the unit's memory, as shown in Figure 62. The word **SAVED** will flash four times and then the remote will return to normal operation.



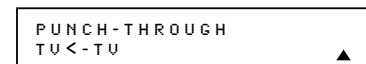
TV < AUR [VOL]
SAVED

Figure 62

7. Once the punch-through is programmed, the Volume Up/Down and Mute buttons of the second device named will be used when those buttons 40 43 are pressed while the master device is in use.

Returning the Volume Control Settings to Default Operation:

If you wish to remove the Volume punch-through so that the commands for Volume and Mute are returned to the factory default setting, follow the steps shown above, except that in Steps 4 and 5, select the same device for both the **DEVICE IN USE** on the left side of the bottom line and the **PUNCH-THROUGH** device. In the example used, the display to return the remote to default settings will appear as shown in Figure 63.



PUNCH-THROUGH
TV < TV

Figure 63

Channel Punch-Through

Channel punch-through allows the Channel Up/Down buttons to send commands to a different device than the one that has been selected for other commands. For example, you may wish to use a cable box or satellite receiver as the source for a VCR, so you would want the **Channel Up/Down Selectors** 42 to transmit commands to the cable box even though the other button commands are programmed to operate the VCR.

Programming the Remote

To program the AVR for Channel punch-through, follow these steps. This example will show how to program channel punch-through so that the commands programmed for Channel Up/Down for the VID 3/ Cable device will be transmitted when the VID 1/VCR device has been selected as the current device.

1. Press and hold the **Program Button** 37 for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 until **PUNCH-THROUGH** appears on the bottom line of the LCD screen, as shown in Figure 58. Press the **Set Button** 16 to enter the main punch-through menu branch.
3. At the next menu screen, press the **Navigation Buttons** 15 until **CHANNEL** appears on the bottom line of the LCD screen, as shown in Figure 64. Press the **Set Button** 16 to begin programming the remote for Channel punch-through.

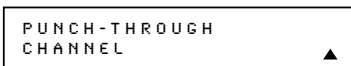


Figure 64

4. The next display screen (Figure 65) is where you select the device that will receive the punch-through commands. In our example, that is the VID 1/VCR button, as that is where we want the cable box's channel controls to be active. Press the **Navigation Buttons** 15 until the name of the base device appears and then press the **Set Button** 16.

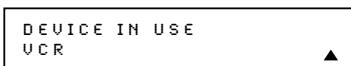


Figure 65

5. At the next display screen (Figure 66), you will select the device whose Channel Up/Down commands will be used. Press the **Navigation Buttons** 15 until the desired device name appears to the right of the device in use. In our example, that is the cable box. When the desired combination of devices appears, press the **Set Button** 16.

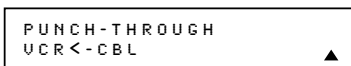


Figure 66

6. When the Set button is pressed, the display will change to show you that the new combination of control commands is being saved to the unit's memory, as shown in Figure 67. The word **SAVED** will flash four times and then the remote will return to normal operation.

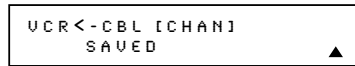


Figure 67

7. Once the punch-through is programmed, the channel up/down buttons of the second device named will be used when those buttons 42 are pressed while the master device is in use.

Returning the Channel Control Settings to Default Operation:

If you wish to remove the Channel Punch-Through so that the commands for Channel Up/Down are returned to the factory default setting, follow the steps shown above, except that in Steps 4 and 5, select the same device for both the **DEVICE IN USE** on the left side of the bottom line and the **PUNCH-THROUGH** device. In the example used, the display to return the remote to default settings will appear as shown in Figure 68.

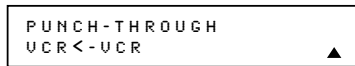


Figure 68

Transport Punch-Through

Transport punch-through allows the **Play** 26, **Stop** 26, **Fast Forward/Reverse** 26, **Pause** 26, **Record** 26 and **Skip Up/Down** 23 buttons to send commands to a different device than the one that has been selected for other commands. For example, you may wish to operate the transport of a second VCR you have connected to the VID 2/TV input, as shown in the following example.

1. Press and hold the **Program Button** 37 for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** 3. Release the button when the red light under the **Set Button** 16 appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** 16 will remain illuminated in red. Press the **Navigation Buttons** 15 until **PUNCH-THROUGH** appears on the bottom line of the LCD screen, as shown in Figure 58. Press the **Set Button** 16 to enter the main punch-through menu branch.
3. At the next menu screen, press the **Navigation Buttons** 15 until **TRANSPORT** appears on the bottom line of the LCD screen, as shown in Figure 69. Press the **Set Button** 16 to begin programming the remote for transport punch-through.

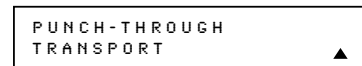


Figure 69

4. The next display screen (Figure 70) is where you select the device that will receive the punch-through commands. In our example, that is the TV button, as that is where we want the VCR's transport controls to be active. Press the **Navigation Buttons** 15 until the name of the base device appears and then press the **Set Button** 16.

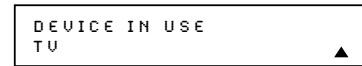


Figure 70

5. At the next display screen (Figure 71), you will select the device whose transport commands will be used. Press the **Navigation Buttons** 15 until the desired device name appears to the right of the device in use. In our example, that is the VCR. When the desired combination of devices appears, press the **Set Button** 16.

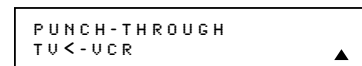


Figure 71

6. When the Set button is pressed, the display will change to show you that the new combination of control commands is being saved to the unit's memory, as shown in Figure 72. The word **SAVED** will flash four times and then the remote will return to normal operation.

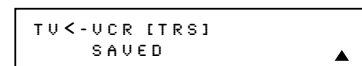


Figure 72

7. Once the punch-through is programmed, the transport buttons of the second device named will be used when those buttons are pressed while the master device is in use.

Programming the Remote

Returning the Transport Control Settings to Default Operation:

If you wish to remove the Transport Punch-Through so that the transport commands are returned to the factory default setting, follow the steps shown above, except that in Steps 4 and 5, select the same device for both the **DEVICE IN USE** on the left side of the bottom line and the **PUNCH-THROUGH** device. In the example used, the display to return the remote to default settings will appear as shown in Figure 73.

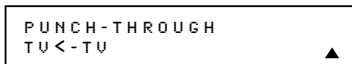


Figure 73

Renaming

While the names given to the buttons and inputs on the AVR represent recognizable categories of audio/ video products, system operation may be easier if the displays shown in the remote's LCD screen are customized to reflect the specific characteristics of a playback source's brand name or the new function given to a specific button when one remote's controls are programmed into the AVR remote. The AVR remote allows you to change the name of either a master device or any button on the remote using the following steps.

Renaming a Device

To rename a specific device/input source button, follow these steps. For this example, we will show you how to rename the Device/Input Selector normally shown as "TV" to "HDTV TUNER."

1. Press and hold the **Program Button** **37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** **3**. Release the button when the red light under the **Set Button** **16** appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** **16** will remain illuminated in red. Press the **Navigation Buttons** **15** until **RENAME** appears on the bottom line of the LCD screen, as shown in Figure 74.

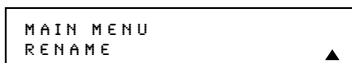


Figure 74

3. At the next menu screen press the **Navigation Buttons** **15** until **RENAME DEVICE** appears on the bottom line of the LCD screen, as shown in Figure 75. Press the **Set Button** **16** to begin renaming a device.



Figure 75

4. The next display screen (Figure 76) is where you select the device that will be renamed. In our example, that is the TV button. Press the **Navigation Buttons** **15** until the name of the base device appears and then press the **Set Button** **16**.

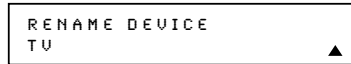


Figure 76

5. At the next menu screen you will see the device name on the bottom line of the display with a blinking cursor box to the right of the device name. Press the **Navigation Buttons** **15** to return the blinking cursor to the far left side of the display line. You may then retitle the device name as shown in the next step.
6. To enter the new name, press the **Numeric Keys** **13**. The letters above the numbered buttons indicate which letter or symbol will appear when the button is pressed during the renaming process. The first press of the button will enter the first letter shown, subsequent presses of the same button will change the display to the other letters above that numbered key. For example, since the first letter we need to rename the input to HDTV Tuner is an "H", you would locate the "H" above the "4" button, and press the button twice. The first press shows a "G," the second press changes it to an "H." Consult the table at the end of this section to see which characters pressing a particular button generates.

7. After you enter the first letter of the new device name, there are three options for entering the next character:
 - a. To enter a letter that requires a different numeric key to be pressed, simply press that button. The cursor will automatically move to the next position and the first letter accessed by the new button will appear. Following our example, the next letter needed is a "D," so you would press the "3" button once.
 - b. To enter a letter that uses the same numeric key, you must first press the **Navigation Buttons** **15** to move the blinking cursor block to the next position. Then press the **Numeric Key** **13** as required to enter the desired letter.
 - c. To enter a blank space, press the **Navigation Buttons** **15** twice. The first press will move the cursor to the right, and the second press will move the cursor one more space to the right, leaving a blank space between the last letter and the next one.
8. Repeat Step 7 as needed to enter all the needed letters, numbers, characters and spaces.

9. When the text entry is complete, press the **Set Button** **16**. The LCD display will blink **DEVICE RENAMED** three times and then return to normal operation.

Once a device is renamed you will see the new name on the top line of the remote's LCD display whenever the **Input/Device Selector** **5** is pressed, or when any other command/function button on the remote is pressed after the main Device Selector is pressed. Note that renaming a device in the remote will not change the name of the input used by the on-screen menu system of the AVR.

Notes on Renaming Devices:

- To move the cursor to the right or left of the display during the renaming process, press the **Navigation Buttons** **15** as required.
- The table below shows the letters, numbers and characters that may be accessed by pressing the Numeric Keys:

Key	Characters	Key	Characters
1	[,],/,1	6	M,N,O,6
2	A,B,C,2	7	P,Q,R,S,7
3	D,E,F,3	8	T,U,V,8
4	G,H,I,4	9	W,X,Y,Z,9
5	J,K,L,5	0	-,.,#,0

- Renaming a device changes the name of the device only, not any of the individual key functions within that device memory. To change the name of an individual device, follow the instructions in the next section.

Renaming Individual Keys

Thanks to the programming flexibility of the AVR remote, an individual button on the remote may be assigned a feature or function that is different from the name that appears as the factory default when the button is pressed. However, with the Rename Key function it is possible to rename almost any button on the remote so that when the button is pressed you will see a more descriptive or appropriate name displayed.

To rename a specific button on the remote, follow these steps. For this example, we will show you how to rename the **Tone Control Button** **44**, which is normally not used when DVD is selected so that it reads ZOOM in the remote's display.

1. Press and hold the **Program Button** **37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display** **3**. Release the button when the red light under the **Set Button** **16** appears.
2. The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button** **16** will remain illuminated in red. Press the **Navigation Buttons** **15** until **RENAME** appears on the bottom line of the LCD screen, as shown in Figure 74.

Programming the Remote

- At the next menu screen press the ▲▼ **Navigation Buttons 15** until **RENAME KEY** appears on the bottom line of the LCD screen, as shown in Figure 77. Press the **Set Button 16** to continue.

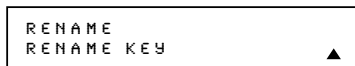


Figure 77

- The next display screen (Figure 78) is where you select the device within which the key to be renamed exists. Press the ▲▼ **Navigation Buttons 15** until the name of the base device appears. In our example, since we want to rename a button within the DVD device memory, **DVD** should appear in the lower line of the LCD. When the desired device name appears, press the **Set Button 16**.

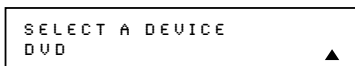


Figure 78

- At the next menu screen you will select the first button within the device to be renamed, as instructed in the display shown in Figure 79. Select the button by simply pressing it on the remote.

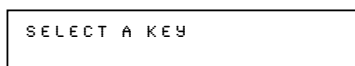


Figure 79

- Depending on whether or not the button pressed already has a named function within the device selected, one of two things will happen.
 - If the button to be renamed already has a pre-programmed, or previously renamed title in the remote's memory, you will see that name on the top line of the LCD display, and a blinking block cursor will appear on the far left side of the bottom line of the display, as shown in Figure 80.
 - If the button to be renamed does not have a function in the device selected, the top line of the LCD screen will be blank, and a blinking block cursor will appear on the far left side of the bottom line of the display, as shown in Figure 81.

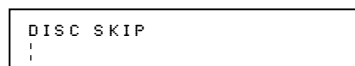


Figure 80



Figure 81

- To enter the new name for the key, press the **Numeric Keys 18**. The letters above the numbered buttons indicate which letters or symbols will appear when the button is pressed during the renaming process. The first press of the button will enter the first character shown, subsequent presses of the same button will change the display to the other letters above that numbered key. For example, since the first letter we need to rename the Tone button to Zoom is a "Z," so you would locate the "Z" above the "9" button, and press the button four times. The first press shows a "W," the subsequent presses step through the other letters available until the "Z" appears. Consult the table on the previous page to see which characters are available by pressing a particular button.

- After you enter the first letter of the new device name, there are three options for entering the next character:
 - To enter a letter that requires a different numeric key to be pressed, simply press that button. The cursor will automatically move to the next position and the first letter accessed by the new button will appear. Following our example, the next letter needed is an "O," so you would press the "6" button once.
 - To enter a letter that uses the same numeric key, you must first press the ► **Navigation Buttons 15** to move the blinking cursor block to the next position. Then press the **Numeric Key 18** as required to enter the desired letter. This is the way you would enter the second "O" in the word ZOOM, and again for the letter "M."
 - To enter a blank space, press the ► **Navigation Buttons 15** twice. The first press will move the cursor to the right, and the second press will move the cursor one more space to the right, leaving a blank space between the last letter and the next one.
- Repeat Steps 7 and 8 as needed to complete entering the needed letters, numbers, characters and spaces.
- When the text entry is complete, press the **Set Button 16**. The new name will be entered into the remote's memory, replacing the default name.

- At this point you have two options:

- If you wish to program an additional key within the same device, press the **Set Button 16** as instructed by the bottom line of the LCD display reading **ANOTHER KEY**. The remote will return to the **SELECT A KEY** menu option as shown in Step 6. Repeat the instructions in Steps 6 through 11 to rename the next key.
- If you have no additional keys to rename, press the ▲ **Navigation Buttons 15** once so that the menu screen displays **EXIT** on the bottom line of the display. Press the **Set Button 16** to return the remote to normal operation.

Notes on Renaming Keys:

- Renaming a key does not change its function. You may change the function of an individual key by learning a new code into the remote. See page 54 for more information.
- When a key is renamed it will only apply to the specific device selected in Step 4. The same key may be renamed as needed for each individual device with which it is used.

Resetting the Remote

Depending on the way in which the remote has been programmed, there may be a situation where you wish to totally erase all changes that have been made to the remote and return it to the factory defaults. You may do that by following the steps shown below, but remember that once the remote is reset, ALL changes that have been made, including programming for use with other devices, learned keys, macros, punch-through settings and key names, will be erased and any settings you had previously made will have to be reentered.

To erase all settings and reset the remote to the original factory default settings and displays, follow these steps:

- Press and hold the **Program Button 37** for about three seconds while the message shown in Figure 25 appears in the remote's **LCD Information Display 3**. Release the button when the red light under the **Set Button 16** appears.
- The remote's **MAIN MENU** message (Figure 26), will appear in the LCD display and the **Set Button 16** will remain illuminated in red. Press the ▲▼ **Navigation Buttons 15** until **USER RESET** appears on the bottom line of the LCD screen, as shown in Figure 82.

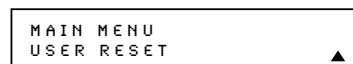


Figure 82

Programming the Remote

3. Press the **Set Button 16** to reset the remote. Note that once the Set Button is pressed the process may not be stopped. While the remote's memory is being cleared a **RESETTING...** message will appear in the upper line of the remote's LCD screen as shown in Figure 83.

It may take a few minutes for the reset process to take place, and the length of time will vary depending on how much customization and programming has taken place. Please be patient; as long as the message appears in the display the remote is functioning properly.



Figure 83

4. When the remote has been totally reset and returned to the factory default condition, a **REMOTE RESET COMPLETE** message will appear (Figure 84) briefly, and then the remote will return to normal operation.

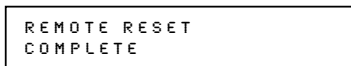


Figure 84

Backlight Options

The AVR 645's remote has a built-in backlight system that makes it easier to use the remote when the room lighting is dimmed for an optimal home theater experience. To turn the backlighting on, simply press the **Light Button 27**. That button is made from a special "glow" material that makes it easier to find in dark rooms. This glow feature does not use any battery power, so the glow will fade when the remote is kept in a dark room for an extended period of time. You may "recharge" it by placing the remote in normal room lighting for a few hours.

Once the **Light Button 27** is pressed, the remote's backlighting will remain on for approximately 7 seconds, and when you press any button on the remote while the backlighting is on, the light will stay on for another 7 seconds. However, the remote's "Couch" function will conserve battery power by turning both the backlighting and the LCD display off when any button is pressed for more than 30 seconds.

You may also configure the remote so that the backlighting will come on, any time a button is pressed.

To set this option, follow these steps:

1. Press and hold the **Program Button 37** for about 3 seconds while the message shown in Figure 25 appears in the remote's LCD display. Release the button when the red light under the **Set Button 16** appears.
2. When the remote's Main Menu message (Fig. 26) appears in the LCD display and the **Set Button 16** remains illuminated in red, press the **▲▼ Navigation Buttons 15** until **BACK LIGHT** appears in the bottom line of the LCD screen, as shown in Figure 85.

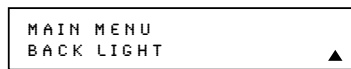


Figure 85

3. Press the **Set Button 16** and then press the **▲▼ Navigation Buttons 15** again so that **ON FULL** appears in the bottom line of the LCD display, as shown in Figure 86.

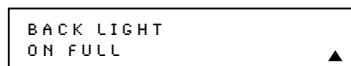


Figure 86

4. Press the **Set Button 16** one more time. The LCD display will show the word **SAVING** on the top line for about 2 seconds and then flash **SAVE D** four times on the bottom line to indicate that the setting has been accepted by the remote's memory.
5. The remote's backlighting will now turn on whenever a button is pressed. To revert to the original setting, follow the four steps shown above, but in Step 3, select the option that has the word **NORMAL** on the bottom line of the LCD display.

Additional Notes on Configuring and Operating the Remote:

- When the remote is being programmed, it will automatically time-out if no button is pressed within a thirty-second period. The message shown in Figure 87 will appear briefly, and the remote will then exit the feature being programmed and any data entered will be lost.

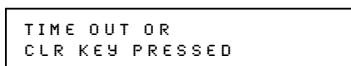


Figure 87

- The programming or configuration process may also be stopped at any time by pressing the **Clear Button 34**. The message shown in Figure 87 will appear, the data entered in the current process will be lost and the remote will return to normal operation. Any process that was underway when the button will be pressed must be re-started.

- Extensive use of the programming, learning and configuration functions of the remote may consume significantly more battery power than normal remote operation. While the batteries should last for four to six months in normal operation, you may find that they need to be changed sooner after the remote is programmed for the first time.

- When the batteries approach a level below which the remote will not function, the remote's LCD screen will display a **LOW BATTERY** warning as shown in Figure 88. We strongly recommend replacing the batteries as soon as this message appears to avoid the loss of programming and configuration settings. These settings are not lost when the batteries are changed quickly.

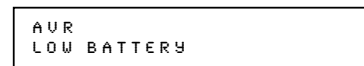


Figure 88

- The remote has a built-in backlight that may be activated by pressing the **Light Button 27**. This button is made from a special "glow" material so that it is easier to find in dark rooms. This glow feature does not consume any electricity, but the glow will fade when the remote is kept in a dark location for an extended period of time. The "glow" feature may be restored by placing the remote in normal room light for a few hours.
- The remote's backlight will remain lit for approximately five seconds after the **Light Button 27** is pressed, and it will stay lit for another five seconds if any key is pressed while the backlight is on. You may keep the backlight lit by holding the Light Button, but extensive use of the backlight will reduce battery life.
- The LCD display will remain on for ten seconds after a key is pressed and then turn off to conserve battery life.
- When any button is held for more than thirty seconds the LCD will turn off and the remote will stop transmitting the codes to conserve battery life.

Troubleshooting Guide

SYMPTOM	CAUSE	SOLUTION
Unit does not function when Main Power Switch 1 is pushed	<ul style="list-style-type: none"> No AC Power 	<ul style="list-style-type: none"> Make certain AC power cord is plugged into a live outlet Check to see if outlet is switch controlled
Display lights, but no sound or picture	<ul style="list-style-type: none"> Intermittent input connections Mute is on Volume control is down 	<ul style="list-style-type: none"> Make certain that all input and speaker connections are secure Press Mute button 43 K Turn up volume control
Units turns on, but Front-Panel Display does not light	<ul style="list-style-type: none"> Display brightness is turned off 	<ul style="list-style-type: none"> Follow the instructions in the Display Brightness section on page 47 so that the display is set to V F D FULL
No sound from any speaker; light around Power switch 2 is red	<ul style="list-style-type: none"> Amplifier is in protection mode due to possible short Amplifier is in protection mode due to internal problems 	<ul style="list-style-type: none"> Check speaker-wire connections for shorts at receiver and speaker ends Contact your local Harman Kardon service depot
No sound from surround or center speakers	<ul style="list-style-type: none"> Incorrect surround mode Input is mono Incorrect configuration Stereo or Mono program material 	<ul style="list-style-type: none"> Select a mode other than Stereo There is no surround information from mono sources (except with Theater and Hall surround modes) Check speaker mode configuration Some surround modes may not create rear-channel information from nonencoded programs
Unit does not respond to remote commands	<ul style="list-style-type: none"> Weak batteries in remote Wrong device selected Remote sensor 30 is obscured 	<ul style="list-style-type: none"> Change remote batteries Press the AVR Selector B Make certain front-panel sensor is visible to remote or connect remote sensor
Intermittent buzzing in tuner	<ul style="list-style-type: none"> Local interference 	<ul style="list-style-type: none"> Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances
Letters flash in the Channel Indicator Display 24 and Digital Audio stops	<ul style="list-style-type: none"> Digital audio feed paused 	<ul style="list-style-type: none"> Resume play for DVD Check that Digital Signal is fed to the Digital Input selected

Processor Reset

In the rare case where the unit's operation or the displays seem abnormal, the cause may involve the erratic operation of the system's memory or microprocessor.

To correct this problem, first unplug the unit from the AC wall outlet and wait at least three minutes. After the pause, reconnect the AC power cord and check the unit's operation. If the system still malfunctions, a system reset may clear the problem.

To clear the AVR's entire system memory including tuner presets, output level settings, delay times and speaker configuration data, first put the unit in Standby by pressing the **System Power Control** button **2**. Next, press the **Surround Mode 5** and the **RDS 16** buttons simultaneously for three seconds.

The unit will turn on automatically and display the **RESET** message in the **Main Information Display 29**. Note that once you have cleared the memory in this manner, it is necessary to re-establish all system configuration settings and tuner presets.

NOTE: Resetting the processor will erase any configuration settings you have made for speakers, output levels, surround modes, digital input assignments as well as the tuner presets. After a reset the unit will be returned to the factory presets, and all settings for these items must be reentered.

If the system is still operating incorrectly, there may have been an electronic discharge or severe AC line interference that has corrupted the memory or microprocessor.

If these steps do not solve the problem, consult an authorized Harman Kardon service depot.

APPENDIX

System Defaults

The two tables in this section show the factory default settings for the Video Inputs, Video Sources and Video Display Aspect Ratios. These tables give you the complete picture on the AVR 645's initial settings. You may then decide whether any item needs to be changed so that it is more appropriate for your specific installation. Any of the settings shown may be changed as shown in the pages of the System Configuration section of this manual (pages 23 to 37).

Table 1: Video Input Defaults

INPUT	AUDIO INPUT	VIDEO INPUT	COMPONENT VIDEO INPUT	RECORD OUTPUT
Video 1	ANALOG	AUTO	COMPONENT 1	ANALOG
Video 2	ANALOG	AUTO	COMPONENT 2	ANALOG
Video 3	OPTICAL 1	AUTO	COMPONENT 1	ANALOG
Video 4	OPTICAL 4	AUTO	COMPONENT 2	ANALOG
DVD	COAX 1	AUTO	COMPONENT 3	ANALOG
HDMI 1	HDMI 1	HDMI 1	---	DSP DOWNMIX
HDMI 2	HDMI 2	HDMI 2	---	DSP DOWNMIX
Tuner	ANALOG	AUTO	COMPONENT 1	ANALOG
CD	ANALOG	AUTO	COMPONENT 3	ANALOG
Tape	ANALOG	AUTO	COMPONENT 1	ANALOG
DMP/The Bridge	ANALOG	HDMI 1	COMPONENT 1	ANALOG
6/8 CH Direct	ANALOG	HDMI 1	COMPONENT 1	ANALOG
USB	---	HDMI 1	COMPONENT 3	DSP DOWNMIX

System Default and Personal Settings Worksheets

The worksheets in this section show the system defaults for the global settings on your AVR 645. Once your system is configured manually, or through the use of EzSet/EQ, where applicable, we recommend that you use the "Your System Settings" column to record your personal preferences so that they may be restored in the event the AVR's memory is lost due to an extended power outage, system upgrade, processor reset, or other major service to your unit. Additional copies of this worksheet may be downloaded from the Harman Kardon web site at www.harmankardon.com

APPENDIX

Worksheet B: Surround Configuration Defaults and Settings

Feature	System Default	Your System Settings
Logic 7 Global	On	
Default Surround	Original	
Dolby Pro Logic II Music Center Width	3	
Dolby Pro Logic II Music Dimension	0	
Dolby Pro Logic II Panorama	Off	
Dolby Pro Logic IIx Music Center Width	3	
Dolby Pro Logic IIx Music Dimension	0	
Dolby Pro Logic IIx Panorama	Off	
Night Mode	Off	

Worksheet C: Delay Defaults and Setting

Feature	System Default	Your System Settings
Front Left	12.0 Feet	
Center	12.0 Feet	
Front Right	12.0 Feet	
Surround Right	12.0 Feet	
Surround Back Right	12.0 Feet	
Surround Back Left	12.0 Feet	
Surround Left	12.0 Feet	
Subwoofers	12.0 Feet	

Worksheet D: System Defaults and Settings

Feature	System Default	Your System Settings
Front L/R Speaker Size & X-Over	Small – 100 Hz	
Center Speaker Size & X-Over	Small – 100 Hz	
Surround L/R Speaker Size & X-Over	Small – 100 Hz	
Surround Back Speaker Size & X-Over	None	
LFE LP Filter	100 Hz	
Sub Mode	Sub L/R+LFE	
Channel Adjust	Global	
Sub Size	10 in/250 mm	
VFD Fade Time Out	Off	
VFD Brightness	Full	
Volume Default	Off	
Volume Default Set	-25dB	
Semi OSD Time Out	5 Sec	
Full OSD Time Out	20 Sec	
DMP Auto Power	Off	
HDMI Video Auto	On	
Surround Back Amps	Main	
Carrier Out	Zone II	

APPENDIX

Worksheet E: Input Settings

FEATURE	DVD	Video 1	Video 2	Video 3	Video 4	HDMI 1	HDMI 2	CD	Tape	Tuner	The Bridge	USB	6/8 Ch Direct
Input Title													
Surround Mode													
Audio In Port													
Audio Auto Poll													
Video In Port													
Component Video Input													
Video Processing													
AV Sync Delay													
Record Output													
Auto Poll													
Input Source Type													
ADC Sampling													
Tone In/Out													
Bass													
Treble													

Technical Specifications

Audio Section

Stereo Mode

Continuous Average Power (FTC)

90 Watts per channel, 20Hz–20kHz,
@ < 0.07% THD, both channels driven into 8 ohms

5/7 Channel Surround Modes

Power Per Individual Channel

Front L&R channels:
75 Watts per channel,
@ < 0.07% THD, 20Hz–20kHz into 8 ohms

Center channel:
75 Watts, @ < 0.07% THD, 20Hz–20kHz into 8 ohms

Surround (L & R Side, L & R Back) channels:
75 Watts per channel,
@ < 0.07% THD, 20Hz–20kHz into 8 ohms

Input Sensitivity/Impedance

Linear (High Level) 200mV/47kohms

Signal-to-Noise Ratio (IHF-A) 95dB

Surround System Adjacent Channel Separation

Analog Decoding 40dB
(Pro Logic, etc.)

Dolby Digital (AC-3) 55dB

DTS 55dB

Frequency Response

@ 1W (+0dB, -3dB) 10Hz–130kHz

High Instantaneous

Current Capability (HCC) ±50 Amps

Transient Intermodulation

Distortion (TIM) Unmeasurable

Rise Time 16 µsec

Slew Rate 40V/µsec**

FM Tuner Section

Frequency Range	87.5–108MHz
Usable Sensitivity	IHF 1.3 µV/13.2dB
Signal-to-Noise Ratio	Mono/Stereo: 70/68dB (DIN)
Distortion	Mono/Stereo: 0.15/0.2%
Stereo Separation	40dB @ 1kHz
Selectivity	±400kHz: 70dB
Image Rejection	80dB
IF Rejection	90dB

AM Tuner Section

Frequency Range	520–1710kHz
Signal-to-Noise Ratio	45 dB
Usable Sensitivity	Loop: 500µV
Distortion	1kHz, 50% Mod: 0.8%
Selectivity	±10kHz: 30dB

Video Section

Video Format	PAL/NTSC
Input Level/Impedance	1Vp-p/75 ohms
Output Level/Impedance	1Vp-p/75 ohms
Video Frequency Response (Composite and S-Video)	10Hz–8MHz (-3dB)
Video Frequency Response (Component)	10Hz-50MHz (-3dB)
HDMI Version	1.1

General

Power Requirement	AC 220-240V/50Hz
Power Consumption	120W idle, 1180W maximum (7 channels driven)

Dimensions (Max)



Width 440mm

Height 165mm

Depth 435mm

Weight 19.9 kg

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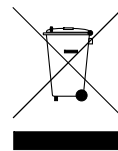
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**Without input anti slewing and output isolation networks.

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H A Harman International Company
250 Crossways Park Drive, Woodbury, New York 11797
www.harmankardon.com
Harman Consumer Group, Inc.:
2, route de Tours, 72500 Château-du-Loir, France
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