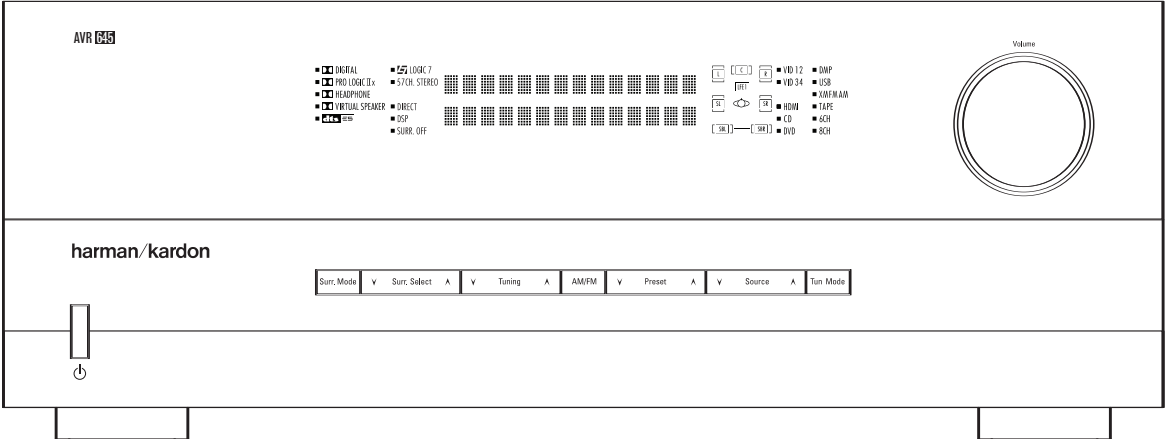


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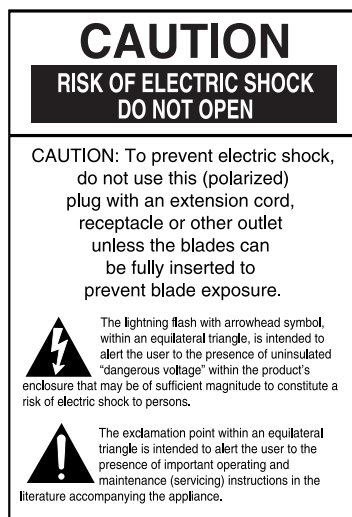
AVR 645

AUDIO/VIDEO RECEIVER
OWNER'S MANUAL



AVR 645 AUDIO/VIDEO RECEIVER

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For Canadian model

This class B digital apparatus complies with Canadian ICES-003.

For models having a power cord with a polarized plug:
CAUTION: To prevent electric shock, match wide blade of plug to wide slot, fully insert.

Modèle pour les Canadien

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Sur les modèles dont la fiche est polarisée:
ATTENTION: Pour éviter les chocs électriques, introduire la lame la plus large de la fiche dans la borne correspondante de la prise et pousser jusqu'au fond.

Please register your product on our Web site at www.harmankardon.com. Note: You'll need the serial number of your new AVR. At the same time, you can choose to be notified about our new products and/or special promotions.

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 screen, or on the front-panel information display

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

A — (letter in a square) indicates a front-panel control that is normally concealed behind the drop-down door

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

1 — (number in an oval) indicates a button or indicator on the TC 30 remote

A — (letter in an oval) indicates a button on the ZR 10 remote

Important Notes about the instructions in this manual:

- The appearance of the text and cursor in 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.

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 and XM-Ready® operation, are new to even the most experienced home theater enthusiast. Although the power of the AVR 645 makes them easy to use, we strongly recommend that you take a few minutes to read this owner's manual to familiarize yourself with how the full suite of AVR 645 features and capabilities are configured and used in day-to-day operation. This small investment of time will yield significant dividends in taking the maximum advantage of this new addition to your home theater system.

If you have any questions about this product, its installation or its operation, you may also access a wealth of information and assistance by visiting our Web site at www.harmankardon.com.

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's video processing allows you to individually adjust the video processing parameters for each input, and then scale the output signal to 720p or 1080i to match the requirements of your specific video display. 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.

Thanks to a wide range of multizone options and a standard ZR 10 remote control, the AVR 645 makes it possible to watch and listen to a separate source in one room while the main home theater uses a different source. Using the assignable rear surround channel amplifiers, you may create a basic remote listening zone without any additional equipment, or the unit's multiroom outputs may be used to feed an optional, external power amplifier and volume control. For one-wire multiroom connectivity, the AVR 645 is A-BUS/READY®, requiring only a single Category 5/5e cable run and an optional remote module to power a pair of remote speakers while controlling volume and enabling full control over the program source and connected IR-controlled devices.

Along with the latest advances in digital audio and video technology, Harman Kardon recognizes that some things remain constant, and in the case of the AVR 645 that is a requirement for audio power best served by our time-honored high-current, ultrawide bandwidth amplifier design. The AVR 645's seven-channel amplifier provides the power to reproduce the loudest crescendos or cinema sound effects while remaining virtually free from distortion or system noise.

With a combination of state-of-the-art circuitry, digital technology and proven performance with an elegant design that is compatible with the latest source components and video displays, the AVR 645 represents the culmination of Harman Kardon's fifty-plus year history of delivering the finest sonic performance.

- All popular digital and matrix surround modes, including Dolby® Digital, Dolby Digital EX, Dolby Pro Logic® II, DTS®, DTS-ES® Discrete and Matrix, DTS Neo:6® and DTS 96/24®
- Seven channels of high-current, ultrawide bandwidth amplification with the surround back channels assignable to either main-room or remote-room use
- Harman Kardon's Logic 7® processing brings a new sense of reality to stereo and matrix surround sources
- Dolby Virtual Speaker processing for use when less than a full 5.1 or 7.1 speaker complement is available
- Dolby Headphone for 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
- Full bass management for all inputs, including the analog direct inputs for high-resolution DVDs, DVD-Audio and SACD™ players, including Quad Crossover settings and individual settings for each input
- Dual subwoofer outputs for 7.2 operation with improved low-frequency performance
- A/V sync delay adjustable for each input delivers perfect lip sync with digital programs or video displays
- Front-panel digital audio and analog audio/video jacks may be used as either inputs or outputs for connection to the latest portable digital products or video game consoles
- Extensive multiroom options, including a standard ZR 10 remote, audio and video outputs to the remote zone, assignable rear channel amplifier channels and A-BUS/READY® capability for listening to a separate source in a remote zone
- Harman Kardon's TC 30 activity-based remote with color LCD screen for total system control

SAFETY INFORMATION

Important Safety Information

Verify Line Voltage Before Use

Your AVR 645 has been designed for use with 120-volt AC current. Connection to a line voltage other than that for which it is intended can create a safety and fire hazard and may damage the unit.

If you have any questions about the voltage requirements for your specific model, or about the line voltage in your area, contact your selling dealer before plugging the unit into a wall outlet.

Do Not Use Extension Cords

To avoid safety hazards, use only the power cord attached to your unit. We do not recommend that extension cords be used with this product. As with all electrical devices, do not run power cords under rugs or carpets, or place heavy objects on them. Damaged power cords should be replaced immediately by an authorized service center with a cord meeting factory specifications.

Handle the AC Power Cord Gently

When disconnecting the power cord from an AC outlet, always pull the plug; never pull the cord. If you do not intend to use the unit for any considerable length of time, disconnect the plug from the AC outlet.

Do Not Open the Cabinet

There are no user-serviceable components inside this product. Opening the cabinet may present a shock hazard, and any modification to the product will void your guarantee. If water or any metal object such as a paper clip, wire or a staple accidentally falls inside the unit, disconnect it from the AC power source immediately, and consult an authorized service center.

CATV or Antenna Grounding

If an outside antenna or cable system is connected to this product, be certain that it is grounded so as to provide some protection against voltage surges and static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements of the grounding electrode.

NOTE TO CATV SYSTEM INSTALLER: This reminder is provided to call the CATV (cable TV) system installer's attention to article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as possible.

Installation Location

- To ensure proper operation and to avoid the potential for safety hazards, place the unit on a firm and level surface. When placing the unit on a shelf, be certain that the shelf and any mounting hardware can support the weight of the product.
- Make certain that proper space is provided both above and below the unit for ventilation. If this product will be installed in a cabinet or other enclosed area, make certain that there is sufficient air movement within the cabinet. Under some circumstances, a fan may be required.
- Do not place the unit directly on a carpeted surface.
- Avoid installation in extremely hot or cold locations, or in an area that is exposed to direct sunlight or heating equipment.
- Avoid moist or humid locations.
- Do not obstruct the ventilation slots on the top of the unit, or place objects directly over them.
- Due to the weight of the AVR 645 and the heat generated by the amplifiers, there is the remote possibility that the rubber padding on the bottom of the unit's feet may leave marks on certain wood or veneer materials. Use caution when placing the unit on soft woods or other materials that may be damaged by heat or heavy objects.

Cleaning

When the unit gets dirty, wipe it with a clean, soft, dry cloth. If necessary, wipe it with a soft cloth dampened with mild soapy water, then a fresh cloth with clean water. Wipe dry immediately with a dry cloth. NEVER use benzene, aerosol cleaners, thinner, alcohol or any other volatile cleaning agent. Do not use abrasive cleaners, as they may damage the finish of metal parts. Avoid spraying insecticide near the unit.

Moving the Unit

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

Important Information for the User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. The limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that harmful interference will not occur in a particular installation. If this equipment does cause harmful interfer-

ence to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept interference received, including interference that may cause undesired operation.

NOTE: Changes or modifications may cause this unit to fail to comply with Part 15 of the FCC rules and may void the user's authority to operate the equipment.

Unpacking

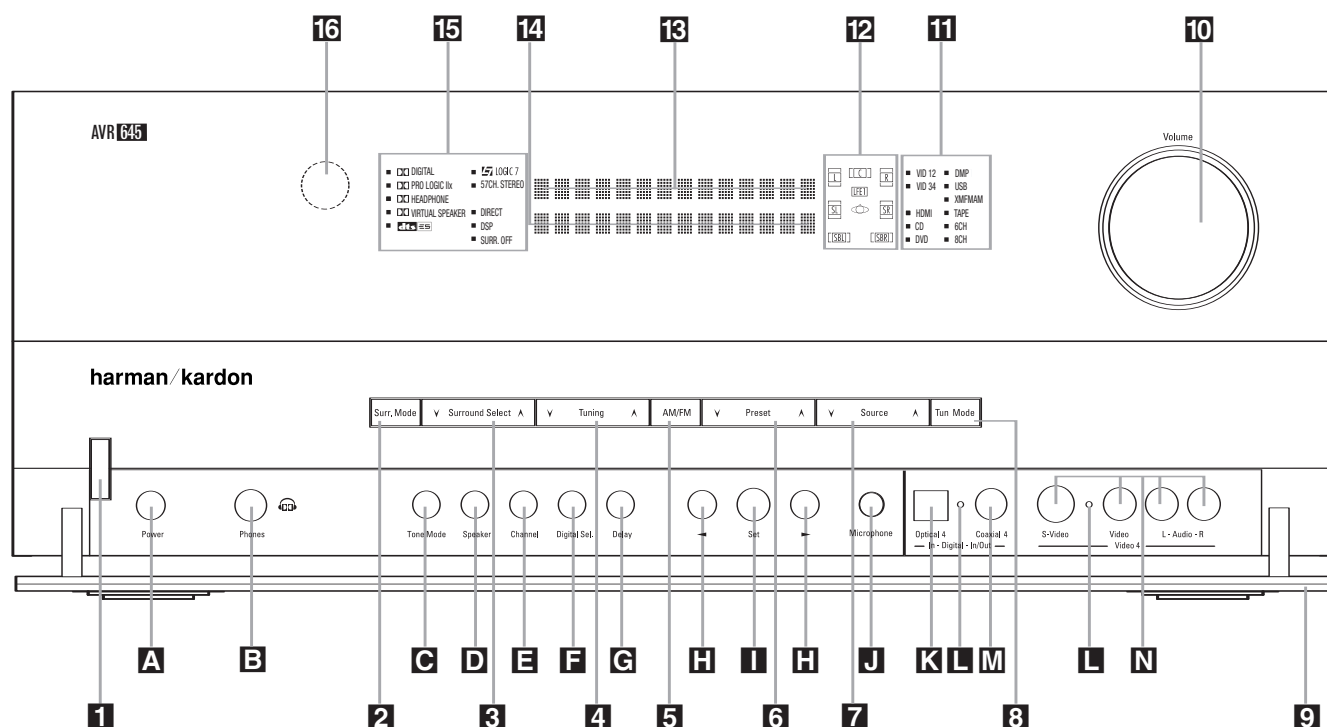
The carton and shipping materials used to protect your new receiver during shipment were specially designed to cushion it from shock and vibration. We suggest that you save the carton and packing materials for use in shipping if you move, or should the unit ever need repair.

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.

At this time, you should remove the protective plastic film from the front-panel lens. Leaving the film in place will affect the performance of your remote control.

FRONT-PANEL CONTROLS



NOTE: To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

The following controls and indicators are available on the AVR 645's front panel:

- | | | |
|---------------------------------------|--|------------------------------------|
| 1 Standby/On Switch | 7 Input Source Selector | 13 Upper Display Line |
| 2 Surround Mode Group Selector | 8 Tuning Mode Selector | 14 Lower Display Line |
| 3 Surround Mode Selector | 9 Front-Panel Door | 15 Surround Mode Indicators |
| 4 Tuning Selector | 10 Volume Control | 16 Remote Sensor Window |
| 5 Tuner Band Selector | 11 Input Indicators | |
| 6 Preset Station Selector | 12 Speaker/Channel Input Indicators | |

The following controls and jacks are located behind the front-panel door. To open the door, place the edge of a finger on the left or right edge of the panel and gently swing the door down toward you.

- | | | |
|----------------------------------|-----------------------------------|---|
| A Main Power Switch | F Digital Input Selector | K Optical 4 Digital Input |
| B Headphone Jack | G Delay Adjust Selector | L Input/Output Status Indicators |
| C Tone Mode Button | H ◀▶ Buttons | M Coaxial 4 Digital Jack |
| D Speaker Selector Button | I Set Button | N Video 4 Input/Output Jacks |
| E Channel Adjust Selector | J EzSet/EQ Microphone Jack | |

1 Standby/On Switch: When the **Main Power Switch A** is "ON," press this button to turn on the AVR 645; press it again to turn the unit off. Note that the illumination surrounding the switch will turn blue when the unit is on, or in the Multiroom mode.

2 Surround Mode Group Selector: Press this button to select the top-level group of surround modes. Each press of the button will select one of the surround mode categories. Once the button is pressed so

that the name of the desired surround mode category appears in the on-screen display and in the **Lower Display Line 14**, press the **Surround Mode Selector 3** to cycle through the individual modes available. For example, press this button to select Dolby modes, and then press the **Surround Mode Selector 3** to choose from the various mode options.

3 Surround Mode Selector: Press this button to select from among the available surround mode

options for the surround mode category selected. The specific modes will vary based on the number of speakers available, the surround mode category and whether the input source is digital or analog. For example, press the **Surround Mode Group Selector 2** to select a category such as Dolby or Logic 7, and then press this button to see the specific mode choices that are available. For more information on mode selection, see pages 40 – 42.

FRONT - PANEL CONTROLS

4 Tuning Selector: Press the left side of the button to tune lower-frequency stations and the right side of the button to tune higher-frequency stations. When the tuner is in the **MANUAL/MONO** mode, each tap of the Selector will increase or decrease the frequency by one increment. When the tuner receives a signal strong enough for adequate reception, **MANUAL TUNED** will appear in the **Lower Display Line 14** and in the on-screen display. When the tuner is in the **AUTO/STEREO** mode, press the button once, and the tuner will scan for a station with acceptable signal strength. When the next higher- or lower-frequency station is tuned, the frequency scan will stop and the **Lower Display Line 14** and the on-screen display will indicate **AUTO TUNED**. When an FM stereo station is tuned, the display will read **AUTO ST TUNED**. See page 45 for more information on using the tuner. When an XM-Ready module is connected and activated, and when there is sufficient signal strength for the XM system to operate, pressing this button will change the XM Radio channel.

5 Tuner Band Selector: Pressing this button will automatically switch the AVR 645 to the Tuner mode. Pressing it again will select the AM or FM frequency band, or XM Radio. (See page 45 for more information on the tuner.)

6 Preset Station Selector: Press this button to scroll up or down through the list of stations that have been entered into the preset memory. (See page 46 for more information on tuner programming.)

7 Input Source Selector: Press this button to change the input by scrolling up or down through the list of input sources.

8 Tuning Mode Selector: Press this button to select Auto or Manual tuning. When the button is pressed so that **AUTO/STEREO** appears in the **Upper Display Line 13**, the tuner will search for the next station with an acceptable signal when the **Tuning Selector 4** is pressed. When the button is pressed so that **MANUAL/MONO** appears in the **Upper Display Line 13**, each press of the **Tuning Selector 4** will increase the frequency. (See pages 45–46 for more information on using the tuner.)

This button may also be used to switch between Stereo and Mono modes for FM radio reception. When weak reception is encountered, select the Manual/Mono tuning mode. Press and hold again to switch back to Stereo mode. (See pages 45–46 for more information on using the tuner.)

When an XM Connect & Play module is connected and activated, and when there is sufficient signal strength for the XM system to operate, this button has a different set of functions than when traditional AM or FM radio is in use. See page 46 for more information on XM Radio operation.

9 Front-Panel 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 toward you, using either upper corner of the door.

10 Volume Control: Turn this knob clockwise to increase the volume, counterclockwise to decrease the volume. If the AVR 645 is muted, adjusting the volume control will automatically release the unit from the silenced condition.

11 Input Indicators: One of these indicators will light to identify the currently selected input. Note that the entire list will light briefly each time the unit is turned on as a test.

12 Speaker/Channel Input Indicators: These indicators are multipurpose, indicating both the speaker type selected for each channel and 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 indicated by one or two boxes. The center box lights when a “small” speaker is selected, and the two outer boxes light when “large” speakers are selected. When none of the boxes are lit for the center, surround or subwoofer channels, no speaker has been assigned that position. The letters inside each box display the active input channels. For standard analog inputs, only the L and R will light, indicating a stereo input. For a digital source, the indicators will light to display the channels being received at the digital input. When the letters flash, the digital input has been interrupted. (See page 44 for more information on the Channel Indicators.)

13 Upper Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, this line will show the current input source and identify whether an analog or digital input is in use. When the tuner is selected as the input, this line will identify the station as AM or FM and show the frequency and preset number, if any.

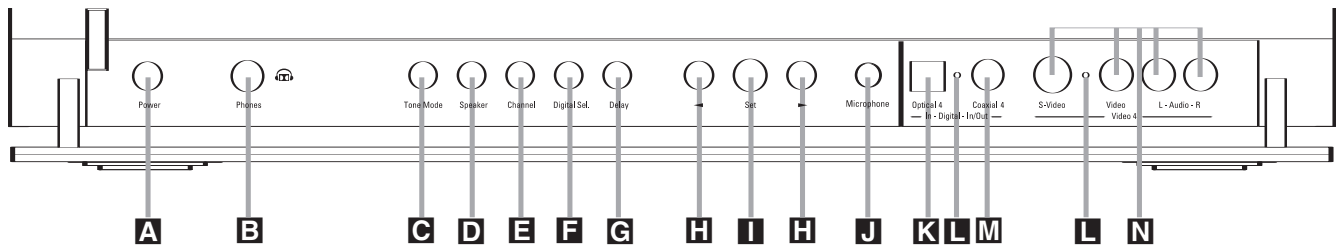
When an XM Connect & Play module is connected and activated, and when there is sufficient signal strength for the XM system to operate, the XM channel number and signal strength will appear here.

14 Lower Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, the current surround mode will appear on this line. When an XM-Ready module is connected and activated, and when there is sufficient signal strength for the XM system to operate, a variety of messages and information, including the XM channel title name, the current artist and track title, the XM Radio channel category and, when available, local traffic and weather information, will appear here.

15 Surround Mode Indicators: One of these indicators will light to show the surround mode in use. Depending on the specific combination of input sources and surround mode selected, more than one indicator may light. (See page 43 for more information.)

16 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.

FRONT-PANEL CONTROLS



The following controls and jacks are located behind the front-panel door. To open the door, place the edge of a finger on the left or right edge of the panel and gently swing the door down toward you.

A Main Power Switch: Press this switch to apply power to the AVR 645. When the switch is pressed in, the unit is placed in a Standby mode, as indicated by the amber illumination surrounding the **Standby/On Switch 1**. This button **MUST** be pressed in to operate the unit. To turn the unit off 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.

B Headphone Jack: This jack may be used to listen to the AVR 645's output through a pair of headphones. Be certain that the headphones have a standard 1/4" stereo phone plug, or that you use an adapter, as needed, to convert the plug on your headphones to the 1/4" jack used on the AVR. When the headphone jack is in use, the main room speakers will automatically be turned off and the unit will output a standard stereo signal. You may also use the Dolby Headphone mode for an enhanced listening experience.

C Tone Mode 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 MODE** message in the **Lower Display Line 14** and in the on-screen display. To take the controls out of the signal path, press either of the **Left/Right Arrow Buttons H** 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 14** and in the on-screen display and then press either of the **Left/Right Arrow Buttons H** to enter the desired boost or cut setting. See page 40 for more information on the tone controls.

D Speaker Selector Button: Press this button to begin the process of configuring the AVR 645 for the type of speakers it is being used with. For complete information on configuring the speaker settings, see page 33.

E Channel Adjust Selector: Press the button to begin the process of manually adjusting the channel level outputs using the source currently playing through your AVR. For complete information on adjusting the channel output level, see page 48.

F Digital Input Selector: Press this button to begin the process of selecting a digital source for use with the currently selected input. Once the button has been pressed, use the **Left/Right Arrow Buttons H** to choose the desired input and then press the **Set Button I** to enter the setting into the unit's memory. See page 42 for more information on digital audio.

G 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.

H Left/Right Arrow Buttons: When making system configuration changes using the front-panel controls, press these buttons to scroll through the available choices for the option being adjusted.

These buttons are also used to scroll through the various video processing options. Press either **Left/Right Arrow Buttons H** to activate Faroudja scaling and processing, or video format conversion without scaling or bypass.

I Set Button: When making system configuration changes using the front-panel controls, press this button to enter a setting into the unit's memory.

J 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.

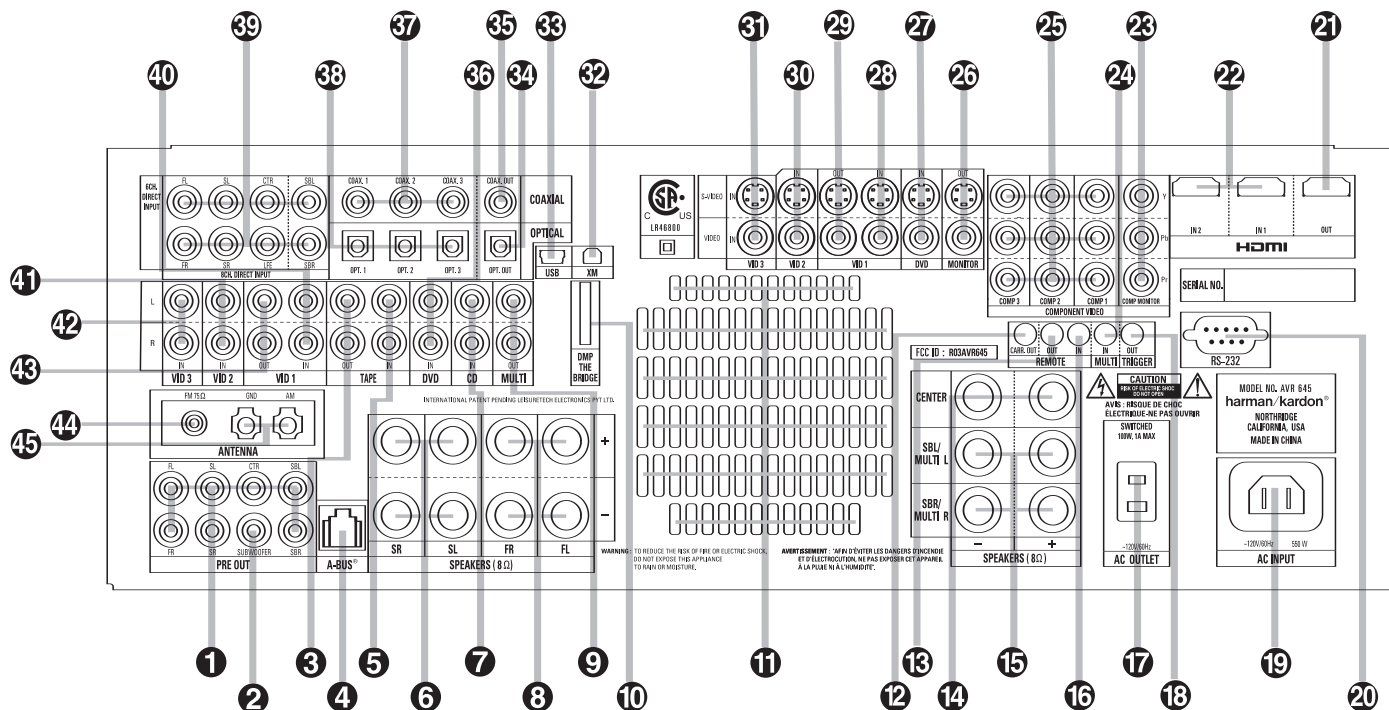
K Optical 4 Digital Input: Connect the optical digital output of an audio or video product to this jack.

L Input/Output Status Indicators: These LED indicators will normally light green to show that the front-panel **Coaxial 4 Digital Jack M** and **Video 4 Input/Output Jacks N** are operating as inputs. When these jacks are configured for use as outputs, the appropriate indicator will turn red to show that the jack may be used as an output for recording. (See page 47 for more information on configuring the front-panel jacks as outputs, rather than inputs.)

M Coaxial 4 Digital Jack: Connect the coaxial digital input or output for a digital audio product such as a portable audio player or video game to this jack. The jack is normally an input, but may be switched to an output for recording, using the menu system. See page 47 for more information.

N Video 4 Input/Output Jacks: These audio/video jacks may be used as either inputs or outputs for temporary connection to video games or portable audio/video products such as camcorders and portable audio players. (See page 47 for more information on switching one of these jacks between an input and output.)

REAR-PANEL CONNECTIONS



NOTE: To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

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

NOTE: To assist in making the correct connections for multichannel input, output and speaker connections, all connection jacks and terminals are color-coded 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:	Purple
Coaxial Digital Audio:	Orange
Composite Video:	Yellow

Component Video "Y":	Green
Component Video "Pr":	Red
Component Video "Pb":	Blue
Optical Digital In:	Black
Optical Digital Out:	Gray

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

2 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.

3 Tape Outputs: Connect these jacks to the Record/Input jacks of an audio recorder.

4 A-BUS Connector: Connect this jack to optional A-BUS®-certified products to extend the multiroom capabilities of your AVR 645. See page 17 for more information on A-BUS.

5 Tape Inputs: Connect these jacks to the Play/Out jacks of an audio recorder.

6 Surround Speaker Outputs: Connect these outputs to the matching + and – terminals on your surround channel speakers. In conformance with the CEA color-code specification, the blue terminal is the positive (+) 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 15 for more information on speaker polarity.)

7 CD Audio Inputs: Connect these jacks to the left/right analog audio output of a compact disc player or CD changer or other audio source.

8 Front Speaker Outputs: Connect these outputs to the matching + or – terminals on your left and right speakers. When making speaker connections, always make certain to maintain correct polarity by connecting the color-coded (white for front left and red for front right) (+) terminals on the AVR 645 to the red (+) terminals on the speakers and the black (–) terminals on the AVR 645 to the black (–) terminals on the speakers. See page 15 for more information on speaker polarity.

9 Multiroom Audio Outputs: Connect these jacks to the optional external audio power amplifier and video distribution system that delivers the source selected for multizone distribution.

10 The Bridge® Digital Media Player (DMP) Input: With the AVR 645 turned off, connect the optional Harman Kardon The Bridge® to this connector. Once this is done and with a compatible iPod® (optional) docked in The Bridge, selecting the DMP/The Bridge input allows you to play audio programming from the iPod and view navigation menus on the AVR's front panel and any video display connected to the AVR. You may control the iPod's functions and select tracks using the ▲/▼/◀▶Ⓢ, Set Ⓢ and Transport Ⓢ buttons. See page 45 for more

information.

11 Fan Vents: These ventilation holes are the output of the AVR 645'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 3 inches of open space between the vent holes and any wooden or fabric surface. It is normal for the fan to remain off at most normal volume levels. An automatic temperature sensor turns the fan on only when it is needed.

12 Full Carrier IR Output: The output of this jack is the full signal received at the Remote Sensor Window 16 or input through the IR Input 16 including the carrier frequency that is removed from signals at the IR Output 13. Use this output to extend IR signals to the input of compatible products either by direct connection or through the use of optional, external IR "blasters". If you are in doubt as to which of the 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.

13 IR Output: This connection permits the IR sensor in the receiver to serve other remote controlled devices with "stripped carrier." Connect this jack to the "IR IN" jack on compatible Harman Kardon equipment.

14 Center Channel Speaker Outputs: Connect these outputs to the matching + and – terminals on your center channel speaker. In conformance with the CEA color-code specification, the green terminal is the positive (+) 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 15 for more information on speaker polarity.)

15 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 Advanced Menu of the OSD system. See page 51 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.

16 IR Input: If the AVR 645'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.

17 Switched AC Accessory Outlet: This outlet may be used to power any device you wish to have turned on when the AVR 645 is turned on with the Standby/On Switch 1.

IMPORTANT NOTE: The power consumption of any device connected to the accessory outlet should not exceed 100 watts. Never connect high-power devices such as amplifiers or video displays to the accessory outlet.

18 Trigger 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.

19 AC Power Cord Socket: Connect the AC power cord here 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 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 or installer.

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

22 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.

23 Component Video Monitor Outputs: Connect these outputs to the component video inputs of a video display.

24 Multiroom IR Input: Connect the output of an IR sensor in a remote room to this jack to operate the AVR 645's multiroom control system.

25 Component Video Inputs: These inputs may be used with any source device that is equipped with analog Y/Pr/Pb or RGB component video outputs, as assigned through the IN/OUT SETUP menu. See page 22 for more information on configuring the component video inputs.

REAR-PANEL CONNECTIONS

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

27 DVD Video Inputs: Connect the composite or S-video outputs of a DVD player or other video source to these jacks.

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

29 Video 1 Video Outputs: Connect the composite or S-video REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks.

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

31 Video 3 Video Inputs: Connect the composite or S-video PLAY/OUT jacks of a VCR or other video source to these jacks.

32 XM-Ready Module Input: When an optional XM Connect & Play module is connected to this jack, and the XM service activated, you will be able to enjoy the XM Radio through your AVR 645. See page 46 for more information.

33 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.

34 Optical Digital Audio Output: Connect this jack to the optical digital input connector on a CD-R/RW, MiniDisc or other compatible digital recorder.

35 Coaxial Digital Audio Output: Connect this jack to the coaxial digital input of a CD-R/RW, MiniDisc or other compatible digital recorder.

36 DVD Audio Inputs: Connect the left/right analog outputs of a DVD player or other audio source to these jacks.

37 Coaxial Digital Audio Inputs: Connect the coax digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, DTS signal or a standard PCM digital source. Do not connect the RF digital output of an LD player to these jacks.

38 Optical Digital Audio Inputs: Connect the optical digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, a DTS signal or a standard PCM digital source.

39 8-Channel Direct Inputs: These jacks are used for connection to source devices such as high-resolution DVD players, DVD-Audio or SACD players with discrete analog audio 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 (sub-woofer input) jacks will be used for 5.1 audio signals.

40 Video 1 Audio Inputs: Connect the left/right PLAY/OUT audio output jacks on a VCR or other video source to these jacks.

41 Video 3 Audio Inputs: Connect the left/right PLAY/OUT audio output jacks on a VCR, PVR, cable set-top, satellite receiver, HDTV receiver or other video source to these jacks.

42 Video 2 Audio Inputs: Connect the left/right PLAY/OUT audio output jacks on a VCR or other video source to these jacks.

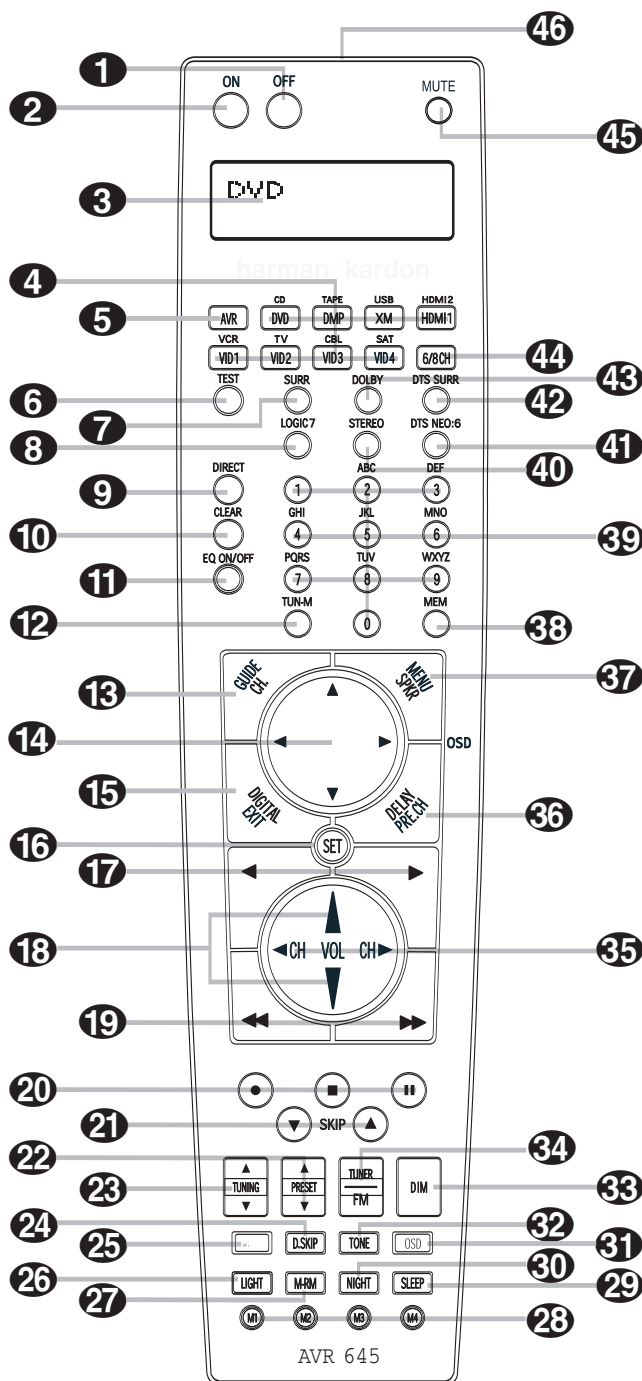
43 Video 1 Audio Outputs: Connect the left/right REC/IN audio input jacks on a VCR or other video source to these jacks.

44 FM Antenna Jack: Connect the supplied indoor or an optional external FM antenna to this terminal.

45 AM Antenna Connections: 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.

MAIN REMOTE CONTROL FUNCTIONS

- ❶ Power Off Button
- ❷ Power On Button
- ❸ LCD Information Display
- ❹ Input Selectors
- ❺ AVR Selector
- ❻ Test Button
- ❼ DSP Surround Mode Selector
- ❽ Logic 7 Mode Select Button
- ❾ Direct Button
- ❿ Clear Button
- ⓫
- ⓬ Tuning Mode Button
- ⓭ Channel Select Button
- ⓮ Navigation Button
- ⓯ Digital Select Button
- ⓰ Set Button
- ⓱ Transport Play Buttons
- ⓲ Volume Up/Down Selectors
- ⓳ Transport Fast-Play/Scan Buttons
- ⓴ Main Transport Controls
- ⓵ Track Skip Up/Down Buttons
- ⓶ Preset Up/Down Button
- ⓷ Tuning Up/Down Button
- ⓸ Disc Skip Button
- ⓹ Program Button
- ⓺ Light Button
- ⓻ Multiroom Button
- ⓼ Macro Buttons
- ⓽ Sleep Button
- ⓿ Night Mode Button
- ⓾ OSD Button
- ⓿ Tone Control Button
- ⓿ AM/FM Button Dim Button
- ⓿ Tuner/FM Select Button
- ⓿ Channel Up/Down Selector
- ⓿ Delay Select Button
- ⓿ Speaker Select Button
- ⓿ Memory Button
- ⓿ Numeric Keys
- ⓿ Stereo Mode Select Button
- ⓿ DTS Neo:6 Mode Select Button
- ⓿ DTS Digital Mode Select Button
- ⓿ Dolby Mode Select Button
- ⓿ 6-Channel/8-Channel Input Select
- ⓿ Mute Button
- ⓿ Lens



NOTES:

- The function names shown here are each button's feature when used with the AVR 645. Most buttons have additional functions when used with other devices. When a button is pressed, the function name will appear in the bottom line of the **LCD Information Display** ❸.
- 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.
- To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

MAIN REMOTE CONTROL FUNCTIONS

IMPORTANT NOTE: The AVR 645's remote may be programmed to control up to eight devices, including the AVR 645. Before using the remote, it is important to remember to press the **Input Selector Button 4** that corresponds to the unit you wish to operate. In addition, the AVR 645's remote is shipped from the factory to operate the AVR 645 and most Harman Kardon CD or DVD players and cassette decks. The remote is also capable of operating a wide variety of other products using the control codes that are part of the remote. Before using the remote with other products, follow the instructions on pages 43 – 46 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 Selectors 4**. The descriptions shown here primarily detail the functions of the remote when it is used to operate the AVR 645.

1 Power Off Button: Press this button to place the AVR 645 or a selected device in the Standby mode. Note that this will turn off the main room functions, but if the Multiroom system is activated, it will continue to function.

2 Power On Button: Press this button to turn on the power to a device selected by first pressing one of the **Input Selectors 4**.

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

4 Input Selectors: Pressing one of these buttons will perform three actions at the same time. First, if the AVR 645 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 645. Finally, it will change the remote control so that it controls the device selected.

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

- The first press of the button labeled DMP selects The Bridge as the input. A second press of this button selects the Tape inputs.
- The first press of the XM button selects XM Radio as the input. A second press selects the source connected to the USB jack as the input.
- The first press of the HDMI 1 button selects the device 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 5**, follow the instructions on page 52.

5 AVR Selector: Pressing this button will switch the remote so that it will operate the AVR 645's functions. If the AVR 645 is in the Standby mode, it will also turn the AVR 645 on.

6 Test Button: Press this button to begin the sequence used to manually calibrate the AVR 645's output levels. (See page 29 for more information on calibrating the AVR 645.)

7 DSP Surround Mode Selector: Press this button to select one of the DSP surround modes, such as Hall 1, Hall 2 or Theater. Each press of the button selects another mode. (See page 34 for more information on surround modes.)

8 Logic 7 Mode Select Button: Press this button to select from among the available Logic 7 surround modes. (See page 34 for the available Logic 7 options.)

9 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 39** to select a station. (See page 37 for more information on the tuner.)

10 Clear Button: When programming the remote or using the EzSet feature, press this button to cancel the current function. When using the remote to enter frequencies for direct tuner access, press this button to clear previous entries.

12 Tuning Mode Button: When using listening to AM or FM stations, press this button to change the tuner mode between manual and automatic. When the button is pressed so that **AUTO/STEREO** appears in the **Upper Display Line 13** and in the on-screen display, only stations with acceptable signal quality will be tuned, and the tuner will play FM stations in stereo, when available. In the **AUTO** mode, when the **Tuning Up/Down Buttons 4P** are pressed, the unit will automatically search for the next available station with good signal strength. When this button is pressed so that **MANUAL/MONO** appears in the **Upper Display Line 13** and in the on-screen display each press of the **Tuning Up/Down Buttons 4P** will move the frequency up or down in single-step increments. When the FM band is in use, pressing the button so that the **MANUAL** mode is activated will enable you to tune stations with weak signals by changing to monaural

reception. (See pages xx –xx for more information on AM/FM tuner operation.) When listening to XM Radio, press this button to scroll through the following display options for the **Lower Display Line 14**: Channel Name → Channel Category → Artist → Title. (See pages xx-xx for more information on XM Radio operation.)

13 Channel Select Button: This button is used to start the process of setting the AVR 645's output levels to an external source. Once this button is pressed, press the **▲/▼** on the **Navigation Button 14** to select the channel being adjusted, then press the **Set Button 15**, followed by the **▲/▼** on the **Navigation Button 14** again, to change the level setting. (See page 38 for more information.)

14 Navigation Button: This single disc-like button is used to navigate through the on-screen configuration menus, to scroll through the options list and to select choices for the various settings such as delay, speakers, surround modes, digital inputs, etc. To use the button, simply press it left, right, up or down in the direction indicated by the **▲/▼/◀▶** icons printed on the button disc. Depending on the menu being used, pressing the button will either change a specific menu or configuration choice, or it will change the option shown in the on-screen or front-panel display. The sections in this manual describing the unit's individual features and configuration options contain specific information on how the navigation controls are used.

15 Digital Select Button: Press this button to assign one of the digital inputs **37/38 K M** to a source. (See page 33 for more information on using digital inputs.)

16 Set Button: This button is used to enter settings into the AVR 645's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment.

17 Transport Play Buttons: These buttons have no direct function on the AVR 645, but they are used when the remote is programmed for a compatible DVD, CD or tape player. Pressing these buttons will transmit a forward- or reverse-play command, according to the capabilities of the player being controlled. In the factory default setting, these buttons are programmed for Harman Kardon DVD players so that you may control a compatible player without having to switch devices.

18 Volume Up/Down Buttons: These controls share the common disc in the lower third of the remote. To raise the volume, press the button marked **▲** by pressing towards the top of the remote. To lower the volume, press the button marked **▼** by pressing towards the bottom of the remote. The **◀▶** buttons on the left and right sides of this disc change channels

up or down when the TV, cable box or satellite **Input Selectors 4** have been pressed.

19 Transport Fast-Play/Scan Buttons: These buttons have no direct function on the AVR 645, but they are used when the remote is programmed for a compatible DVD, CD or tape player. Pressing these buttons will transmit a fast-play forward, fast-play reverse, or fast-forward or -reverse scan command, according to the capabilities of the player being controlled. In the factory default setting, these buttons are preprogrammed with the remote codes for Harman Kardon DVD players so that you may control a compatible player without having to switch devices.

20 Main Transport Controls: These buttons have no direct function on the AVR 645, but they are used when the remote is programmed for a compatible DVD, CD or tape player. Pressing these buttons will transmit a stop (■), record (●), or pause (⏸) command, according to the capabilities of the player being controlled. In the factory default setting, these buttons are programmed with the remote codes for Harman Kardon DVD players so that you may control a compatible player without having to switch devices.

21 Track Skip Up/Down Buttons: These buttons do not have a direct function with the AVR 645, but when used with a compatibly programmed CD or DVD changer will change the track or chapter currently being played. In the factory default setting, these buttons are programmed with the remote codes for Harman Kardon DVD players so that you may control a compatible player without having to switch devices.

22 Preset Up/Down Button: When the tuner is in use, press this button to scroll through the stations programmed into the AVR 645's memory.

NOTE: When the AVR 645 is used with The Bridge (optional) and your iPod, some of the buttons that are used to control the various transport functions on source devices are used to control the iPod and navigate through its menus and content. Consult the Owner's Manual packed with The Bridge for more information.

23 Tuning Up/Down Button: Press this button when the tuner is in use to change the station to one with a higher or lower frequency or to change the XM channel. When the tuner is in the **MANUAL/MONO** mode, each tap of the Selector will increase or decrease the frequency by one increment. When the tuner receives a strong-enough signal for adequate reception, **MANUAL TUNED** will appear in the **Lower Display Line 14** and in the on-screen display. When the tuner is in the **AUTO/STEREO** mode, press the button once, and the tuner will scan for a station with acceptable signal strength. When the next higher- or lower-frequency station with a strong-enough signal is tuned,

the frequency scan will stop and the **Lower Display Line 14** and the on-screen display will indicate **AUTO TUNED**. When an FM Stereo station is tuned, the display will read **AUTO ST TUNED**. See page 37 for more information on using the tuner.

24 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.

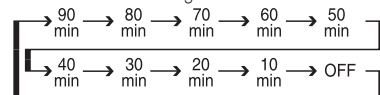
25 Program Button: This button is used to begin the process of programming the remote. Press and hold this button for 3 seconds to place the remote in the programming mode. Once the red LED under the **Set Button 17** lights, release the button. You may then select from the desired option. (See pages 43 – 53 for more information on configuring the remote.)

26 Light Button: Press this button to activate the remote's backlight for ease of use in darkened rooms.

27 Multiroom Button: Press this button to begin the process of activating the multiroom system or to change the input or volume level for the second zone. (See page 41 for more information on the multiroom system.)

28 Macro Buttons: Press these buttons to store or recall a "Macro", which is a preprogrammed sequence of commands stored in the remote. (See page 46 for more information on macros.)

29 Sleep Button: Press this button to place the unit in the Sleep mode. After the time shown in the display, the AVR 645 will automatically go into the Standby mode. Each press of the button changes the time until turn-off in the following order:



When the Sleep timer is in use, the front-panel display indicators will dim to half brightness.

30 Night Mode Button: Press this button to activate the Night mode. This mode is available in specially encoded Dolby Digital sources, and it preserves dialogue (center channel) intelligibility at low volume levels.

31 OSD Button: Press this button to activate or turn off the On-Screen Display (OSD) system used to set up or adjust the AVR 645's parameters.

32 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 14** and in the on-screen display. To take the controls out of the signal path, press either of the **▲/▼**

Navigation Buttons 14 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 14** and in the on-screen display and then press either of the **▲/▼ Navigation Buttons 14** to enter the desired boost or cut setting. See page 32 for more information on the tone controls.

33 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 5 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 Switch 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.

34 Tuner/FM Select Button: This button functions in two ways. Press it up, towards the top of the remote to select the tuner as the AVR's input. The first press will call up the last used station (or XM Channel). Subsequent presses will select last used FM, AM and XM Radio station or channel. When the button is pressed down, towards the bottom of the remote, the last tuned FM station is selected as the AVR's input.

35 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 43 – 53 for more information on programming the remote.

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 14** 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 14** 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 14** until the desired channel name is shown, and then press the **Set Button 16**. Use the **▲/▼ Navigation Buttons 14** to change

MAIN REMOTE CONTROL FUNCTIONS

the delay amount. (See page 28 for more information on delay options.)

37 Speaker Select Button: Press this button to begin the process of configuring the AVR 645's bass management system. Then press the **▲/▼ Navigation Button 14** to select the channel you wish to set up. Press the **Set Button 16** and then select another channel to configure. When all adjustments have been completed, press the **Set Button 16** twice to exit the settings and return to normal operation. (See page 27 for more information on speaker setup.)

38 Memory Button: Press this button to enter a radio station to the AVR 645's preset memory. First, tune the desired station, and then press this button. Within 5 seconds of when you see the station's frequency flash in the **Upper Display Line 13** and in the on-screen display, press the numeric keys for the preset number between 01 and 30 that you wish to assign to the station. (See page 37 for more information.)

39 Numeric Keys: These buttons serve as a 10-button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when TV, Cable or SAT has been selected on the remote, or to select track numbers on a CD, DVD or LD player, depending on how the remote has been programmed. These buttons are also used to enter letters and numbers when renaming devices in the LCD Information Display. (See page 50 for more information on renaming devices and keys.)

40 Stereo Mode Select Button: Press this button to select a stereo listening mode. When the button is pressed so that **SURROUND OFF** appears in the **Lower Display Line 14**, the AVR will operate in a bypass mode with true, fully analog, two-channel left/right stereo mode with no surround processing or bass management, as opposed to other modes where digital processing is used. When the button is pressed so that **SURROUND OFF** appears in the **Lower Display Line 14**, and the **DSP and Surround Off Surround Mode Indicators 15** are lit, you will enjoy a two-channel presentation of the sound, along with the benefits of bass management. Depending on whether your system is configured for 5.1 or 6.1/7.1 channels, the next press of the button will cause either **5 CH STEREO** or **7 CH STEREO** to appear, and the stereo signal will be routed to all five (or seven) speakers. (See page 34 for more information on stereo playback modes.)

41 DTS Neo:6 Mode Select Button: Press this button to select a DTS Neo:6 mode. (See page 34 for the available DTS Neo:6 options.)

42 DTS Digital Mode Select Button: When a DTS-encoded digital source is playing, each press of

this button will scroll through the available DTS modes. The specific choice of modes will vary according to the type of encoding on the disc and your system's speaker configuration. When a DTS source is not in use, this button has no function. (See page 34 for the available DTS digital options.)

43 Dolby Mode Select Button: This button is used to select from the available Dolby Surround modes. Each press of this button will select one of the Dolby Pro Logic II, Pro Logic IIx or Dolby Virtual Speaker modes, as available for the number of speakers in your system. When a Dolby Digital-encoded source is in use, the Dolby Digital mode may also be selected. (See page 34 for the available Dolby surround mode options.)

44 6-Channel/8-Channel Input Select: Press this button to select the device connected to the **8-Channel Direct Inputs 49**. (See page 32 for information.)

45 Mute Button: Press this button to momentarily silence the AVR 645 or TV set being controlled, depending on which device has been selected.

46 Lens: The infrared emitters behind the plastic lens at the top of the remote communicate the remote codes to the AVR 645. Be certain that the lens is not covered when using the remote, and point the lens toward the AVR for best results. In learning mode, the remote receives IR codes to be learned through a sensor behind the lens.

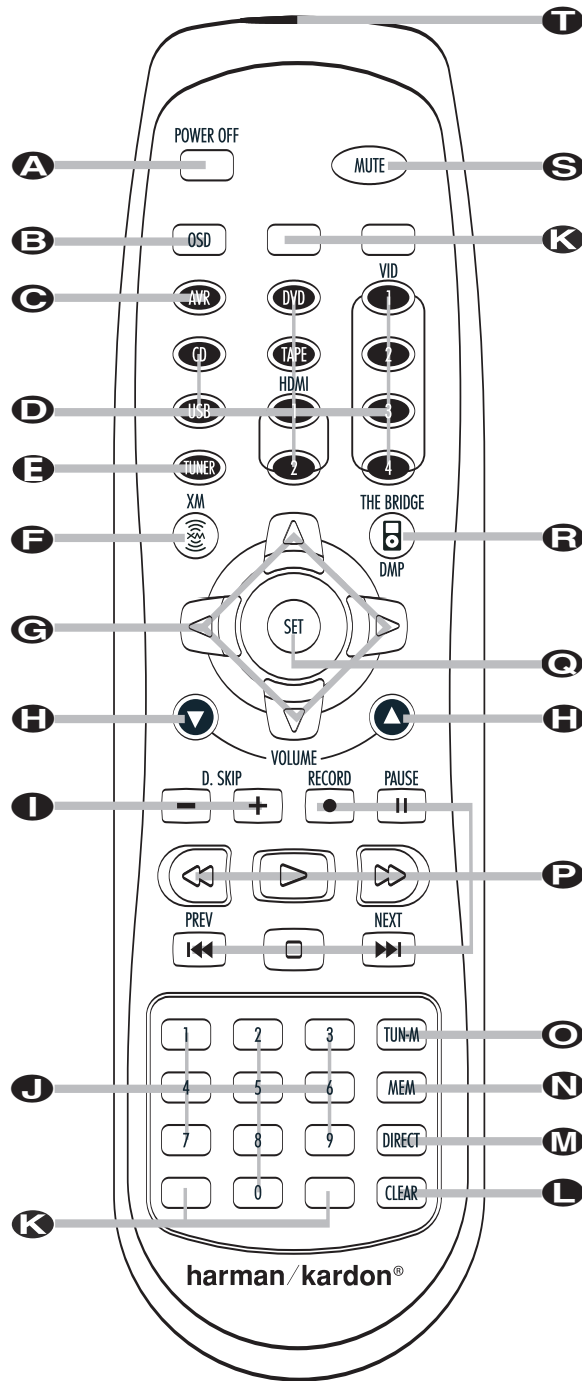
NOTE: DO NOT remove the rubber plug that covers the jack on the upper right side of the remote. The jack is not active and is reserved for future use.

ZR 10 REMOTE CONTROL FUNCTIONS

- A** Power Off Button
- B** OSD Button
- C** AVR Selector Button
- D** Input Selectors
- E** Tuner Selector
- F** XM Radio Selector
- G** Navigation Controls
- H** Volume Up/Down Buttons
- I** Disc Skip Buttons
- J** Numeric Keys
- K** Blank Buttons
- L** Clear Button
- M** Direct Button
- N** Memory Button
- O** Tuner Mode Button
- P** Transport Controls
- Q** Set Button
- R** [™]Bridge- /DMP Selector
- S** Mute Button
- T** IR Transmitter Lens

NOTES:

- The ZR 10 remote may be used either in the same room where the AVR 645 is located or in a separate room with an optional infrared sensor or A-BUS product that is connected to the AVR 645's **Multiroom IR Input Jack 26**. When it is used in the same room as the AVR 645, it will control the functions of the AVR 645 or any compatible Harman Kardon products in that room. When it is used in a separate room via a sensor connected to the **Multiroom IR Input Jack 24**, the buttons for Power, Input Source, Volume and Mute will control the source and volume for the second zone, as connected to the **Multiroom Audio Output Jacks 9**. (See page 51 for complete information on using the Multiroom system.)
- We strongly recommend that the ZR 10 remote be used for the initial configuration and setup process for the AVR 645.
- To make it easier to follow the instructions that refer to the controls and connectors in this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.



ZR 10 REMOTE CONTROL FUNCTIONS

A Power Off Button: When used in the room where the AVR 645 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 **Multiroom IR Input Jack 24**, this button turns the Multiroom system on and off.

B OSD Button: Press this button to activate or turn off the On-Screen Display (OSD) menu system used to set up or adjust the AVR 645's configuration settings.

C AVR Selector Button: Press this button to turn on the AVR 645. The input in use when the unit was last on will be selected.

D Input Selectors: When the AVR 645 is off, press one of these buttons to select a specific input and turn the unit on. When the unit is already in use, pressing one of these buttons will change the input.

E Tuner Selector: Press this button to select the Tuner as the input source and listen to the tuner band last used. Press the button again to change between AM, FM and, if an XM Connect & Play module is connected and activated, XM Radio.

F XM Radio Selector: Press this button to select XM Radio as the input source when an XM Connect & Play module is connected and activated.

G 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.

H Volume Up/Down Buttons: When the ZR 10 remote is used in the room where the AVR 645 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 **Multiroom IR Input Jack 24**, this button will raise or lower the volume in the remote room.

I Disc Skip Buttons: Press these buttons to change discs on compatible Harman Kardon CD or DVD changers or players.

J Numeric Keys: Press these buttons to enter a station's frequency or an XM Radio channel number after the **Direct Button M** is pressed, or when programming the tuner memories. These buttons may also be used for numeric entries when appropriate with other compatible sources.

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

L Clear Button: When programming the tuner memory, press this button to clear the current entry.

M Direct Button: Press this button when the tuner is in use to start the entry of a station's frequency or an XM channel number for direct access to that station or channel. After pressing this button, press the appropriate **Numeric Keys J**.

N Memory Button: Press this button to enter a station or XM channel number into the AVR 645's memory. First, tune to, or select, the desired station or channel, and then press this button. Within five seconds, while you see the station or channel flash in the **Upper Display Line 13** and in the on-screen display, press the **Numeric Keys J** for the preset number between 01 and 30 that you wish to assign to the station or channel. (See page 46 for more information.)

O Tuner Mode Button: When listening to AM or FM stations, press this button to change the tuner mode between manual and automatic. When the button is pressed so that **AUTO/STEREO** appears in the **Upper Display Line 13** and in the on-screen display, only stations with acceptable signal quality will be tuned, and the tuner will play FM stations in stereo, when available. In the **AUTO** mode, when the **Tuning Up/Down Buttons 4 P** are pressed, the unit will automatically search for the next available station with good signal strength. When this button is pressed so that **MANUAL/MONO** appears in the **Upper Display Line 13** and in the on-screen display, each press of the **Tuning Up/Down Buttons 4 P** will move the frequency up or down in single-step increments. When the **MANUAL** mode is activated will enable you to tune stations with weak signals by changing to monaural reception. (See pages 45–46 for more information on AM/FM tuner operation.) When listing to XM Radio, press this button to scroll through the following display options for the **Lower Display Line 14**: Channel Name → Channel Category → Artist → Title. (See pages 46–47 for more information on XM Radio operation.)

P Transport Controls: Press these buttons to control the operation of a compatible Harman Kardon DVD or CD player when the AVR 645 is connected to the source unit via the **IR Input Jack 16**. When the AVR's tuner or XM Radio is in use, the **◀▶▶▶ Prev/Next Buttons P** are used to tune up or down through the list of preset stations, the station frequencies or channel numbers.

Q Set Button: When using the configuration menus, press this button to enter a setting to the AVR's memory.

R Bridge Digital Media Player Selector: When Harman Kardon's **Bridge** (optional) is connected to **Bridge Digital Media Player (DMP) Input 10** and a compatible iPod is docked in **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 23 25**, the iPod's messages will appear on screen, and in the **Upper and Lower Display Lines 13 14**. The **▲/▼/◀▶ Buttons G**, the **Set Button Q** and the **Transport Controls 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.

S Mute Button: When the ZR 10 remote is used in the room where the AVR 645 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 **Multiroom IR Input Jack 24**, this button will temporarily silence the feed to the remote room only. Press the button again to return to the previous volume level.

T IR Transmitter Lens: The infrared code commands from the remote are sent to the AVR from the components behind this lens. To ensure proper operation, do not block this area when holding the remote.

System Installation

After unpacking the unit, locating it in a place with adequate ventilation and placing it on a solid surface capable of supporting its weight, you will need to make the connections to your audio and video equipment.

IMPORTANT NOTE: For your personal safety and to avoid possible damage to your equipment and speakers, it is always good practice to turn off and unplug the AVR and ALL source equipment from the AC output before making any audio or video system connections.

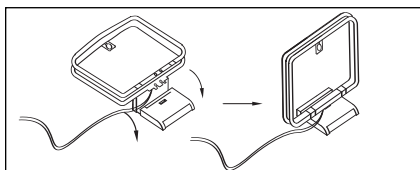
Audio Equipment Connections

We recommend that you use high-quality interconnect cables when making connections to source equipment and recorders to preserve the integrity of the signals.

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

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

2. Connect the analog Play/Out jacks of a cassette deck, MD, CD-R or other audio recorder to the **Tape Inputs 5**. Connect the analog Record/In jacks on the recorder to the **Tape Outputs 3** on the AVR 645.
3. Connect the output of a digital source such as a CD or DVD changer or player, a video game, a digital satellite receiver, an HDTV tuner or digital cable set-top box or the output of a compatible computer sound card to the **Optical and Coaxial Digital Audio Inputs 37/38 KIM**.
4. Connect the coaxial or optical **Digital Audio Outputs 34/35** on the rear panel of the AVR 645 to the matching digital input connections on a CD-R, MiniDisc or other digital recorder.
5. Assemble the AM loop antenna supplied with the unit so that the tabs at the bottom of the antenna loop snap into the holes in the base. Connect it to the **AM Antenna Connections 45**.



6. Connect the supplied FM antenna to the **FM Antenna Jack 44**. The FM antenna may be an external roof antenna, an inside powered or wire-lead antenna or a connection from a cable TV system. If the antenna or connection uses 300-ohm twin-lead cable, you must use an optional 300-ohm-to-75-ohm adapter to make the connection.

7. Connect the front, center, surround and surround back speaker outputs **6 8 14 15** 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 cable with a gauge of 14 or smaller. Remember that when specifying cable, the lower the number, the thicker the cable.

Cable with a gauge of 16 may be used for short runs of less than 10 feet. We do not recommend that you use cables with an AWG equivalent of 18 or higher, due to the power loss and degradation in performance that will occur.

Cables that are run inside walls should have the appropriate markings to indicate listing with UL, CSA or other appropriate testing agency standards. Questions about running cables inside walls should be referred to your installer or a licensed electrician who is familiar with the NEC and/or the applicable 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 has a specific color code, as noted on page 8. However, most speakers still use a red terminal for the positive (+) connection. Connect the "negative" or "black" wire to the same terminal on both the receiver and the speaker.

NOTE: While most speaker manufacturers adhere to an industry convention of using black terminals for negative and red ones for positive, some may vary from this configuration. To ensure proper phase and optimal performance, consult the identification label 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 645.

8. Connections to a single subwoofer are normally made via a line-level audio connection from the **Subwoofer Output 2** 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 audio source such as a DVD-Audio, SACD or high definition optical disc player with 5.1 or 7.1 analog audio outputs is part of your system, connect the outputs of the source to the **8-Channel Direct Inputs 39**.

Analog Video Equipment Connections

Analog video components are connected in the same manner as audio components. Again, the use of high-quality interconnect cables is recommended to preserve signal quality.

1. Connect the Video Play/Out jacks of a standard (composite) video or S-Video outputs of a digital video recorder or conventional VCR to the **Video 1 Video Inputs 28** on the AVR. Connect the Record/In jacks from that device to the **Video 1 Video Outputs 29** on the AVR.
2. Connect analog Audio Left/Right Play/Out jacks of the device connected to the Video 1 Inputs to the **Video 1 Audio Inputs 40** on the AVR. Connect the analog Audio Left/Right Record/In jacks from that device to the **Video 1 Audio Outputs 43** on the AVR. If the device has a digital audio output, connect it to one of the **Coaxial 37** or **Optical 38** digital audio inputs.
3. Connect the Play/Out jacks of a standard (composite) video or S-Video outputs of a video playback source such as a set-top box or video game console to the **Video 2 Video Inputs 30** or **Video 3 Video Inputs 31**. If the device has analog component video (Y/Pr/Pb) outputs, connect them to one of the **Component Video Inputs 25**.
4. Connect the analog audio outputs from the source to the matching **Video 2 Audio Inputs 41** or **Video 3 Audio Inputs 42**. If the device has a digital audio output, connect it to one of the **Coaxial 37** or **Optical 38** digital audio inputs.
5. If any of the video source devices has analog component video (Y/Pr/Pb) outputs, but not HDMI, connect them to **Component Video Inputs 25**. The chart on page 55 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 22.
6. The default video connection for a DVD player is to use the **Component Video Input 3 Jacks 25** on the AVR, but you may change this assignment in the **IN/OUT SETUP** menu (see page 22). A DVD player's composite and S-video outputs may also be connected to the **DVD Video Inputs 27**. Only one connection type is required, although a

INSTALLATION AND CONNECTIONS

composite or S-video connection is required if the AVR 645 is to be used in a multiroom video system.

7. 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 47**, but you may also make a connection to either the **Coaxial 47** or **Optical 38** digital inputs, or the **Analog DVD Audio Inputs 35**. You may change the assignment in the **IN/OUT SETUP** menu as described on page 22, or by using the front-panel **Digital Input Selector F**.
8. 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 N** that are behind the **Front-Panel Door 9**. If the source has digital audio outputs, connect them to the **Optical 4 Digital Input K** or the **Coaxial 4 Digital Jack M**.

CONNECTION NOTES:

- When making connections to the **Component Video Inputs 25** or the **Coaxial 40** or **Optical 38** 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.
 - When connecting a source device such as a cable set-top box where the audio streams may change between digital and analog as you change channels, we recommend that you make both analog and digital connections. The AVR's Auto Poll feature will automatically sense when the digital stream is replaced by an analog output and switch the input accordingly. (See page 22 for more information on the Auto-Poll feature.) This dual connection is not required for sources (such as DVD players or video games) that always output a digital stream.
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 21**, as described in the next section.
 - If your video display has component video inputs (Y/Pr/Pb), connect the **Component Video Outputs 23**.
 - If your display does not have digital or component video inputs, connect the **Video Monitor Output 26** 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 multi-channel or 2-channel PCM audio signals only. Connect the HDMI output of a 1.0 source to either of the **HDMI Inputs 22** 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 39**. 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 47 M** or **Optical 38 K 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 22** 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 39

- **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.
- It is not possible to feed an analog audio or 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 30 31** and **Audio 40 41** 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 21** 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.

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, an optional remote sensor may be used. Connect the output of the remote sensor to the **IR Input 16**.

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 **IR Output 13** to the Remote IR Input jack on Harman Kardon or other compatible equipment.

If other Harman Kardon-compatible source equipment is part of the main room installation, the **IR Output Jack 13** on the rear panel should be connected to the **IR IN** jack on source equipment. 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 hard wire connection or use an optional, external IR "blaster" connected to the **Full Carrier IR Output 12**. If you are in doubt as to which IR Output jack to use for the equipment in your sys-

tem, contact your dealer or installer, or the manufacturer's support site and ask whether the unit to be controlled uses "full carrier" IR commands. When "full carrier" commands are used, make the connection to the **Full Carrier IR Output 1**. Otherwise, make the connection to the **IR Output 13**.

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

The AVR 645 is equipped with multizone capabilities that allow it to send a separate audio source to the remote zone from the one selected for use in the main room.

Depending on your system's requirements, three options are available for audio connection:

Option 1: Use high-quality, shielded audio interconnect cable from the AVR 645'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 645, plug the audio interconnect cables into the **Multiroom Audio Outputs 31** on the AVR 645's rear panel.

Option 2: Connect the **Multiroom Audio Outputs 31** on the AVR 645 to the inputs of an optional stereo power amplifier. Run high-quality speaker wire from the amplifier to the speakers in the remote room.

Option 3: Taking advantage of the AVR 645'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 645 in the main listening room, but you will be able to add another listening room without 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 15**. 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 51.

NOTE: For all options, you may connect an optional IR sensor in the remote room to the AVR 645 via an appropriate cable. Connect the sensor's cable to the **Multiroom IR Input 24** on the AVR 645 and use the ZR 10 remote to control the room volume. You may install an optional volume control between the output of the amplifiers and the speakers in options 1 and 2.

A-BUS® Installation Connections

The AVR 645 is among the few receivers available that offer built-in A-BUS/READY operation. When used with an optional A-BUS product, you have all the benefits of remote zone operation without the need for an external power amplifier.

To use the AVR 645 with an approved A-BUS product, simply connect it to the AVR 645 using standard Category 5 wiring that is properly rated for the specific in-wall installation. Terminate the wiring at the receiver end to a standard RJ-45 connector in compliance with the instructions furnished with the A-BUS product.

No further installation or adjustment is needed, as the A-BUS jack on the AVR 645 routes the signals to their proper destination for power, signal source and control. The output fed to the A-BUS jack is determined by the AVR 645's multiroom system and menus.

RS-232 Connections

The AVR 645 is equipped with an **RS-232 Serial Connection Port 20** that may be connected to a compatible, optional, external computer, keypad or control system for bidirectional 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 645's RS-232 port is a standard D-SUB 9 connection, but to ensure compatible and proper operation, specific software commands and pin wiring schemes may be required.

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. If you do not need the USB cable provided with the AVR 645 for programming the TC 30 remote, it may be used for this purpose.

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 33** on the AVR's rear panel.

NOTES ON USB:

- The USB jack on the AVR 645 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 645'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 Connections

The AVR 645 is equipped with a low-voltage triggers that may be used to control a wide variety of compatible, optional devices that respond to voltage actuation commands. This includes external audio power amplifiers, video screens, motorized blinds and other compatible products in a home theater or automation system. **Due to the complexity of interfacing with power-controlled devices, we strongly recommend that they be installed by a qualified professional.**

The trigger jack delivers 5 volts DC when activated, and remove the voltage when they are off. The connection is a 3.5mm mono mini plug with the signal on the center pin ("tip") and the outer shaft ("ring") acting as the negative or ground connection.

The **Trigger Output 18** is for use with devices such as power amplifiers that you wish to activate with whenever the AVR is turned on, regardless of the input selected.

After checking for voltage, current and polarity compatibility between the device being controlled and the AVR, simply connect one end of the trigger cable to the device being controlled and the other end to the desired Trigger Output on the AVR.

IMPORTANT NOTE ON THE TRIGGER CONNECTION: The current draw from the Trigger Jack cannot exceed 1.0mA.

XM Radio Connections

XM Radio is a satellite-delivered, subscription-based, programming service that provides a wide range of music, sports, news and information programming with digital audio quality. The AVR 645 is XM Connect & Play-ready, which means that you can easily add the XM service to your home audio system by purchasing an XM antenna module or Passport system, activating an account with XM and then making a simple, single-cable connection to your AVR.

To purchase an XM antenna module or Passport system, consult your dealer, or contact XM Radio at www.xmradio.com. After following the instructions packed with the module, place the XM antenna near a south-facing window and run the cable to the AVR. Connect the plug at the end of the cable to the **XM Module Input 32**. If you are using an XM Passport system, remember that the Passport card must be inserted for the system to operate. Once the connection is made, follow the instructions on page 46 for more information on listening to XM Radio.

NOTES on XM Radio:

- XM Radio requires the purchase of additional, optional hardware and a separate subscription to the XM service.
- XM Radio is available only in the Continental United States and Canada. It is not available in Alaska

INSTALLATION AND CONNECTIONS

or Hawaii.

- XM reception requires that the antenna be able to “see” the XM satellites or receive a signal from one of the XM ground-based repeaters. Depending on your installation and location, XM service may not be available in some areas.

AC Power Connections

This unit is equipped with an accessory AC outlet that may be used to power accessory devices, but it should not be used with high-current draw equipment such as power amplifiers. The total power draw to each outlet may not exceed 100 watts.

This **Switched AC Accessory Outlet 17** is powered only when the unit is on. This is recommended only for devices that have 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. This type of product may not operate properly when used with the switched outlet.

The AVR 645 features a removable power cord that allows wires to be run in advance to a complex installation so that the unit itself need not be installed until it is ready for connection. When all needed connections have been made, connect the AC power cord to the **AC Power Cord Jack 19**.

The AVR 645 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 645's incredible power and fidelity!

When all audio, video and system connections have been made, the final steps before listening to your new AVR are to make the configuration adjustments that tailor the unit to the other components in your system as well as accommodate your personal listening preferences. A few minutes spent to correctly calibrate and configure your system will greatly add to your listening pleasure.

Speaker Selection and Placement

While the most seamless surround sound reproduction comes from the use of speakers with identical or carefully matched driver elements at each position, no matter which brand or type of speakers you prefer, it is always best to use the same model or series for the left front, center and right front speakers. Similarly, it is also desirable to use the same model or series for the surround speakers. This ensures that the soundstage will be relatively seamless when a sound moves from one side of the room to the other.

Speaker Placement

Once you have selected your speakers, it is important that they be placed in positions that enable them to do the best job of reproducing the sound as it was meant to be heard, regardless of the program content. The placement of speakers can have a noticeable impact on the accuracy of the surround process, particularly in multichannel systems.

When placing your speakers in a listening room, picture an imaginary circle starting at the center of your video screen that arcs around the room with the prime listening position, or "sweet spot," at the center of the circle. Depending on the number of speakers in your system, there is a recommended placement along the circle for each speaker, though the specific construction of your room, taking into account the available walls, bookcases, or floor space at which the speakers may be placed will obviously have some impact on where the speakers are ultimately located. As a general rule, try to place all speakers so that they are positioned at the same height as your ears when you are seated at the prime listening position.

Use the following suggestions as a guide, and make the changes needed to fit the speakers to your room. Don't be afraid to experiment a bit until you find the right combination of locations that works for you. At the end of the day, there is no real "right" or "wrong" place to put the speakers; work to optimize their locations so that audio moves across the front of the room smoothly, without seeming to jump from one speaker to another.

Front Left/Right Speakers

The recommended placement for front left/right speakers is at the 30-degree position with reference to the center channel speaker. The distance between them should be about the same as the distance from the center channel speaker to the prime listening position.

Although the natural tendency is to place the speakers so they are parallel to the wall behind them, and thus in line with the video screen, the preferred placement is to angle the speakers slightly ("toe in") so that they point at the prime listening position.

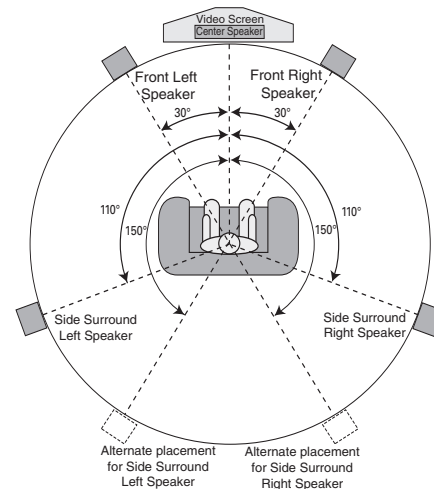
Center Channel Speaker

The ideal location for the center channel speaker is at "0 degrees" in our circle, directly in front of the prime listening position. Place the center channel speaker as close to the top (or bottom) of the video screen as possible so that when you position the front left/right speakers the tweeters of all three front channel speakers are within 24" of one another.

Surround Speakers for 5.1 Systems

In a 5.1 surround system, an additional pair of left/right speakers is added. Although many believe that these speakers should be placed at the rear of the room, the preferred position for them is at the sides of the room, with rear placement a second option when room conditions prevent the use of side-mounted surround speakers.

When side-wall placement is possible, place the left/right surround speakers at a point that is 110 degrees along our circle from the center of the video screen. This translates to placing them to the side and slightly behind your preferred listening position. If possible, angle the speakers in slightly so that they are pointing toward the listener's ears.



5.1 Placement Diagram

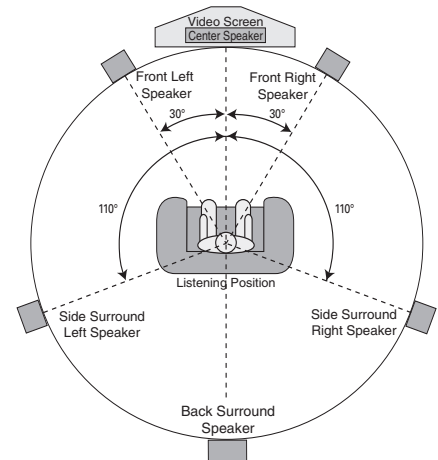
If it is not possible to place the surround speakers at the sides of the room, the alternate position is at the back of the room, at a spot that is about 150 degrees around our circle from the center of the video screen. Another way to spot the optimal, alternate rear-wall mounting position is to place the left surround speaker on the back wall so that it points directly at the front right speaker, and to have the right surround speaker point directly at the front left speaker. If possible,

aim the surround speakers so that they point inward, toward the listening area, rather than perpendicular to the walls.

Surround Speakers for 6.1 Systems

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.



6.1 Placement Diagram

NOTE: The 6.1-channel configuration is not recommended for the AVR 645. 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 7.2-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 29). After EzSet/EQ has finished, connect the single surround back speaker to the *Left Surround Back Speaker Outputs* 12. 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.

SYSTEM CONFIGURATION

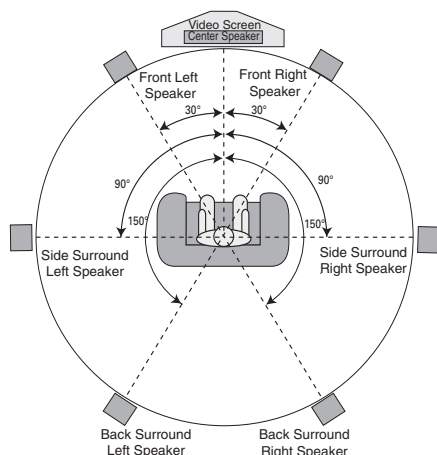
Surround Speakers for 7.1 or 7.2 Systems

For the ultimate home theater experience, a 7.1 or 7.2 surround system uses both traditional surround left/right channels and a surround back left/right speaker pair. In a 7.1 system, the front left/center/right speakers remain in the same place as they would be for a 5.1 or 6.1 system, but due to the number of speakers involved, the placement of the surround speakers is different.

In a 7.1 system, you should place the main surround left/right speakers at the 90-degree point on our circle. A good way to visualize proper surround speaker positioning for 7.1 is to place the speakers directly to the left and right of the ears of someone sitting in the prime listening spot. The two speakers should ideally face toward each other.

When two subwoofers are installed, the AVR 645 is able to create a smoother low-frequency reproduction with more powerful bass.

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 left speaker directly opposite the left front speaker.



7.1 Placement Diagram

Subwoofer Placement

Since subwoofers produce nondirectional sound, they may be placed almost anywhere in a room. Actual placement should be based on room size and shape and the type of subwoofer used. One method of finding the optimal location for a subwoofer is to begin by placing it in the front of the room, about six inches from a wall, or near the front corner of the room.

Another method is to temporarily place the subwoofer at your normal listening position, and then walk around the room until you find a spot where the subwoofer sounds best. Place the subwoofer in that spot. You should also follow the instructions of the sub-

woofer's manufacturer, or you may wish to experiment with the best location for a subwoofer in your listening room.

The AVR 645 is equipped for 7.2 operation, which means that you can increase the low-frequency performance of your system by using two subwoofers, rather than one. When using two subwoofers, the following tips will add to the smoothness and power of the bass reproduction:

- Although it is not mandatory, you will have the best performance when both subwoofers are identical in terms of driver size, amplifier power and cabinet design (e.g., ported or sealed).
- The optimal placement when two subwoofers are in use is to have them on the side walls of the room, to the immediate left and right of the listening position. If that positioning is not practical, a good alternative is to place the subwoofers in the front left and right corners of the room, or to place the subwoofers in any two corners of the room.
- Regardless of which subwoofer placement option is chosen, EzSet/EQ will help to smooth room conditions to deliver the optimal bass response.

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 few feet 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 19).

Remote Control Setup

The AVR 645 comes with two remotes, Harman Kardon's TC 30 activity-based remote control with color LCD and the ZR 10, which is designed primarily for use in remote rooms but which may also be used as a compact remote in your main home theater room.

The TC 30 remote packed with your new receiver will operate the AVR 645 without any further programming. However, in order to take full advantage of the TC 30's power and flexibility, you will need to program it via the Internet so that the codes needed to control the other devices in your system (such as a video display, DVD players and set-top boxes) are transferred into the TC 30's memory. Programming the TC 30 is easy, and complete instructions for setting up the TC 30 may be found in the separate Installation Guide for the remote.

Before using the TC 30, you must install the rechargeable battery and connect the charging cradle to its power supply. The battery should then be charged for at least twelve hours before using the TC 30.

To allow you to continue with the setup of your AVR 645 while the TC 30 battery is charging, the ZR 10 may be used to navigate through the system menus. No configuration is required; simply remove the battery compartment door on the back of the ZR 10 and install the AAA batteries supplied with the AVR. Replace the battery cover and you are ready to go!

System Setup

Once the speakers have been placed in the room and connected, the remaining steps in the setup process are to assign input and output connections, make any video or audio adjustments, select a surround mode, program the AVR 645's bass management system for the type of speakers used in your system, calibrate the output levels and set the delay times used by the surround sound processor.

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.

1. Make certain that the AC power cord is firmly inserted into the **AC Power Cord Jack 20** 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 A** located behind the **Front-Panel Control Door 9** in until it latches and the word "OFF" on the top of the switch disappears inside the front panel. Note that the illumination around the **Standby/On Switch 1** will turn amber, indicating that the unit is in the Standby mode.
3. Carefully remove the protective plastic film from the front-panel lens. If left in place, the film will prevent proper operation of the remote control.
4. Turn the AVR 645 on either by pressing the **Standby/On Switch 1** on the front panel, by pressing the **AVR Selector G** or any button on the ZR 10 remote that selects an input source (**Input Source Buttons D**, **Tuner Selector E**, **XM Radio Selector F** or **The Bridge/DMP Selector R**), or by pressing the **Devices Button 5** on the TC 30 and then pressing the **Screen Button 7** at the top of the left side of the remote, next to the screen message **AV Receiver**. The lighting around the **Standby/On Switch 1** and the **Volume Control 10** will turn blue and the front panel display will light to confirm that the unit is on.

Using the On-Screen Display

When making the following adjustments, you may find it easier to use the AVR 645's on-screen display system. These easy-to-read displays give you a clear picture of the current status of the unit and make it easy to see which speaker, delay, input or digital selection you are making.

To view the on-screen menus, make certain you have made a video or HDMI connection on the rear panel to the appropriate matching input of your TV or projector. In order to view the AVR 645's displays, the correct video source must be selected on the video display.

IMPORTANT NOTE: When viewing the on-screen menus using a CRT-based projector, plasma display or direct-view CRT monitor or television, it is important that they not be left on for an extended period of time. Prolonged display of a static image such as these menus may cause the image to be permanently "burned into" the projection tubes, plasma screen or CRT display. This type of damage is not covered by the AVR 645 warranty and may not be covered by the video display's warranty.

The AVR 645 has two on-screen display modes. "Full-OSD" displays comprehensive menus of system options that may be adjusted using the navigation buttons on the remote. The "semi-OSD" system displays two-line messages at the bottom of the screen and is

typically used to make minor adjustments to previously established settings with discrete function controls on the remote. We strongly recommend that the full-OSD system be used for the AVR 645's initial setup and configuration, as it contains many system options not accessible through the discrete function buttons and semi-OSD messages.

Making Configuration Adjustments

To activate and configure the AVR 645 using the full-OSD system, either the TC 30 remote or the ZR 10 remote may be used, though you may find the ZR 10 an easier choice for this purpose.

With the TC 30:

- Press the **Devices Button 4**.
- When the images on the LCD screen change, press the **Screen Button 7** at the top of the left side of the remote, next to the screen message **AV Receiver**.
- Press the **Menu Button 11** to activate the OSD menu system.
- When the **Master Menu** or any subsequent menu is on the screen, use the **▲/▼ Navigation Buttons 14** to move through the menus or sub-menus. Press the **OK/Enter Button 15**, when appropriate, to enter a selection.
- To scroll through the options available for a specific menu, press the **◀▶ Navigation Button 14**. In most cases, you may simply select the option and then use the **▲/▼ Navigation Button 14** to move to the next line, while in some cases you may need to press the **OK/Enter Button 15** first. The detailed instructions for each menu will tell you which buttons to press.
- Press the **Menu Button 11** to remove the menus from the screen and return to normal operation.

With the ZR 10:

- Press the **OSD Button E** to activate the menu system. The **MASTER MENU** (Figure 1) will appear.
- Once the **MASTER MENU** or any subsequent menu is on the screen, use the **▲/▼ Navigation Buttons G** to move through the menus or sub-menus. Press the **Set Button C**, when appropriate, to enter a selection.
- To scroll through the available options for a specific menu, press the **◀▶ Navigation Buttons G**. In most cases, you may simply select the option and then use the **▲/▼ Navigation Buttons G** to move to the next option, while in some cases you may need to press the **Set Button C** first. The detailed instructions for each menu will tell you which buttons to press.

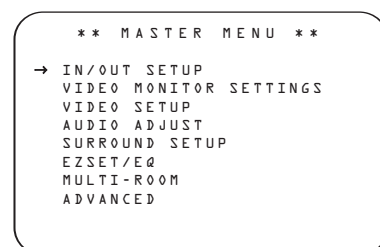


Figure 1

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 50.

In addition to the menu-driven full-OSD system, a number of settings and adjustments may be made directly from the TC 30 remote, using the semi-OSD system. To make adjustments using the semi-OSD, with the TC 30:

- Press the **Devices Button 4**.
- When the images in the LCD change, press the **Screen Button 7** at the top of the left side of the remote control, next to the screen message **AV Receiver**.
- The screen images will change again. To adjust a setting on the first page of options, press the **Screen Button 7** to the left or right of the item you wish to change, and then use the **▲/▼ Navigation Buttons 14** to move through the available settings and option choices. Press the **OK/Enter Button 15**, when appropriate, to enter a selection.
- More adjustment options may be accessed by pressing the **Page Left/Right Buttons 9**.

When the full-OSD system is in use, the menu selections are not shown in the **Upper** or **Lower Display Lines 13/14** and **OSD ON** will appear in the **Upper Display Line 13** to remind you that a video display must be used. When the semi-OSD system is used in conjunction with the discrete configuration buttons, the on-screen display will show the current menu selection. That selection will also be shown in the **Upper** or **Lower Display Lines 13/14**, depending on which parameter is being adjusted.

NOTE: Semi-OSD messages are not available when a 720p or 1080i image is being viewed.

Setting the System Configuration Memory

The AVR 645 features an advanced memory system that enables you to establish different configurations for the component video assignment, digital input and

SYSTEM CONFIGURATION

surround mode and other settings for each input source. This flexibility enables you to customize the way in which you listen to each source and have the AVR 645 memorize those settings. Once these settings are made, they will automatically be recalled whenever you select that input.

To simplify initial configuration and operation, the AVR 645 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.

Before using the unit, you may want to change the settings for some inputs so that they are properly configured to reflect the use of digital or analog inputs, the type of video display and speakers installed, and the surround mode specifics of your home theater system.

In/Out Setup

The first step is to configure each input source. When an input is selected, the settings will “attach” themselves to that input and be stored in a nonvolatile memory. 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 customize each source to your specific listening requirements. However, once done, they need not be changed again unless your system components have changed.

When using the full-OSD system to make the setup adjustments, press the **Menu Button** **11** or **OSD Button** **13** once so that the **MASTER MENU** (Figure 1) appears. The cursor will be next to the **IN/OUT SETUP** line. Press the **On/Enter Button** **15** or the **Set Button** **16** and the first page of the **IN/OUT SETUP** menu (Figure 2) will appear on the screen. Press the **Navigation Button** **14** until the desired input name appears in the highlighted video, as well as being indicated in the front-panel **Input Indicators** **11**.

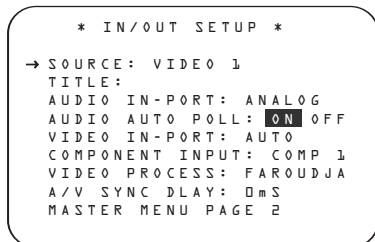


Figure 2

When one of the four Video inputs 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 **Navigation Buttons** **14** on the remote so that the 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 **On/Enter Button** **15** or the **Set Button** **16**, as you are now ready to enter the device name.

Press the **Navigation Buttons** **14** and note that alphanumeric characters will appear with the start of the alphabet in capital letters, followed by the lowercase letters, and then numbers and symbols. When you press the **Navigation Button** **14**, the symbols and numbers will appear first, followed by a reverse list of the alphabet in lowercase 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 **Navigation Button** **14**.

When the desired character appears, press the **Navigation Button** **14** and repeat the process for the next letter, and continue until the desired name is entered, up to a maximum of 14 characters. Press the **On/Enter Button** **15** or the **Set Button** **16** to enter the input name into the system memory and to proceed with the configuration process.

After entering the input title, press the **Navigation Buttons** **14** to move to the next line.

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 **Navigation Buttons** **14** to move to the next line.

With the cursor pointing to **AUDIO IN-PORT**, press the **Navigation Buttons** **14** to change the default to a different audio input connection. When the name of the desired input appears, press the **Navigation Buttons** **14** to move to the next line.

Note that in addition to using the menu system to change the audio input, you may change it at any time with the TC 30 remote by following these steps:

- Press the **Devices Button** **4**.
- When the images in the LCD change, press the **Screen Button** **7** at the top of the left side of the remote, next to the screen message **AV Receiver**.
- At the next screen, press the **Screen Button** **7** to the left of the message **Setup Menu**.

- When the new list of options appears, press the **Screen Button** **7** to the right of Digital Input. The current digital input name will begin to flash in the **Upper Display Line** **13**.
- Press the **Navigation Buttons** **14** until the desired input name appears on the right side of the **Upper Display Line** **13** or in the semi-OSD message.
- After five seconds, the input name will stop flashing, as it is entered into the system memory and the unit will return to normal operation.

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 **Navigation Buttons** **14** so that **OFF** (rather than **ON**) is in a white video highlight.

When the desired auto-poll setting is entered, press the **Navigation Button** **14** 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 **Navigation Buttons** **14** 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 **Navigation Buttons** **14** to move to the next line.

If your system includes any sources that are equipped with Y/Pr/Pb component video outputs, the AVR 645 is able to switch them to send the proper signals to your video display. Each of the **Component Video Inputs** **27** 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 you do not need to change these defaults, press the **Navigation Button 15** to go to the next setting.

To change the Component Video assignment, first make certain that the cursor is pointing to the **COMPONENT INPUT** line on the menu screen, and then press the **Navigation Buttons 14 G** until you see the desired input in the highlighted video.

When the desired component input has been selected, press the **Navigation Button 14 G** to go to the next setting.

At the **VIDEO PROCESS** line, you are able to select which type of video processing or conversion, if any, is to be used with the input source being configured. The default setting is to have the AVR 645's Faroudja processing circuitry in use, which will deliver the best image quality when a digital video display is in use. If you do not need to change the setting, simply press the **Navigation Buttons 14 G** to move to the next line.

If your video display is not capable of accepting high-resolution (480p and above) signals through either an HDMI or component video connection, it is very important that this setting be changed. Three options are available:

The default setting is **FAROUJJA**. Depending on the input source, the video signals will be handled in different ways:

- A standard-definition (480i) analog signal (composite, S-video or component) will be digitized and sent to the Faroudja video processor for enhancement. The signal will be available as both an analog component and HDMI signal. The standard definition video signal will also be available at the record outputs.
- An analog component high-definition signal will be digitized and sent to the Faroudja video processor for enhancement. The signal will be available as both an analog component and an HDMI signal, but not at the analog composite or S-video monitor or record outputs.
- Any HDMI signal other than 1080i will be sent to the Faroudja video processor for enhancement and it will be available as an output at both the HDMI and analog component outputs. Program material that carries HDCP copy protection encoding will only be available through the HDMI output.
- HDMI signals in 1080i resolution will be sent directly to the HDMI and analog component outputs without processing. Program material that carries HDCP copy protection encoding will only be available through the HDMI output.

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) 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 both the HDMI and analog component outputs. Program material that carries HDCP copy protection encoding will only be available through the HDMI output.

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 and analog component outputs. Program material that carries HDCP copy protection encoding will only be available through the HDMI output.

In addition to the changes to the video processing configuration that are made through the **IN/OUT SETUP** menu, you may change the setting for an input at any time by pressing the **Buttons H** on the front panel to cycle through the available choices.

When any needed change to the video processing setting has been made, press the **Navigation Buttons 14 G** 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 36, but you may also make it here using the menu sys-

tem. 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 Buttons 14 G** 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 Buttons 14 G** until the on-screen cursor is pointing to **PAGE 2** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote to move to the second screen of input/output settings. If all settings for input configuration are complete, press the **Navigation Buttons 14 G** until the on-screen cursor is pointing to **MASTER MENU** and then press the **Set Button C** on the ZR 10 remote to return to the main menu screen.

The second page of the **IN/OUT SETUP** menu (Figure 3) allows you to further configure the AVR 645 for special custom features.

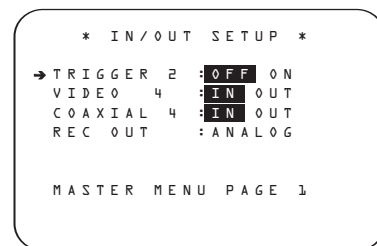


Figure 3

The **TRIGGER 2** line enables you to choose whether a trigger voltage signal is sent to the **Trigger 2 Output Jack 19** when a specific input is selected. Unlike the **Trigger 1 Output 18**, which always has a trigger voltage present when the AVR 645 is turned on, the default for the **Trigger 2** connection is off. The setting on this menu line allows you to turn it on for a specific input so that an input or source-dependent accessory (such as a motorized projection screen or blinds) may only be activated when, for example, an input which requires a projection screen or darkened room is selected.

To change the setting, press the **Navigation Buttons 14 G** until the desired setting appears. Press the **Navigation Buttons 14 G** to move to the next line when the setting is correct or if no configuration changes are required.

The front-panel analog **Video 4 Jacks N** are normally set as inputs for use with camcorders, video games and other portable audio/video products, but they may be switched to outputs. First, make certain that you are at the **IN/OUT SETUP** menu.

SYSTEM CONFIGURATION

Press the **Navigation Buttons** **14** **G** until the cursor is pointing to the **VIDEO 4** line. Press the **Navigation Buttons** **14** **G** so that the word **OUT** is highlighted. The **Input/Output Status Indicator** **L** between the S- and composite video jacks will turn red, indicating that the analog Video 4 jacks are now record outputs.

Selection of the front-panel jacks as outputs will remain effective as long as the AVR 645 is on. Once the unit is turned off, the jacks will revert to their normal use as inputs when the unit is turned on again. An exclusive Harman Kardon feature is the ability to switch the front-panel coaxial digital audio and analog audio/video jacks from their normal use as inputs to output connections so that portable recording devices may easily be connected. On the AVR 645, the **Coaxial 4 Digital Jack** **M** is normally an input, but it may be switched to a digital output for use with digital recorders. To change the jack to an output, press the **Navigation Buttons** **14** **G** while the **IN/OUT SETUP** menu is on screen until the cursor is next to **COAXIAL 4**. Then press the **Navigation Buttons** **14** **G** so that **OUT** is highlighted. The **Input/Output Status Indicator** **L** will then 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 645 is digital. Digital signals will be passed through, regardless of their format, and which digital input (optical or coax) they are fed from. Analog signals are not converted to digital, and their format (e.g., PCM, Dolby Digital or DTS) may not be changed.

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 Buttons** **14** **G** 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.

When the adjustment has been made, or if no adjustment is required and all settings on this page are complete, press the **Navigation Buttons** **14** **G** until the on-screen cursor is pointing to **PAGE 1** and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote 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 Buttons** **14** **G** until the on-screen cursor is pointing to **MASTER MENU** and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote to return to the main menu screen.

Video Monitor Settings

The **VIDEO MONITOR SETTINGS** menu (Figure 4) 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 Buttons** **14** **G** until the on-screen cursor is pointing to **VIDEO MONITOR SETTINGS** and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote to move to the menu screen.

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

Figure 4

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 **OUT VIDEO FORMAT** line is a non-adjustable informational display of the video resolution of the output signal, as determined by the input and whether or not video processing or conversion is in use.

The **COMPONENT OUT** line is an informational display of whether or not the Composite 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 **480i** 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 Buttons** **14** **G** 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 Buttons** **14** **G** to make the desired selection.

When required adjustments have been made for this input, or if no adjustment is required, press the **Navigation Buttons** **14** **G** until the on-screen cursor is pointing to **BACK TO MASTER MENU** and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote to return to the main menu screen.

Video Setup

The AVR 645 is among the very few audio/video receivers that include an onboard video processing system using DCDi by Faroudja technology. It is unique in that it also allows the video controls to be individually set for each video input source. This permits you to compensate for the problems inherent in older technologies such as VCR while taking the maximum advantage of new source options such as DVD, digital cable and satellite programming.

IMPORTANT NOTE: The video processing is only available when the AVR 645 is connected to a "digital-ready" or HDTV video display that is able to accommodate input sources of 480p or greater via an analog component or HDMI connection. If your video display does not have that capability, you may skip the settings in this section, as they will not apply to your home theater system.

Within the **VIDEO MAIN** menu are the settings that define the input and establish the global settings for the video output. The two video **ADVANCED CONFIGURATION** submenus contain the individual parameters that will be applied to the specific video input in use. Before proceeding with the setup, we suggest that you look at the default settings for each input, which are listed in the appendix to this manual. If the settings for any input mirror the configuration of your home theater system, then no further adjustment is needed.

It is worth noting that the impact of many of the individual settings is subtle, and it is only when they are grouped together that the full power of the video processing system is unleashed. That means that there is

no "right" or "wrong" setting in many cases, and the setting that looks best to your eyes is the one that is truly correct for your specific combination of equipment, room environment and your own personal viewing preferences. Feel free to experiment with different setting combinations, as you can't "hurt" anything by doing so.

When you do reach the combination of settings for both your display system and each input, it is a good idea to write those settings down using the worksheets found on pages 55 – 57. (A copy of the blank worksheets may also be found in the support section our Web site at www.harman-kardon.com/support.)

To reach the **VIDEO MAIN** menu, first make sure the **MASTER MENU** is on the screen, and then press the **Navigation Buttons** **14** **G** until the on-screen cursor is pointing to **VIDEO SETUP** and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **G** on the ZR 10 remote. The **VIDEO MAIN** menu (Figure 5) will appear on the screen.

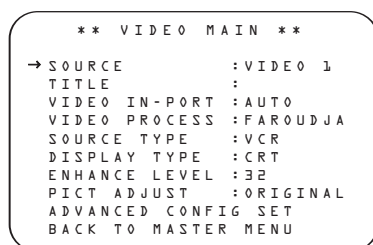


Figure 5

Once the first **VIDEO MAIN** menu is displayed with the on-screen cursor pointing to **SOURCE**, press the **Navigation Buttons** **14** **G** until the name of the input you wish to change the settings for is shown. At the same time, any video input name previously changed to individualize the source setting will be shown on the **TITLE** line. To change the title, go back to the **IN/OUT SETUP** menu. Once the source to be adjusted has been selected, press the **Navigation Buttons** **14** **G** until the on-screen cursor is pointing to **SOURCE TYPE** as the two lines below the **TITLE** line are informational only, and their setting may not be adjusted in this menu.

- The **VIDEO IN-PORT** line shows the video input jacks used for this input. If **AUTO** has been selected, the display will alternate between **AUTO** and the actual active input.
- The **VIDEO PROCESS** line shows whether the system is in the Bypass, Video Conversion or Faroudja video processing mode. Note that the **FAROUDJA** setting must be enabled for the input being adjusted through the **IN/OUT MENU** in order for the settings available on this menu and the **ADVANCED CONFIGURATION** menus to be active.

Once an input is selected, the first configuration choice is to tell the AVR 645 what type of device is being used for that source. To change this setting from the system default, press the **Navigation Button** **14** **G** so that the on-screen cursor is pointing to **SOURCE TYPE** and then press the **Navigation Buttons** **14** **G** to select, from among the options shown, one that is closest to the type of product connected to that input. The selection made will change the settings on the **ADVANCED CONFIGURATION SUB-MENUS** to those best suited to that type of device. Of course, you may also change these settings yourself at any time through the submenus.

The list of input source defaults is:

DVD: This setting is optimized for use with the output signal of a typical DVD player.

VCR: This setting is optimized for use with the output signal of an analog videocassette recorder.

CABLE DIG: This setting is optimized for use with digital cable set-top boxes. However, it is important to note that even when a digital cable system is in use, there may be a mix of digital and analog channels. We recommend that you start with this setting and then change the options in the **ADVANCED CONFIGURATION** menus as needed, to tailor the output to your preferences.

SAT DIG: This setting is optimized for use with digital satellite-system set-top boxes.

CABLE ANA: This setting is optimized for use with analog cable set-top boxes.

SAT ANA: This setting is optimized for use with analog satellite-system set-top boxes.

CAMERA ANA: This setting is optimized for use with analog VCRs and camcorders.

CAMERA DIG: This setting is optimized for use with digital camcorders or still-image cameras.

The **DISPLAY TYPE** line is a global, rather than input-dependent setting, as there is only one display connected to the AVR. The settings here are primarily changes to the video enhancement level and aspect ratio for a specific type of device, and defaults were selected after testing on a wide range of brands. To change this setting, press the **Navigation Button** **14** **G** so that the on-screen cursor is pointing to **DISPLAY TYPE** and then press the **Navigation Buttons** **14** **G** to select, from among the options shown, one that is closest to the type of display being used. The selection will change the settings on the **ADVANCED CONFIGURATION SUB-MENUS** to the parameters best suited to that type of display. Of course, you may also change

these settings yourself at any time, through the submenus. The list of input source defaults is:

CRT: This setting is optimized for use with displays that use cathode ray tubes (CRTs) to display images. For the purposes of this setting, it does not matter whether the display is a single tube, direct-view CRT TV or a three-tube front or rear projector. The default aspect ratio is 4:3, but you may change that setting, if desired, on the second page of the **Advanced Configuration** submenus, as shown on page 27.

REAR PROJECT: This setting is optimized for rear projectors, regardless of the imaging technology used.

FRONT PROJECT: This setting is optimized for front projectors, regardless of the imaging technology used.

PLASMA: This setting is optimized for plasma displays, regardless of whether they are true high-definition or "ED" displays that are HD-compatible.

DLP: This setting is optimized for use with projectors that use light engines with Texas Instruments' DLP® technology. For the purposes of this setting, it does not matter whether the display uses one or three chips, or whether the display is front or rear projection.

LCD: This setting is optimized for use with displays that use liquid crystal display (LCD) technology. For the purposes of this setting, it does not matter whether the display is a direct-view LCD flat panel, or front or rear projector.

The **ENHANCE LEVEL** setting adjusts the degree to which the enhancement circuits that adjust the high-frequency content of the signal are applied. This is similar to the "Sharpness" control on a traditional television. This setting acts on the vertical and horizontal as well as the luminance and chrominance signals to offer what will appear as enhanced depth in the picture as well as greater small object detail. In general, lower settings are applicable for digital displays and sources, while higher settings may be preferred for CRT-based displays and digital sources.

If you wish to change the default setting to suit your specific display type, input sources and personal image preferences, when the **VIDEO MAIN** menu is on the screen, press the **Navigation Button** **14** **G** so that the on-screen cursor is pointing to **ENHANCE LEVEL** and then press the **Navigation Buttons** **14** **G** to enter the setting that delivers the best image to your eyes on the scale of 0 to 100.

After any changes to the **ENHANCE LEVEL** line have been made, press the **Navigation Buttons** **14** **G** so that the on-screen cursor is pointing to the **PICT ADJUST** line. At this

SYSTEM CONFIGURATION

line, you are able to change the setting for the output aspect ratio. In most cases, the default setting of **ORIGINAL** provides the best result, but if the combination of program material, input source device capabilities and the adjustments available on your video display do not provide the desired picture format, press the **▲/▼ Navigation Buttons 14 G** to experiment with the six available options.

- **ADJUST 1** will stretch a 4:3 letterbox input vertically so that it fills a 16:9 screen.
- **ADJUST 2** will apply a nonlinear horizontal stretch of a full-screen 4:3 input to a 16:9 screen. When this option is chosen, objects will appear to be a bit "fatter," due to the stretch.
- **ADJUST 3** will process a 2.35:1 image that is formatted with a 4:3 letterbox and vertically stretch it to fill a 16:9 screen, but it will also crop the left and right sides of the image.
- **ADJUST 4** will process a 2.35:1 image that is formatted with a 4:3 letterbox and vertically stretch it to fill a 16:9 screen, with nonlinear horizontal processing so that the full image appears on the screen. To accomplish this, you will find that objects on the far left and right sides of the screen may appear to be "skinnier" than normal.
- **ADJUST 5** will apply a stretch to fit 4:3 full-screen images to fill a 16:9 screen.
- **ADJUST 6** is an automatic mode that will apply the processing from **ADJUST 3** to a letterbox input or **ADJUST 2** to a full-screen 4:3 input.

Once settings are made on the **VIDEO MAIN** menu, you may either return to the **MASTER MENU** or proceed to either of the two **ADVANCED CONFIGURATION** setting menus. The options on those pages are set by your choice on the **SOURCE TYPE** line, but you may change one or more of the settings to customize your video presentation. To return to the **MAIN MENU**, press the **▲/▼ Navigation Buttons 14 G** so that the on-screen cursor is pointing to **BACK TO MASTER MENU** and press the **OK/Enter Button 15** or the **Set Button 17**. To change the settings on the **ADVANCED CONFIGURATION** menus, press the **▲/▼ Navigation Button 14 G** so that the on-screen cursor is pointing to **ADVANCED CONFIG SET** and press the **OK/Enter Button 15** or the **Set Button 17**. The first page of the **ADVANCED CONFIGURATION** menus (Figure 6) will appear on screen.

Advanced Configuration Settings

The Advanced Configuration Settings may be used to change the individual items that make up the default profile for each video input. You may change none, one or as many of the settings as you wish, to create

the on-screen image that you prefer. As with all of the video settings, you can't "hurt" anything by experimenting with the settings, and while the defaults represent the result of extensive lab testing with a variety of display types, input sources and test signals, there is no "right" or "wrong" setting other than the ones that look best to you.

The settings that are available on **PAGE 1** of the **ADVANCED CONFIGURATION** menus (Figure 6) are all On/Off settings. On that page, use the **▲/▼ Navigation Buttons 14 G** to move the on-screen cursor next to the line for the setting you wish to change. Then, press the **◀▶ Navigation Buttons 14 G** to turn the setting on or off.

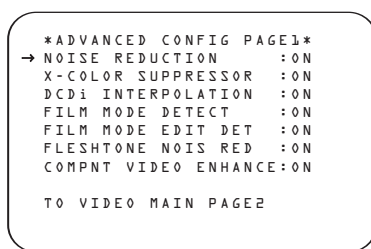


Figure 6

These settings are available on **PAGE 1** of the **ADVANCED CONFIGURATION** menu:

NOISE REDUCTION: When this setting is turned on, there is a reduction in the video noise that is often present in analog input sources.

X-COLOR SUPPRESSOR: When this setting is on, there is a reduction in the cross-color interference that typically appears in composite video sources as moiré in finely detailed objects.

DCDi INTERPOLATION: DCDi stands for Directional Correlation De-interlacing, and it is a Faroudja technology that examines each pixel for the optimal direction from which to interpolate the video information, with regard to local edges. This adaptive process prevents the appearance of staircasing and the jagged edges that are often visible with other means of de-interlacing.

FILM MODE DETECT: When this setting is on, special circuits are used to detect the presence of film-originated material so that the original film-frame sequence may be recovered by weaving together the appropriate video fields.

FILM MODE EDIT DETECT: When this setting is on, additional processing is applied when film-based material is detected so that any disruption in the frame sequence of film-based material due to video edits or the overlay of video text over film is compensated for by processing, before artifacts such as feathering may appear.

FLESH TONE NOISE REDUCTION:

When this setting is on, the processing is adapted to preserve the detail in faces and flesh tones while reducing noise in the total picture.

COMPONENT VIDEO ENHANCE:

When this setting is on, component video signals are processed to adjust the high-frequency content of the signal to offer enhanced depth in the picture, as well as greater small object detail.

When all settings on this submenu page that require adjustment have been made, use the **▲/▼ Navigation Buttons 14 G** to move the on-screen cursor next to **PAGE 2** and then press the **OK/Enter Button 15** or the **Set Button 17** to move to the next page of the **ADVANCED CONFIGURATION** settings, or move the on-screen cursor next to the **TO VIDEO MAIN** line to return to the **VIDEO MAIN** menu.

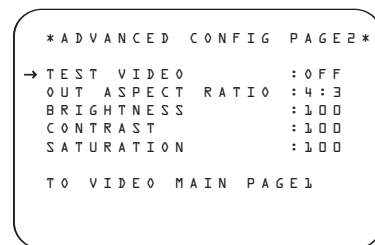


Figure 7

These settings are available on **PAGE 2** of the **ADVANCED CONFIGURATION** menu (Figure 7):

TEST VIDEO: The test signals that are called up on this line are designed for use in factory setup of the AVR 645's video processing circuit and they are not designed for user adjustment of any controls on your video sources, on your video display or on the AVR 645 itself. You may bypass this setting line unless you wish to view the signals, but remember that they are not designed for any consumer use.

To view the test signals, with the on-screen cursor next to the **TEST VIDEO** line, press the **◀▶ Navigation Buttons 14 G** to select one of the test signals described below, and then press the **OK/Enter Button 15** or the **Set Button 17** to activate the test signal. The test signal will remain on the screen for the length of time selected in the **ADVANCED SETTINGS** menu for the on-screen menus, as explained on page 50. The four test signals are:

Color Bars: These are a variation of traditional split-field color bars used to check the internal settings for luminance/chrominance voltage levels with respect to the eight basic colors.

Triangle Fixed: This test signal puts two opposing triangles on screen, with a black triangle on the right and a white triangle on the left, to test aspects of the pull-down logic software.

Triangle Flashing: This test signal also puts two opposing black and white triangles on the screen, but it flashes them at a high frame rate, to test the 3/2 pull-down edit detection and other aspects of the processor and interpolation software.

Ramp/Square: This complex pattern uses a variety of fixed and pulsating gray-scale tests to test different aspects of the 3/2 pull-down edit detection and other aspects of the processor and interpolation software.

The **OUT ASPECT RATIO** line sets the aspect ratio for the input source currently being adjusted. To make a change from the default setting, press the **Navigation Buttons 14 G**. Remember that this setting impacts the actual playback only. The on-screen menus will always be output as a 4:3 signal, though they may be stretched to 16:9 by a setting available in your video display.

BRIGHTNESS: The changes to this setting are similar to the Brightness control on your display, changing the video level. If circumstances are such that a source has a low signal and appears dark, you may wish to change this setting, but be careful not to increase it to the point where the video display is over-driven into clipping or blooming.

CONTRAST: The changes to this setting are similar to the Contrast control on your display, changing the black level to compensate for poor contrast.

SATURATION: The changes to this setting are similar to the Color control on your display, and may be used as needed to compensate for over- or under-color-saturation.

When all settings on this submenu page that require adjustment have been made, use the **Navigation Buttons 14 G** to move the on-screen cursor next to **PAGE 1** and then press the **OK/Enter Button 15** or the **Set Button C** to return to the previous **ADVANCED CONFIGURATION** settings page, or point the on-screen cursor at **TO VIDEO MAIN** to return to the **VIDEO MAIN** menu.

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. To make configuration changes to those parameters, first make certain that the **MASTER MENU** is on screen with the cursor pointing to the **AUDIO SETUP**

line, and press the **OK/Enter Button 15** or the **Set Button C**. The **AUDIO SETUP** menu (Figure 8) will appear.

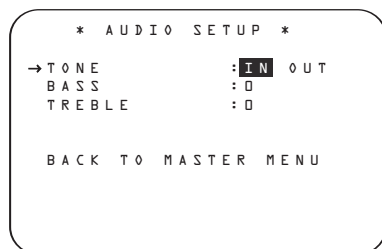


Figure 8

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 Buttons 14 G** so that **OUT** is highlighted.

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 up to ± 12 dB in 2dB steps by pressing the **Navigation Buttons 14 G** so that the cursor is next to **BASS** or **TREBLE**, depending on which setting you wish to adjust. Next, press the **Navigation Buttons 15** until the desired setting is shown.

When all desired changes have been made on this menu, press the **Navigation Buttons 14 G** so that the cursor is next to the **BACK TO MASTER MENU** line; press the **OK/Enter Button 15** or the **Set Button C**.

Surround Setup

The next step is to set the surround mode you wish to use with the input that was previously selected in the **IN/OUT SETUP** menu. Since surround modes are a matter of personal taste, feel free to select any mode you wish — you may change it later. However, to make it easier to establish the initial parameters for the AVR 645, we suggest Logic 7 (Cinema or Music) for most analog inputs. In the case of inputs such as a CD Player, Tape Deck or Tuner, you may wish to set the mode to Stereo ("Surround Off"), as they are not typically used with multichannel program material, and it is unlikely that surround-encoded material will be used. Alternatively, the Logic 7 Music mode is a good choice for stereo-only source material. See page 41 for more information on available surround modes.

For digital program material, the AVR will always examine the data stream and automatically select a Dolby Digital or DTS mode, as applicable.

To begin the surround setup process, from the **MASTER MENU** (Figure 1), press the **Navigation Buttons 14 G** until the cursor is next to the **SURROUND SELECT** line. Press the **OK/Enter Button 15** or the **Set Button C** until the **SURROUND SELECT** menu (Figure 9) is on the screen.

Navigation Buttons 14 G until the cursor is next to the **SURROUND SELECT** line. Press the **OK/Enter Button 15** or the **Set Button C** until the **SURROUND SELECT** menu (Figure 9) is on the screen.

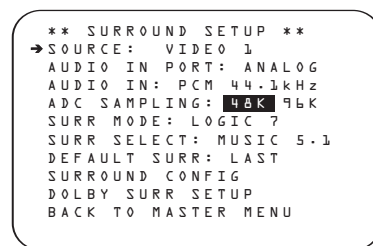


Figure 9

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 14 G** 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 Buttons 14 G** 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 14 G** 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 Buttons 14 G** 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 14 G** 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 Buttons 14 G** to move to the **SELECT** line.

SYSTEM CONFIGURATION

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 41. 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 Buttons** **14** **G** 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** **14** **G** so that **ORIGINAL** appears.

Before proceeding to the **SURROUND CONFIG** line, it is worth noting that the settings in the sub-menus 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 Buttons** **14** **G** 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 **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote to go to the main **SURROUND CONFIG** menu (Figure 10).

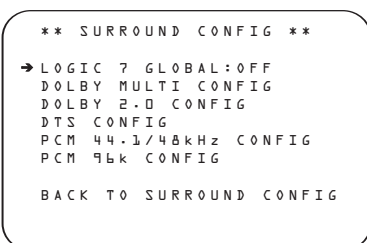


Figure 10

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** **14** **G** 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 Buttons** **14** **G** until the on-screen cursor is pointing to the desired mode, and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote. Within each menu, press the **▲/▼ Navigation Buttons** **14** **G** to move the cursor up and down through the list, and then press the **◀▶ Navigation Buttons** **14** **G** to turn the mode “**ON**” or “**OFF**.”

- 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 645's surround modes may be found on page 41, 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 multi-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 **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.

When all surround modes that are not required have been turned off, press the **▲/▼ Navigation Buttons** **14** **G** until the on-screen cursor is pointing to **BACK TO SURROUND CONFIG**; then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote.

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 **OK/Enter Button** **15** on the TC 30 or the **Set Button** **C** on the ZR 10 remote to call the **DOLBY SURROUND** menu (Figure 11) up on the screen.

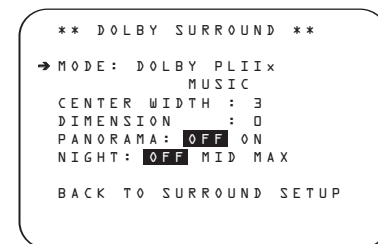


Figure 11

With the exception of the Night mode setting, which is global and applies to all inputs, the settings on this page may be set individually for each input, but they are only active when the Dolby Pro Logic II or

Dolby Pro Logic IIx modes are in use. Press the **Navigation Buttons 14 G** to select the desired Dolby Pro Logic mode for adjustment, and then press the **Navigation Buttons 14 G** to move through the three choices. Press the **Navigation Buttons 14 G** to adjust the settings, as desired.

The three Dolby surround settings are:

- **CENTER WIDTH:** This setting adjusts the balance of the vocal information in the front sound-stage 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 to **ON** to add an enveloping wraparound presentation that increases the perception of sound along the sides of the room.

When any needed adjustments to the parameter settings for the Dolby Pro Logic II and Dolby Pro Logic IIx Music modes have been made, or if no adjustment to those settings are required, press the **Navigation Buttons 14 G** to move to the last line on the menu.

The **NIGHT** line adjusts the settings for the Night mode, which is only available when specially encoded Dolby Digital sources are being played.

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

To adjust the Night mode setting, make certain that the cursor is on the **NIGHT** line of the **DOLBY** menu. Next, press **Navigation Buttons 14 G** to choose between the following settings, as they appear in the on-screen display:

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

MID: When **MID** is shown, a mild compression will be applied.

MAX: When **MAX** is shown, a more severe compression algorithm will be applied.

We recommend that you select the **MID** setting as a starting point and change to the **MAX** setting later, if desired.

When all settings on the **DOLBY SURROUND** menu have been completed, press the **Navigation Buttons 14 G** until the cursor is next to **BACK TO SURROUND SETUP** and press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote. You may then make any additional changes to the available options from that screen, or use **Navigation Buttons 14 G** to move the cursor to the **BACK TO SURROUND CONFIG** menu and press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote 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 Buttons 14 G** to move the cursor to the **BACK TO MASTER MENU** and press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote 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 645 includes the latest Harman Kardon 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 a Texas Instruments™ DA 610 digital signal processor, running at 250MHz, EzSet/EQ eliminates the need for manual adjustment of speaker "size", crossover, delay and output level settings while it adds the power of proprietary algorithms and configurable digital filters to deliver 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 properties of your listening room are. EzSet/EQ includes a number of improvements to the original version, including the ability to set up to three different sets of EQ measurements and the capability to handle dual subwoofers. The menu and setup system not only delivers improved precision for all measurements, but it also guides you through the step-by-step process of EQ Design. With EzSet/EQ, you can

now "test drive" the settings by listening to the results of the EzSet/EQ process before entering the settings into the system memory.

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 33–38.

Before starting EzSet/EQ, 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 three feet from the nearest hard surface, and adjust it so that the microphone is at or 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 J** located behind the **Front-Panel Control Door 9**.

Finally, before going further, make certain that the program volume is at -25dB. 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.

To start the EQ Design process, first navigate to the **EZSET/EQ MAIN** menu (Fig. 12) by pressing the **OSD Button 13** on the ZR10 remote or the **Menu Button 11** on the TC 30. Press the **Navigation Buttons 15** until the cursor is pointing to **EZSET/EQ** in the **MASTER MENU**. Press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** to bring the new menu to the screen.

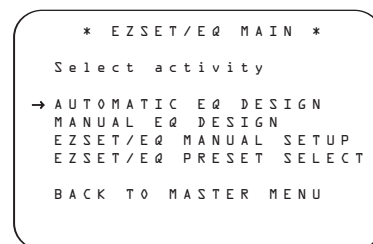


Figure 12

There are four choices in the **EZSET/EQ MAIN** menu, three of which are relevant at this time. Use the **Navigation Buttons 14 G** to move the cursor next to the line that contains the type of setup you wish to perform, and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote to start that process.

- In most cases, you will want to use the Automatic mode, which calibrates the system for speaker pres-

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ence, speaker "size", speaker crossover, channel output level, speaker-to-listener delay time and room equalization. To choose this mode, simply press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14**, as the cursor is already pointing to Automatic when the menu appears on the screen. Then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** again when the **AUTOMATIC EzSet/EQ** menu appears, and continue to Step 1 of the EQ Design process.

- If you wish to set the speaker size and crossover, channel delay or channel output levels manually and then have EzSet/EQ set the room equalization, with the **EZSET/EQ MAIN** menu (Figure 12) on the screen, press the **▲/▼ Navigation Buttons 14** to move the cursor to the **EZSET/EQ MANUAL SETUP** line and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** on the ZR 10 remote. Follow the instructions on pages 33 to 38 for the items you wish to set manually. During that process, a message may appear reminding you to run EzSet/EQ, which you may ignore at this time since you will return to the EzSet/EQ menu at the conclusion of your manual adjustments.

After completing all manual settings, press the **▲/▼ Navigation Buttons 14** to move the cursor to the **BACK TO EZSET/EQ MAIN** line and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** on the ZR 10 remote. When that menu (Figure 12) returns to the screen, press the **▲/▼ Navigation Buttons 14** again to move the cursor to the **MANUAL EQ DESIGN** line and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** on the ZR 10 remote. A message will appear, reminding you to manually set the system parameters, but since you have just done that, make certain that the cursor is at the **CONTINUE** line and press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** on the ZR 10 remote. Follow the steps shown below to complete the EzSet Design process.

- If you wish to enter the settings for speaker configuration, channel output adjustment and delay times manually, press the **▲/▼ Navigation Buttons 14** to move the cursor to the **EZSET/EQ MANUAL SETUP** line and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** on the ZR 10 remote. This will take you to the **MANUAL SETUP** menu, where additional submenus contain the configuration adjustments. Skip to page 33 for details on manual setup.

- The **EZSET/EQ PRESET SELECT**

line is used to recall one of the three EQ Designs that may be stored with different settings. For more information on using the Preset Selections, see page 38 or 48.

EQ Design is done in a series of steps, with the Far Field measurements first, followed by the Near Field measurements and, finally, the Subwoofer measurements. In each case, the process is the same: the on-screen menus will direct you to place the microphone in a specific location, and when that portion of the process is started, test tones will be sent to the speaker or speakers being measured. The system will then pause slightly as the results of the measurement are calculated and stored in system memory.

If the step was successful, an on-screen message will report the test results and direct you to the next step. If the step did not produce acceptable results, an error message will appear, suggesting the adjustments needed to correct the problem and start a re-test.

During each EQ Design step, you have the option to perform the tests for that specific portion of the process, or you may skip the settings and move to another step or return to the **EZSET/EQ MAIN** menu (Figure 12).

When the complete EQ Design process is complete, you will be given an opportunity to "test drive" the settings by listening to a source with the room equalization filters applied. In order to take advantage of this feature, before beginning the EQ Design, make certain that a source is playing with program material you are familiar with. If necessary, exit the menu system at this time to select and start the playback, and then return to EzSet/EQ. The source will mute during the EQ Design, but will return when it is time for the "test drive."

Step 1. The **EZSET DESIGN STEP 1** menu (Figure 13) will appear with instructions as to where to place the microphone. As noted on the screen, use the **Volume Control 10/18** to adjust the volume level to -25dB, as shown on the line that appears at the bottom of the menu when the volume is adjusted. Press the **OK/Enter Button 15** on the TC 30 or the **Set Button 14** when the volume is set to the proper level.

```
* EZSET DESIGN STEP 1 *  
  
Place mic at ear  
level near preferred  
listening position, at least  
3ft/0.9m from any  
hard surface.  
Set volume to -25dB  
→ CONTINUE TO FAR FIELD  
SKIP FAR FIELD DESIGN  
BACK TO EZSET/EQ MAIN
```

Figure 13

The final menu screen before the EzSet/EQ process starts is a warning screen (Figure 14) that serves as a

reminder to keep the room as quiet as possible while the system is in use.

```
WARNING !!!  
  
During measurements  
Please keep silence.  
Test signals will be  
heard on all speakers.  
  
→ START: OFF ON  
BACK TO EZSET/EQ MAIN
```

Figure 14

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 airflow 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. To begin the EzSet/EQ Far Field measurements, press the **◀/▶ Navigation Buttons 14** so that **ON** is highlighted in reverse video, and press the **OK/Enter Button 15** on the TC 30, or the **Set Button 14**.

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.

At this point, a series of test tones will circulate among all the speakers in your system. While this is happening, the AVR 645 is reading the signal to determine which speaker positions are active, what type of speaker is present at each active position and 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 tones stop, the system will pause for as long as a minute while the processor makes its calculations based on the results of the signal measurements. Do not be alarmed if the "WARNING" message remains on the screen after tones stop until a results message is displayed.

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 carefully to make sure that the test tone circulates in a clockwise rotation, starting with the front left speaker, to the center, to the front right, and so on to the subwoofer. If the tone is heard from a speaker that seems as though it is out of sequence, such as the tone coming from the surround left speaker when the next speaker in the sequence should be the surround right speaker, exit the EzSet/EQ system when the test sequence is completed and use the manual output level tone adjustment process, as outlined on page 37, to determine which, if any, speaker is incorrectly connected.

When the Far Field tests are complete, a message screen will appear to indicate whether the procedure was successful or not. In most cases, there will not be any problems and you will see the message shown in Figure 15 on your screen.

```
* DESIGN STEP 1 RESULTS*
STEP 1 successful
Detected speaker config
FL : YES      SBR: YES
CEN : YES      SBL: YES
FR : YES      SL : YES
SR : YES

→ CONTINUE TO NEAR FIELD
SKIP NEAR FIELD DESIGN
BACK TO EZSET/EQ MAIN
```

Figure 15

If the speaker positions shown match the actual speaker layout in your system, confirm that the cursor is pointing to **CONTINUE TO NEAR FIELD** and press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** to take the Near Field measurements in Step 2.

If the measurements are not successful, due to a missing or malfunctioning speaker, an **ERROR** message will appear as shown in Figure 16. 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 the menus and turn the receiver off. Check all speaker wire connections and then rerun EzSet/EQ.

```
* EQ DESIGN STEP 1 ERROR*
Detected speaker config
FL : YES      SBR: YES
CEN : YES      SBL: YES
FR : YES      SL : YES
SR : NO
Verify spkr cons, mic
Position. Raise vol 5dB.

→ REPEAT TEST
BACK TO EZSET/EQ MAIN
```

Figure 16

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 17.

```
EQ DESIGN OVERLOAD

Overload found. Check
microphone placement.
Reduce volume by 6dB
and run EZSET/EQ again.

→ CONTINUE
```

Figure 17

If the **EQ DESIGN OVERLOAD** message appears, first press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote. This will take you back to the **EQ DESIGN SETP 1 ERROR** menu. Make certain that the cursor is pointing to **REPEAT TEST** and press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote again. At the **EZSET DESIGN STEP 1** menu, lower the volume by at least 6dB and follow the steps described above to run the EzSet/EQ system again. Depending on the amount of the overload, you may need to repeat the process more than once to achieve satisfactory results.

Step 2. When the Far Field measurements are completed, the next step is to take the Near Field measurements. These measurements enable EzSet/EQ to produce the most accurate settings for high-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.

```
* NEAR FIELD MENU *
Please select a speaker:
→ 1-LEFT FRONT      : NO
2-CENTER FRONT      : NO
3-RIGHT FRONT       : NO
4-LEFT SURR         : NO
5-RIGHT SURR        : NO
6-LEFT BACK SURR    : ---
7-RIGHT BACK SURR   : ---
SKIP NEAR FIELD DESIGN
BACK TO EZSET/EQ MAIN
```

Figure 18

When it first appears, the **NEAR FIELD MENU** (Figure 18) will show a list of all the possible speakers and **NO** next to each speaker position where the Far Field measurements detected a speaker. The Near Field measurements should be made for each of those speakers to create a successful EQ Design. To select a speaker position for measurement, press the **▲/▼ Navigation Buttons** **14** **Ⓢ** to move the cursor next to the desired speaker position and then press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote.

Before the test begins, an informational message will appear (Figure 19).

```
EZSET DESIGN STEP 2
Put mic 2ft/0.6m from
selected speaker,
pointing at it, in a
direct path between
the listening position
and the speaker.

→ CONTINUE
BACK TO EZSET/EQ MAIN
```

Figure 19

Follow the instructions and place the microphone about halfway between the speaker and the listening position where the microphone was placed during the Far Field measurements. With the cursor pointing to **CONTINUE**, press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote control.

When the **WARNING** message appears, press the **► Navigation Button** **14** **Ⓢ** to start the test. A short tone will be heard from the speaker being tested, and after a short pause the on-screen menu will show a message to inform you of whether the test was successful or not.

- If the test was successful and there are more speaker positions for which a Near Field measurement is required, press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote to return to the **NEAR FIELD MENU**. Speaker positions where the Near Field measurement has been completed will show **DONE** to the right of the position name. Press the **▲/▼ Navigation Buttons** **14** **Ⓢ** to select a position where **NO** still appears and repeat the steps shown above until a Near Field measurement has been taken at all speaker positions.
- If the test was successful and all Near Field measurements have been completed, the on-screen message will direct you to the Subwoofer measurements. Make certain that the cursor is pointing to **CONTINUE TO SUB DESIGN** and press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **Ⓢ** on the ZR 10 remote (unless

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you wish to choose another option to skip the subwoofer measurements and either complete the EQ Design or return to the **EZSET/EQ MAIN** menu.

- If there was an error during the test, the Design Step 2 Error message will appear. Follow the on-screen instructions to check speaker connections (if no sound was heard from the speaker during the test), check the microphone placement to make certain it is no further than half the distance from the speaker to the listening position and pointing directly at the speaker, or increase the volume by 5dB. After taking the corrective steps, make sure the cursor is pointing to **REPEAT TEST** and press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote. Select the speaker again and repeat the steps as needed until a successful measurement is made.

Steps 3 and 4: The third and fourth steps in the EzSet/EQ II Design process are the measurement for the subwoofers, if present. Although the subwoofers are generally considered one speaker position, since the AVR 645 may be used with two subwoofers, two separate measurement steps must be combined for a complete EQ Design.

When the **SUBWOOFER DESIGN** message appears, make certain that the cursor is pointing to **CONTINUE TO SUB DESIGN** and press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote control. The **EZSET DESIGN STEP 3** (Figure 20) message will appear.

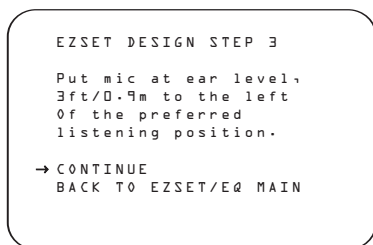


Figure 20

Follow the instructions (using the extender rod if necessary), to make sure that the microphone is at ear level and to the left of where the microphone was placed during the Far Field measurements. Press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote to continue.

When the **WARNING** message appears on screen, press the **Navigation Buttons** **14** **15** to start the test. The test tone will be sent to the subwoofer(s) and the system will then pause slightly to perform the needed calculations. When the calculations are complete, the **EZSET DESIGN STEP 4** message will appear.

The instructions here are identical to those in Step 3 except that the microphone should be placed to the right of where it was during Far Field measurements. Press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote to continue.

When the subwoofer tests in Steps 3 and 4 are complete, a message (Figure 21) will appear after a brief pause to display the results.

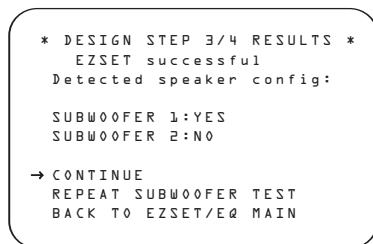


Figure 21

- If the tests were successful, the message will show the number of subwoofers, as shown in Figure 21. You may either press the **OK/Enter Button** **15** on the TC 30 (or the **Set Button** **15** on the ZR 10 remote) to continue to the next step and conclude the EzSet Design process, or press the **Navigation Buttons** **14** **15** and then the **OK/Enter Button** **15** on the TC 30 (or the **Set Button** **15** on the ZR 10 remote) to either repeat the subwoofer test or return to the main EzSet/EQ menu. In most cases you should select "Continue."
- If the tests were not successful, a message similar to Figure 21 will appear, except that the top line will flash **DESIGN STEP 3/4 ERROR**. Follow the suggestions in the message to verify that the subwoofer(s) is properly connected and that the microphone is in the proper position, and increase the volume level by 5dB. Then, press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote to repeat the test as often as needed until a successful result is achieved.

Step 5: When all measurements are successfully completed, the final step in the EzSet Design process is to save the settings into the AVR 645's memory. You may program up to three different EQ settings to accommodate differences in placement of the microphone to reflect alternate listening positions, but we recommend that you create two settings and leave one memory in the "bypass" mode so that you have the ability to compare the two equalized settings against a "straight through" setting that has no equalization applied.

At the conclusion of the measurements for an EQ Design, make certain that the **EZSET/EQ DESIGN DONE** menu (Figure 22) is on your screen. It will appear when you are done with the Subwoofer design, or when you "skip" through the Near Field and/or Subwoofer steps.

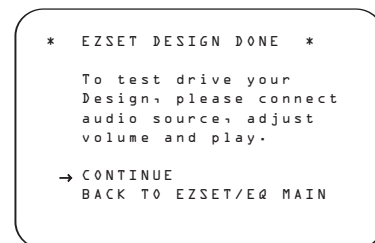


Figure 22

The "test drive" feature allows you to listen to the source that was playing before the EzSet/EQ Design process was initiated, and it is a good way to make sure that you are pleased with the results. The "Warning" refers to the fact that the volume level may have been raised during the Design process, so it is always a good idea to lower the volume a bit. You may always raise it once the playback starts.

With the cursor pointing to **CONTINUE**, press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote, and playback will resume while the on-screen menu changes to the **DESIGN PREVIEW** page (Figure 23).

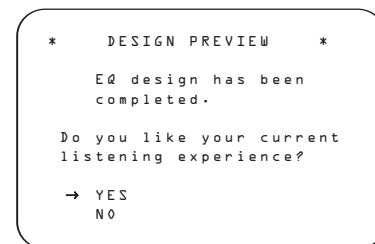


Figure 23

- If you are pleased with the sound, press the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote to move to the next screen and store the settings.
- If the sound is not to your liking, press the **Navigation Buttons** **14** **15** so that the cursor is next to **NO** and then the **OK/Enter Button** **15** on the TC 30 or the **Set Button** **15** on the ZR 10 remote. Follow the on-screen prompts in the menus to return to the **EZSET/EQ MAIN** menu and repeat the EQ Design process.
- If this is your first attempt at running EzSet/EQ, we recommend that you save the settings, even if you are not sure whether you like them, then rerun the EQ Design process again. Since the AVR 645 is able to store multiple EQ Design settings, this will give you the opportunity to compare two different designs to the bypass mode with no equalization applied. You may then select the preset you like best.

If you proceed to store the settings, the next menu will let you select which memory position will be used (Figure 24).

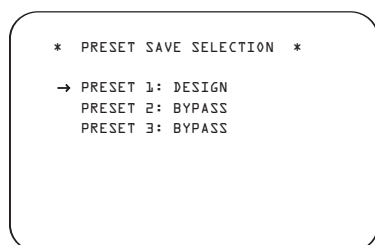


Figure 24

When the **PRESET SAVE SELECTION** screen appears for the first time, **BYPASS** will appear next to all memory preset position. This indicates that no settings are stored in any position. Press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to the preset where you wish to save the settings and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote. If you have previously stored an EQ Design and wish to enter new settings to that position, a warning message will appear, reminding you that the existing settings for that preset will be overwritten. If that message appears, press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote to continue, or press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to **N0** and then the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote to return to the **PRESET SAVE SELECTION** screen so that you may select another memory preset.

While an EQ Design is being stored, a message will appear to remind you that the memory storage is in process. When the settings are stored, you will be returned to the **EZSET/EQ MAIN** menu. Once a setting is stored, the next time you complete an EQ Design and are at the **PRESET SAVE SELECTION** page, the word **DESIGN** will appear next to any preset where you have previously stored data.

At this point, you may either follow the prompts in the menu to exit back to another menu, create another EQ Design, or use the manual setup menus to fine-tune an EQ Design.

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 39 for complete information on operating your AVR 645.

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 EQ Design settings, make certain that the **EZSET/EQ MAIN** menu (Figure 12) is on the screen. Press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to **EZSET/EQ MANUAL SETUP** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote. The **EZSET/EQ MANUAL SETUP** menu (Figure 25) will appear on the screen.

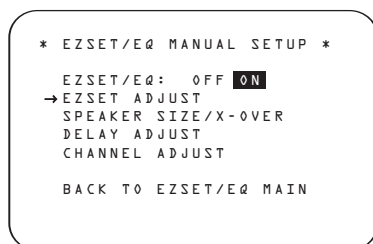


Figure 25

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 **ON**, 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 Buttons 14 G** so that **OFF** is highlighted. 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 the **EZSET EQ** line is set to **ON**, as this item is not available when EzSet/EQ is not in the signal path. To adjust the tilt setting, press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to

EZSET ADJUST and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote. The **EZSET ADJUST** menu (Figure 26) will appear on the screen.

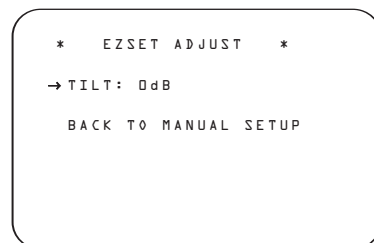


Figure 26

Press the **◀/▶ Navigation Buttons 14 G** to change the setting as needed. When the adjustment is complete, press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to **BACK TO MANUAL SETUP** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote.

Note on Manual Setup Menus: Each manual setup menu (**SPEAKER SIZE/X-OVER**, **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 Buttons 14 G** until the cursor is in the **EZSET SETTINGS** line on the menu in use and press the **◀/▶ Navigation Buttons 14 G** to change the setting to **OFF**. This will allow you to make changes to the settings in 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 645 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.

SYSTEM CONFIGURATION

On the **SPEAKER SIZE/X-OVER** menu (Figure 27), you have the option to change the type of speaker configured for each of the four speaker 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, 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 Buttons 14 G** until the cursor is on the **EZSET SETTINGS** line of the menu and then pressing the **◀▶ Navigation Buttons 14 G** 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 **FL/FR**, **CENTER**, **SL/SR** and **SBL/SBR** 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 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 view or change the current speaker size settings, make certain that the **EZSET/EQ MAIN** menu (Figure 12) is on the screen. Press the **◀▶ Navigation Buttons 14 G** to move the cursor next to **SPEAKER SIZE** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button G** on the ZR 10 remote control. The **SPEAKER SIZE** menu (Figure 27) will appear on the screen.

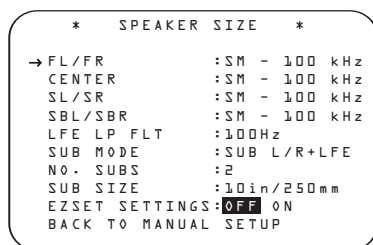


Figure 27

On the **SPEAKER SIZE** menu (Figure 27), 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.

To change the setting for any of the four speaker positions, press the **▲/▼ Navigation Buttons 14 G** until the cursor points to the line where you wish to make the change. Press the **◀▶ Navigation Buttons 14 G** to change the setting, but note that when you do this for the first time in the menu, a warning message (Figure 28) will appear in the on-screen display, reminding you to rerun EzSet/EQ when 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.

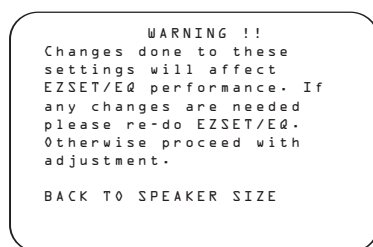


Figure 28

The warning message will remain for five 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 14 G** 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 without the ability to properly reproduce low-frequency sounds, select **SMALL**.

At all 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. When a 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 41 for more information on the Dolby Virtual Speaker mode.)

When **NONE** is selected for the Back Surround speakers, the 6.1/7.1-channel surround modes are not available. If 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 51 for more information on amplifier configuration.)

Once any desired changes have been made to the speaker size and/or crossover, press the **▲/▼ Navigation Buttons 14 G** to move the cursor to any other line in this menu to make a setting change, or go to the **BACK TO MANUAL SETUP** menu and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button G** 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 27) is on the screen, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointing to **LFE LP FLT**. Press the **◀▶ Navigation Buttons 14 G** to begin the selection process, and note that the warning message (Figure 28) 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 Buttons 14 G** to make your selection. When the desired setting appears, press the **▲/▼ Navigation Buttons 14 G** 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 **OK/Enter Button 15** in the TC 30 or the **Set Button 6** to continue with overall 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 27) is on the screen, and then press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointing to **SUB MODE**. Press the **◀▶ Navigation Buttons 14 G** to begin the selection process, and note that the warning message (Figure 28) 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 LP FLT** line will be sent to BOTH the subwoofer and 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 Buttons 14 G** to make your selection. When the desired setting appears, press the **▲/▼ Navigation Buttons 14 G** 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 **OK/Enter Button 15** in the TC 30 or the **Set Button 6** to continue with overall configuration.

Subwoofer Configuration

The AVR 645 is among the very few A/V receivers or surround processors that are capable of feeding two subwoofers, as well as the standard configuration of a single subwoofer. Although one subwoofer is capable of delivering powerful bass, the use of two subwoofers in conjunction with EzSet/EQ expands the bass response over a wider listening area.

The default setting for the AVR 645 is a single subwoofer, but if you are using two subwoofers, it is important to change the setting on the **N0 - SUBS** line. To do that, press the **◀▶ Navigation Buttons 14 G** as needed so that the cursor is pointing to **N0 - SUBS**, and then press the **◀▶ Navigation Buttons 14 G** so that the number shown changes from **1** to **2**.

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 27) is on the screen; then press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointing to **SUB SIZE** and then press the **◀▶ Navigation Buttons 14 G** to begin the selection process. Note that a warning message will appear for four 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 Buttons 14 G** until the cursor is on the **BACK TO MANUAL SETUP** menu; then press the **OK/Enter Button 15** on the TC 30 or the **Set Button 6** so that you may make any other adjustments to the system parameters. Remember to rerun the EzSet/EQ system if any changes have been made to the settings in this menu, following the instructions for using the Manual mode shown on page 30.

The speaker configuration settings may also be adjusted directly and without going into the OSD menu system at any time using the TC 30 remote control. To adjust the speaker settings, first press the **Devices Button 5** on the TC 30, and then press the **Screen Button 7** at the top of the left vertical row, to the right of the **AVR** image on the remote's screen. When the images in the LCD change, press the **Screen Button 7** next to the box with the word **SPEAKER**. Immediately press the **◀▶ Navigation Buttons 14 G** until the desired speaker position's name appears in the **Lower Display Line 14**, and in the semi-OSD message, if the video in use is a 480i source.

Within five seconds of stopping at the desired speaker position, press the **OK/Enter Button 15**. Use the **◀▶ Navigation Buttons 14 G** to select the desired setting and then press the **OK/Enter Button 15** again to enter the setting into the system memory.

Delay Settings

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

In most cases, the settings established by EzSet/EQ are accurate to within one foot, but the placement of the microphone and other factors may influence the setting. Should you wish to manually adjust the channel delay times, follow the instructions shown below. Whenever adjustments to the delay settings are made remember that the distance settings need not be accurate to the inch, as the system is designed to accommodate a typical listening area rather than the precise measurement from the speakers to a specific "sweet spot" position.

SYSTEM CONFIGURATION

In addition to providing delaying adjustments for each individual speaker position, the AVR 645 allows you to adjust the delay for the combined output of all speakers as a group. This feature is called A/V Sync Delay; it allows you to compensate for delays to the video image that may be caused by the processing in products such as digital video displays, video scalars, digital cable or satellite systems, or personal video recorders. With proper adjustment of the setting for A/V Sync Delay, you can eliminate the loss of lip sync that may be caused by digital video applications.

To view or change the current delay settings, make sure the **EZSET/EQ MAIN** menu (Figure 12) is on the screen. Press the **▲/▼ Navigation Buttons 14 G** to move the cursor to **DELAY ADJUST** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10. The **DELAY ADJUST** menu (Figure 29) will appear on the screen.

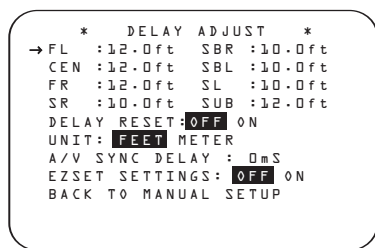


Figure 29

Once the **DELAY ADJUST** menu is on your screen, note that the default for distance settings is in feet. If your measurements are in feet, proceed to the next step; if your measurements are made in meters, press the **▼ Navigation Buttons 14 G** until the on-screen cursor is at the **UNIT** line on the menu. Then, press the **◀/▶ Navigation Buttons 14 G** so that **METER** is highlighted. When the change in measurement units is made, press the **▲/▼ Navigation Buttons 14 G** to return the cursor to the **FL** position.

If you wish to reset all delay settings to the factory defaults, as shown in Figure 29, press the **▲/▼ Navigation Buttons 14 G** until the cursor is pointing to the **DELAY RESET** line. Next, press the **◀/▶ Navigation Buttons 14 G** so that **ON** is highlighted in reverse video. The settings will reset, and you may now continue to make any needed changes following the instructions below. Once you make the first change to the default settings, the **DELAY RESET** line will return to **OFF**, indicating that the factory defaults are no longer in effect.

To change a setting, first make certain that the on-screen cursor is pointing to **FL**, and press the **◀/▶ Navigation Buttons 14 G** until the distance from the center speaker to the preferred listening position is entered. Next, press the **◀/▶ Navigation Buttons**

14 G to move the cursor to the next line and use the **◀/▶ Navigation Buttons 14 G** again to enter the distance from the main listening position to the center speaker. Repeat the procedure for all active speaker positions, first using the **▲/▼ Navigation Buttons 14 G** to change to the next position; then use the **◀/▶ Navigation Buttons 14 G** to change the setting. Note that only the speaker positions that have been set to **LARGE** or **SMALL** in the **SPEAKER SIZE** menu, as shown on page 34, may be adjusted. The appearance of three dashes next to a speaker position in place of a distance setting indicates that you have not configured an active speaker for that location.

If you have already run EzSet/EQ, return to the settings established by the automated system by pressing the **▲/▼ Navigation Buttons 14 G** until the cursor is pointing to the **EZSET SETTINGS** line. Next, press the **◀/▶ Navigation Buttons 14 G** so that **ON** 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 Buttons 14 G** 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 manual setup by pressing the **▲/▼ Navigation Buttons 14 G** until the cursor points to **BACK TO MANUAL SETUP** and then pressing the **OK/Enter Button 15** on the TC 30 or the **Set Button C**. However, if you have a digital video source or a digital video display that causes lack of lip sync, you may use the A/V sync adjust feature to delay the audio signal as it is sent to all channels (as opposed to the individual settings) so that the picture and sound are brought back together. We recommend that this adjustment be made using the direct-access controls on the remote, as shown below. That enables you to see the image while making the adjustment; however, you may also adjust it here using the menu system.

To adjust the A/V sync delay, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointing to the **A/V SYNC DELAY** line in the menu and then press the **◀/▶ Navigation Buttons 14 G** to delay the sound until it matches the on-screen video. The delay settings may also be adjusted directly and without going into the OSD menu system at any time using the TC 30 remote control and while viewing an on-screen image. This is particularly helpful in the case of the A/V sync delay, since it is important to be able to view the impact of the A/V sync delay adjustment with on-screen images.

To adjust the delay settings, first try to have a program on the video display that has close-ups and dialogue. If you feel that the audio is ahead of the picture, look closely at the actors' lips when they stop speaking, and notice whether their lips move for a short duration after the dialogue has stopped. When using the delay adjustments, change the setting so that the movement of the actors' lips is in sync with the sound, so that the sound stops when their lips stop. This is a good way to get the image and sound locked together.

The controls for A/V sync delay are activated by first pressing the **Devices Button 5** on the TC 30, and then pressing the **Screen Button 7** at the top of the left vertical row, to the right of the **AVR** image in the remote's screen. When the images in the LCD change, press the **Screen Button 7** to the left of the box with the word **DELAY**.

Within five seconds, when the **A/V SYNC DELAY** message appears in the **Lower Display Line 14**, press the **OK/Enter Button 15** and then use the **◀/▶ Navigation Buttons 14 G** to bring the image and sound into sync. When you have completed the adjustments, press the **OK/Enter Button 15** again to enter the setting into the system memory.

When a 480i image is being viewed, you will see the A/V sync time message appear as a semi-OSD on-screen message, as well as in the front-panel display. Semi-OSD messages are not available when 480p or higher resolution video is in use.

To change the delay setting for an individual speaker setting directly, rather than the A/V sync "group delay," follow these same instructions, but when the **A/V SYNC DELAY** message appears, press the **◀/▶ Navigation Buttons 14 G** until the desired speaker position name appears, and then press the **OK/Enter Button 15** to start the selection, the **◀/▶ Navigation Buttons 14** to change the delay settings, and finally the **OK/Enter Button 15** to store the setting.

Note that the A/V sync delay setting is unique to each video input source, so you may enter a different setting to compensate for the differences with any product attached to the different inputs.

When all changes to the Delay settings have been made, press the **▲/▼ Navigation Buttons 14 G** until the cursor is on the **BACK TO MANUAL SETUP** menu and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** so that you may make any other adjustments to the system parameters. If the changes just made complete the manual adjustments needed, press the **Menu 11** or **OSD Button B** to exit the menu system and resume normal system operation.

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 645, as correct outputs ensure that you hear soundtracks 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.

IMPORTANT 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, which 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 set to the level that you will use during a typical listening session. We recommend that EzSet/EQ be used when the AVR is first installed, to establish the initial level settings.

To view or change the current Channel Output settings, make certain that the **EZSET/EQ MAIN** menu (Figure 12) is on the screen. Press the **▲/▼ Navigation Buttons 14 G** to move the cursor next to **CHANNEL ADJUST** and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote control. The **CHANNEL ADJUST** menu (Figure 30) will appear on the screen.

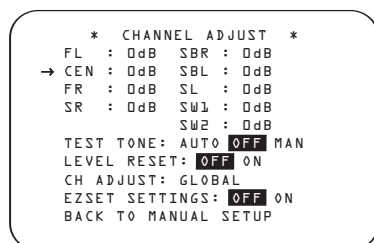


Figure 30

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 Buttons 14 G** again until the cursor is on the **TEST TONE** line and then press the **◀/▶ Navigation Buttons 14 G** until **AUTO** is highlighted video. The test tone will then circulate among all channels for five seconds at each position.

As the test tone circulates, the cursor will flash as it moves to each position, to indicate where the tone should be coming from. If the tone is heard from a different speaker than the one indicated on the menu screen, turn the AVR 645 off using the **Main Power Switch A** and check the speaker wiring or connections to external power amplifiers to make certain that each speaker is connected to the correct output terminal. When you have verified that all speakers are connected properly, turn the AVR 645 on and return to this menu to resume the channel adjustment procedure. If any speaker connections were changed, we also recommend that you rerun EzSet/EQ before making any manual calibration adjustments.

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 **◀/▶ Navigation Buttons 14 G** on the remote to bring all speakers to the same volume level. 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.

Continue to adjust the individual channels until the volume level sounds the same from each speaker. Adjustments should be made with the **◀/▶ Navigation Buttons 14 G** on the remote only, NOT the main volume controls. If you are using a sound-pressure level (SPL) meter for precise level adjustment, set the volume so that the meter reads 75dB, C-Weighting Slow.

When all channels have an equal volume level, the adjustment is complete. To exit this menu, press the **▲/▼ Navigation Buttons 14 G** until the cursor is next to the **BACK TO MANUAL SETUP** line, and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** to return to the **MANUAL SETUP**.

In addition to having the test tone circulate automatically, you may also turn the test tone on, but advance it from one channel to the next manually. This allows you to make calibration adjustments, but to have more control over the way the test tone is moved among the channels.

To change the tone manually, first make certain that the **CHANNEL ADJUST** menu is on the screen, following the instructions shown above, and then press the **▲/▼ Navigation Buttons 14 G** until the cursor is on the **TEST TONE** line. Next, press the **◀/▶ Navigation Button 15** until **MAN** is highlighted. This will start the test tone from the front left speaker position but, rather than circulating to the next channel every five seconds as is the case in the automatic mode, you must press the **▲/▼ Navigation Buttons 14 G** to change the channel the test tone is being sent to. When you have circulated through all channels, the test tone will stop, but you may restart it by returning to the **TEST TONE** line and activating manual sequencing.

The final option for tone adjustment using the menu system is to not use the internal test tone at all. Simply use the **▲/▼ Navigation Buttons 14 G** to change the channel and then use the **▲/▼ Navigation Buttons 14 G** 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.

The output level settings may also be adjusted directly (without going into the OSD menu system) at any time, using the TC 30 remote control. To adjust the speaker settings, first press the **Devices Button 5** on the TC 30, and then press the **Screen Button 7** at the top of the left vertical row, to the left of the **AVR** image on the remote's screen. When the images in the LCD change, press the **Screen Button 7** next to the box with the word **TEST**.

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 **Lower Display Line 14**. While the test noise is circulating, the proper channel position will also be indicated in the **Speaker/Channel Input Indicators 12** by a blinking letter within the correct channel.

SYSTEM CONFIGURATION

To adjust the output level, press the ▲/▼ **Navigation Buttons 14 G** until the desired level is shown in the display or on the screen. Once the buttons are released, the test noise will begin to circulate again in five seconds. When all channels have the same output level, press the **Screen Button 7** next to **TEST** again to complete the process.

NOTE: Output level adjustment with the test tone is not available in the Surround Off 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 the settings that were entered by running EzSet/EQ.

To reset all channel levels to 0dB, press ▲/▼ **Navigation Buttons 14 G** so that the cursor is pointing to the **LEVEL RESET** line and then press the ▲/▼ **Navigation Buttons 14 G** once so that **ON** appears in highlighted video.

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 Buttons 14 G** so that the cursor is pointing to the **EZSET SETTINGS** line and then press the ◀▶ **Navigation Buttons 14 G** once so that **ON** appears in highlighted video. Remember that after turning the EzSet/EQ settings back on, you must 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 run EzSet/EQ and/or made any desired manual trim adjustments, to set a baseline for all channels. Next, press the ▲/▼ **Navigation Buttons 14 G** to move the cursor to the **CH ADJUST** line and then press the ◀▶ **Navigation Buttons 14 G** so that **INDEPENDENT** appears. After that is done, press the **Menu Button 11** or the **OSD Button B** 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 Selector 7** on the front panel or the buttons on the TC 30 or ZR10 remote that are used to select an input source **4 33 44 C D**. Next, return to the **CHANNEL ADJUST** submenu using the steps outlined above.

When all changes to the Channel Output levels have been made, press the ▲/▼ **Navigation Buttons**

14 G until the cursor is on the **BACK TO MANUAL SETUP** menu and then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** so that you may make any other adjustments to the system parameters. If the changes just made complete the manual adjustments needed, press the **Menu Button 11** or the **OSD Button B** to exit the menu system and resume normal system operation.

Additional Input Adjustments

After one input has been configured, go back to the **IN/OUT SETUP** line on the **MASTER MENU** (Figure 1) and enter the settings for each input that you will use. In most cases, only the video input, 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 645 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 49 and 50 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.

EzSet/EQ II Preset Selection

If you have stored more than one EQ Design using EzSet/EQ II, you may select the Design you wish to use from the **EZSET/EQ PRESET SELECT** line of the **EZSET/EQ MAIN** menu (Figure 12). Follow the instructions on page 29 to view the **EZSET/EQ MAIN** menu, and then press the ▲/▼ **Navigation Buttons 14 G** to move the cursor to the **EZSET/EQ PRESET SELECT** line. Press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote to bring the next menu to the screen, and then press the ▲/▼ **Navigation Buttons 14 G** to move the cursor to the preset number for the Design you wish to use. When your selection is made, ▲/▼ **Navigation Buttons 14 G** to move the cursor to **BACK TO EZSET/EQ MAIN** and press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10 remote, or simply press the **Menu Button 11** on the TC 30 or the **OSD Button B** on the ZR 10 remote to exit the menu system.

You may also select an EQ Design directly, or turn the EQ filters off by following the instructions on page 48.

Having completed the setup and configuration process for your AVR 645, you are about to experience the finest in music and home theater listening. Enjoy!

Basic Operation

Once you have completed the initial setup and configuration, the AVR 645 is simple to operate and enjoy. The following instructions will help you maximize the enjoyment of your new receiver:

Before using the AVR 645, we strongly recommend that you program the TC 30 remote, following the instructions provided in both the separate TC 30 Installation Guide and the wizards available when the TC 30 is connected to the Internet through your computer. While the TC 30 is preprogrammed to operate the AVR 645 and Harman Kardon DVD players right out of the box, programming the TC 30 for all the components in your system and setting it up for the activities that best match the way you use your home entertainment system will greatly add to the enjoyment of your total home entertainment system.

Turning the AVR 645 On or Off

- When using the AVR 645 for the first time, you must press the **Main Power Switch A** to turn the unit on. This places the unit in a Standby mode, as indicated by the amber illumination surrounding the **Standby/On Switch 1**.
- To turn the AVR 645 on or off from the front panel, press the **Standby/On Switch 1**.
- To turn the AVR 645 on using the TC 30 remote:
 - Press the **Screen Button 7** next to one of the Activities shown on the LCD screen. The preprogrammed Activities include the remote control codes that not only turn on the AVR 645, but also switch it to the input associated with the Activity and turn on a compatible Harman Kardon DVD player when it is part of the Activity. If you have programmed the TC 30 for your own Activities, other devices will turn on and operate as specified in the Activity design.
 - Press the **Devices Button 5** and then press the **Screen Button 7** to the left of **AVR**. When the options on the LCD screen change, press the **Screen Button 7** to the right of **ON** to turn the unit on or the one next to **OFF** to place it in the Standby mode.
- When using the ZR 10 remote, press the **AVR Selector G** to turn the unit on and select the last source that was used. Press any of the **Input Selectors D**, or source-specific buttons such as the **Tuner Selector E**, **XM Radio Selector Button F**, or **The Bridge/DMP Selector Button R** to both turn the AVR 645 on and select that specific source.

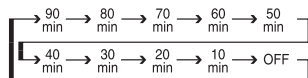
Whenever the AVR is turned on, you will see all of the front-panel indicators light up for a few seconds. This is normal, and it is part of the unit's power-on self-test procedure.

NOTE: When an Input Selector or source-specific button on the ZR 10 remote **DEFR** is used to turn the AVR 645 on, press the **AVR Selector G** to use the remote for control of the AVR 645.

To turn the unit off at the end of a listening session, simply press the **Standby/On Switch 1** on the front panel or the **Power Off Button 3 A** on the remote. Power will be shut off to any equipment plugged into the rear-panel **Switched AC Accessory Outlet 17** and the illumination around the **Standby/On Switch 1** will turn amber.

When the remote is used to turn the unit "off," it is actually placing the system in a Standby mode, as indicated by the amber lighting around the **Standby/On Switch 1**.

- To set the AVR 645 to turn off after a predetermined time period, press the **Devices Button 5**, followed by the **Screen Button 7** at the top of the row of buttons on the left side of the TC 30, to the left of the A/V receiver image on the LCD screen. Next, press the **Page Left/Right Buttons 9** to view **PAGE 2** of the AVR functions.
- To put the AVR in the Sleep mode, press the **Screen Button 7** to the right of the word **SLEEP** in the LCD. Each press of the button will decrease the time before the AVR shuts down in the following sequence.



Once you have set the desired Sleep Time, the front-panel display will automatically dim to half-brightness. The display will return to full-brightness when any button on the front panel or a remote is pressed, and then return again to half-brightness. To check on the time remaining until the unit shuts down, follow the instructions shown above to access the **Screen Button 7** for Sleep and press it once.

To cancel the Sleep function, follow the instructions shown above to access the **Screen Button 7** for Sleep and press it first until the information display returns to normal brightness and then again as many times as needed until the words **SLEEP OFF** appear in the **Lower Display Line 14**.

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 A**.

NOTE: All preset memories are lost if the unit is left turned off by using the **Main Power Switch A** for more than four weeks.

Source Selection

- To select an input source from the front panel, press the **Input Source Selector Button 7**. Each press of the button will move the input selection through the list of available choices. If the button is pressed when the AVR is in the Standby mode, the first press of the button will turn the unit on and select the last used input.
- When the AVR is already turned on, you may select the tuner directly by pressing the **Tuner Band Selector 4**. The first press will select the last tuned frequency band and station. Each subsequent press will change the band to the last tuned station or XM preset.
- Two options are available for selecting an input source using the TC 30 remote.
 - Pressing the **Activities Button 4** will display the list of preprogrammed activities. Press the **Screen Button 7** next to any activity to turn the unit on, select the input source shown, and perform any other steps that have been programmed into the activity.
 - To directly select a source, first press the **Devices Button 5** and then press the **Screen Button 7** to the left of **AV Receiver** at the top of the list of options on the **LCD Screen 8**. To select an audio-only input source (Tuner, CD, 6/8-Channel Direct, DMP/The Bridge or Tape), press the **Screen Button 7** to the left of **Audio Inputs**. When the screen display changes, press the **Screen Button 7** next to the desired input. To select an audio/video input source (Video 1/2/3/4, DVD or HDMI 1/2) press **Screen Button 7** to the right of **A/V Inputs**. When the screen display changes, press the **Screen Button 7** next to the desired input.
- To select an input using the ZR 10 remote, press one of the **Input Selectors D**, or the source-specific buttons for **Tuner E**, **XM Radio F** or **The Bridge R**.
- When a new input is selected, 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 N**, **Optical Digital 3 Input K** or the **Coaxial Digital 3 Input M** may be used to connect a device such as a video game or camcorder to your home entertainment system on a temporary basis.
- 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 (except when 720p or 1080i sources are in use). The input name

will also appear in the **Upper Display Line 13** and in the front-panel **Input Indicators 11**.

- When an audio only source is selected, the last video input used remains routed to the **Video 1/Video 2 Video Outputs 31** and **Video Monitor Outputs 23**. This permits simultaneous viewing and listening to different sources.
- When a composite or S-video source is selected, the video signal for that input will be routed to the **Video Monitor Output 23** and will be viewable on a TV monitor connected to the AVR 645.

6-Channel/8-Channel Direct Input

There are four input choices available for use with sources such as DVD-Audio SACD player or HD-DVD or Blu-ray disc player that are connected to the **8-Channel Direct Inputs 42**. 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* when the input source 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 bass-management options for the direct input as are used for 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 42** 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 42** and when the input source 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 bass-management options for the direct input as are used for all other inputs.

Volume and Tone Control

- Adjust the volume to a comfortable level using the front-panel **Volume Control 10** or remote **Volume Up/Down Buttons 13 H**.
- To temporarily silence all speaker outputs, press the **Mute Button 12 5**. 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 flash in the on-screen display (except when 720p or 1080i sources are in use) and **Upper Display Line 13**; press the **Mute Buttons 12 5** again to return to normal operation.
- The unit's tone controls may be taken out of the signal path by pressing the **Tone Mode Button** on the front panel **C** or by pressing the **Devices Button 5** on the TC 30 remote and then pressing the **Screen Button 7** to the left of **Tone Mode** at the bottom of the list of options on the bottom left side of the **LCD Screen 8**. The first press of either button will show a message in the on-screen display (except when 720p or 1080i sources are in use) and **Lower Display Line 14** with the current status of the tone controls. The system default is **TONE IN**, which indicates that the bass and treble controls are active. Press the **▲/▼ Navigation Buttons 14** on the TC30 remote or the **◀▶ Buttons H** on the front panel to change the setting to **TONE OUT**, which is "flat" response without the tone controls being active.
- When the tone controls are active, the amount of bass and treble boost/cut may be adjusted up to 12dB in 2dB steps by first pressing the **Tone Mode Button** on the front panel **C** or by first pressing the **Devices Button 5** on the TC 30 remote and then pressing the **Screen Button 7** to the left of **Tone Mode** at the bottom of the list of options on the bottom left side of the **LCD Screen 8** two or three times until the desired setting (**BASS MODE** or **TREBLE MODE**) appears in the on-screen display and the **Lower Display Line 14**. Next, use the **◀▶ Navigation Buttons 14** on the remote or the **◀▶ Navigation Buttons** on the front panel **H** to change the setting as desired. The unit will return to normal operation within five seconds after the setting is changed.
- For private listening, simply place a standard 1/4" stereo headphone plug or adapter into the **Headphone Jack B** behind the door **9** on the front panel. The speakers will automatically mute and a two-channel stereo signal will be sent to the headphones. The **Lower Display Line 14** will read **DOLBY H: BP**, indicating that the headphone output is in the Bypass mode, and to confirm that

no processing is being used. To listen through the headphones using the Dolby Headphone mode, simply press the buttons on the remote or front panel as shown below for changing a Dolby mode. **DOLBY H: DH** will appear in the Lower Display Line when the Dolby Headphone mode is in use.

Surround Mode Selection

One of the most important features of the AVR 645 is its ability to reproduce a full multichannel surround sound field from digital sources, analog matrix surround-encoded programs and standard stereo programs.

Selection of a surround mode is based on personal taste, as well as the type of program source material being used. For example, motion pictures or TV programs bearing the logo of one of the major surround-encoding processes, such as Dolby Surround or DTS Stereo may be played in either the Dolby Digital, Dolby Pro Logic II Cinema, DTS Neo:6 Cinema, or Logic 7 Cinema surround modes, depending on the source material.

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 produced 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, Logic 7 or DTS Neo:6, and the Hall or Theater modes often deliver enveloping surround presentations through the use of the natural information present in all stereo recordings.

Surround modes may be changed at any time by using either the front panel or remote control. To select a new surround mode from the front panel, first press the **Surround Mode Group Selector Button 2** until the desired major surround mode group such as Dolby, DTS or Logic 7 is selected. Next, press the **Surround Mode Selector Button 3** to choose the specific individual surround mode.

To select a surround mode using the TC 30 remote, first press the **Devices Button 5**, followed by the **Screen Button 7** at the top of the row of buttons on the left side of the TC 30, to the left of the **AV receiver image** on the LCD screen. After the list of options displayed on the **LCD Screen 8** changes,

Continued on page 42

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 sound field is available. Even if a source does not contain specific EX encoding, the special algorithms may be used to 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 laser discs 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 Game Pro Logic	Dolby Pro Logic II decodes full-range, discrete, left, center right, right surround and left surround channels from either matrix surround-encoded programs and conventional stereo sources when an analog input is in use. The Dolby Pro Logic II Movie mode is optimized for movie soundtracks, while the Pro Logic II Music mode should be used with musical selections. The Pro Logic II Game mode is designed to enhance the soundtrack of video games from either dedicated consoles or computers. The Pro Logic mode re-creates original Pro Logic processing for those who prefer that presentation.
Dolby Pro Logic IIx Movie Music Game	Dolby Pro Logic IIx is the latest extension of Dolby Laboratory's benchmark matrix surround technology which creates a discrete 7.1 sound field from matrix surround or two-channel stereo sources when your system is configured for surround back speakers. Movie, Music and Game versions are available that customize the processing to the type of source in use. These modes may also be used to create 7.1 sound fields from 5.1 digital soundtracks.
Logic 7 Cinema Logic 7 Music	Exclusive to Harman Kardon for A/V receivers, Logic 7 is an advanced mode that extracts the maximum surround information from either surround-encoded programs or conventional stereo material. When your system has been configured for use with Surround Back speakers (see page 41), you may choose between either 7.1 or 5.1 versions of the Logic 7 modes, while only the 5.1 versions are available when there are no Surround Back speakers. 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. The Logic 7 M (or Music) mode 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 seems broader and wider than when the subwoofer is the sole source of bass energy. Logic 7/7 may also be used to add surround back channels to many 5.1 digital soundtracks.
DTS Neo:6 Cinema DTS Neo:6 Music	These two modes are available when any analog source is playing to create a three-channel, five-channel or 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 available on specially encoded (and labeled) optical discs that offer five channels of audio with a 96kHz sampling rate that delivers greatly improved audio performance. When a DTS 96/24 disc is in use and the player is connected with a digital link, this mode is selected automatically.
Theater	The Theater mode creates a sound field that resembles the acoustic feeling of a standard live-performance theater.
Hall 1, Hall 2	The two Hall modes create sound fields that resemble a small- (Hall 1) or medium-sized (Hall 2) concert hall.
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. Depending on the number of speakers available in your system, a variety of different sound field options are available for both the Reference and Wide modes.
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, it places the same signal at the front-left and surround-left, and 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 (DH)	Dolby Headphone enables ordinary stereo headphones to portray the sound of a five-speaker surround-playback system.

For additional information on the specifics of surround modes and processing, information about Dolby modes may be found at www.dolby.com. Information about DTS modes is available at www.dtsonline.com.

press the **Screen Button** **7** to the right of **Surr Menu**. The options list will change again, this time showing the major display category modes. The first press of a 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** **14**, the on-screen display and the front-panel **Surround Mode Indicators** **15**.

The Dolby Digital, Dolby Digital EX, DTS 5.1, DTS-ES Matrix and DTS-ES Discrete modes may only be selected when a digital input is in use. In addition, when a digital source is present, the AVR 645 will automatically select and switch to the correct mode, regardless of the mode that has been previously selected. For more information on selecting digital sources, see the Digital Audio Playback section below.

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 external source device and carry them straight through to the volume control without any further digital processing.

To listen to a program in traditional two-channel stereo, using the front left and front right speakers only (plus the subwoofers, if installed and configured), first follow the instructions shown above so that the **AVR: Surround Menu** page of the TC 30 remote is on the **LCD Screen** **8**, and then press the **Screen Button** **7** to the right of the Stereo option until **SURROUND OFF** appears in the **Lower Display Line** **14**. From the front panel, press the **Surround Mode Group Selector** **2** until the **Stereo** modes appear in the on-screen display and **Lower Display Line** **14**. Next, press the **Surround Mode Selector Button** **3** until **SURROUND OFF** appears in the on-screen display and **Lower Display Line** **14**.

Digital Audio Playback

Digital audio is a major advancement over older analog surround processing systems. It delivers up to six discrete channels, and each channel reproduces a 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. When a digital soundtrack is playing, the number of channels available will vary according to the way in which the program was recorded. Although most movies recorded with digital

sound have 5.1 soundtracks, some have 6.1 or 7.1 sound, while others retain the original two-channel or even monaural sound. When the program source is a broadcast, cable or satellite delivered digital program, only one type of soundtrack may be delivered at a time, while optical sources such as DVD may provide more than one audio option. In either case, the decision of what type of sound track and how many channels to offer is up to the program's producer. With the AVR 645 you are able to not only play back the original compatible digital format, but using the processing power of the Texas Instruments DSP processor, it is possible to decode the basic digital track for 2.0 or 5.1 sound and then select an additional "post-processing" mode to deliver additional channels.

Dolby Digital

Dolby Digital is the default format for DVD discs and for the (ATSC) high-definition system used in the United States and Canada. It is also used by the digital satellite program services and is available on most digital cable set-top boxes. When the AVR 645 is connected to a blue-laser-based high-definition optical disc player via an HDMI, coaxial or optical digital connection, the soundtrack from the player is also available in the standard Dolby Digital format so that it may be decoded by the AVR.

An optional, external RF demodulator is required to use the AVR 645 to listen to the Dolby Digital soundtracks 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** **KM4041** of the AVR 645. A demodulator is not required for use with high-definition optical disc or DVD players, or with 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 Dolby Digital 5.1 data stream is detected, the choice of which surround mode is activated is determined by the setting on the **DEFAULT SURR** line of the **SURROUND CONFIG** menu (Figure 19), as shown on page 28.
- 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 2.0 Dolby Digital data is detected, the default mode is Dolby Digital with Pro Logic II postprocessing when you have a 5.1 speaker sys-

tem, or Dolby Digital with Pro Logic IIx postprocessing 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 postprocessing 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 postprocessing to create the rear surrounds in 7.1 speaker systems.

DTS

DTS is another digital audio system that is capable of delivering 5.1 or 6.1 discrete or matrix sound field reproduction. 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 soundtracks are available on select DVD and LD discs, as well as on special audio-only DTS discs. You may use any LD or CD player equipped with a digital output to play DTS-encoded discs with the AVR 645. All that is required is to connect the player's output to either an **Optical** or **Coaxial Input** on the rear panel **4041** or front panel **KM**.

In order to listen to DVDs encoded with DTS soundtracks, the DVD player must be compatible with the DTS signal, which is indicated by a DTS logo on the player's front panel. Early DVD players may not be able to play DTS-encoded DVDs. If you are in doubt as to the capability of your DVD player to handle DTS discs, consult the player's owner's manual.

When the AVR 645 is connected to a blue-laser-based high-definition optical disc player via an HDMI, coaxial or optical digital connection, the soundtrack from the player is also available in the standard DTS format so that it may be decoded by the AVR.

NOTE:

- Some DVD players have a default setting that does not pass through the DTS signal. Before playing DVDs with a DTS soundtrack, make certain that the settings in your DVD player have been properly adjusted so that DTS audio is passed through. Consult the owner's manual for your DVD player for more information on making these settings.
- When selecting surround modes, any mode where the setting in its mode group (Dolby, DTS, Logic 7, PCM, etc.) has been set to **OFF** in one of the **SURROUND CONFIG** menus will not appear. You may change the settings in this list at any time by following the instructions on page 28.

Selecting a Digital Source

To utilize either digital mode, you must have properly connected a digital source to the AVR 645. Connect the digital outputs from DVD players, HDTV receivers, satellite systems or CD players to the **Optical** or **Coaxial Inputs** **KM4041**. 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 645 rear panel (e.g., connect the analog stereo audio output from a DVD to the **DVD Audio Inputs** **35** on the rear panel when you connect the source's digital outputs).

If you have not already configured an input for a digital source using the on-screen menus, as shown on page 22, first select the input using the remote or front-panel controls, as outlined in this manual. Next, press the **Devices Button** **5**, followed by the **Screen Button** **7** at the top of the row of buttons on the left side of the TC 30, to the left of the A/V receiver image on the LCD screen. After the list of options displayed in the **LCD Screen** **8** changes, press the **Screen Button** **7** to the left of **Setup Menu**. After the options change, press the **Screen Button** **7** to the right of **Digital Input** and then press the **Navigation Buttons** **14** on the TC 30 remote or the **Navigation Button** **14** on the front panel to choose any of the **OPTICAL** or **COAXIAL** inputs, as they appear in the **Upper Display Line** **13** or on-screen display. When the digital source is playing, the AVR 645 will automatically detect which type of digital data stream is being decoded and display that information in the **Upper Display Line** **13**.

When both a digital and an analog connection are made between a source device and the AVR, the digital input is the default. If the digital stream is not present or is interrupted, the unit will automatically switch over to the analog inputs for the selected source.

If you wish to disable the auto-polling feature, you may do so by following the instructions shown for the **IN/OUT SETUP** menu (Figure 2), as shown on page 22.

Digital Bitstream and Surround Mode Indications

When a digital source is playing, the AVR 645 senses the type of bitstream data that is present, and automatically selects the proper surround mode. 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 or LDs, you may select any of the standard Dolby or DTS surround modes or Logic 7. Since the range of available surround modes is dependent on the type of digital data that is present, the AVR 645 shows you what type of signal is present to help you understand the choice of modes.

When a digital source is first detected, the AVR 645 will display a message to indicate the type of bitstream being received. It will remain in the **Lower Display Line** **14** for about 5 seconds before that portion of the display returns to the normal surround mode indication.

For Dolby Digital and DTS sources, a numerical indication (such as **3/2/2.1**) will appear, showing the number of channels present in the data.

The first number in the display message 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, Dolby Digital EX and DTS 5.1 or DTS-EX 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 bitstreams 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 in the display message 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 bitstreams 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 whether 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 a subwoofer.
- The information on the right side of the display will tell you whether 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 a 2.0 or 5.1 digital source is playing on a system configured for 5.1 operation, you may use Dolby Digital EX, DTS-ES, Logic 7/7 or Dolby Pro Logic IIx to add rear channels for full 7.1 sound fields. Note, however, that the availability of specific modes for postprocessing is dependent on the format of the incoming source material. While some combinations (e.g., a Dolby Digital or DTS 5.1 source with Logic 7/7 or Dolby Pro Logic IIx postprocessing) are allowable, others (e.g., a Dolby Digital 5.1 source with DTS Neo:6) are not. If you wish to add surround back channels to a 2.0 or 5.1 source, we recommend that you experiment with the various options to see which may be available and which are best suited to your taste and listening environment.

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 an 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.

PCM Playback

PCM is the abbreviation for Pulse Code Modulation, the digital signal format used for standard CD playback, and other non-Dolby Digital and non-DTS digital sources such as MiniDisc. When a **PCM** signal is detected, the **Lower Display Line** **14** will briefly show a message with the letters PCM, in addition to a readout of the sampling frequency of the digital signal.

In most cases, this will be **PCM 44.1kHz** or **PCM 48kHz**, though in the case of specially mastered, high-resolution audio discs, you will see a **PCM 96kHz** indication. Note that the sampling rate displayed is that of the incoming digital signal, and not the upsampled rate that may be applied to PCM sources when Dolby Pro Logic or Pro Logic II processing is applied, as shown on page 27.

During PCM playback, you may select any surround mode except Dolby Digital or DTS/DTS-ES mode.

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.

OPERATION

The AVR 645'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 46** on the AVR using a cable with a standard USB plug on one side and a USB "Mini B" plug on the other side. You may use an optional cable available at most electronics and computer stores for this purpose, or you may use the cable supplied for use with the TC 30 remote, if it is not being used to program the remote.

In addition, you will need to have a media player installed on the computer. The AVR 645 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 7** until USB appears as the input name in the **Upper Display Line 13** and in the semi-OSD display, if available. The **USB Input Source Indicator 11** will also light up on the front panel.
- Two options are available for selecting an input source using the TC 30 remote.
 - Press the **Activities Button 4** to display the list of preprogrammed activities and then press the **Screen Button 7** to the left of **Listen to USB**. This will both select the USB input and change the remote codes so that the buttons will control the media player on your computer.
 - To directly select the USB input as a source, first press the **Devices Button 5** and then

press the **Screen Button 7** to the left of **AV Receiver**. When the next page of options appears in the **LCD Screen 8**, press the **Screen Button 7** to the left of USB.

- 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 645 is connected to a compatible computer with one of the media players mentioned above open, you may then use the TC 30 to start and stop playback, as well as move to the next track using either the commands that appear in the **LCD Screen 8** in conjunction with presses of the **Screen Buttons 7**, or the **Transport Controls 11**. 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 645 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 (Figure 31).

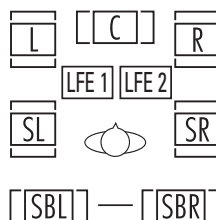


Figure 31

The letters inside the boxes tell you which channels are receiving an input signal. Since conventional analog audio is only two channels, the "L" and "R" letters will light with any analog source. When a digital source is in use, you will see letters displayed that correspond to the number of channels in the incoming data stream, which may be just the L and R for two-channel PCM or 2.0 Dolby Digital material. When a 5.1 signal is being received, the L/C/R/SL/SR indicators will light, with the LFE indication also being shown when an LFE signal is present. All seven indicators, including the SBL/SBR letters, will light for a 7.1 signal, and a horizontal line is shown to connect the SBL/SBR indicators when a 6.1 source is in use.

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 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 645. It is also possible for the type of signal feed to change during the course of a DVD's 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. The AVR 645 will automatically sense changes to the bitstream and channel count and reflect them in these indicators.

The letters used by the **Speaker/Channel Input Indicators 12** will 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 paused. 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 645. This is normal, and the digital playback will resume once the playback is started again.

The boxes around the channel indication letters are used to show which speakers are configured in your system. A small box around the letter indicates that a "Small" speaker has been assigned to that position, while a larger, double box indicates a "Large" speaker assignment.

Note that in some cases, such as an analog stereo or 2.0 digital sources you will see empty speaker position boxes, which indicates that the speaker is active and will receive sound, but that there is no discrete signal for that channel. In other cases you may see letters with no speaker boxes. This indicates that there is a discrete signal for that channel, but due to the mode in use (e.g., Dolby VS with a 5.1 source) there is no signal being sent to the channel.

Night Mode

A special feature of Dolby Digital is the Night mode, which enables specially encoded Dolby Digital input sources to be played back with full digital intelligibility while reducing the minimum peak level 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 Dolby Digital signals with special data are being played.

The Night mode may be engaged at any time when a Dolby Digital source is playing by pressing the **Devices Button** **5** on the TC 30, followed by the **Screen Button** **7** at the top of the row of buttons on the left side of the TC 30, to the left of the **AV Receiver** image on the LCD screen. After the list of options displayed on the **LCD Screen** **8** changes, press the **Page Left/Right Button** **9** to display the next page of options, and press the **Screen Button** **7** to the left of the word **Night**. Each press of the button will change the Night mode setting, as shown in the lower third of the on-screen display (except when 720p or 1080i sources are in use). To turn the Night mode off, press the button as described until **D-RANGE OFF** is shown.

The Night mode may also be selected to always be on at either level of compression using the options in the **DOLBY SURROUND** menu. See page 29 for information on using the menus to set this option.

IMPORTANT NOTES ON DIGITAL PLAYBACK:

- When playing DVDs, please note that even when you have selected a specific digital audio format for playback, an individual disc may change formats or the number of available channels during playback. For example, even if you select a DTS mode for the movie, you may see Dolby Digital in use when the trailers, menus or copyright warnings are playing. This is not a fault with either the AVR or your DVD player, as both are responding to the way the disc was created.
- When viewing digital television signals, note that the number of audio channels available may vary during the course of a program, depending on the content. For example, while a sports event may have 5.1 sound, the commercials or local station content may be in 2.0. In addition, not all local stations are currently equipped for carrying the 5.1 digital audio signals. This may mean that even though the actual program is produced with 5.1, it may be transmitted in a 2.0 configuration in some areas. Your AVR will automatically change to react to the proper type of audio stream if it is changed by the broadcast station.
- Although the AVR 645 will decode virtually all current DVD movies, CDs and HDTV sources, it is possible that some future digital sources may not be compatible with the AVR 645.
- Not all digitally encoded programs 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 645 will automatically sense the type of digital surround encoding used and adjust to accommodate it.

- When a digital source is playing, you may not be able to select some of the analog surround modes such as Dolby Pro Logic II, Dolby Pro Logic IIx, Stereo, Hall, Theater or Logic 7.
- When a Dolby Digital or DTS source is playing, it is not possible to make an analog recording using the **Tape Outputs** **37** and **Video 1 Audio Outputs** **43**. However, the digital signals will be passed through to the **Digital Audio Outputs** **37/38M**.

Using The Bridge

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

When The Bridge is connected to the AVR and an iPod properly docked, you may use the TC 30 or ZR 10 remote to control the iPod for audio playback using either the TC 30 or ZR 10 remote, 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 645 through The Bridge also charges the iPod's battery. Using the **DMP AUTO POWER** menu option, as described on page xx, you may even have the AVR 645 automatically turn on with your iPod as a playback source whenever the iPod is turned on.

You may select The Bridge as an input by pressing the **Devices Button** **5** on the TC 30 and then pressing the **Screen Button** **7** next to **Listen to the Bridge**. The **LCD Screen** **8** will change to display options that allow you to control the iPod by pressing the **Screen Button** **7** next to the function you would like to use. You may also use the ZR 10 to control the iPod using the controls outlined in the instructions that are furnished with **The Bridge**.

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** **14** 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 **Tuner Mode Button** **17** to play or pause the current track. The **Tuning Selector** **9** 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** **14** 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.

Video Adjustments and Operation

The AVR 645's video system uses the power of DDCI by Faroudja processing in combination with HDMI 1.1 connectivity to allow for connection to virtually any video display with the best possible picture. If the Faroudja processing has not been activated for any source in the **IN/OUT SETUP** menu (Figure 2), you may return to that menu and make the changes shown on page 23 to set a new choice for **VIDEO PROCESSING**, or you may turn the processing on or off using one of these two options:

- From the front panel, press the **Navigation Buttons** **H** and observe the choices shown in the **Lower Display Line** **14** or in the semi-OSD message until the desired option appears.
- To change the setting with the TC 30 remote, first press the **Devices Button** **5** and then press the **Screen Button** **7** to the left of **AV Receiver**. When the next page of options appears in the **LCD Screen** **8**, press the **Screen Button** **7** to the right of **Video On/Off** to change the setting until the desired processing mode name is shown in the **Lower Display Line** **14** or in the Semi-OSD message.

It is important to note that in some cases you may choose a combination of video processing mode and output settings that is not compatible with the circuitry of your video display. When this happens, an error message will appear in the video display. Follow the on-screen instructions to move back to one of the video menus, and as needed, navigate to the **IN/OUT SETUP** menu (Figure 2) to make the setting change.

Once you're familiar with the operation of the AVR 645, you may wish to experiment with the various source, output, aspect ratio, picture control and display-type settings available in the **IN/OUT SETUP** (Figure 2), **VIDEO MONITOR** (Figure 4) and **VIDEO SETUP** (Figures 5–7) menus, as described on pages 24–27. This will allow you to customize the appearance of your system to the unique characteristics of your specific combination of sources and video display.

AM/FM Tuner Operation

The AVR 645's AM/FM tuner is capable of tuning AM, FM and FM Stereo broadcast stations. Stations may be tuned manually, or they may be stored as favorite station presets and recalled from a 30-position memory.

Tuner and Station Selection

The AVR 645's AM/FM tuner may be selected as the unit's source, and stations changed, by following one of these steps:

- From the front panel, press the **Input Source Selector** **7** until the desired tuner frequency band

OPERATION

(AM, FM or XM) appears. To change stations within a frequency band, press the **Tuning Selection 4**.

- You may also press the front panel's **Tuner Band Selector 5** to select the tuner. The first press will select the last used frequency band and station. Subsequent presses will change the frequency bands, selecting the last used station or XM program used. Press the **Tuning Selection 4** to change stations within a frequency band.
- From the TC 30 remote, press the **Devices Button 5** and then press the **Screen Button 7** to the left of **Audio Inputs**. When the next page of options appears on the **LCD Screen 8**, press the **Screen Button 7** to the left of **Tuner**. The tuner will become the active input and the options on the LCD screen will become those needed for tuner operation. Press the **Screen Button 7** next to any option to use it. For example, press the **Screen Button 7** next to **FM-AM-XM** to change the frequency band. To tune up or down through the current frequency band, press the **Screen Button 7** next to **Tuning Up** or **Tuning Down**. When the tuner is the active device on the TC 30, the Channel Up/Down buttons are used to change station presets.
- To directly access the commands used for listening to FM radio, press the **Activities Button 4** and then press the **Screen Button 7** to the right of **Listen to FM Radio**.
- To select the tuner from the ZR 10 remote, press the **Tuner Selector E**, or for XM Radio press the **XM Radio Selector Button F** (when an optional XM Connect & Play or Passport module is connected and the programming service has been activated).
- To change the tuning mode, press the **Tuning Mode Selector 8** or the TC 30 **Screen Button 7** next to **Tune M**.

When the button is pressed so that **AUTO/STEREO** appears in the **Upper Display Line 13**, each press 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/MONO** appears in the **Upper Display Line 13**, each tap of the Selector will increase or decrease the frequency by one increment. When the tuner receives a strong-enough signal for adequate reception, **MANUAL TUNED** will appear in the **Lower Display Line 14**.

- Stations may also be tuned directly in either the automatic or manual mode. To enter a station's frequency directly, first select the AM or FM band as shown above. Next, press the **Direct Button M** or the **Screen Button 7** next to **Direct**. Within 5 seconds of when **DIRECT IN** scrolls in the **Upper Display Line 13**, enter the station frequency by pressing the **Numeric Keys 11**. If you press an incorrect button while entering a direct frequency, press the **Clear Button L** to start over.

NOTE: When FM reception of a station is weak, audio quality will be increased by switching to Mono mode by switching to the **MANUAL/MONO** mode.

Preset Tuning

Using the remote, up to 30 stations may be stored in the AVR 645'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 O** on the ZR 10 remote; the station's frequency will flash or press the **Screen Button 7** next to **Memory**.
2. Within 5 seconds, press the **Numeric Keys J 18** corresponding to the location where you wish to store this station's frequency. Once entered, the preset number will appear in the **Upper Display Line 13**.
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 J 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 6 22** on the front panel or the remote, the **Prev/Next Transport Controls P** on the ZR 10 remote, or the **Channel Up/Down Buttons 17** on the TC 30 remote control when the tuner is the active input device.

XM Radio Operation

XM Radio is a satellite-delivered service that offers hundreds of program channels, as well as local traffic and weather information for select cities. The AVR 645 is "XM Ready," which means that the unit is able to receive the XM service when an optional XM Connect and Play or Passport module is connected and the service activated. You may purchase the antenna module needed for XM Radio from many electronics

or online retailers, or directly from XM Radio through the "Home Receivers" section of the XM Radio Store at www.xmradio.com.

Once you have purchased the XM module, follow the instructions accompanying it to activate the XM Service. Connect the plug on the XM module to the **XM Ready Module Input 35** on the rear panel of the AVR 645. For best results, point the antenna module out a window, again, following the instructions packed with the XM product. If a window view is not available for the antenna, XM Radio operates a series of terrestrial repeater stations that may be able to provide reception, though this service is not available everywhere.

IMPORTANT NOTE: XM Radio requires both the optional, external antenna module and a subscription to the XM Radio service. Antenna and service sold separately; XM Radio is not available in Alaska or Hawaii.

If you need to view the antenna module's number, connect it to the AVR and then follow one of the steps shown below to select XM Radio as the input source. Tune to "000" to get a readout of the number.

Once you have an activated module connected, follow one of these steps to select XM Radio as your system's audio source:

- From the front panel, press the **Input Source Selector 7**. If XM was the last used tuner source, it will appear; or press the button again until XM Radio is heard. Press the **Tuning Selection 4** to change stations within a frequency band. Press the **Tuning Selection 4** to select a different XM channel.
- From the TC 30 remote, press the **Devices Button 5** and then press the **Screen Button 7** to the left of **Audio Inputs**. When the next page of options appears on the **LCD Screen 8**, press the **Screen Button 7** to the left of **Tuner**. The tuner will become the active input and the options on the LCD screen will become those needed for tuner operation. Press the **Screen Button 7** next to any option to use it. For example, to tune up or down through the current frequency band, press the **Screen Button 7** next to **Tuning Up** or **Tuning Down**. When the tuner is the active device on the TC 30, the Channel Up/Down buttons may be used to change station presets.
- The easiest way to select XM Radio as a source with the TC 30 remote is to invoke the XM Activity. First press the **Activities Button 4** and then press the **Screen Button 7** to the right of **Listen to XM Radio**. This will both select XM Radio as the unit's input and change the options shown on the **LCD Screen 8** to those appropriate for XM Radio. To tune through the list of

available XM channels, press the **Screen Button 7** next to **Tuning Up** or **Tuning Down**.

- To select the tuner from the ZR 10 remote control, press the **XM Radio Selector Button F**. Channels are selected using the **Prev/Next Transport Controls P**.

While using XM Radio is similar in many ways to AM/FM terrestrial radio, the wide range of program choices available, as well as the ability of the XM service to add special data and information tags into the digital audio data stream, means that some of the front-panel and remote controls traditionally used for tuner operation have different functions with XM Radio.

- When XM Radio is the AVR's source, the channel number will appear in the **Upper Display Line 13**, along with an indication of the Preset number, if any, and a series of bars at the far right end of the display. These bars (not shown in the semi-OSD message), show the current signal strength similar to the signal strength displays on a cellular phone.
- The current channel's name will normally appear in the **Lower Display Line 14**. For local traffic information, the name of a city will be shown in place of the channel name. You may change this display to show the current artist and track title information by pressing the **Tuning Mode Selector 8 G** or the **Screen Button 7** that is next to **Tune M-XM Display** when you are using the TC 30's Tuner pages to operate the AVR. When you are listening to a channel with local traffic information in the "200" series of channel numbers, these buttons change the display to show the temperature and current weather for the selected city.
- To tune a channel number directly, simply press the **Numeric Keys 18 J**. Unlike standard AM/FM tuner operation, it is not necessary to press the Direct Button first.
- The AVR 645 has five banks of preset memories for XM Radio, each with eight memory positions and designated by a letter ("A" through "E"). To store a channel into a memory group, first press the **OK/Enter Button 15** when using the TC 30 remote control to operate the AVR's XM Radio function, or the **Set Button G** on the ZR 10 remote until **PRESET SEARCH** appears in the **Upper Display Line 13** and on the top line of the semi-OSD display. Next, press the **Navigation Buttons 14 G** until the desired preset memory bank letter appears in the **Lower Display Line 14** and in the bottom line of the semi-OSD display. Next, press the **Memory Button N** or the **Screen Button 7** next to the word **Memory** on the LCD screen and note that a dash will start to flash next to the preset memory bank letter. Within

five seconds, press the **Numeric Button 18 J** from 1 to 8 for the memory slot you wish to use.

- To tune up or down through a list of channels stored in the currently active preset memory, press the **Channel Up/Down Buttons 17** on the TC 30 or the **Screen Button 7** next to **Next Preset** or **Prev Preset** when the "Listen to XM Radio Activity" is in use. You may also use the **Preset Station Selector 6** on the front panel. To change to another preset bank, press the **Set Button 1 G** on the front panel or the ZR 10 remote, or the **OK/Enter Button 15** when using the TC 30 remote, and then press the **Navigation Buttons 14 G** until the desired preset memory bank letter appears in the **Lower Display Line 14** and in the bottom line of the semi-OSD display.
- Each XM Radio channel is assigned a category, which may be viewed by pressing the **Tuning Mode Selector 8 G** or the **Screen Button 7** that is next to **Tune M-XM Display** when you are using the TC 30's Tuner pages to operate the AVR. You may search for an XM channel in any of the categories by first pressing the **Set Button 1 G** on the front panel or ZR 10 remote, or the **OK/Enter Button 15** when using the TC 30 remote, and then pressing the **Navigation Buttons 14 G** until the desired category name appears in the **Lower Display Line 14** and in the bottom line of the semi-OSD display. Press the **Set Button 1 G** or **OK/Enter Button 15** again to start the search for the next channel in that category.
- Note that you may see a **LOADING** message, indicating that the XM tuner is downloading content and may not be able to operate. If the message continues to appear, check to see whether the XM antenna is properly positioned toward a south-facing window, experiment with the antenna position, or change to another input and then reselect XM Radio.

Recording

In normal operation, the audio or video source selected for listening through the AVR 645 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 37** or **Video 1/Video 2 Audio and Video Outputs 17 19 40 42** in the record mode.

When a digital audio recorder is connected to the **Digital Audio Outputs 30 34 M**, you are able to record the digital signal using a CD-R, MiniDisc or other digital recording system.

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. In addition, the digital recorder must be compatible with the output signal. For example, the PCM digital input from a CD player may be recorded on a CD-R or MiniDisc, but Dolby Digital or DTS signals may not.
- The **Front-Panel Video 4 N** and **Coaxial 4 M** jacks may be configured for use as outputs, allowing connection to a recorder, when the steps shown in the section below are followed.
- Please make certain that you are aware of any copyright restrictions on any material you copy. Unauthorized duplication of copyrighted materials is prohibited by federal law.

Front-Panel Connections

In addition to the rear-panel digital and analog outputs, the AVR 645 offers Harman Kardon's exclusive configurable front-panel output-jack feature. For easy connection of portable devices, you may switch the front-panel **Video 4 Jacks N** or the **Coaxial Digital 4 Jack M** from an input to an output by following these steps:

1. Press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver** and then press the **Menu Button 11** or press the **OSD Button B** to view the **MASTER MENU** (Figure 1).
2. Press the **OK/Enter Button 15** or the **Set Button G** to enter the **IN/OUT SETUP** menu (Figure 2).
3. Press the **Navigation Button 14 G** so that the on-screen cursor is next to **VIDEO 4** or **COAXIAL 4**.
4. Press the **OK/Enter Button 15** or the **Set Button G** and then press the **Navigation Buttons 14 G** so that the word **OUT** is highlighted.
5. Press the **OK/Enter Button 15** or the **Set Button G** to enter the change.
6. Press the **Menu Button 11** or press the **OSD Button B** to exit the menus and return to normal operation.

Once the setting is made, the **Input/Output Status Indicator L** will turn red, indicating that the jacks are now outputs, instead of in the default setting as inputs. Once changed to an output, the setting will remain as

long as the AVR 645 is turned on, unless the setting is changed in the OSD menu system, as described above. However, once the AVR 645 is turned off, the setting is canceled. When the unit is turned on again, the front-panel jacks will return to their normal default setting as inputs. If you wish to use the jacks as outputs at a future time, the setting must be changed again using the OSD menu system, as described above.

Output Level Trim Adjustment

Normal output level adjustment for the AVR 645 is established using EzSet/EQ, as outlined on pages 29–33. In some cases, however, it may be desirable to trim 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 can only be adjusted using this procedure.

To adjust the output levels using program material, first set the reference volume for the front left and front right channels using the **Volume Control** **10** **B** **H**.

Press the **Devices Button** **5** on the TC 30 remote and then press the **Screen Button** **7** next to **AV Receiver**. Next, press the **Screen Button** **7** next to **Setup Menu** and after the choices in the **LCD Screen** **8** change, press the **Screen Button** **7** next to **Channel** and **FRONT L LEVEL** will appear in the **Lower Display Line** **14**. To change the level, first press the **OK/Enter Button** **15** or the **Set Button** **Q**, and then use the **▲/▼ Navigation Buttons** **14** **G** 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 **OK/Enter Button** **15** or the **Set Button** **Q** and then press the **▲/▼ Navigation Buttons** **14** **G** to select the next output-channel location that you wish to adjust. To adjust the subwoofer level, press the **▲/▼ Navigation Button** **15** until **W00FER LEVEL** appears in the **Lower Display Line** **14** or on-screen display.

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 5 seconds, the AVR 645 will return to normal operation.

The output levels may also be adjusted using the on-screen menu system to either the internal test tone or an external test disc by following the instructions shown on page 37

EzSet/EQ Operation

A major advantage of EzSet/EQ over competitive systems is its ability to store up to three different EQ Designs. This allows you to preset different combinations of speakers or manually set adjustments, or perhaps create different EQ Designs with the microphone in different locations to optimize the system for either your favorite listening position, or for a different setting when more people are in the listening room. You may also turn off the EzSet/EQ system entirely so that you may compare the sound of your system with the system in a particular EQ Design, or with it out of the system.

To access the settings for selecting an EQ Design preset, press the **Devices Button** **5** on the TC 30 followed by the **Screen Button** **7** at the top of the row of buttons on the left side of the TC 30, to the left of **AV Receiver** on the LCD screen. After the list of options displayed in the **LCD Screen** **8** changes, press the **Page Left/Right Button** **9** to go to the second page of **AV Receiver** settings. When that page of settings appears, you may do the following:

- Press the **Screen Button** **7** to the left of **EQ On/Off** to bring the EQ settings into the signal path, or to put the system in the Bypass mode, which removes the equalization filters.
- Press the **Screen Button** **7** to the left of **EQ Presets** to cycle through the EQ Designs stored in each of the three memory positions, as shown in the instructions on page 38.

Subwoofer Control

If you have a 7.2 system with two subwoofers present, you may occasionally wish to turn one of the subwoofers off to accommodate your preferences with a particular movie or musical program, or to demonstrate the change made by using one subwoofer or two. To do this, press the **Devices Button** **5** on the TC 30 followed by the **Screen Button** **7** at the top of the row of buttons on the left side of the TC 30, to the left of **AV Receiver** on the LCD screen. After the list of options displayed on the **LCD Screen** **8** changes, press the **LCD Screen** **8** to go to the second page of **AV Receiver** settings. When that page of settings appears, press the **Screen Button** **7** to the left of **Sub 2 On/Off** to turn the feed to the second subwoofer on or off.

Dim Function

Since the AVR 645 will often be used when movies or other kinds of video programming are 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 49, or you may control the brightness directly from the remote.

Press the **Devices Button** **5** on the TC 30 remote and then press the **Screen Button** **7** next to **AV Receiver**. Next, press the **LCD Screen** **8** and after the choices in the **LCD Screen** **8** change, press the **Screen Button** **7** next to **Dim**. Note that when the displays are dimmed or turned off, the blue lighting around the **Standby/On Switch** **1** will continue to stay lit as a reminder that the AVR is still turned on. The accent lighting for the **Volume Control** **10** 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, return the TC 30 to the **AVR Device screen**, and press the **Screen Button** **7** next to **Dim** 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 49.

Memory Backup

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

The AVR 645 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.

To change a setting from its factory default, you will use the **ADVANCED SELECT** menu. First press the TC 30's **Devices Button 5** and then press the **Screen Button 7** next to **AV Receiver** and press the **Menu Button 11**. With the ZR 10 remote, press the **OSD Button B** to call up the **MAIN MENU** (Figure 1). Next, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is next to **ADVANCED**; then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10. When the **ADVANCED SELECT** menu (Figure 32) appears, follow the instructions shown below to make any needed configuration adjustments.

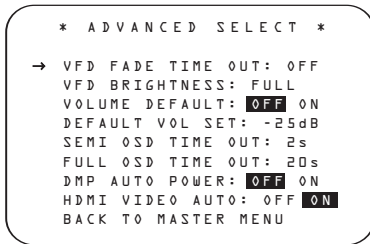


Figure 32

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 48. 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.

With the **ADVANCED SELECT** menu on your video display, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointed to the **VFD FADE TIME OUT** line. Next, press the **◀▶ Navigation Buttons 14 G** so that the amount of time that you wish the displays to fade out after a button is pressed is shown. When **OFF** is selected, there is no display fade-out.

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 1**, 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 48, the Fade function will not operate.

If you wish to make adjustments to other items on the **ADVANCED SELECT** menu, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is next to the desired item, or place the cursor next to the **BACK TO MASTER MENU** line and press the **OK/Enter Button 15** or the **Set Button 17** to make an adjustment to another menu. If you have completed all adjustments, press the **Menu Button 11** or the **OSD Button B** to exit the menu system.

Display Brightness

The AVR 645's front-panel displays and indicators are set at a default brightness level that is sufficient for viewing in a normally lit room. However, you may wish to occasionally lower the brightness of the display, or turn it off completely.

Next, press the **▲/▼ Navigation Buttons 15** until the cursor is next to the **VFD** line. Press the **◀▶ Navigation Buttons 14 G** 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 front-panel indicators will go dark. However, the blue lighting surrounding the **Standby/On Switch 1** will remain lit to remind you that the AVR is still turned on.

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

If you wish to make other adjustments, press the **▲/▼ Navigation Buttons 14 G** until the cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **OK/Enter Button 15** or the **Set Button 17**. If you have no other adjustments to make, press the **Menu Button 11** or the **OSD Button B** to exit the menu system.

Turn-On Volume Level

As is the case with most audio/video receivers, when the AVR 645 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 645 turn on at a specific setting, regardless of what was last in use when the unit was turned off.

With the **ADVANCED SELECT** menu on the screen, press the **▲/▼ Navigation Buttons 14 G** as needed until the cursor is next to the **DEFAULT VOL SET** line. Press the **◀▶ Navigation Buttons 14 G** until the desired volume level is shown on the **DEFAULT VOL SET** line. 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 10 13 H**. 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 **Lower Display Line 14**. (A typical volume level will appear as a negative number such as **-25dB**.) When making the adjustment, use the **◀▶ Navigation Buttons 14 G** to enter this setting.

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

If you wish to make other adjustments, press the **▲/▼ Navigation Buttons 14 G** until the on-screen cursor is next to the desired setting or the **BACK TO MASTER MENU** line, and press the **OK/Enter Button 15** or the **Set Button 17**. If you have no other adjustments to make, press the **Menu Button 11** or the **OSD Button B** to exit the menu system.

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, Tuner Frequency or any of the configuration settings is changed. The semi-OSD system is helpful in that it 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 also prefer to turn these displays off permanently. 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 645.

With the **ADVANCED SELECT** menu on the screen, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is pointing to the **SEMI OSD/TIME OUT** line. Select one of these options:

- To keep the semi-OSD system activated, but to adjust the length of time the displays remain on the screen, press the **◀▶ Navigation Buttons 14 G** until the desired time-out is shown. The default setting is 5 seconds.
- To turn the semi-OSD system off so that it does not appear at any time, press the **◀▶ Navigation Buttons 14 G** so that **OFF** is shown on the right side of the line.

ADVANCED FEATURES

To make other adjustments, press the ▲/▼

Navigation Buttons 14 G until the cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **OK/Enter Button 15** or the **Set Button C**. If you have no other adjustments to make, press the **Menu Button 11** or the **OSD Button B** 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 645 by 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 (Time-Out). Time-Out is a safety measure to prevent image retention of the menu text in your monitor or projector, which might happen if it were left on indefinitely. However, some viewers may prefer a slightly longer or shorter period before the on-screen display disappears.

With the **ADVANCED SELECT** menu on the screen (Figure 32) make certain that the cursor is next to the **FULL OSD TIME OUT** line by pressing the ▲/▼ **Navigation Buttons 14 G** as needed. Next, press the ◀/▶ **Navigation Buttons 14 G** until the desired time is displayed in seconds. 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 if the unit is turned off.

If you wish to make other adjustments, press the ▲/▼ **Navigation Buttons 14 G** until the cursor is next to the desired setting or the **BACK TO MASTER MENU** line and press the **OK/Enter Button 15** or the **Set Button C**. If you have no other adjustments to make, press the **Menu Button 11** or the **OSD Button B** to exit the menu system.

DMP/™Bridge™ Auto Power

When using Harman Kardon's optional **™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 32) is on the screen, and then press the ▲/▼ **Navigation Buttons 14 G** until the cursor is pointing to **DMP AUTO POWER**. Press the ▲/▼ **Navigation Buttons 14 G** so that **ON** is highlighted to have the AVR turn on in sync with an iPod, or **OFF** for standard operation.

HDMI Video Auto Function

In normal operation when the AVR 645 is connected to an HDMI-equipped video display, the display will almost always use a signal called EDID (extended display identification data), which communicates a variety of information that helps the AVR to properly format the output video signal to conform with the capabilities of the display. In most cases, the goal is for the AVR or any other source device using EDID to tell all other devices in the signal chain which resolutions and aspect ratios are available. The AVR default setting is to allow for this automatic operation.

In some cases, you may wish to override the default settings, perhaps to send a lower resolution output from the AVR to the display, so that you may demonstrate the difference between the various output resolutions offered by the AVR 645. The **HDMI VIDEO AUTO** line enables you to do this, by formatting the video output the resolution set in the video configuration menus, or when the Faroudja video processing is set to Bypass, to the resolution of the incoming video signal.

To turn off the automatic HDMI configuration so that the display's EDID signal is ignored, press the ▲/▼ **Navigation Buttons 14 G** while the **ADVANCED SELECT** menu is on screen until the cursor is pointing to **HDMI VIDEO AUTO**. Press the ◀/▶ **Navigation Buttons 14 G** to select **OFF**, or select **ON** to return the AVR to normal operation.

When all needed adjustments to the **ADVANCED SELECT** menu have been made, press the ▲/▼ **Navigation Buttons 14 G** until the cursor is pointing to **BACK TO MASTER MENU** to make changes to other menus, or press the **Menu Button 11** or the **OSD Button B** to exit the menu system and return to normal operation.

The AVR 645 is fully equipped to operate as the control center for a complete multiroom system that is capable of sending one audio/video source to a second zone in the house while a 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 645 offers a comprehensive range of options for powering the speakers in the second zone.

- Using the line-level **Multiroom Audio/Video Outputs 9/22**, 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 645 via a single Category 5/5e or higher cable, so that remote zone speakers may be powered directly from the A-BUS module without the need for additional power, IR sensor or volume control wires to be run to the second zone.

In addition, the AVR 645 includes a remote IR sensor input so that remote control commands from the ZR 10 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 17 for the connection of speaker wire and IR remote wiring to the AVR 645.

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 this page.

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 645 provides the capability for full bidirectional 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 professionals. 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 645 needs to be configured for multiroom operation. To change a setting from its factory default, you will use the **MULTI-ROOM SETUP** menu. With the TC 30, first press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver** and press the **Menu Button 11**. With the ZR 10 remote, press the **OSD Button B** to call up the **MAIN MENU** (Figure 1). Next, press the **▲/▼ Navigation Buttons 14 G** so that the cursor is next to **MULTI-ROOM**, then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10. When the **MULTI-ROOM SETUP** menu (Figure 33) appears, follow the instructions shown below to make any needed configuration adjustments.

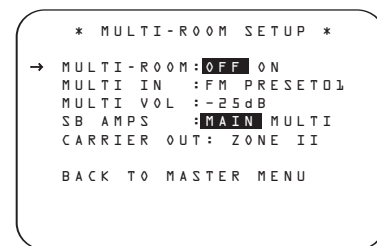


Figure 33

When the **MULTI-ROOM** menu appears, the cursor will be at the **MULTI-ROOM** line. Since this line is used to turn the system on and off, don't make an adjustment here unless you wish to turn the system on at this time. To turn the system on, press the **► Navigation Button 14 G** 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 **▲/▼ Navigation Buttons 14 G** so that the on-screen cursor is next to the **MULTI IN** line.

At the **MULTI IN** line, press the **◀/▶ Navigation Buttons 14 G** until the desired input to the multiroom system appears in the highlighted video. In addition to direct selection of any active input source, you may also select the **DSP DOWNMIX** mode, which outputs a two-channel down-mixed version of multi-channel digital sources. When the selection has been made, press the **▼ Navigation Button 14 G** once so that the cursor is next to **MULTI VOL**.

At the **MULTI VOL** line, press the **◀/▶ Navigation Buttons 14 G** until the desired volume level for the multiroom 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 **▲/▼ Navigation Buttons 14 G** until the cursor is next to the **BACK TO MASTER MENU** line. If you have no other adjustments to make, press the **Menu Button 11** or the **OSD Button B** to exit the menu system.

Surround Channel Amplifier Assignment

The AVR 645 is equipped with seven full-power amplifier channels to allow for complete 7.1-channel operation. However, if your system is only configured for 5.1 channels in the main listening room, you may take advantage of the "extra" two channels by using them to power speakers placed in a second zone location. This enables you to use the multiroom capabilities of the AVR 645 without the cost of an additional, external power amplifier.

To change the setting so that the Surround Back amplifiers are fed by the source selected through the Multiroom system rather than the SBL/SBR channels of the main room, make certain that the **MULTI-ROOM SETUP** menu (Figure 33) is on the screen; then press the **◀/▶ Navigation Buttons 14 G** so that the cursor is pointing to the **SB AMPS** line. Press the **◀/▶ Navigation Buttons 14 G** so that **MULTI** is shown in highlighted video. When this change is made, connect the wires feeding the remote zone speakers to the **Surround Back/Multiroom Speaker Outlets 15**.

When the SBL/SBR speakers are set for multiroom operation, you may still configure the AVR 645 for 7.1 modes in the main listening room by making certain that the **SURR BACK** line in the **SPEAKER SIZE** menu (Figure 27) is set to **SMALL** or **LARGE**, as shown in the instructions on page xx. When that is done, the word **MULTI** will appear next to the large or small designator to alert you to the fact that the internal SBL/SBR amplifiers are assigned to the multiroom system, and that an optional, external two-channel power amplifier must be connected to the **SBL/SBR Preamp Outputs 1** in order to use surround back channel speakers.

MULTIROOM OPERATION

Once this setting is made, press the **▲/▼ Navigation Buttons 14 G** to select another configuration item on this page, or press the **Menu Button 11** or the **OSD Button B** if you have completed your adjustments to the Multi-room system.

Infrared Output Selection

The AVR 645 enables you to select which IR input will be used to feed the **Full Carrier IR Output 12**. The factory default setting is the IR signal that is fed to the **Multiroom IR Input 26**, 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 14 G** so that the cursor is next to **CARRIER OUT**; then press the **OK/Enter Button 15** on the TC 30 or the **Set Button C** on the ZR 10. Press the **▲/▼ Navigation Buttons 14 G** to select one of these options:

- **ZR 10** feeds the signal present at the **Multiroom IR Input 26** to the **Full Carrier IR Output 12**.
- **A-BUS** feeds the signal carried back from an optional A-BUS module connected to the AVR to the **Full Carrier IR Output 12**.
- **FRONT** feeds the received through the front-panel **Remote Sensor Window F** to the **Full Carrier IR Output 12**.

When all needed adjustments to the **MULTI-ROOM SETUP** menu have been made, press the **▲/▼ Navigation Buttons 14 G** until the cursor is pointing to **BACK TO MASTER MENU** to make changes to other menus, or press the **Menu Button 11** or the **OSD Button B** to exit the menu system and return to normal operation.

Multiroom Operation

When operating the AVR 645 from a remote room location where an IR sensor link has been connected to the AVR 645's rear-panel **Multiroom IR Input 26** or via an A-BUS module, you may use either the TC 30 or the ZR 10 remote.

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 C** 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 E**, the **XM Radio Selector F** or the **Bridge Selector R** to turn the multiroom system on directly to a specific source. To turn the multiroom system on using the TC 30 remote, press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver**. When the choices on the

LCD Screen 8 change, press the **Page Left/Right Buttons 9** once and then press the **Screen Button 7** next to **Multi-Room**.

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 13** or **Full Carrier IR Output 12**, 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 or the appropriate controls that have been programmed for any source device into the TC 30.

To turn the system off from the remote room, press the **Power Off Button A** on the ZR 10. Remember that the AVR 645 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 have an impact on the remote room.

To turn the multiroom system on from the room where the AVR 645 is located, press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver**. When the choices on the **LCD Screen 8** change, press the **Page Left/Right Buttons 9** once and then press the **Screen Button 7** next to **Multi-Room**. If the AVR is in the Standby mode (not turned "on"), the multiroom system will automatically be turned on. If the AVR is on, a **MULTI-ROOM ON/OFF** message will appear in the **Lower Display Line 14**. Press the **OK/Enter Button 15** and then press the **▲/▼ Navigation Buttons 14 G** to turn the system on.

To turn the multi-room system off from the room where the AVR 645 is located, press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver**. When the choices on the **LCD Screen 8** change, press the **Page Left/Right Buttons 9** once and then press the **Screen Button 7** next to **Multi-Room**. A **MULTI-ROOM ON/OFF** message will appear in the **Lower Display Line 14**. Press the **OK/Enter Button 15** and then press the **▲/▼ Navigation Buttons 14 G** to turn the system off.

NOTE: The multiroom system will remain on even when the AVR is turned off in the main listening room where it is located. When the AVR 645's multiroom system is turned on, but the unit is in the Standby

mode (turned "off") in the room where the AVR 645 is located, the light surrounding the front-panel **Standby/On Switch 1** will remain blue, rather than amber, and a **MULTI-ROOM ON** message will be shown in the **Lower Display Line 14**.

When the Multiroom system is turned on, the input selected using the Multiroom menu will be fed to the **Multiroom Audio/Video Outputs 9 22** on the rear panel as well as the **A-BUS Connector 4**. The volume will be as set in the previous selection, although it may also be adjusted using an optional IR sensor and the ZR 10 remote in the remote location, or the A-BUS keypad, or on the optional audio power amplifier connected to the **Multiroom Audio Outputs 9**.

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. Using the TC 30 remote, press the **Devices Button 5** on the TC 30 remote and then press the **Screen Button 7** next to **AV Receiver**. When the choices on the **LCD Screen 8** change, press the **Page Left/Right Buttons 9** once and then press the **Screen Button 7** next to **Multi-Room**. Press the **▲/▼ Navigation Buttons 14** to select either **MULTI INPUT** or **MULTI LEVEL**.

To change the remote room's input source, when **MULTI INPUT** appears, press the **OK/Enter Button 15** or the **Set Button C**, and then press the **▲/▼ Navigation Buttons 14 G** until the desired input appears in the on-screen display and in the **Lower Display Line 14**.

To change the remote room's volume, when **MULTI LEVEL** appears, press the **OK/Enter Button 15** or the **Set Button C**, and press the **▲/▼ Navigation Buttons 14 G** to change the volume setting. Note that this volume adjustment controls the level for the output to the **Multiroom Audio Outputs 31** and for any speakers connected to the **Surround Back/Multiroom Speaker Outputs 10** when the Surround Back amplifier channels are configured for Multiroom use, as shown on page 57. This adjustment does NOT change the volume level for any room where an A-BUS module is used, as that setting is only adjustable using the A-BUS module's volume control or a remote pointed at the A-BUS module's built-in sensor.

To turn the Multiroom system off from a remote room using the ZR 10 remote, press the **Power Off Button** **A**. To turn the Multiroom system off from the remote room using the TC 30, press the **Devices Button** **5** on the TC 30 remote and then press the **Screen Button** **7** next to **AV Receiver**. When the choices on the **LCD Screen** **8** change, press the **Page Left/Right Buttons** **9** once and then press the **Screen Button** **7** next to **Multi Room**. Press the **OK/Enter Button** **15** and then the **▲/▼ Navigation Buttons** **14**.

TROUBLESHOOTING GUIDE

SYMPTOM	CAUSE	SOLUTION
Unit does not function when Main Power Switch is pushed	No AC Power	- Make certain AC power cord is plugged into a live outlet - Check to see whether outlet is switch-controlled
Display lights, but there is no sound or picture	- Intermittent input connections Mute is on - Volume control is down	- Make certain that all input and speaker connections are secure - Press Mute Button  - Turn up volume control
Unit turns on, but front-panel display does not light up	Display brightness is turned off	Follow the instructions in the Display Brightness section on pages 48–49 so that the display is set to VFD FULL
No sound from any speaker; light around power switch is red	- Amplifier is in protection mode due to possible short - Amplifier is in protection mode due to internal problems	- Check speaker wire connections for shorts at receiver and speaker ends - Contact your local Harman Kardon service center
No sound from surround or center speakers	- Incorrect surround mode - Input is monaural - Incorrect configuration - Stereo or Mono program material	- Select a mode other than Stereo - There is no surround information from mono sources - Check speaker mode configuration - The surround decoder may not create center- or rear-channel information from nonencoded programs
Unit does not respond to remote commands	- Weak batteries in remote - Wrong device selected - Remote sensor is obscured	- Change remote batteries - Press the AVR selector - Make certain front-panel sensor is visible to remote or connect remote sensor
Intermittent buzzing in tuner	Local interference	Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances
Letters flash in the channel indicator display and digital audio stops	Digital audio feed paused	- Resume play for DVD - Check that Digital Input is selected
Fan does not appear to operate	Additional cooling may not be required	The fan is activated only when additional cooling is required due to high internal temperature, it is normal for the fan to be inactive at normal volume levels

In addition to the items shown above, additional information on troubleshooting possible problems with your AVR 645, or installation-related issues, may be found in the list of "Frequently Asked Questions" which is located in the Product Support section of our Web site at www.harmankardon.com.

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 3 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 645'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 **Standby/On Switch** . Next, press and hold the **Surround Mode Group Selector**  and the **Tuning Mode Selector**  buttons for 3 seconds.

The unit will turn on automatically and display the **RESET** message in the **Upper Display Line** .

NOTE: Resetting the processor will erase any configuration settings you have made for speakers, output levels, surround modes, and 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 center.

SYSTEM DEFAULTS

The two tables in this section show the factory default settings for the Video Inputs and Video Sources. These tables give you a picture of 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 21–33).

TABLE 1: VIDEO INPUT DEFAULTS

INPUT	AUDIO INPUT	VIDEO INPUT	COMPONENT VIDEO INPUT	TRIGGER 2 SETTING	RECORD OUTPUT	AUTO-POLL	INPUT SOURCE TYPE
Video 1	ANALOG	AUTO	COMPONENT 1	ON	ANALOG	ON	VCR
Video 2	ANALOG	AUTO	COMPONENT 2	ON	ANALOG	OFF	CABLE DIGITAL
Video 3	OPTICAL 1	AUTO	COMPONENT 1	ON	ANALOG	ON	CABLE ANALOG
Video 4	OPTICAL 4	AUTO	COMPONENT 2	ON	ANALOG	ON	SATELLITE DIGITAL
DVD	COAX 1	AUTO	COMPONENT 3	ON	ANALOG	OFF	DVD
HDMI 1	HDMI 1	HDMI 1	---	ON	DSP DOWNMIX	OFF	*
HDMI 2	HDMI 2	HDMI 2	---	ON	DSP DOWNMIX	OFF	*
Tuner	ANALOG	AUTO	COMPONENT 1	ON	ANALOG	---	*
XM	---	HDMI 1	COMPONENT 1	ON	ANALOG	---	*
CD	ANALOG	AUTO	COMPONENT 3	ON	ANALOG	OFF	*
Tape	ANALOG	AUTO	COMPONENT 1	ON	ANALOG	OFF	*
DMP/The Bridge	ANALOG	HDMI 1	COMPONENT 1	ON	ANALOG	---	*
6/8 CH Direct	ANALOG	HDMI 1	COMPONENT 1	ON	ANALOG	---	*
USB	---	HDMI 1	COMPONENT 3	ON	DSP DOWNMIX	---	*

*: User should change setting to match input type.

TABLE 2: VIDEO SOURCE DEFAULTS

FEATURE	DVD	VCR	CABLE DIG	SAT DIG	SAT ANALOG	CABLE ANALOG	CAMERA DIG	CAMERA ANALOG
Noise Reduction	OFF	ON	OFF	OFF	ON	ON	OFF	ON
X-Color Suppressor	ON	ON	ON	ON	ON	ON	ON	ON
DCDi Interpolation	ON	ON	ON	ON	ON	ON	ON	ON
Film Mode Detect	ON	ON	ON	ON	ON	ON	ON	ON
Film Mode Edit Detect	ON	ON	ON	ON	ON	ON	ON	ON
Composite Video Enhancement	ON	ON	ON	ON	ON	ON	ON	ON
VCR Sync Time Enhancement	ON	ON	ON	ON	ON	ON	ON	ON

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 II, 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

Worksheet A: Video Monitor and Aspect Ratio Defaults and Settings

Feature/Display Type	System Default	Your System Setting
Display Interface	Analog	
HDMI Audio Out	Off	
CRT	4:3	
Front Projection	4:3	
Rear Projection	4:3	
Plasma (PDP)	16:9	
DLP™	16:9	
LCD	16:9	

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	
Number of Subs	1	
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	

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													
Trigger 2													
Record Output													
Auto Poll													
Input Source Type													
Display Type													
Video Input Port													
Enhance Level													
Input Aspect Ratio													
Noise Reduction													
X-Color Suppressor													
DCDi Interpolation													
Film Mode Edit Detect													
Fleshtone Noise Reduction													
Composite Video Enhancement													
Output Aspect Ratio													
Brightness													
Contrast													
Saturation													
ADC Sampling													
Tone In/Out													
Bass													
Treble													

AVR 645 TECHNICAL SPECIFICATIONS

Audio Section

Stereo Mode

Continuous Average Power (FTC)

100 Watts per channel, 20Hz–20kHz,
@ <0.07% THD, both channels driven into 8 ohms

Seven-Channel Surround Modes

Power per Individual Channel

Front L&R channels:

85 Watts per channel

@ <0.07% THD, 20Hz–20kHz into 8 ohms

Center channel:

85 Watts @ <0.07% THD, 20Hz–20kHz into 8 ohms

Surround (L & R Side, L & R back) channels:

85 Watts per channel

@ <0.07% THD, 20Hz–20kHz into 8 ohms

Input Sensitivity/Impedance

Linear (High-Level) 200mV/47k ohms

Signal-to-Noise Ratio (IHF-A)

100dB

Surround System Adjacent Channel Separation

Pro Logic V/II 40dB

Dolby Digital (AC-3) 55dB

DTS 55dB

Frequency Response

@ 1W (+0dB, –3dB) 10Hz –130kHz

High Instantaneous

Current Capability (HCC)

±60 Amps

Transient Intermodulation

Distortion (TIM)

Unmeasurable

Slew Rate

40V/μsec

FM Tuner Section

Frequency Range 87.5–108.0MHz

Usable Sensitivity IHF 1.3μV/13.2dB

Signal-to-Noise Ratio Mono/Stereo 70/68dB

Distortion Mono/Stereo 0.2/0.3%

Stereo Separation 40dB @ 1kHz

Selectivity ±400kHz, 70dB

Image Rejection 80dB

IF Rejection 90dB

AM Tuner Section

Frequency Range

520–1720kHz

Signal-to-Noise Ratio

45dB

Usable Sensitivity

Loop 500μV

Distortion

1kHz, 50% Mod 0.8%

Selectivity

±10kHz, 30dB

Video Section

Television Format

NTSC

Input Level/Impedance

1V p-p/75 ohms

Output Level/Impedance

1V p-p/75 ohms

Video Frequency Response
(Composite and S-Video)

10Hz–8MHz (–3dB)

Video Frequency Response
(Component Video)

10Hz–100MHz (–3dB)

HDMI

Version 1.1

General

Power Requirement

AC 120V/60Hz

Power Consumption

120W at Power On, idle; 1,405W at rated power output
(7 channels driven)

Dimensions

Product

Shipping

Width

17-5/16 inches (440mm)

20-1/16 inches (510mm)

Height

6-1/2 inches (165mm)

10 inches (254mm)

Depth

17-1/16 inches (435mm)

22-3/16 inches (565mm)

Weight

44 lb (19.9kg)

51 lb (23.1kg)

Depth measurement includes knobs, buttons and terminal connections.

Height measurement includes feet and chassis.

All features and specifications are subject to change without notice.

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Supplied Accessories

The AVR 645 is supplied with the following accessory items. Please note that they are packed in different boxes, so it is important to check each individual box before reporting missing items. If any item is missing, please contact Harman Kardon customer service at www.harmankardon.com.

- TC 30 remote control
- Battery for the TC 30
- USB cable for the TC 30
- TC 30 charging cradle
- Charger for the TC 30
- TC 30 software CD-ROM
- TC 30 installation guide
- ZR 10 remote control
- Two AAA batteries for ZR 10
- **Logic 7**™ microphone
- Extender rod for microphone
- AM loop antenna
- FM wire antenna
- AC power cord

Please register your product on our Web site at www.harmankardon.com. NOTE: You'll need the serial number of your AVR. At the same time, you can choose to be notified about our new products and/or special promotions.

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