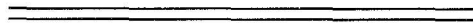
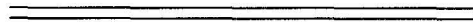




THEATER

REFERENCE SYSTEM



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INTRODUCTION

Congratulations. Your purchase of a Shure HTS5000 Surround Audio Processor will provide years of listening pleasure while serving as the main control component of your Home Theater Sound System. Unlike other surround sound audio products, the HTS5000 is capable of recreating in your home the audio experience of the very best motion picture theaters with Dolby Stereo¹ equipment. The latest techniques in analog and digital signal processing electronics have been employed in the HTS5000 to duplicate the performance of professional Dolby stereo motion picture theater equipment.

If you are quite familiar with surround sound, Dolby Surround, and the Dolby Stereo process, you may wish to skip ahead in the manual and set up your system using the block diagrams shown in Figures 6 and 7. Initial control settings are discussed starting on page 6, and special adjustments are described on page 8.

Since the application of Dolby Stereo to the home environment is a relatively new concept to most people, we encourage you to read the entire manual before setting up and enjoying your HTS5000. Several sections have been included beyond normal system setup and operation to help maximize your listening pleasure, and broaden your understanding of this exciting new concept.

With any new concept, terminology is often the source of much confusion. Because a surround sound system can involve as many as six amplifier and loudspeaker channels and is designed to be used with new types of program material, a few definitions may be helpful:

OO Dolby Stereo—Dolby Stereo is the term used to describe a motion picture audio process that results in a surround sound experience in the theater. The basic elements of such a system are three loudspeaker channels behind the screen (Left Front, Center Front, and Right Front) and a fourth to the sides or behind the listener. This process was developed by Dolby Laboratories and involves sophisticated techniques to encode

and decode four audio channels on stereo film sound tracks. Dolby Stereo has become the most widely used process for producing stereo motion picture sound tracks in the world with over 700 movies made to date. Movies made using this process display the Dolby Stereo logo during the credit portion of the film. With the growth of consumer audio/video technology, this process is now being applied to music video and television drama production.

DD Dolby Surround—Dolby Surround is the term used to describe systems that allow Dolby Stereo sound tracks to be played back in the home. All products that carry the Dolby Surround logo must meet certain minimum technical requirements established by Dolby Laboratories. The Shure HTS5000 goes beyond these requirements by a wide margin to significantly increase the listening experience in the home as compared to basic Dolby Surround processors. Consumer program material that contains Dolby Stereo sound tracks will soon be identified with the Dolby Surround logo. (See section on Program Material for more details).

Before getting into the specifics of the HTS5000 and how to set it up in your home, it is worthwhile to consider the audio-visual aspects of a total home theater system in general terms:

In the theater, the large size of the movie screen contributes greatly to the participatory quality of the experience. An effect of the big screen is to overwhelm other stimuli, precluding attention to offscreen happenings.

The viewer is much closer to the home tv screen than the moviegoer to the theater screen. As a result, the home screen need not be absolutely as large as the movie screen to rivet the attention comparably. But, the larger the screen, the more participatory the experience will be.

The largest available home screens are used with projection tv systems which vary in color quality, resolution, brightness and clarity of the off-axis image. The most successful surround sound home televiewing experience will be with a system that has a bright on- and off-axis picture, high resolution, and excellent color accuracy. In some viewing rooms, these qualities may be achievable with a 19- or 25-inch television receiver; in most cases, a projection tv will be preferable.

A high performance audio system contributes as much as the large screen to the participatory quality of the theatre experience. To duplicate this quality in the home, the system must be capable of producing high sound pressure levels not only in the front but also in the subwoofer (or low frequency) and surround channels. The use of a center channel loudspeaker also becomes very important in maintaining proper audio perspective for all viewers. In order to obtain the optimum listening experience using the HTS5000, it is important to select loudspeakers and amplifiers that are capable of producing adequate sound levels. As a basis for comparison, a modern motion picture theater capable of showing Dolby Stereo movies is set up to generate maximum sound pressure levels of 108 dB SPL at an ideal viewing position.

1. Manufactured under license from Dolby Laboratories Licensing Corporation. Additionally licensed under one or more of the following patents: U.S. numbers 3,632,886, 8,6,972, and 3,959,590; Canada numbers 1,004,603 and 1,037,877. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

GENERAL DESCRIPTION

The HTS5000 Surround Audio Processor provides a theater-sound environment in the home. This Home Theater Sound (HTS) system decodes Dolby stereo sound encoded in video discs, video tape, and broadcast television. The HTS5000 provides up to six channels of audio output: left, center, right, two surround channels, and a subwoofer. Acra-Vector* decoder circuitry replicates the directional accuracy of the finest theater sound equipment. True digital time delays provide the same performance, free of distortion and noise, as in the theater. The Acoustic Space Generator creates the same immersion in sound as in the theater, but using a minimum number of speakers. All these features help to re-create the sound field of an original theatrical showing. The HTS5000 can also produce simulated surround sound from ordinary stereo, and even from mono sources.

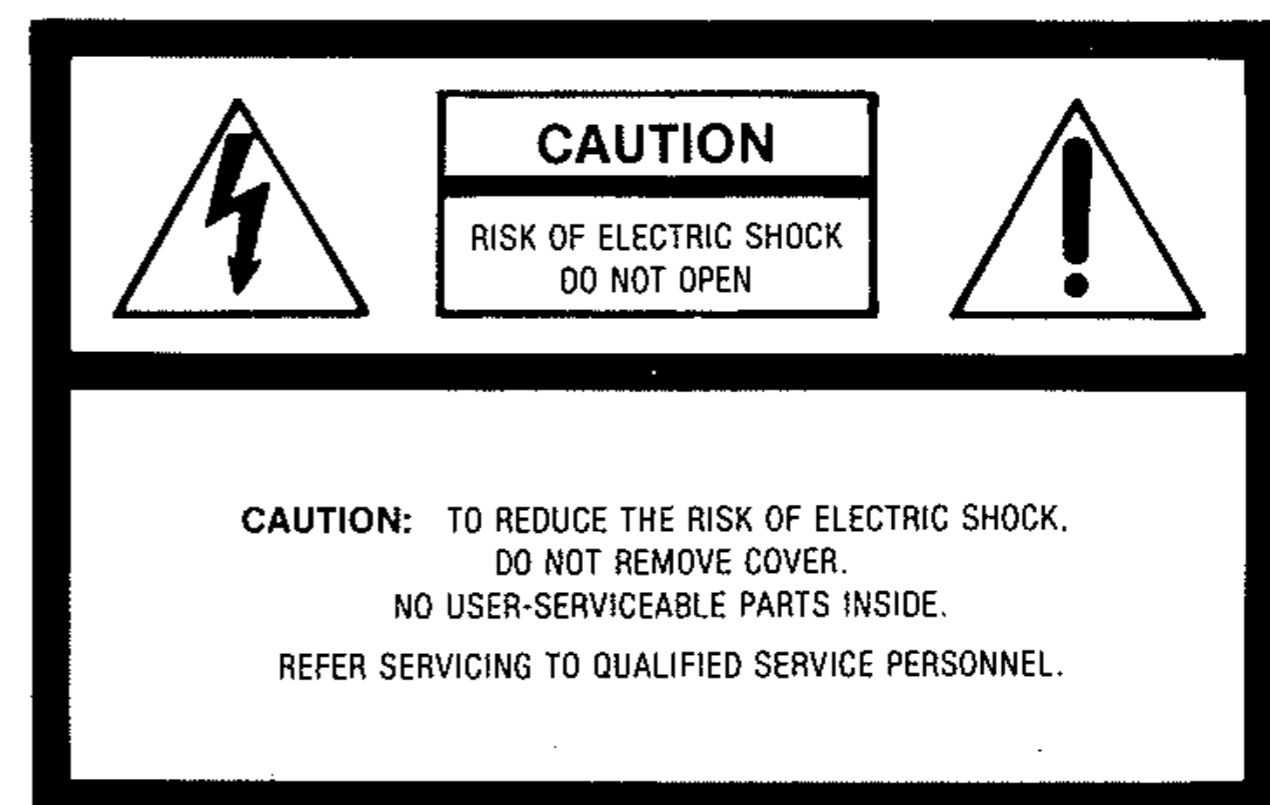
A basic HTS Surround Sound installation employs four loudspeakers and two stereo amplifiers; a complete system uses six loudspeakers and three stereo amplifiers to reproduce the theater experience. The system operates as follows.

Exclusive Acra-Vector circuits enhance the directional accuracy of the reproduced sound field. In the front, this creates a spacious stereo panorama with realistic "motion" effects from moving sources. The surround channel signals are delayed according to a user-selected digital delay setting chosen for the particular room environment, such that the shortest delay between front and rear speakers heard by any listener is 20 ms. Then an Acoustic Space Generator processes the delayed signal to further enhance the perception of spaciousness. In the basic system, dialogue originates from a phantom center channel; while in the complete system, a center-front speaker delivers dialogue. This keeps the acoustic image stably centered regardless of where the listener sits in the room. Finally, in the complete system, low-frequency information (below 80 Hz) is consigned to a subwoofer channel. (In the basic system, low-frequency audio is handled by the four front and surround channels — and loudspeakers.) Because the film industry uses very low-frequency audio as an integral part of the creation of mood and place, use of a subwoofer reinforces the theater illusion and intensifies the verisimilitude of the performance. In both basic and complete systems, the HTS accurately localizes sound sources within the audio environment.

The HTS5000 front panel controls and displays include pushbutton selectors of operating modes: Dolby Surround, synthesized-surround stereo or mono, and, by means of a defeat button, pure stereo or mono. There is also pushbutton choice of the audio

source from either Left and Right inputs or Tape Monitor Return inputs. Rotary knobs on the front adjust the following: input level, with a five-LED level display; input balance, with an LED for visual determination of correct balance; digital delay time to best suit the particular listening room; and volume and surround levels. An overriding wired Remote Control lets the listener adjust surround and overall volume levels from the listening position. The Remote also permits muting of the audio outputs. A four-channel graphic display provides visual demonstration of the surround characteristics of the input signal.

The HTS5000 rear panel includes left and right audio inputs; outputs for front left and right and surround left and right channels; a separately switched front-center output jack; and a subwoofer output jack. Tape Monitor Send outputs and Return inputs for Left and Right channels are also included. These audio input and output jacks are all phono types. In addition, front- and rear-panel eighth-inch diameter phone jacks accommodate the wired Remote Control.



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

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

*Patent pending

SYSTEM SETUP

To install a Surround Sound System, you will need the following. **For a basic system:**

- 1 HTS5000
- 1 Dolby Stereo source (e.g., video disc player, video tape player, stereo tv/audio receiver, audio tape player, stereo turntable, CD player)
- 2 Stereo power amplifiers (one of these may be an existing hi-fi receiver or amplifier)
- 4 Full-range loudspeakers (two of these may be the hi-fi system loudspeakers)

For a complete system, add:

- 1 Stereo power amplifier
 - 1 Full-range loudspeaker
 - 1 Subwoofer loudspeaker
- or
- 1 Mono amplifier
 - 1 Full-range loudspeaker
 - 1 Self-powered subwoofer

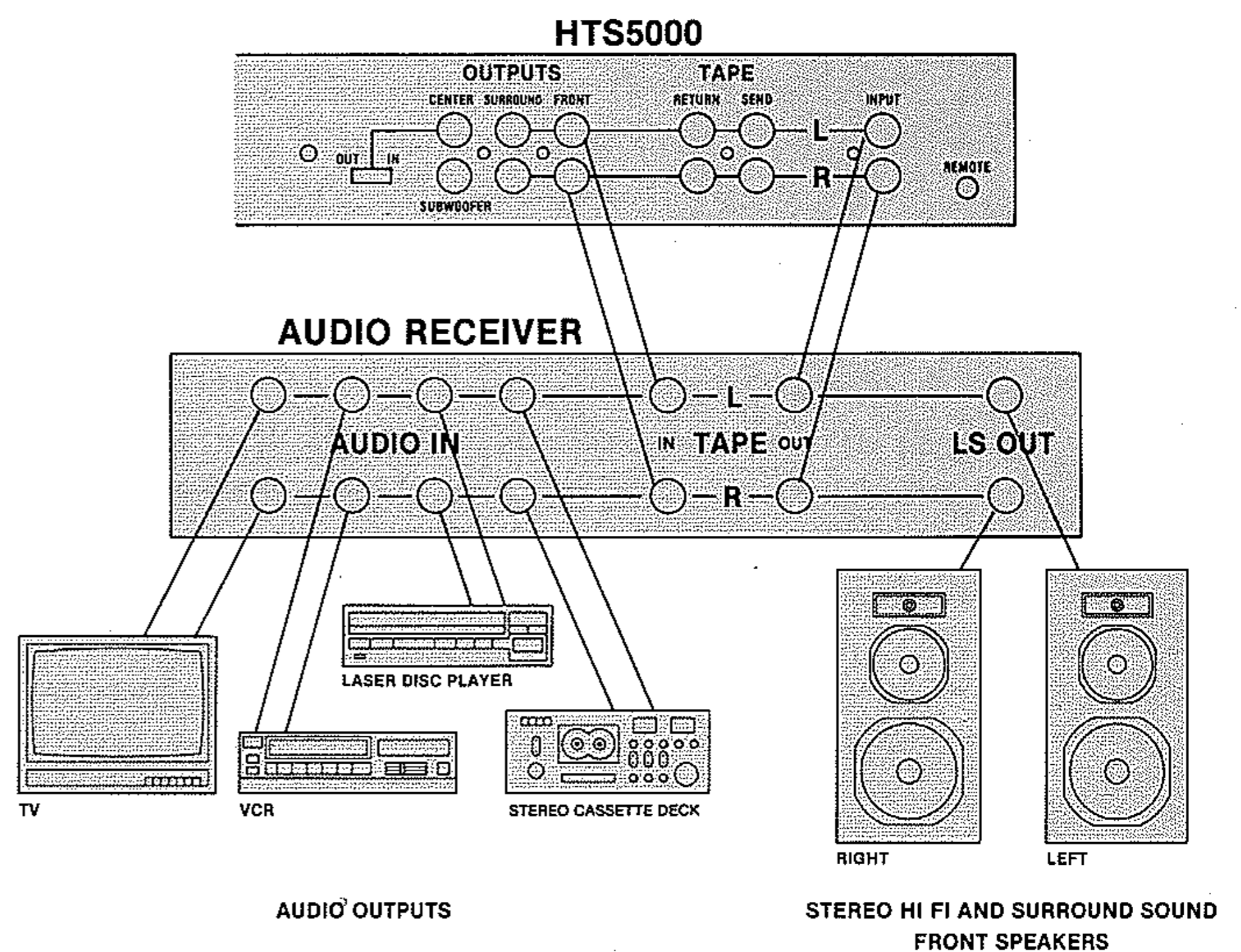


FIGURE 2

MULTIPLE INPUTS TO THE HTS5000

When multiple sources are to be decoded, i.e., a VTR, video disc player, and broadcast tv as well as an audio-only cassette deck, it is most efficient to connect them all to a single unit, such as an audio receiver, and to connect that unit's stereo tape outputs to the HTS5000 Left and Right inputs. (See Figure 1.)

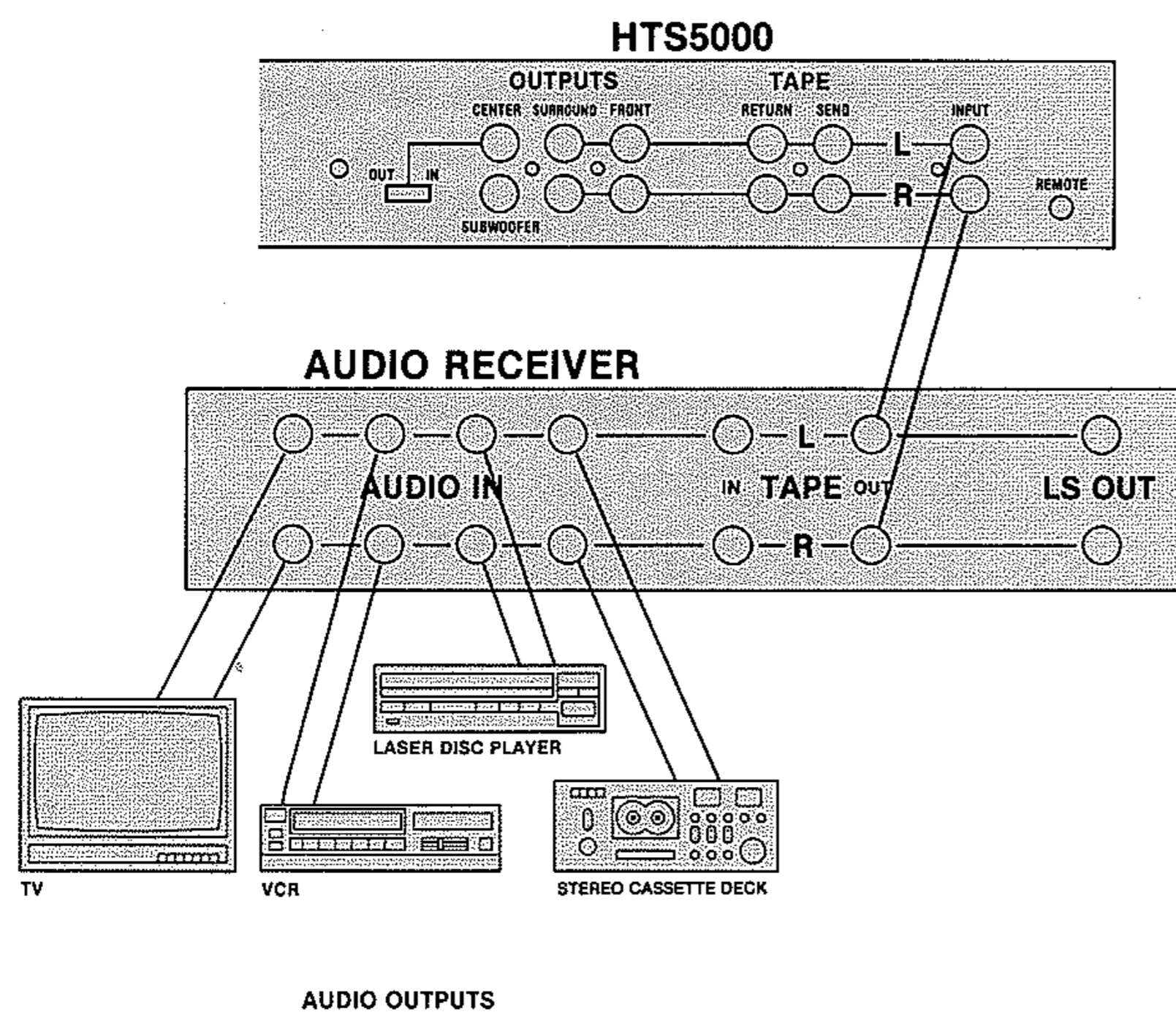
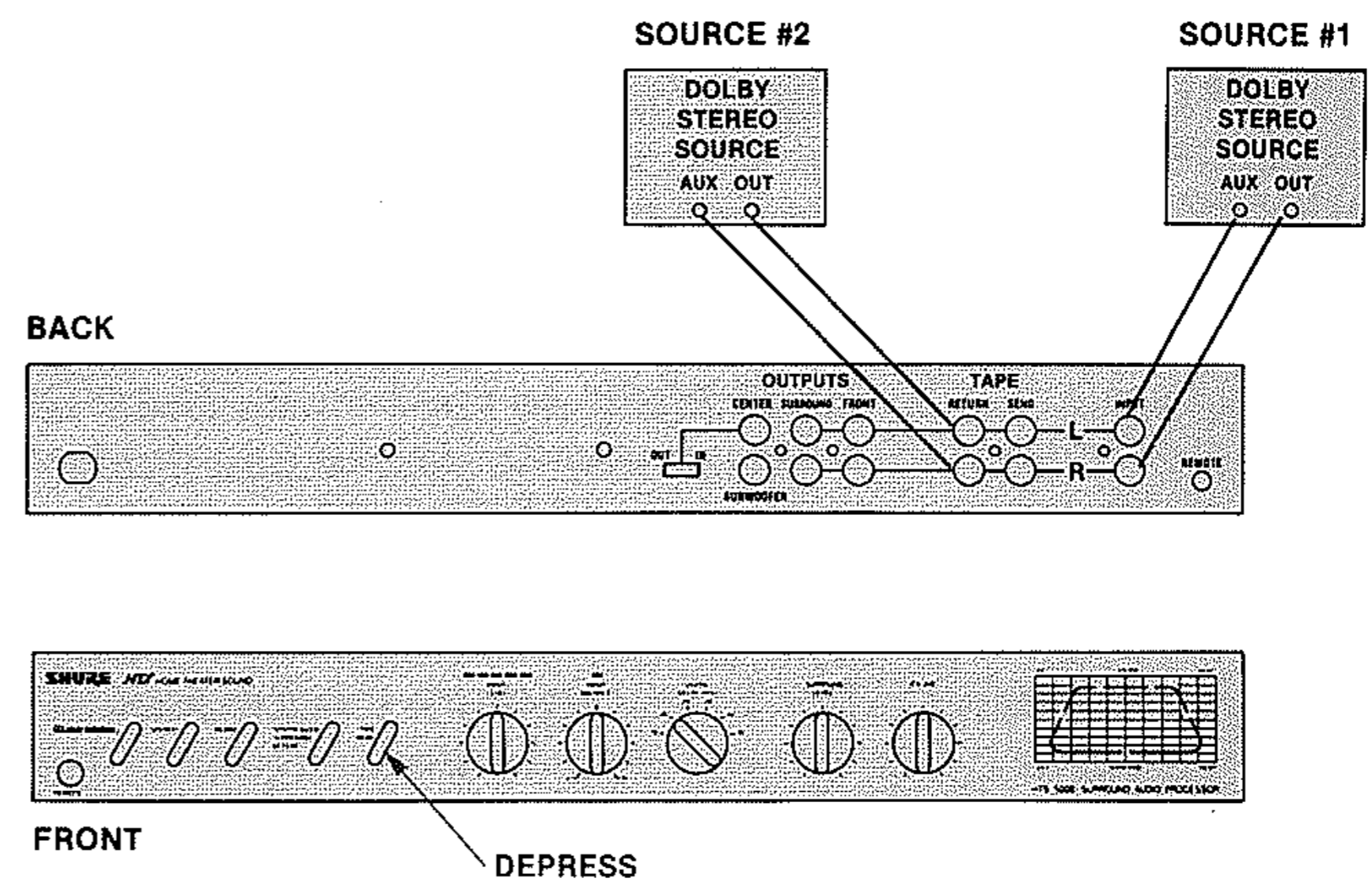


FIGURE 1

In this case, the stereo system's high fidelity speakers can also serve as the Surround Sound System's front left and right speakers. To accomplish this, connect the HTS5000 Front Left and Right outputs back to the tape inputs on the high fidelity receiver (see Figure 2.) The HTS5000 Tape Send outputs and Return inputs can be used in the place of the receiver's tape outputs and inputs.

Or, a second audio source can be connected to the HTS5000 Tape Return Left and Right inputs (see Figure 3). In this case:

1. When the front panel Tape Mon switch is **out**, the HTS5000 processes the inputs from L and R.
2. When the front panel Tape Mon switch is **in**, the HTS5000 processes the inputs from Tape Return L and R.



USING A SECOND SOURCE CONNECTED TO THE TAPE RETURN INPUTS

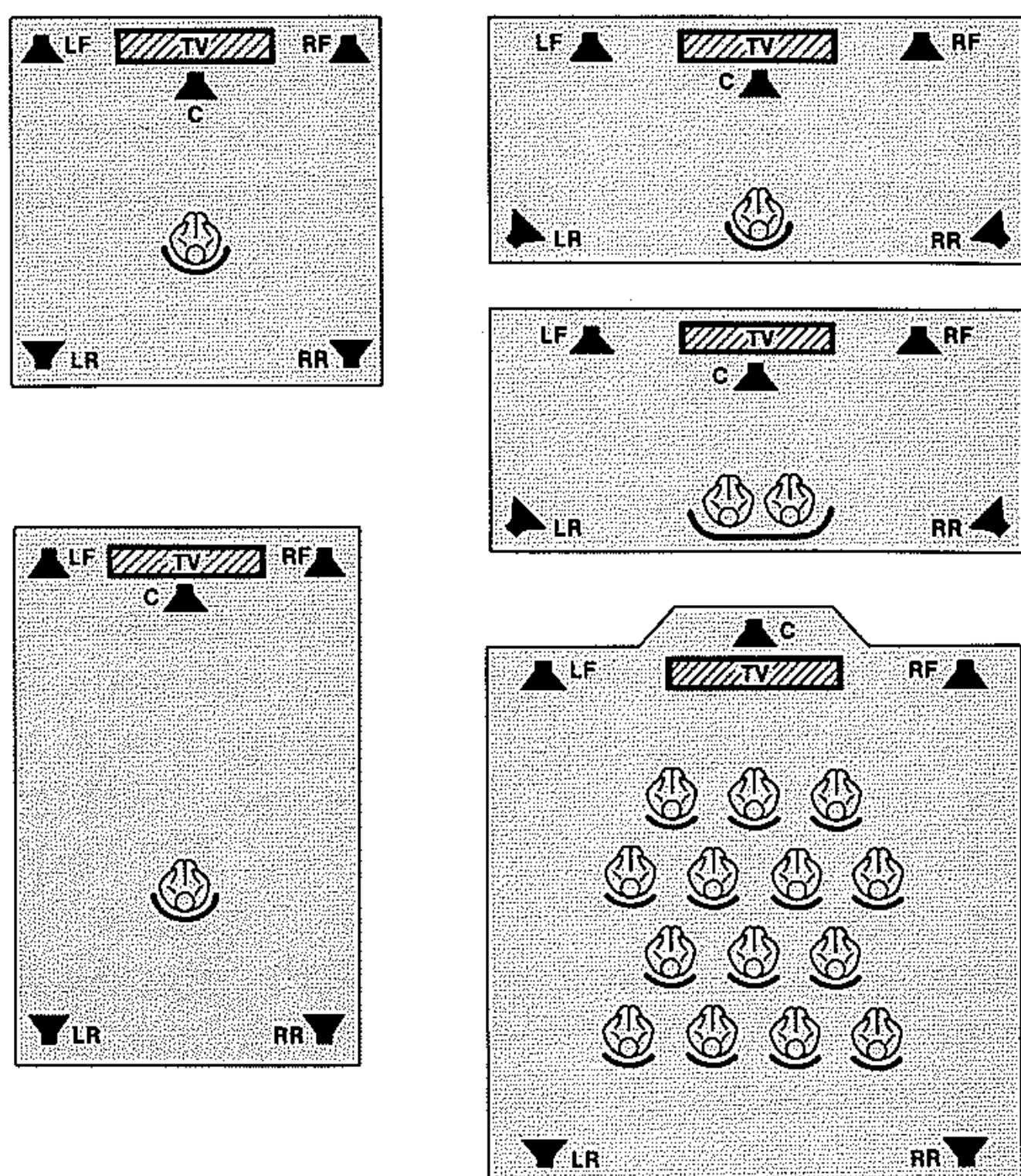
FIGURE 3

LOCATING SPEAKERS

Speaker location will depend in each case on the size and shape of the specific room in which the Home Theater System is installed. The diagrams in Figure 4 may be used as a general guide to speaker placement in rooms of various shapes. To avoid interference with the tv picture, speakers without special magnetic shielding should ordinarily be more than 0.6m (2 ft) from the screen. In each case, it is best to consult the tv and loudspeaker manufacturers.

When a Center speaker is employed, it is most conveniently mounted above or below the screen, but always as close to the screen centerline as possible.

Because very low frequencies are nondirectional in a room, a subwoofer can usually be located almost anywhere convenient in the room. However, depending on room acoustics and the particular subwoofer, some locations may be clearly superior to others. Consult the subwoofer manufacturer for specifics.



LOCATING SPEAKERS
FIGURE 4

CONNECTIONS

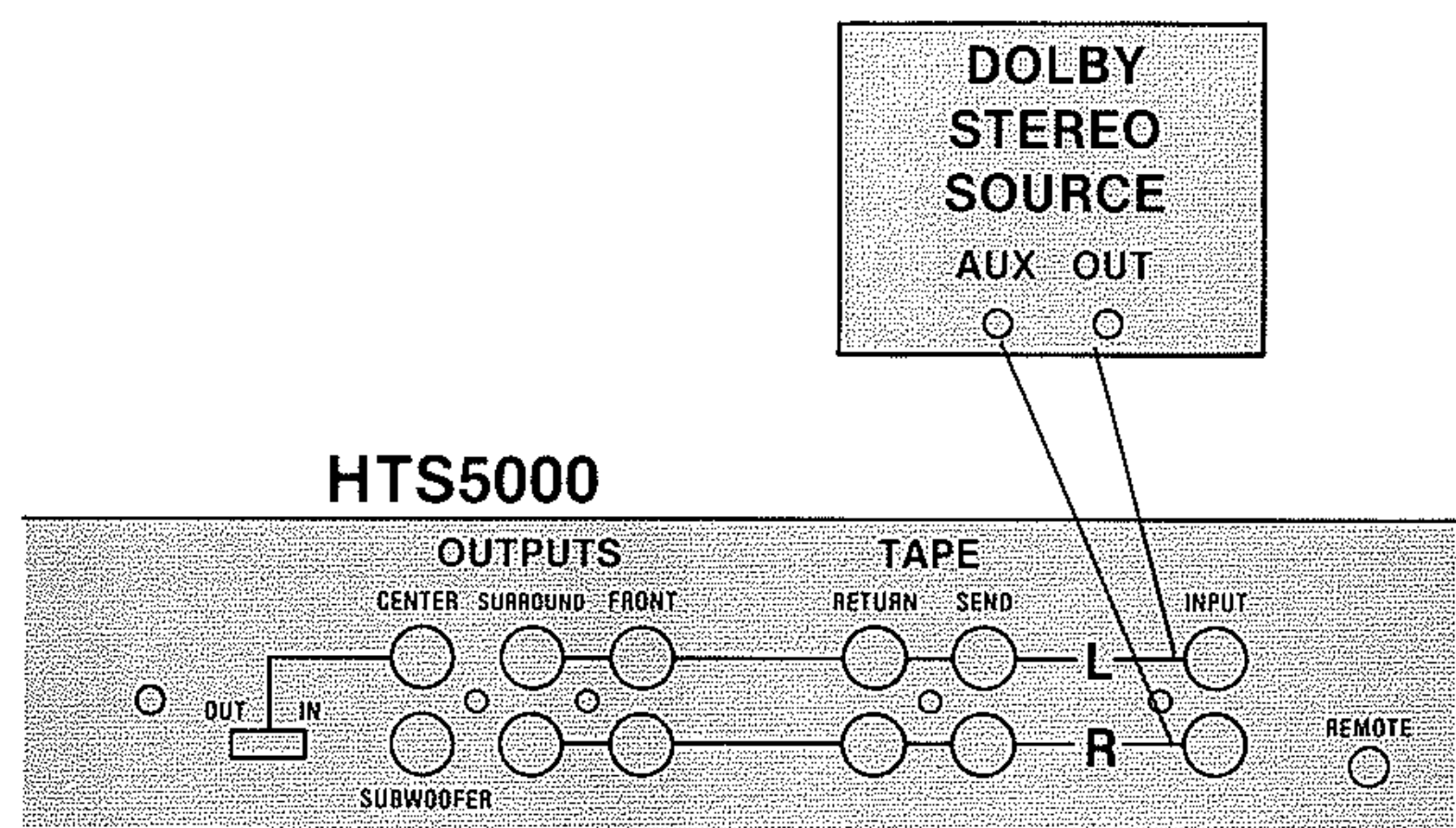
All connections (except the supplied wired Remote Control) are made via phono pin plugs. Four pairs of interconnecting cables with plugs are supplied.

Inputs (see Figure 5)

Connect the stereo preamp or Aux output of a video disc player, video tape recorder, or tv receiver to the Left and Right inputs of the HTS5000. (See Figure 1 for multiple sources.)

IMPORTANT

For optimum decoding of Dolby Surround program material, system equalization should be done following the HTS5000 outputs. If equalization is used ahead of the HTS5000, it should be applied identically to both channels and in moderate amounts.



SINGLE INPUT
FIGURE 5

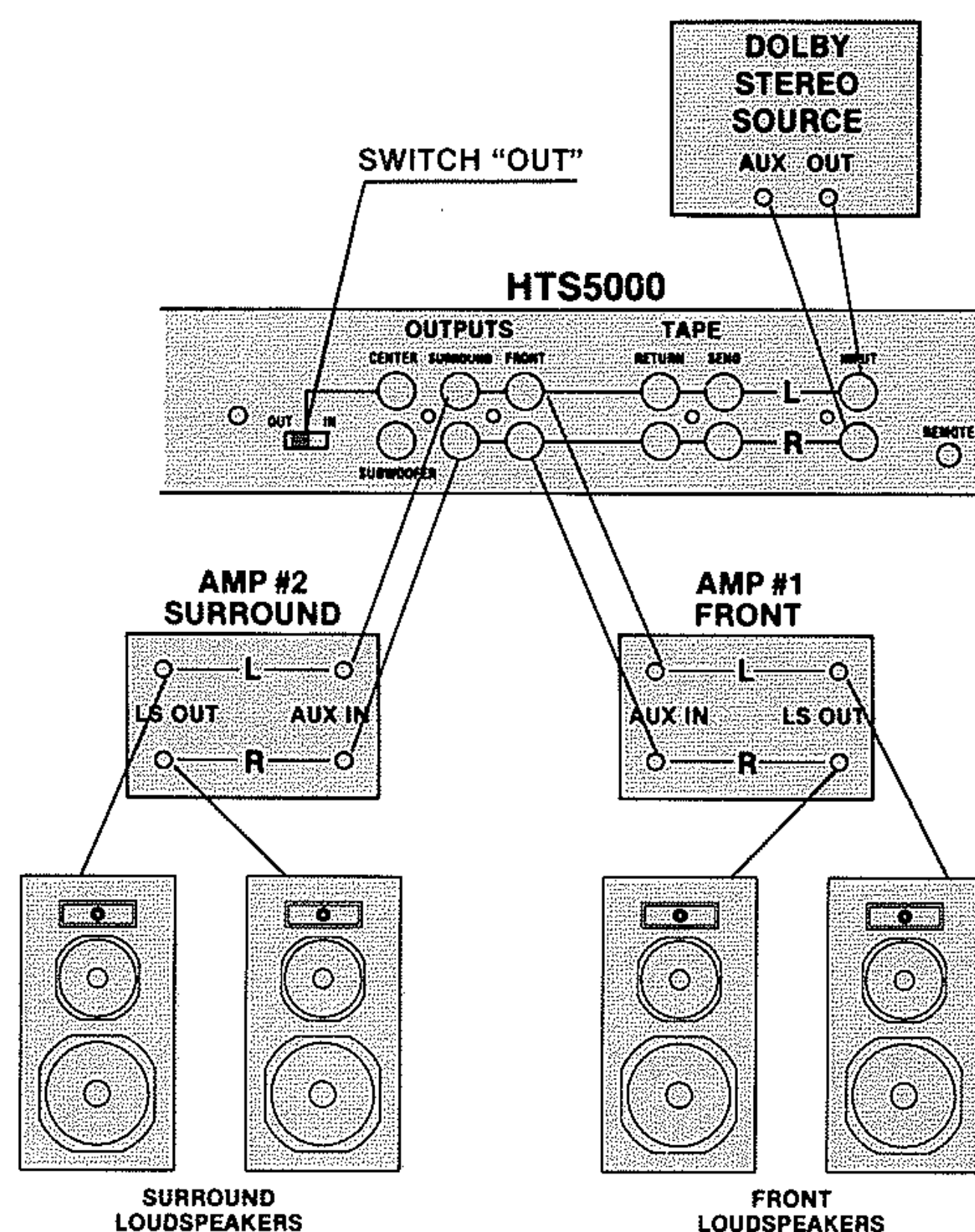
Outputs

For a basic system (see Figure 6):

- Connect the HTS5000 Front Left and Right outputs to the stereo inputs of an amplifier or receiver. These inputs should accept Aux or preamp level signals. The home stereo hi-fi receiver or amp is often conveniently used for front left and right signals (see Figure 1 also).
- Connect the stereo speaker outputs of the front amplifier to front left and right loudspeakers. These can also see double duty as the hi-fi audio system speakers (see Figure 2 also).
- Connect the HTS5000 Surround Left and Right outputs to the second stereo amplifier's Aux or preamp level inputs.
- Connect the second amplifier's outputs to the surround left and right loudspeakers.

IMPORTANT

When setting up a basic system, make sure that the HTS5000 back panel Center switch is in the Out position.



BASIC SYSTEM
FIGURE 6

For a complete system, make the following additions (see Figure 7):

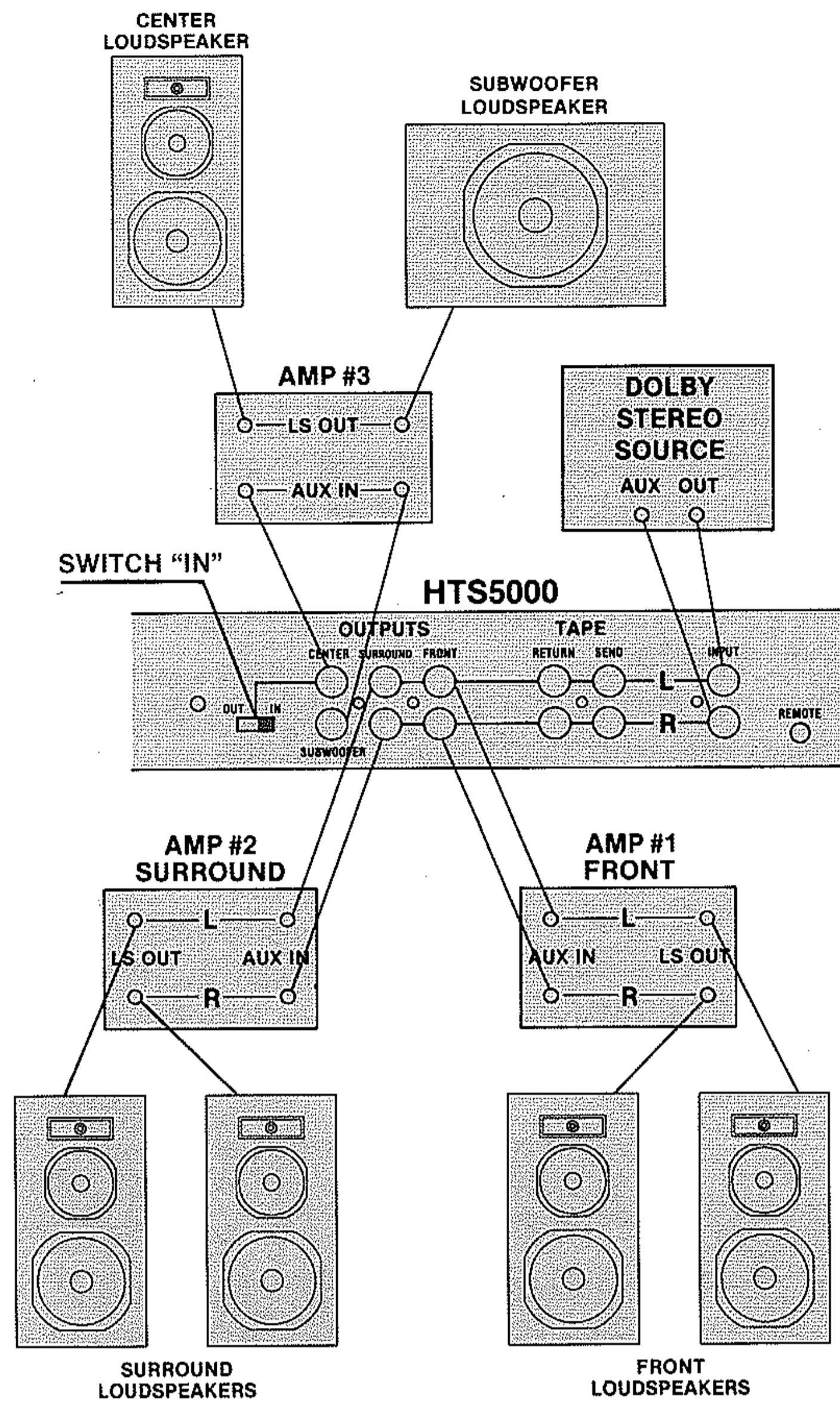
- Connect the Center output on the HTS5000 to one input of a third stereo amplifier.

IMPORTANT

Make sure that the back panel Center switch is in the In position.

- Connect the Center amplifier output to a full-range loudspeaker.
- Connect the HTS5000 Subwoofer output to the other stereo input of the third amplifier.*
- Connect the amplifier Subwoofer output to a subwoofer loudspeaker.

* A self-powered subwoofer can also be used. In this case, connect the HTS5000 subwoofer output directly to the powered subwoofer input. (Only a mono amp is required in this case for the center channel.)



COMPLETE SYSTEM
FIGURE 7

NOTE: Select power amplifier #3 to match the power requirements of the particular subwoofer loudspeaker used.

OPERATION (Figure 8)

PUSHBUTTON CONTROLS

Dolby Surround/Stereo/Mono

Depress one, or two, of the first three switches at the left of the front panel, depending on the type of audio source material.

(A) Dolby Surround: Depress this switch if the source material is "Dolby Surround" or "Dolby Stereo." The HTS5000 will decode all ambience and surround information and will process it for full surround sound.

NOTE: Some video tapes and discs that are actually Dolby Surround encoded are not so labeled. The only way to determine this is to try a source with the Dolby Surround switch pressed in. Most

recently released stereo movies are Dolby-Surround encoded. Additionally, for many viewers, all types of program sources will sound acceptable if the HTS5000 switch is left in the Dolby Surround position.

(B) Stereo: Depress this switch if the source material is stereo (e.g., music videos, records, or compact discs). The HTS5000 processor will simulate surround sound with the Acoustic Space Generator and true digital time delays. Outputs will appear at Front Left and Right, Surround Left and Right, and Subwoofer channels. There will be no output at the Center channel, and the Center switch has no effect on the output.

(C) Mono: When the source is monophonic, depress this switch. By means of its Acoustic Space Generator and digital time delays, the HTS5000 will provide simulated-stereo and -surround sound from mono sources. When the Center switch is in the In position, outputs will appear at all six channels. **When a center speaker is not used, make sure the Center switch is in the Out position.** With a Center speaker in the system, there will be very stable center localization of dialogue; without a Center speaker, dialogue will appear in a phantom center channel. See the section on Mono Enhance Adjust to set the amount of simulated surround with the switch in Mono.

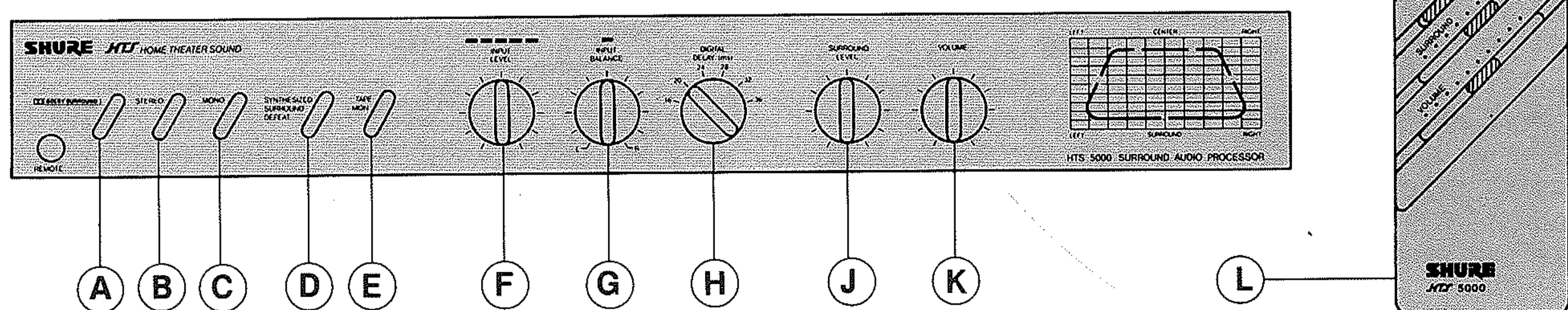
(D) Synthesized Surround Defeat: Depress this switch to bypass HTS5000 processing when the Stereo or Mono switch is also depressed. The output will then be straight stereo or mono appearing in the Left and Right or Center channels. The Subwoofer channel will continue to function.

NOTE: If the Stereo button is depressed, the output will appear only in the Front Left and Right channels. If the Mono button is depressed and the Center switch is in the In position, output will appear in the Center channel only. If the Mono button is depressed and the Center switch is in the Out position, output will appear in the Front Left and Right channels only.

(E) Tape Monitor: When this switch is **Out**, the HTS5000 derives its source from the Left and Right input jacks. When this switch is **In**, the HTS5000 source derives from the Tape Monitor Return Left and Right input jacks.

ROTARY CONTROLS

(F) Input Level: For the best signal-to-noise ratio and input processing, set the Input Level control as you would set a VU meter. With the volume control set to a



HTS5000 AND REMOTE CONTROL
FIGURE 8

low but audible position, adjust the control so that only the loudest occasional peak signals light the red, but most signals remain below the red.

Recommended initial setting: Straight up and down.

NOTE: In the future, consumer software may be available with Dolby calibration tones. To calibrate the HTS unit using these tones, put the HTS5000 in the stereo mode, and adjust the Input Level control to just light the last green LED on the input level display.

G Input Balance: To set the Input Balance, use a source (like dialogue) that usually comes from the center of the sound stage. Adjust the Balance control so that its LED lights most often when center dialogue is present. Rotate the control slightly left and right to ensure that it is set at the optimum position.

Recommended initial setting: Straight up and down.

H Digital Delay (ms): To select and set the Digital Delay time, use the following formula (see Figure 9):

$$20 + D_1 - D_2 = DS$$

Where D_1 = distance (in feet) from listener to closest front loudspeaker

D_2 = distance (in feet) from listener to closest rear loudspeaker

DS = Delay setting (in milliseconds)

Set the HTS5000 Digital Delay to the closest delay setting (use the higher delay setting if between two delay values). In some room arrangements, it may be difficult to decide which listener and which speaker to use for calculating distances. The guiding principle, where there are multiple listeners, is that the shortest delay heard by any listener should be 20 ms. So, for instance, in installations where there are multiple rows of listeners, calculate distances from the listener in the back row who is closest to a rear speaker. The diagrams in Figure 9 provide examples to clarify which listeners and distances to use in calculating the optimum Digital Delay setting in rooms of various shapes. (Other delay times may be preferred by some listeners.) The final setting should cause the rearmost listener to hear center-screen speech coming from the front of the room. Never from the rear.

Recommended initial setting: 20 ms

J Surround Level and K Volume: Use these controls to set a first approximation to the final listening level desired. The Volume control adjusts the volume of all (six, five, or four) output channels used. The Surround Level control adjusts the level of the rear channels, thus permitting the listener to achieve the desired front/rear balance in the sound field.

NOTE: Output trim controls are available underneath the unit for cases where front and rear amplifiers and/or speakers differ so much in power or efficiency that the Volume and Surround Level controls do not provide the desired relative levels. See the section on Output Level Controls.

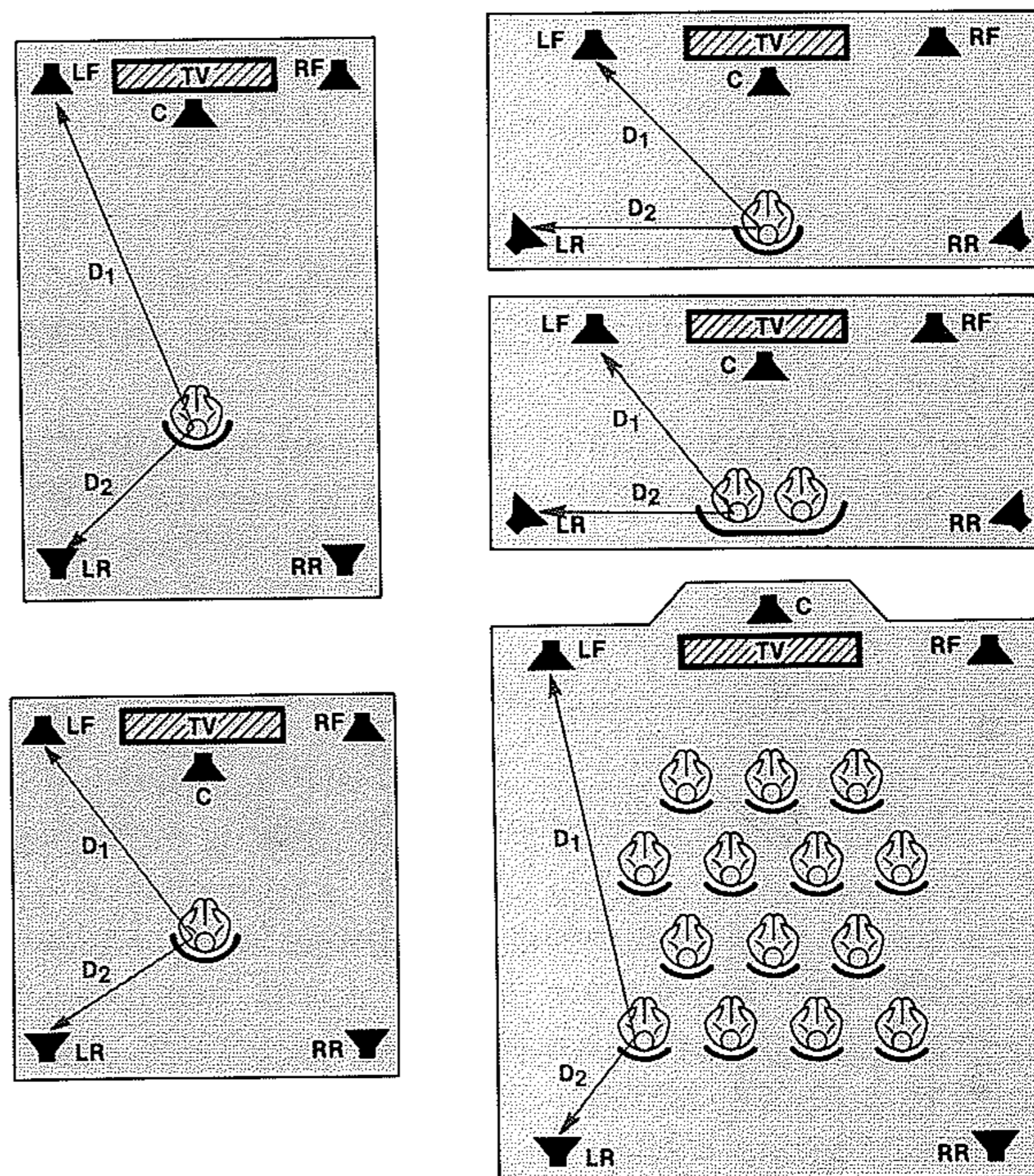
Recommended initial settings: Start with the Surround controls at higher levels than you might imagine desirable; then back off until satisfactory levels are reached. Starting at a low level and advancing the controls may lead the listener to stop adjustment before the optimum level has been attained.

L REMOTE CONTROL

The Remote Control should be used because it permits the listener to adjust the Surround Level and overall Volume from the listening position to suit each individual tape, disc, or broadcast. The Remote overrides the front panel Surround Level and Volume controls, but these should always be turned to their minimum positions to prevent an unpleasant blast of sound should the Remote be accidentally disconnected.

The Remote Control is also equipped with a Mute slide switch for temporary reduction of sound level when necessary. A red LED next to the switch glows to indicate that the Mute is engaged; the light is extinguished when the Mute is off.

Recommended initial settings of Remote Surround Level and Volume: Same as Recommended Levels for front panel Surround Level and Volume above.



D1 AND D2 IN VARIOUS ROOM CONFIGURATIONS
FIGURE 9

MONO ENHANCE ADJUST

A screwdriver-adjustable trim control labeled MONO ENHANCE ADJUST is provided on the bottom of the HTS5000 (see Figure 10). When the Surround Sound System is in the MONO Mode, this control permits the listener to adjust the amount of stereo synthesis to individual taste. The control affects the HTS5000 output **only when** the front panel MONO button is depressed and the SYNTHESIZED SURROUND DEFEAT button is out. (Turn clockwise to increase the amount of enhancement.)

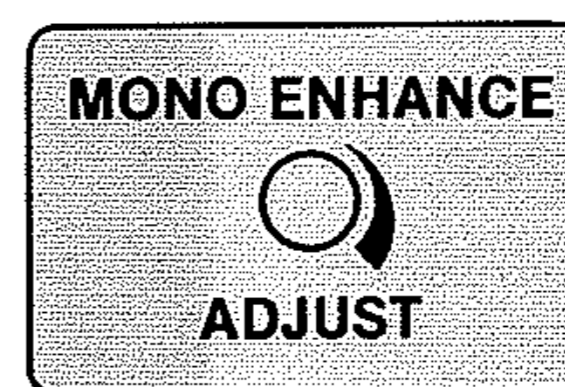


FIGURE 10

SYSTEM BALANCE

A. To balance a System with a Center amplifier and speaker

1. Turn the Surround Level control and Volume control all the way off.
2. Set the Volume controls of the left-, center-, and right-channel **power amplifiers** to maximum; set the subwoofer and surround **power amplifier** volume controls to minimum.
3. Select a good quality mono program source; set the HTS5000 pushbutton switch to Dolby Surround. Advance the HTS volume control to obtain a modest listening level in the Center loudspeaker.
4. Switch the HTS5000 to Stereo.
5. Listen carefully. Turn down the **power amplifier** volume control(s) for the louder source until switching between Dolby Surround and Stereo produces the same level at a center listening position.
6. If balance cannot be achieved with the power amplifier volume controls, use the output level trimmers (six screwdriver-adjustable controls) located on the bottom of the HTS5000 (see Figure 11).

B. To balance a System without a Center channel amplifier and speaker

1. Set the Volume controls of the left- and right-channel **power amplifiers** to maximum; set the subwoofer and surround **power amplifier** volume controls to minimum.
2. Select a good quality mono program source; set the HTS5000 pushbutton switch to Dolby Surround.
3. Listen for a center image. If necessary, reduce the level of the louder amplifier until a center image is obtained.

C. To balance the Surround and Subwoofer amplifiers and speakers

1. Leave **power amplifier** volume controls as set above. Select a program source with significant surround channel program material as indicated by the front panel graphic display. (Music portions of Dolby Surround movies often have suitable program material.)
2. Advance the HTS5000 Surround Level control to the middle of its range; advance the HTS5000 Volume control to a normal listening level.
3. Depress the HTS5000 Dolby Surround pushbutton.
 - a. Advance the volume controls on the surround channel **power amplifiers** until the surrounds have about equal levels with the fronts.
NOTE: Use the trimmers on the bottom of the HTS if the power amplifiers do not offer sufficient adjustment to balance.
 - b. Adjust the volume control on the subwoofer **power amplifier** to give an appropriate, bigger than life presentation.

IMPORTANT

All preamplifier, receiver, and power amplifier volume controls are now set. Changing any of these settings will change the balance of the system rather than just the overall level. The HTS5000 will henceforth control the output of the entire system regardless of the program source.

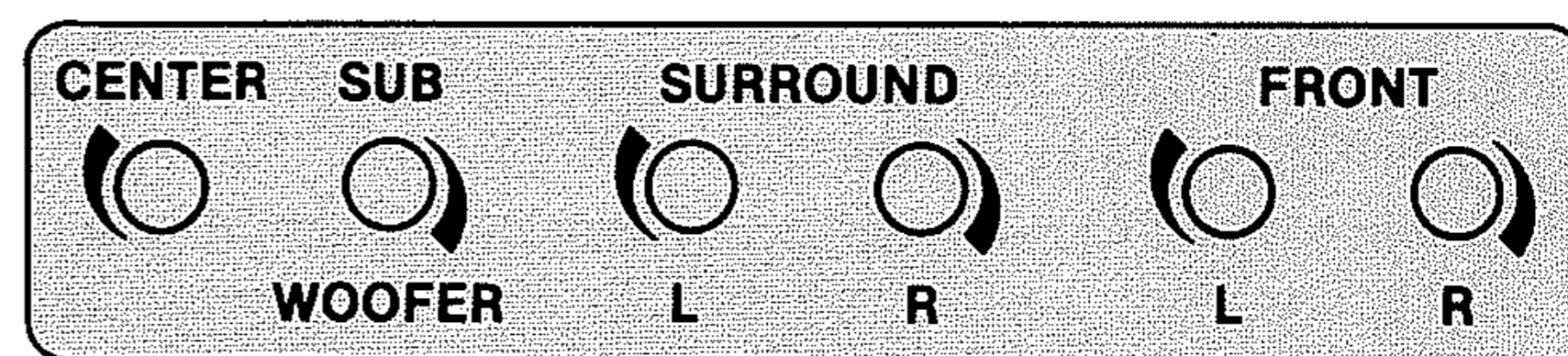


FIGURE 11

PHASING

IMPORTANT

While making phase checks, various connections to power amplifiers will be changed. Be sure to take necessary precautions when doing so in order to protect all power amplifiers and loudspeakers against overload.

A. In order to obtain correct operation from an HTS5000 Surround Sound System, all speakers and amplifiers must be in phase. Check the phase as follows.

1. Use a mono input signal (an FM tuner set to Mono is a convenient source).
2. Set the HTS5000 front panel pushbutton to Stereo.
3. Set the volume control for a moderate level.
4. Listen to the sound. If the Front Left and Right amplifiers and speakers are in phase, the sound will be centered, and its quality will be good across the audio spectrum. If they are out of phase, the sound will have a diffuse and directionless quality, particularly noticeable in the almost total loss of low frequencies (bass sounds).
5. To correct an out-of-phase condition in the Front, interchange the wires to one of the Front speakers, **either** at the amplifier output **or** at the speaker input terminal.

B. Now turn down the sound, and check the phasing of the Surround speakers using the following technique.

1. On the back of the HTS, temporarily unplug the Front Left and Right output connectors.
2. Plug the Surround Left and Right channel connectors into the Front Left and Right output channels.
3. Proceed as in steps 1. to 5. above.
4. Return the Front Left and Right and the Surround Left and Right connectors to their proper jacks.

C. If a Center speaker is used, check its phasing as follows.

1. Switch to the Dolby Stereo mode; move the rear panel Center switch to the In position; and turn down the Surround Level control to avoid confusion.
2. Set the HTS5000 front panel pushbutton to Stereo; and set the Volume control for a moderate level.
3. On the back of the HTS, unplug the Right Front output connector.
4. Plug the Center channel connector into the Right Front output channel.
5. Listen to the sound. If the Center channel amplifier and speaker are in phase with the front channel amplifiers and speakers, the sound will be centered and its quality will be good across the audio spectrum. If they are out of phase, the sound will have a diffuse and directionless quality. If the Center speaker is not like the Front Left and Right speakers, the distinction may not be clearcut. In that case, choose the connection that increases bass output.
6. To correct an out-of-phase condition in the Center, interchange the wires to the Center speaker, **either** at the amplifier output **or** at the speaker input terminal.

D. If a subwoofer is used, check its phasing as follows.

1. Connect the subwoofer; switch to the Mono mode (front panel); and move the rear panel Center switch to Out.
2. Listen to music with very low frequencies, and try both subwoofer speaker connections.
3. Choose the one with more bass output.
4. Return the Center switch to In if appropriate; depress the appropriate mode pushbutton on the front.

THE EDUCATED EAR AND THE GRAPHIC DISPLAY

The front panel graphic display shows the relative levels of the decoded and processed output at the Front and Surround channels in the Dolby Surround and Synthesized Surround modes*. The display is independent of the Volume and Surround Level control settings. The graphic display is used to check initial setup of the HTS Surround Sound System; to confirm that left channel outputs do appear at the left speaker for example. It also validates the recording engineer's intentions on the spatial location and intensity of various sounds.

In addition, listening and experimentation will demonstrate the display's usefulness in educating the ears to the appropriateness of Volume and Surround Levels for various performances. For instance, if surround channel outputs are displayed quite brightly but the aurally evident surround level is low, then the Surround Level control should be turned up in order to achieve the effect intended by the filmmaker. Or, if dialogue appears strongly centered on the display but not to the ear, then the phasing of the front and center speakers should be checked.

*In the bypass modes (Mono and Stereo Synthesized Surround Defeat), the display should not be used as a guide to levels or locations.

PROGRAM MATERIAL

Dolby Surround

The Dolby Surround process is designed for use with any two-channel medium. Any media (like laser discs, VHS Hi Fi, Beta Hi Fi, stereo television broadcasts, stereo satellite transmissions, and stereo cable channels) that preserve the information contained in the original 35 mm stereo optical film soundtrack are suitable for use with the HTS5000 Surround Audio Processor. The HTS5000 will reproduce Dolby Surround movies from any of these sources with all the excitement of the theater.

Films with **Dolby Stereo** soundtracks are identified in the movie credits with the logo **DOLBY STEREO**. Recent releases of these movies in the consumer formats are identified on the jacket with the logo **DOLBY SURROUND**. Earlier releases of **Dolby Stereo** movies are identified either on the jacket with a statement that the product has a matrixed surround soundtrack or in the credits with the Dolby Stereo logo. If you check the early releases in your collection, you may be surprised at the amount of Dolby Surround program material you already have.*

The future of Dolby Surround seems assured. Virtually all major motion pictures being produced today use the Dolby Stereo process, which is also being used to encode the latest music videos to add new dimension and realism to the performances. Stereo broadcast television dramas also benefit from the Dolby Stereo process which stabilizes the dialogue image in the majority of viewing environments while maintaining the audible panorama only Dolby Surround can provide. Each of these new and exciting applications of the Dolby Stereo process is suitable for use with the HTS5000.

Stereo

The HTS5000 uses the same Digital Delay and Acoustic Space Generator necessary for Dolby Surround reproduction to add a new dimension to conventional stereo sound. By using the HTS5000 in the Stereo mode, the ambience recovered from a stereo recording is conditioned and presented in the surround channels. The effect is a re-creation of the excitement of being at the performance. Stereo surround is obtained from sources like stereo music videos, compact discs, phonograph discs, audio cassettes and tape recordings. Although the amount of recovered ambience varies from recording to recording, the Surround Level control and the Digital Delay control can be adjusted to bring a new realism to most stereo recordings.

Mono

The concept of stereo audio transfer is in its infancy in the film and video industries. To date, the vast majority of film and television material produced has been monophonic. In the Mono mode, with additional digital processing of the audio material, the HTS5000 increases the width and depth of monophonic motion pictures, television broadcasts, and music recordings.

*A list of films released with Dolby Stereo soundtracks is enclosed.

TROUBLE SHOOTING GUIDE

SYMPTOM	CAUSE	CURE	
No sound, no LED'S	No power	Check all power cords are plugged in; check power switches controlling circuit are on	
	HTS5000 Tape Mon switch in incorrect position	Check source is connected to L and R inputs (Tape Mon switch up) or to HTS5000 Tape Return L and R inputs (Tape Mon switch depressed)	
	Receiver or preamp Tape Monitor switch incorrectly set	Check manufacturer's instructions; move switch to select HTS5000 input	
	Receiver or preamp input selector incorrectly set	Check manufacturer's instructions; move switch to select HTS5000 input	
	HTS5000 source wiring faulty	Check connections and cables to HTS5000 and to receiver	
No sound, but LED's operate normally	HTS5000 Volume control set too low	Turn Volume control up	
	Remote Control connection faulty	Insert connector fully	
	Remote Control Volume control set too low	Set Remote Volume higher	
	Remote Control in Mute position	Turn Mute off	
	Pushbutton selector switches set incorrectly	All buttons must not be pushed in; stereo and mono buttons must not both be pushed in; only one of the first 3 left side buttons should be pushed in	
	No power to power amps	Check power connections; turn power switch on	
	Power amp input selector incorrectly set	Check power amp instructions	
	Receiver or preamp Tape Monitor switch incorrectly set	Check receiver or preamp instructions	
	Receiver or preamp volume control set too low	Set Volume higher	
	Power amp Volume control set too low	Set Volume higher	
	Faulty output connections	Check that all connectors are fully inserted, all connections are securely made	
	Weak sound	HTS5000 Volume control set too low	Turn Volume control up
		Remote Control connection faulty	Insert connector fully
Remote Control Volume control set too low		Set Remote Volume higher	
Remote Control in Mute position		Turn Mute off	
Receiver or preamp volume control set too low		Set Volume higher	
Power amp Volume control set too low		Set Volume higher	
Center channel switch		Switch must be In if Center speaker is connected; switch must be Out if no Center speaker is in system	
Speakers out of phase		See Phasing section; check phasing of all speakers	
Pushbutton selector switches set incorrectly		All buttons must not be pushed in; stereo and mono buttons must not both be pushed in	
System incorrectly balanced		See section on Output Level Controls	
No surround		HTS5000 Surround control set too low	Turn Surround control up
	Remote Control connection incomplete	Insert connector fully	
	Remote Control Surround level control set too low	Set Remote Surround level higher	
	Receiver or preamp volume control set too low	Set Volume higher	
	Power amp Volume control set too low	Set Volume higher	
	No power to surround power amps	Check power connections and power switches	
	Surround power amp input selector improperly set	Check setting	
	Synthesized Surround Defeat switch is depressed	Press Defeat switch to move to out position	
	Faulty output connections to surround amps and/or speakers	Check connections	
	Improper directional information	Pushbutton selector switches	Check switch is appropriate for material
Surround level control too high or too low		Experiment with other settings	
Faulty Remote Control connection		Make sure plug is inserted fully	
Speakers out of phase		See Phasing section; check phasing of all speakers	
Center channel switch incorrectly set		Switch must be In if Center speaker is connected; switch must be Out if no Center speaker is in system	
System not properly balanced		See section on Output Level Controls	
Left and Right channels reversed	Check that Left and Right sources are correctly connected to L and R inputs		

SPECIFICATIONS

Frequency response

Front Left, Center, Right: 20 to 20,000 Hz \pm 0.5 dB
Subwoofer: -3 dB @ 80 Hz; 12 dB/octave low pass
Surround Left, Right: per Dolby Surround specifications (50 to 7,000 Hz, -3 dB)

Input sensitivity

0.18V (Input Level control at maximum)
1.8V (Input Level control at minimum)
(For red level indication in Dolby Surround mode, one channel driven)

Input clipping level

2.8V

Output clipping level

4.0V

Input Balance control range

\pm 9 dB

Output level trim adjustment range

20 dB

Input impedance

50 k Ω

Output impedance

5.5 k Ω

Total harmonic distortion (1 kHz, 1V output)

Front Left, Center, Right: less than 0.1%, Volume control at maximum
Surround Left, Right: less than 0.3%, Volume control at maximum, Surround Level control centered

Output noise, A-weighted

Front Left, Center, Right: -90 dBV, Volume control centered; -80 dBV, Volume control at maximum
Surround Left, Right: -85 dBV, Volume and Surround Level controls centered; -68 dBV Volume control at maximum, Surround Level control centered

Signal polarity

Non-inverting at all outputs

Operating modes

Dolby Surround, Stereo-Synthesized Surround, Mono-Synthesized Surround, Stereo Bypass, Mono Bypass

Surround delay range

16 to 36 msec

Operating Voltage

120 Vac \pm 10%, 60 Hz, 36W

Temperature Range

Operating: -29 to 57°C (-20 to 135°F)
Storage: -29 to 71°C (-20 to 160°F)

Dimensions

60 mm H x 427 mm W x 382 mm D
(2-3/8 in. x 16-13/16 in. x 15-1/32 in.)

Net Weight

HTS5000: 4.5 kg (9 lb 13 oz); Remote Control: 91g (3 oz)

Certifications

Listed by Underwriters Laboratories Inc.

NOTE: All measurements with outputs loaded with 50 k Ω

IMPORTANT SAFETY INSTRUCTIONS

- 1. Read, Retain, Follow Instructions:** Before operating the unit, **read** all safety and operating instructions. For future reference, **retain** all safety and operating instructions. To assure safe operation, **follow** all safety and operating instructions.
- 2. Heed Warnings:** Comply with all warnings on the unit and in the instructions.
- 3. Water and Moisture:** Do not use the unit near water, for example, near a sink, in a wet basement, or near a swimming pool or lawn sprinkler.
- 4. Carts and Stands:** Any cart or stand should be tip-proof and sturdy enough to support a static load four times the weight of the unit.
- 5. Wall or Ceiling Mount:** A wall or ceiling mount used for the HTS5000 or associated products (such as loudspeakers) should be strong enough to support a static load four times the actual weight of the unit(s).
- 6. Ventilation:** Do not place the HTS5000 near or over a radiator or heat register.
- 7. Power Supply:** Connect the HTS5000 only to a power supply of 120 Vac, 60 Hz.
- 8. Power-Cord Protection:** Route the power cord so that it will not be walked on, crushed, or pinched by items placed on or against it. Pay particular attention to the cord at the point of exit from the unit, and to the plug.
- 9. Cleaning:** Unplug the unit before cleaning it; use a damp (not wet) cloth when necessary.
- 10. Nonuse Periods:** Unplug the power cord from the outlet when the unit will not be used for long periods of time.
- 11. Liquid Entry:** Take care not to spill liquids inside the enclosure.
- 12. Damage Requiring Service:** This unit is not user-serviceable. Refer all servicing to qualified service personnel. The unit should be serviced if:
 - A. The power-supply cord or the plug has been damaged.
 - B. Liquid has been spilled into the unit.
 - C. The unit has been exposed to rain or water.
 - D. The unit has been dropped or the enclosure has been damaged.
 - E. The unit does not appear to operate normally or exhibits a marked change in performance.

SHURE HTS
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