THE CARVER RECEIVER 2000

Operating Instructions

CARVER RECEIVER 2000

POWERFUL – MUSICAL – ACCURATE

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CAUTION

To prevent shock hazard, electrical fires, and damage to the equipment, do NOT plug the receiver into any other power than a nominal 110VAC, 60Hz outlet. Do not expose this unit to moisture or rain. If the unit accidentally gets wet, disconnect the AC power cord until the unit is thorougly dry, inside and out. Before changing any connections, power the receiver off and power off any other units that are in the system.

Do not remove the top or bottom covers with the power cord plugged in. There are no user-serviceable parts or adjustments inside. Unauthorized servicing may void the warranty.

Serial No. 51002431

Date Purchased 10/23/87

Store Name and Address

KUBAN'S - RINGLING SHOPPING CENTER, SARASOTA, FL

THE CARVER RECEIVER 2000

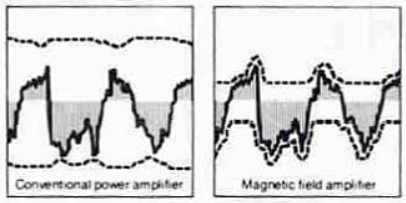
Redefines your expectations of receiver performance with the power you need for Compact Audio Discs plus virtually noise-free *stereo* FM reception. A receiver with astonishing performance incorporating three highly significant technological breakthroughs: Bob Carver's Magnetic Field Power Amplifier, his Asymmetrical Charge Coupled FM Detector, and the Sonic Hologram Generator.

Essential Power

Your system needs an abundance of power to reproduce, without distortion, the dynamic range of music on Compact Audio Discs and fine analog recordings.

The Magnetic Field Amplifier in the CARVER Receiver gives you 200 watts per channel* of *pure*, clean power with superbly defined, high fidelity reproduction.

The Magnetic Field Amplifier produces large amounts of power (absolutely necessary for the accurate reproduction of music at realistic listening levels) without the need for heavy heat sinks, massive transformers, and enormous power capacitors required by conventional amplifier design.



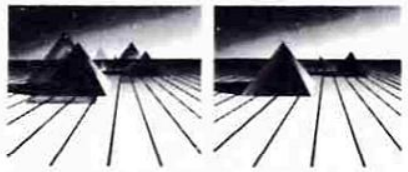
Solid line: audio output signal. Broken line: power supply voltage. Shaded area: wasted power. Vertical lines: power to speakers.

Unlike conventional amplifiers which produce a constant, high voltage level at all times, irrespective of the demands of the ever-changing audio signal (even when there is no audio signal in the circuit at all!), the Magnetic Field Amplifier's power supply is signal responsive. Highly efficient, it produces *exactly* and *only* the power needed to carry the signal with complete accuracy and fidelity.

Your 200 watts-per-channel* CARVER Receiver is about the same size and weight of conventional receivers having merely 60 watts per channel!

Noise-Free Reception

The AM-FM CARVER Receiver gives you FM *stereo* performance unmatched by that of any other receiver.



Reflected multi-path signals cause audible distortion.

Asymmetrical Charge Coupled FM Detector gives your ears a true sonic image.

As it is transmitted from the station, the stereo FM signal is extremely vulnerable to distortion, noise, hiss and multipath interference.

However, when you engage CARVER's Asymmetrical Charge Coupled FM Detector circuit, the stereo signal arrives at your ears virtually noise-free. You hear fully separated stereo with space, depth and ambience!

*200 watts per channel RMS into 8 ohms, 20 Hz to 20 KHz with no more than .15% harmonic distortion.

Three Dimensional Sound

Conventional stereo is a pale, muddled version of live sound. No matter how good your speakers are. No matter how good the sound source is.

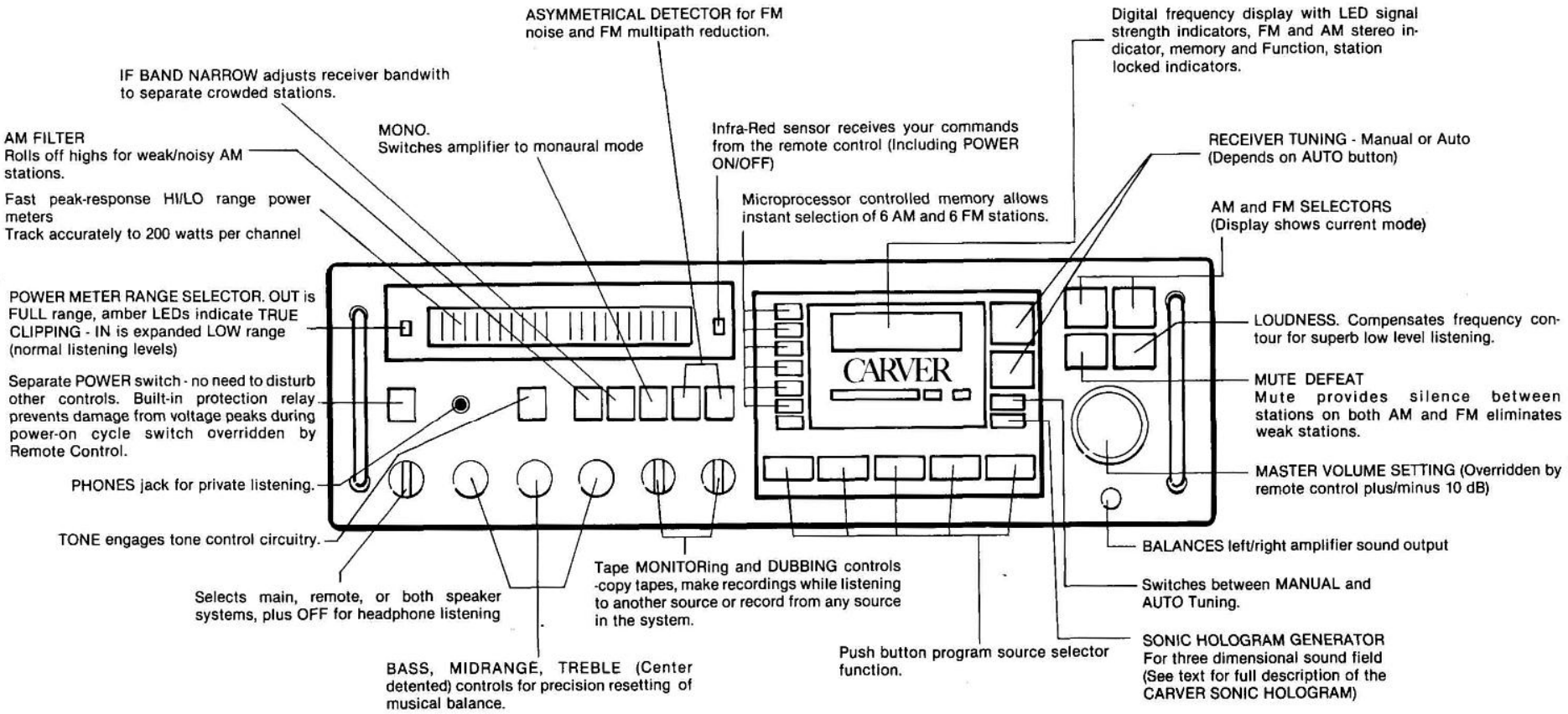
The problems of sonic imagery inherent in conventional stereophonic reproduction have been solved by the Sonic Hologram Generator.

Very briefly, the Sonic Hologram presents timing and phase information that exists in sonic program material – but is normally inaudible. With Sonic Holography, this information emerges in three-dimensional space around the listener who is thus able to establish the precise location of the instruments and voice.

Conventional stereo: Note that when listening to conventional stereo the sound is heard, more or less, on a flat curtain of sound between the two speakers. Volume differences only. The timing cues are gone.

Sonic Holography: With SONIC HOLOGRAPHY, the sound is reproduced much like that of a concert performance, complete with timing, phase and amplitude cues.

Features and Functions



GETTING TO KNOW YOUR CARVER RECEIVER 2000

Here's a quick overview of the versatile controls of your new Receiver. The R indicates features that can also be activated by the Remote Control.

POWER (R)
Push to turn the Receiver on. After about 5 seconds, you'll hear a faint click as the speaker protection relay closes and applies power to the speakers. Press again to turn off. You can also use your Remote Control for Power on/off.

SPEAKERS
This is a rotary switch – rotate to connect the desired pair of speakers. A is for "main" speakers. B is for "remote" speakers. A + B is for both "main" speakers and "remote" speakers. When using headphones, you'll probably want to set "OUT" position for private listening.

ASSYMETRICAL DETECTOR
When engaged, these controls will virtually eliminate noise and multipath from weak FM stereo signals.

PHONES Jack
Plug in stereo headphones for private listening. Leave SPEAKERS switches in the "OUT" position so you don't disturb others (this turns the Speakers off).

Digital Display Panel
Indicates receiving frequency and "AM" or "FM".

SIGNAL STRENGTH
LED indicator shows the relative strength of AM or FM signal.

FM and AM Stereo Indicator
This LED lights up if the MONO button is set for stereo (out) and you are tuned to a stereo FM or AM signal.

LOCKED Indicator
This LED shows tuner locked onto broadcast frequency to prevent distortion from station drift.

Programmable MEMORY Buttons (1-6) (R)
Use to set up to 12 of your favorite stations in memory for immediate recall by pushing one button. (You can set 6 for FM and 6 for AM.)

MEMORY SET
Press to set the Receiver to accept the displayed frequency into memory.

TUNING DOWN/UP (R)
Press UP (or DOWN) key to scan to the next higher (or lower) frequency station (AM or FM).

FM and AM (R)
Press for FM or AM stereo reception, after selecting TUNER.

POWER METER (LEFT & RIGHT)

Indicates power available at the Left and Right speaker outputs. Meters are calibrated for use with 8-ohm speakers. Normally the LED's glow red, but when the Receiver output is more than about 220 watts, the two rightmost LEDs for each channel will glow yellow.

METER RANGE

Pressing METER RANGE expands the scale to show low power levels. (25 W range).

AUTO TUNING

Selects the Auto or Manual Tuning mode; press for auto tuning.

TUNER MUTE DEFEAT

Mute eliminates interstation noise when tuning for FM or AM stations. Receiver will then be silent until you tune a strong station. Press MUTE DEFEAT to receive weak FM or AM stations. MUTE also works in Auto TUNING mode.

MONO

PRESSING THE MONO button defeats stereo operation, the resulting signal is a composite (Left + Right).

SONIC HOLOGRAM (R)

Engages circuitry to create three dimensional sound field.

LOUDNESS

When listening at low volume settings, press in the LOUDNESS button. This overcomes the human ear's reduced sensitivity at low listening levels by compensating the low frequencies.

AM FILTER

Helps to filter out noise. Press AM FILTER to remove hiss and scratch noise. Don't forget to turn it off when you return to the other functions.

TONE

Pressing this button engages the BASS, MIDRANGE, and TREBLE controls.

Source Selector Function Push-Buttons

Determine the desired program source.

TUNER (R): Activates the tuner. Select AM or FM.

PHONO (R): Activates the PHONO 1 jacks on the rear panel. The turntable connected to these inputs can have a magnetic phono cartridge or a moving coil cartridge. Selector switch is on rear panel.

AUX: Activates the AUX jacks on the rear panel. Connect any high-level source (tape deck, TV audio, ham radio.)

CD (R): Activates the CD jacks on rear panel.

VIDEO (R): Activates the VIDEO audio jacks on the rear panel.

TAPE DUBBING

Controls the tape dubbing (duplicating) functions. With switch in center (off) position, both sets of TAPE OUT jacks will carry the same signals as determined by the Function switch. Use 1 ▶ 2 position to dub directly from TAPE 1 IN to TAPE 2 OUT, and 2 ▶ 1 positon to dub from TAPE 2 IN to TAPE 1 OUT.

TAPE MONITOR

Lets you monitor signals connected to TAPE 1, TAPE 2, or the program SOURCE determined by the FUNCTION Push-buttons. Switch must be in center position if you wish to hear your Receiver's sound (AM, FM, PHONO, etc.). To monitor signals connected to TAPE 1 IN, use position 1; for monitoring TAPE 2 IN, use position 2. This switch will be of special benefit when used with a three-head tape deck (one with monitoring facilities).

VOLUME (R)

Adjusts volume of sound from both channels. May be overriden from Remote Control.

BASS, MIDRANGE, TREBLE

These controls let you precisely adjust the frequency response in three different ranges: low frequency, midrange (voice range), and high frequency.

BALANCE

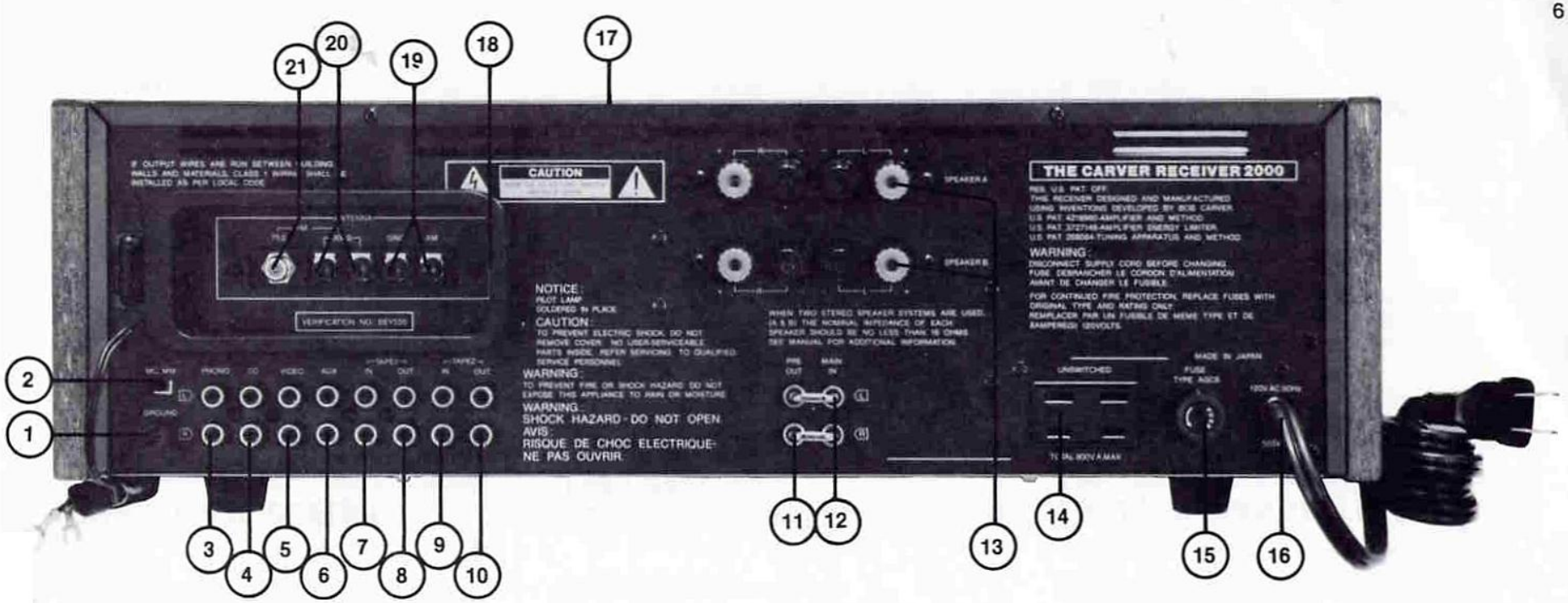
Adjusts balance of sound between left and right channels. At the center position (you'll feel a slight "catch" there) sound will be equal from both channels.

REMOTE SENSOR

Infrared reception window for Remote Control commands.

IF BAND NARROW

Increases the ability to listen to a station on a crowded dial.



REAR PANEL

(1) Phono GND Screw

Connect the ground lead (typically green or black) from the Turntable/Record Changer to this screw (to reduce or eliminate hum).

(2) MM/MC Switch

To select between Moving Magnet or Moving Coil cartridges for Phono Input.

(10) TAPE OUT 2 Jacks

Connect to the Tape Deck's Auxiliary Input for recording any one of the Receiver's program sources. The output from these and all TAPE jacks is unaffected by VOLUME, BALANCE, LOUDNESS or TONE CONTROLS.

(11) (12) PRE OUT/MAIN IN JACKS

As supplied, there are jumper wires between these jacks. If you want to operate a multi-channel system you can remove these jumpers and so use only the power amp circuits. Or, install a Frequency Equalizer system between the PRE OUT and MAIN IN jacks.

(17) VENTED TOP COVER

Allow for air flow through vents when installing unit.

(18) Loop AM Antenna

Is adequate in most areas for AM reception. Move around on its swivel for best reception. May also be wall mounted with supplied bracket.

(3) PHONO Jacks
Connect Turntable to these jacks. These jacks are active when PHONO Push-button is pressed. Set MM Or MC switch for type of cartridge.

(4) CD
Connect a Compact Disc player to these jacks.

(5) VIDEO
Connect video audio to these jacks.

(6) AUX Jacks
Connect output from any high-level source – a third Tape Deck, ceramic or crystal phono cartridge, etc. These jacks are activated when AUX push-button Selector is pressed.

(7) TAPE IN 1 Jacks
Use as following (8) for a second Tape Deck. To activate these jacks, TAPE MONITOR must be set to 1.

(8) TAPE OUT 1 Jacks
Use as following (10) for a second Tape Deck.

(9) TAPE IN 2 Jacks
Connect from Tape Deck's Output jacks for tape playback. To activate these jacks, TAPE MONITOR must be set to 2.

(13) A/B SPEAKERS
Terminals

(14) UNSWITCHED Convenience AC OUTLETS
Can be used to power any audio accessory up to 300 watts. The front panel POWER switch does not affect these receptacles.

(15) Power FUSE
This is the power supply fuse. It protects the Receiver from voltage surges or other abnormal operating conditions. If the Digital Display or an LED Function Indicator does not go on when POWER is pressed, check the FUSE: if it is blown, replace with the same size and value.

(16) AC Cord
Supplies the power. Plug the polarized plug into any 120V AC, 60 Hz outlet. (220/240V AC, 50Hz for European and 240V AC, 50 Hz for Australian model.)

(19) AM Antenna Screw Terminals
Connect an external AM antenna here for long distance AM reception. In most areas the built-in antenna will provide excellent reception. The ground terminal is optional, and may be used for extreme long distance reception. An antenna wire has been included for increased AM sensitivity. We highly recommend its use for AM stereo reception.

(20) FM Antenna 300 Ohm Screw Terminals
Connect the Dipole Antenna (provided), or connect external FM antenna here using standard 300 ohm lead-in.

(21) FM Antenna 75 Ohm Terminal
Connect external antennas here using 75 ohm coaxial lead-in. Coaxial cable provides extremely high immunity for static and other noise.

Adding Your CARVER Receiver to Your System

Before making connections, be sure the POWER switch is "OFF" and the AC power cord is not connected.

Note: To reduce hum, use shielded audio cable for all connections except speakers. For speaker connections use lamp cord or speaker cable.

Speakers

Your CARVER Receiver output is designed for use with 4 - 16 ohm speakers. If you plan to have both A (main) and B (remote) speakers, you should use 8 or 16 ohm speakers to prevent overload.

Note: Be sure to observe proper wiring "polarity". Most speaker wire is clearly marked with a raised line along one conductor, or has one wire a different color from the other. Connect the (+) Receiver output to the (+) or "marked" (color dot or other marking) Speaker terminal. Do not allow stray strands of wire to touch adjacent terminals or the metal chassis.

In-phase operation is important in obtaining the stereo image, and vital in achieving the incredible reality of the CARVER Sonic Hologram.

Phonograph

Connect the turntable leads to the PHONO input. If the turntable has a ground wire (usually black or green) connect it to the PHONO GND screw. Plug the turntable AC cord into the AC convenience outlet or wall socket.

Tape Deck(s)

Connect your Recorder's inputs (usually labeled AUX or LINE IN) to the Receiver's TAPE OUT 1 jacks. The Receiver's TAPE IN 1 jacks should be connected to your Recorder's PRE AMP OUTPUT or LINE OUTPUT jacks. You can connect a second Recorder's inputs to the Receiver's TAPE OUT 2 jacks and the Recorder's output to the Receiver's TAPE IN 2 jacks.

AUXiliary Equipment

The auxiliary inputs may be used with any high level source – a second tuner, TV audio, an additional tape player or recorder, short wave radio, etc.

Antennas

Your receiver comes with an FM Dipole Antenna and AM loop antenna. For FM reception, connect it to 300-ohm antenna terminals on the rear. Tack it to the back of a record cabinet or onto a wall – the higher the better. For the best FM reception, you should use an external antenna.

Compact Disc Player

Connect your Compact Disc player to the CD inputs.

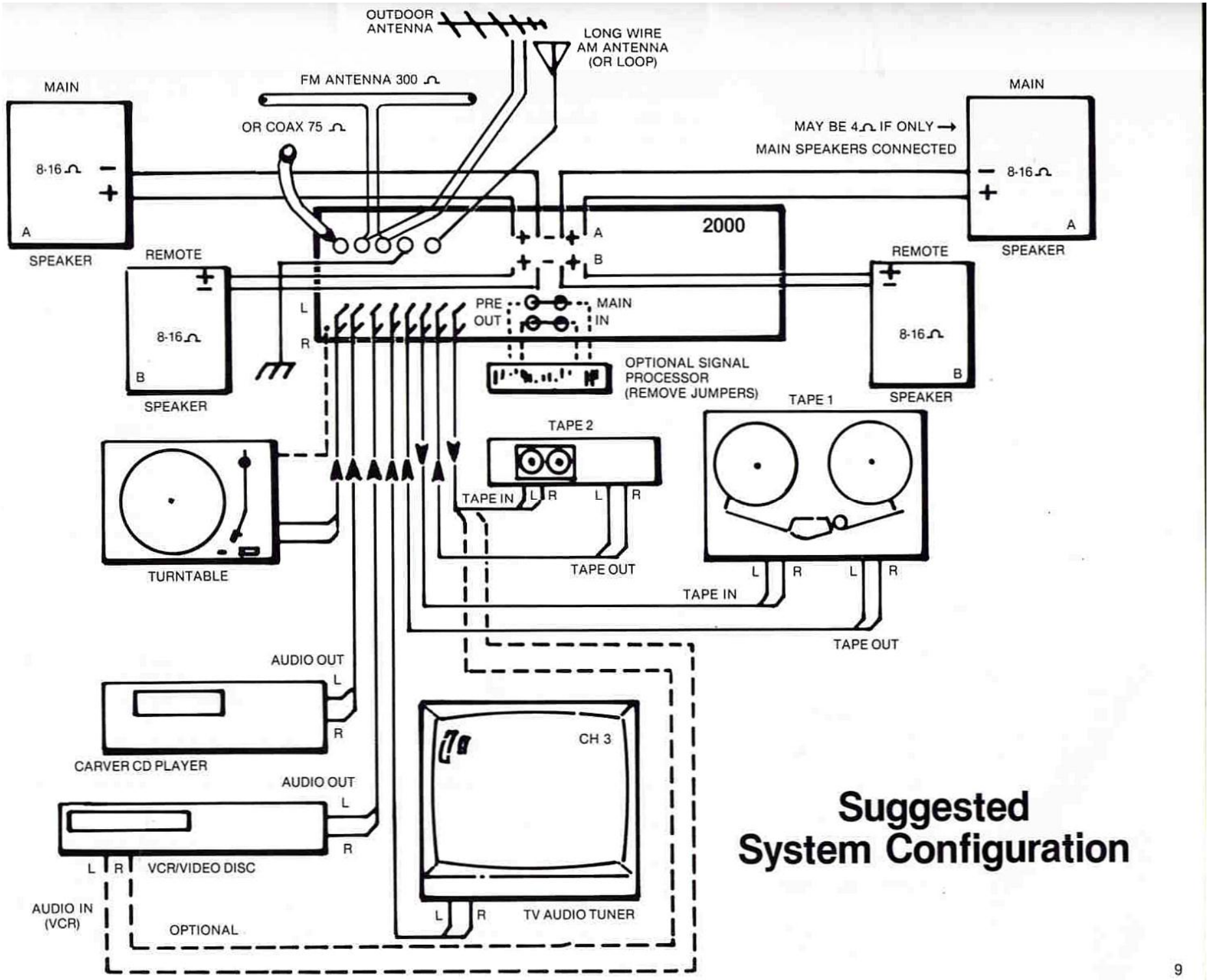
Video

Connect the Audio output of your videotape or video disk machine here.

Before Plugging In Your CARVER Receiver

- Double-check all connections – especially the Speaker connections – to assure that they are all secure and that there are no shorts.
- Set the Volume control to minimum (counter-clockwise) position.
- All push buttons should be out.

Now, connect the power cord to a source of AC power and you are ready for fantastic sound!



Suggested System Configuration

Using Your CARVER Receiver 2000

Power On

Press POWER button to turn the Receiver on. You can also use the Remote Control for Power on/off.

Note: After about 5 seconds, you'll hear a faint click as the protection relay closes. This pause before the output stages are activated protects your speakers and the Receiver's internal circuitry from high-level switching pops and voltage peaks during the power-on cycle. The faint click is your reminder of this vital safety feature. If at any time during operation the protection relays are activated (by a short across the speaker terminals for example), the Receiver will become silent. If this happens, check for improper connection or overheating.

Speakers/Headphones

Set SPEAKERS Selector to A or B (or A + B). For private listening, set SPEAKERS to OUT and plug a pair of headphones into PHONES.

Select the Source

Press the desired Selector push-button: TUNER, CD, PHONO, VIDEO, or AUX.

AM/FM Reception

Press Tuner. Press AM or FM push-button.

Auto Tuning

Press the AUTO TUNING button and press either UP or DOWN TUNING button. The Receiver will automatically stop at the next station. To continue or make another choice, press either TUNING button again. The locked LED will indicate perfect tuning. When you reach the highest frequency (1620 (or 1611) kHz AM, 107.9 (or 108.00) MHz FM) in UP TUNING mode, it will automatically start over. The Receiver will continue to scan the band over and over again. The Auto TUNING will only stop at strong signals on AM and FM. If you want to tune weaker stations, you will have to tune manually. Push the Manual Tuning button to Manual position for manual tuning. You may have to press MUTE for weaker stations. You may find weaker stations noisy. To improve FM quality, engage the Asymmetrical Detector. If the stations still sound noisy or distorted, push the Noise/Multipath button.

If Band Narrow

Pressing the IF BAND NARROW button increases the ability to listen to an AM or FM station on a crowded dial, or when the station is close to a stronger one that is contributing some spillover, by reducing the band of frequencies passed to the rest of the receiver.

How to Set the Memory

A total of 12 frequencies can be set into the Receiver's memory (six for FM, six for AM).

1. Press either AM or FM push-button.
2. Tune to desired station (either Automatically or Manually).
3. Press the MEMORY SET button. The MEMORY LED will be lit.
4. Press MEMORY 1; the MEMORY LED will turn off.
5. Repeat steps 2 - 4 until all the stations you want are set into the Memory.
6. Select the other band (AM or FM) and repeat as above for six more frequencies.

Want to change the stations you've stored in Memory? Simply add new stations as in steps 1 - 6 and old ones are automatically erased.

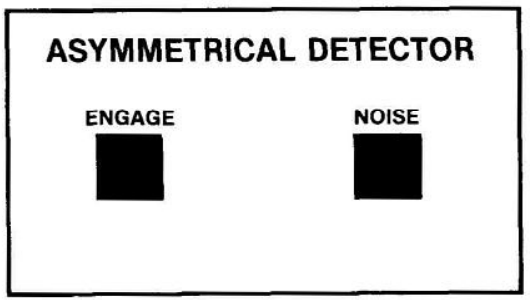
Note: You may want to put a small stick-on label next to each MEMORY button to show the call letters of the stations set into Memory.

Memory Receive

To tune a frequency programmed into Memory, just press the desired Memory button, 1 through 6. If AM push-button is pressed, you'll receive the AM frequency· if in the FM mode, you'll receive the FM frequency.

Note: When the Receiver is unplugged, a built-in Time Constant Circuit will keep the pre-set frequencies in Memory for a few hours. If the Receiver is unplugged for more than a few hours, you'll have to re-enter stations into Memory.

Asymmetrical Detector



The ENGAGE button engages the circuit. Simply push for quiet FM reception.

The NOISE button is a two position switch that allows you to optimize the circuit for a particular reception problem. In the "OUT" position, the circuit will reduce weak station noise. When the button is pushed to the "IN" (Multipath) position, the circuit will reduce both weak station noise and multipath distortion. Ordinarily, the button is positioned "OUT", except for those reception conditions where multipath distortion is present. Feel free to experiment with either position and choose the best.

Listening to Records

Press PHONO push-button and set rear panel switch to Moving Magnet or Moving Coil position. Adjust the VOLUME, BALANCE, BASS, MIDRANGE and TREBLE controls.

Note: For the best fidelity and longest record life, make sure the cartridge on your turntable is operating within the recommended tracking force. Too light or too heavy tracking forces cause distortion and record wear.

Auxiliary Sources

You can also connect high-level sources to your Receiver for even more versatility and enjoyment. Typical auxiliary equipment would be: tape player, TV audio, a UHF or VHF tuner, ham radio, etc. Connect such sources to the rear panel AUX inputs and press AUX push-button. You can also use VIDEO and CD INPUTS.

VOLUME and BALANCE

Increase or decrease the VOLUME control for a pleasant listening level. You can monitor the power available to the speakers by observing the two POWER METERS. If necessary, adjust BALANCE for best stereo effect and channel balance, or to compensate for slightly off-center listening positions.

Tone Control Settings

Your Receiver gives you unusually precise control over the frequency response. You're probably familiar with the use of bass and treble controls. But the MIDRANGE control may seem a little new to you. MIDRANGE (sometimes called "presence") affects frequencies in the human voice range. When you're listening to a vocalist, try varying the MIDRANGE setting. You'll see that an increase in midrange response moves the singer into the background of the ensemble. To increase bass, midrange or treble response, rotate the appropriate control clockwise; to decrease, rotate control counterclockwise. In center position, controls are removed from the circuit for a flat, unadjusted response.

Or, you can leave the control set for your favorite sound compensation and just press TONE when you want to engage the control.

Sonic Holography

The Sonic Hologram Generator is fully explained in a later section of this manual.

For Low Listening Levels

Press LOUDNESS. This increases low frequencies to overcome the human ear's lack of sensitivity at low listening levels.

Tape Functions

Your Receiver has two sets of Tape Input and Output jacks on the rear, plus DUBBING and MONITOR switches on the front panel. This makes it easy to copy tapes, make dual recordings or record any program source without changing rear panel connections.

Recording

Set the Function switch to the desired source – you can record any program source being played through your receiver. Set TAPE DUBBING to center (off) position. Adjust Volume, Balance and tone controls for your preference – they will not affect the output to your Recorder. If you have a 3-head tape deck, you can set TAPE MONITOR switch to 1 (or 2) to hear the recording immediately after it passes the recording head.

When TAPE DUBBING and MONITOR switches are set to their center (off) positions, the signal you are listening to (AM, FM, PHONO, etc.) will appear at both TAPE 1 and TAPE 2 OUT jacks. So, you can record via either or both jacks.

If you set TAPE MONITOR to other than OFF, it will interrupt the "source" signal and connect the Receiver's input to the TAPE IN jacks selected by the position on the TAPE MONITOR switch.

To Duplicate (Dub) Tapes:

Let's say you have Tape Deck "A" connected to TAPE 1 IN and OUT jacks. And you have Tape Deck "B" connected to TAPE 2 IN and OUT jacks.

Put Tape Deck "A" into Play function. Set DUBBING to 1 ▶ 2 and Record with Tape Deck "B". If Tape Deck "B" is a 3-head machine, you can monitor its recording by setting TAPE MONITOR to 2.

You can also record onto Tape Deck "A", when Tape Deck "B" is in the Play mode. Just set DUBBING to 2 ▶ 1. Then, to monitor the recording made on Tape Deck "A" (assuming "A" is a 3-head machine), set MONITOR to 1. As you use and experiment with these jacks and front panel switches, you'll soon begin to appreciate the unusual flexibility and versatility of these inputs and outputs.

Dubbing While Listening to Another Source:

It's possible to dub tapes (from Tape 1 to Tape 2 or Tape 2 to Tape 1) while you are listening to another source (TUNER, PHONO, VIDEO, CD, or AUX). This surprising feature is possible because the TAPE IN/OUT circuits are independent from the rest of the circuitry under the following conditions:

(a) TAPE MONITOR switch must be set to center (off) position.

(b) TAPE DUBBING switch must be set to 1 ▶ 2 or 2 ▶ 1 position, depending on which deck is in playback mode and which is in record mode.

So now if you're doing a lot of dubbing and it gets tedious, you're free to listen to whatever source you choose.

PLAYBACK

If you have a Tape Deck connected to one of the TAPE IN jacks, you can set TAPE MONITOR to the desired positon and, regardless of which input source you're using, you will hear the tape being played.

Note: If you have set TAPE MONITOR to 1 or 2 without a signal source being connected to TAPE IN 1 or TAPE IN 2, the Receiver's sound will cease. TAPE MONITOR (1 or 2) interrupts the signal flow through the Receiver and activates TAPE IN 1 or TAPE IN 2 for the input source. So if the Receiver is "dead", be sure MONITOR is not set to 1 or 2.

Using The Remote Control

The remote control supplied with your CARVER Receiver 2000 is wireless, sending coded signals to the receiver. Commands include Power ON/OFF, Volume UP/DOWN (10 dB), Tuning 6 Stereo AM and 6 Stereo FM stations), Video, CD, and TUNER. You also have the ability to turn on the CARVER Sonic Hologram at will from anywhere in the listening area.

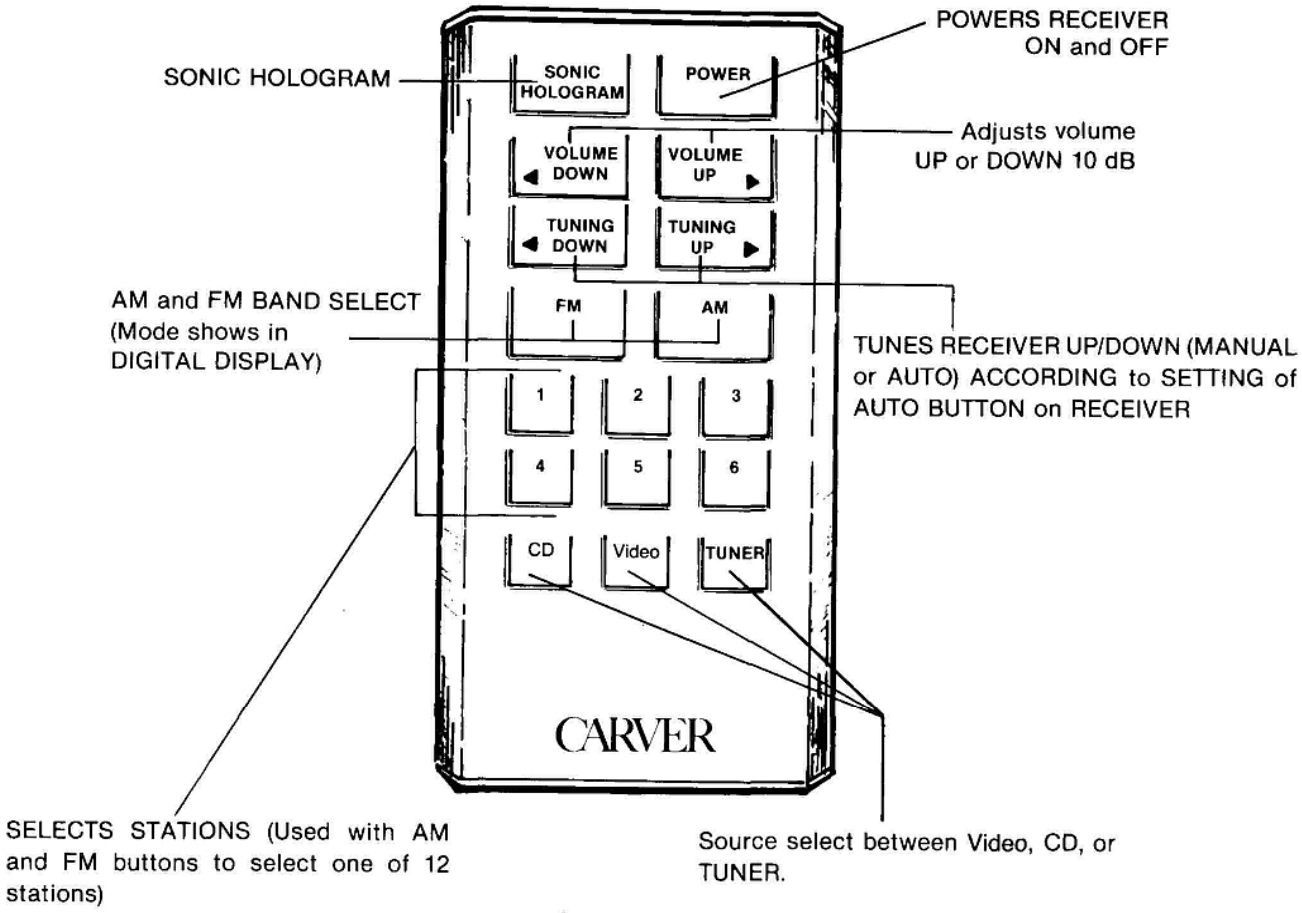
Transmission is in infra-red so the receiver will not switch unless expressly commanded to. Reception is not influenced by visible light or random infra-red light sources. Operation in any normal listening area is reliable.

Other infra-red remote controls, to operate your VCR for example, should not cause switching. Because the coding for each type of control is different, each component should respond as it is supposed to.

Two AAA, 1.5V (UM-4) batteries are needed to power the remote control They should be installed in the battery compartment. Be sure to orient them properly. If the remote doesn't work, verify how the batteries are oriented before trying anything else.

Fresh batteries will be required when you note that the distance at which the receiver responds is becoming shorter. The off-axis angle, the cone in which the receiver responds may also become narrower as the batteries age.

No attempt should be made to open the case. Static charges can mean a repair job.



Remote Control Overrides

Unlike less sophisticated receivers, you can't quite set-and-forget the volume control on the receiver. Let's give you an example:

Suppose that you have been listening with the volume control on the receiver cranked up rather heavy. Then you lower the volume as much as it will go using the remote.

Now, when you turn the receiver on again, the microprocessor will have lost the command it last received, which was "Volume Down 10dB." When the relays kick in, dutifully, the output will be whatever the volume control on the front panel says it is supposed to be, which in our example is a full 10dB greater.

Believe us, it may cause you to scramble for the volume control, or at least shut down the volume using the remote control.

If you keep the Master volume control on the front panel set to a reasonable level there won't be a problem. You can always use the remote control to increase the volume for that session, and decrease it when the phone rings.

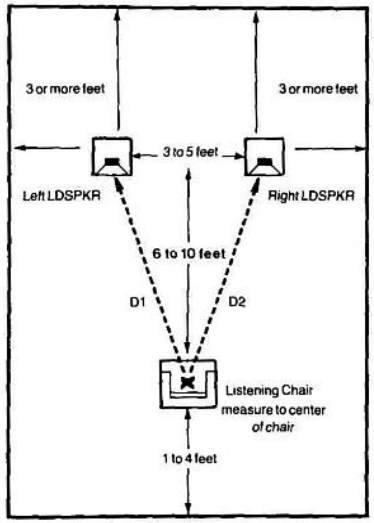
THE CARVER SONIC HOLOGRAM

Your Carver Receiver 2000 is equipped with the acclaimed Sonic Hologram. When the Sonic Hologram is engaged, and your listening position and speaker placement are correct, you will hear a recreation of the three-dimensional sound field of the original musical performance. Sonic Holography is designed to work with any true stereo source; records, tapes, compact discs and stereo radio broadcasts.

Simply put, the goal of Sonic Holography is to so situate in space the various instruments and vocalists that you can not only differentiate the sounds clearly, but actually pinpoint their aural presence within your listening area. It is spectacular!

Making Sonic Holography Work

Making Sonic Holography work properly requires attention to many factors that usually aren't problems or considerations for normal stereo playback. The two most important factors are accurate relationships between the loudspeakers and listening chair, and dealing with reflected sound off surfaces in the listening room. The real key to this process is the relationships between the loudspeakers and chair. While minimizing room reflections is almost as important, a musical image in Sonic Holography will never occur unless the loudspeaker/listening chair relationship is achieved accurately and correctly. It might seem impractical, or a lot of trouble and effort, but you'll be amply rewarded by the stunning, live imaging Sonic Holography brings to your favorite music.



It may be the initial loudspeaker/listening chair placement will not work on a day-to-day basis in your listening room. While the relationships between the loudspeakers and the listening chair must always be the same, there are compromises that should suit the specific needs of your listening space, yet provide for good imaging. We know you want to begin listening to music in Sonic Holography right away. The following section will allow you to do that with the least amount of hassle, and the best first-time results.

To perform the set-up, you'll need a tape measure, temporary listening chair, and adhesive tape (masking, "scotch," electrical). To arrange your loudspeaker system and listening position for Sonic Holography, perform the following step-by-step:

Initial Loudspeaker/Chair Placement

STEP ONE: Move your loudspeakers out and away from the side walls, rear wall, and other reflective surfaces shown in the diagram above. The diagram represents a "universal" listening room with loudspeakers and the listening chair. The loudspeakers should be at least three feet from reflecting surfaces – measured from the wall behind the speakers, side walls and nearby adjoining corners.

Unless your loudspeakers are designed to rest on the floor, place them on stands – ideally, high enough so the midrange/high-frequency drivers are approximately at ear level with a seated listener. Move the speakes fairly close together – three to five feet from center-to-center. The loudspeakers should be positioned to place the listening chair on an axis with the direct sound from each.

STEP TWO: Take the temporary listening chair and place it six to ten feet in front of the loudspeakers. It's ideal to have a rear wall one to four feet behind the chair. If this isn't practical because of room dimensions, move the chair closer to the loudspeakers, not up against the rear wall.

STEP THREE: Using a tape measure or nonstretchable measuring device, carefully measure from the left loudspeaker's top/center to the center of the listening chair. Repeat the measurement for the right loudspeaker, making both distances (D1 and D2 in the diagram) EXACTLY THE SAME. Accuracy within ¼ inch is desired. If using a measuring device other

than a steel tape measure, don't pull too hard on it, as this could cause an error. Have an assistant hold the measuring device to the center of the chair's seat, or secure it with a piece of tape.

If your loudspeakers are "odd shaped," and you aren't sure where to measure from, measure from the chair to the center of the midrange driver.

The goal of this step has been to place the listening chair at a point equidistant from both loudspeakers. This places a seated listener on what can be called the "stereo axis." Being on this acoustic centerline is very important to hearing a musical image in Sonic Holography. If you've performed Step Three carefully, a seated listener in the chair should have a ready-made window for initial experiments with Sonic Holography. You'll undoubtedly have to make some minor adjustments but this should get things going.

It's not enough to try and visually "guesstimate" the distances between the loudspeakers and listening chair. What might appear to be accurate probably won't be accurate enough for creating images in Sonic Holography so don't bother to try it this way.

When one loudspeaker is off, the stereo axis shifts. This places the listener in a position where imaging in Sonic Holography won't occur. The best plan is to perform the measurements as outlined in Step Three. Once you've made these measurements and positioned the loudspeakers and listening chair, take some tape to mark their locations on the floor. If you must move things around during this initial set-up, it will allow you to return things quickly to the proper positions without measuring again.

A Word of Caution:

You may be tempted to skip the three steps for correct loudspeaker/chair placement and engage the Sonic Hologram immediately. Even without establishing the proper relationship between the listening position and the loudspeakers, you will hear additional hall ambience and an enlarged sound field, but don't deprive yourself of the **true** three-dimensionality of Sonic Holography. Sonic Holography is much more.

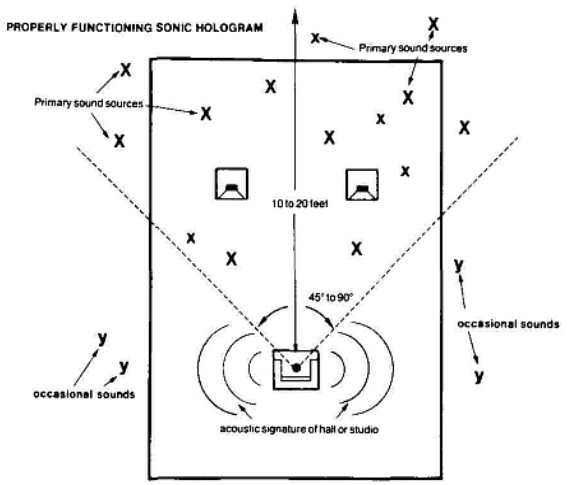
Speakers and listening position set up? Now it is time to read on for the next steps toward achieving Sonic Holography.

A Properly Functioning Image in Sonic Holography

Before listening to some musical selections in Sonic Holography, it's only fair to describe what you should be hearing and what to be listening for. With correctly positoned loudspeakers and listening chair, a Sonic Hologram should give you a sonic image as described and illustrated in the following section. The "X" marks individual sound sources (instruments, vocal artists, etc.).

Musical instruments, and other sound sources, will be spread out in a large arc in front of you with the arc's angle ranging from 45° to 90°. Sound images will exist to the left and right, extending well beyond the limits of the loudspeakers and, occasionally, all the way to the extreme left and right. You'll be able to perceive a sonic stage depth of 10 to 20 feet with sound images clearly floating behind and, from time-to-time, in front of the loudspeakers. You can actually turn your head and look at the sound images; these images will seem to stay put in space. Some sound images will seem to clearly emerge from outside the walls of the listening room. At the listening chair, you get the feel of the sonic signature or ambience of a location where the recording was made. From the stunning reverberation of a gothic cathedral to the subtle sonic signature of a recording studio, this sense of location helps to make the Sonic Hologram convincing, believable, and well-defined.

Now that a properly functioning Sonic Hologram has been described in words, it's your turn to try Sonic Holography in your own listening space. So far, this manual has discussed the "nuts and bolts" end of Sonic Holography. If you've correctly established the initial relationship between the loudspeakers and listening chair, you should be able to experience Sonic Holography almost right away. But, before actually listening to Sonic Holography, take a couple of minutes to preflight your stereo system:



1. Visually check out and confirm that all components are connected in-phase (all left-channel outputs to left-channel inputs, right-channel outputs to right-channel inputs).

2. Check and confirm that the loudspeakers are properly wired in-phase (positive "+" loudspeaker outputs on the amplifier(s) should be connected to the positive terminals on the loudspeakers, negative "-" outputs to negative terminals on the loudspeakers).

3. If your system employs an external equalizer to flatten room response, it's recommended to switch it out to the stereo system's signal path. The simple act of moving the loudspeakers to the proper position will drastically alter room response. Any room curve you've developed will no longer be valid. Wait until you've had a chance to experience and experiment with Sonic Holography before re-equalizing the room. Room response will also be altered by any sound treatments used to reduce room reflections, so wait until all phases of the set-up are complete to save time and trouble.

4. Inspect the phono stylus and cartridge for proper phasing, wear, and tracking. Other than possibly damaging valuable LPs, a cartridge/stylus in poor shape can upset the balance of the program material before it gets to the rest of the stereo system. This can simulate certain acoustic problems that cause strong one-side imaging, with weak imaging on the other.

5. Set the balance control in the preamp to "center."

6. Be sure the program material used during the initial set-up is really recorded in stereo. If you've selected older recordings, check the liner or jacket to confirm this. Recordings "rechanneled for stereo playback" are just monaural recordings; you will not create a successful Sonic Hologram from program material of this kind. We suggest selecting a stereo recording with only a few instruments and the human voice for first-time attempts at Sonic Holography.

Test Flight for Sonic Holography

At this time, take a musical selection and place it on your turntable. Engage the SONIC HOLOGRAM. Go back and sit in the listening chair to begin enjoying the amazing depth and life Sonic Holography brings to music.

If you're not getting the full imaging described earlier, that's okay. It will take a while to learn to hear the full effect created by Sonic Holography, and might require more adjustments to optimize the listening room's acoustics for the best results. If you've performed the initial set-up instructions exactly, you should get some holographic imaging right away. If this isn't happening, go back and make sure the loudspeakers and listening chair are correctly, accurately positioned. Retrace your steps and check the instructions before giving in or giving up. Sonic Holography is such a totally unique and pleasurable experience, it's worth the time spent doing it the right way.

Fine Tuning the Sonic Hologram

After listening to Sonic Holography with your stereo system properly set up, you'll be in a position to begin fine tuning the complete system – in short, the room, loudspeaker placements, your ears, and the room's acoustics. The subject of loudspeaker/listening room interaction, and how we perceive this interaction, is complex. You might have to go over the following section more than once to get a better understanding of what to do to get the best results. Different rooms and loudspeaker systems have some variations in response or interaction that can't be accounted for on an individual basis, so don't be afraid to experiment.

Dealing with Reflections

In theory, the ideal listening room would be relatively dead, acoustically, near the speakers to absorb the early reflections, leaving only the direct sound to reach your ears. Then the Sonic Hologram would fully convey not only the stereo image, but the accoustics of the studio or concert hall direct to you without smearing or muddying the sound.

Also in theory, the same room would be acoustically live behind you to achieve a uniform sound field through late reception of random sounds long after the direct sounds have arrived.

Your effort should be to provide absorption near the lateral plane of the speakers and a few feet out from them to absorb the early reflections, and, as such as possible within the budget, liveness at the other end or side of the room.

Sound-absorbing materials, such as foam-backed drapes, with many 4 or 6 inch pleats are good. Drapes will permit you to place the speakers in front of a large window, which would otherwise not be the thing to do. Bookcases with many books of different sizes can do a pretty fair job. Keep the fronts of the books staggered to breakup the early reflections, and note that any empty bookshelf can act as a tuned cavity to give you sound colorations.

Soft-pillowed upholstered furniture placed at the sides of the listening area can do a great job of absorbing the early reflections. A low hassock placed two or three feet in front of the speakers in a line to your listening position can do much to improve the Sonic Hologram if you have bare floors. Throw rugs help, too.

Any flat, hard surface on the side walls can be sound treated for a few feet out from the plane of the speakers, especially at the height of the midranges and tweeters in your speaker systems. Absorption of the early reflections off the side walls often does a lot to enhance the Sonic Hologram.

Generally, an acoustic-tiled ceiling is better for the sound image than one made of plaster or drywall.

How Sonic Holography Works

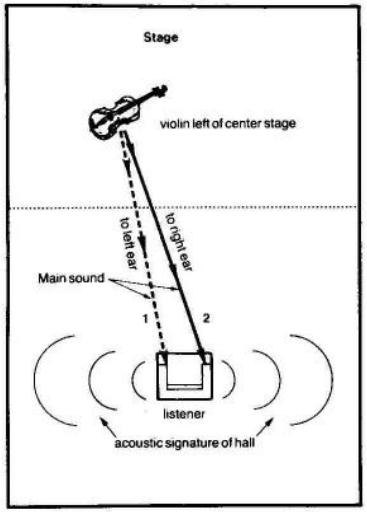
Sonic Holography is a complex method of processing stereo signals to correct the basic imaging-flaw inherent in conventional stereo playback. The problem with conventional stereo playback is that both ears hear the output of both loudspeakers. In order to understand why this is a problem, a comparison must be made between the way we hear a stereo recording of a live event played back through loudspeakers, as opposed to hearing an acutal sonic event. Look at the diagrams.

Diagram A shows what occurs during playback in conventional stereo. A note played on a violin is recorded in stereo with a single microphone to pick up the sound. The signal from the microphone goes to a stereo mixer which takes and splits it electronically with a "pan pot." A pan pot can be compared to the balance control on a preamp. In this case, panned slightly left for a stronger signal in the left channel with some signal going to the right channel. This also simulates the violin's location in the left/right panorama of a stereo "stage." When the mixer's outputs are recorded and played back over loudspeakers, the sound of the violin note is reproduced by the left channel loudspeaker. The sound travels in a straight line to your left and right ears. Since the violin note was recorded in both stereo channels, some version of the original note will be reproduced by the right channel loudspeaker. The sound from the right loudspeaker arrives at your right ear, then, filtered by your head, at the left ear. As shown in Diagram A, this single violin note is represented in stereo playback by FOUR sound arrivals at your two ears.

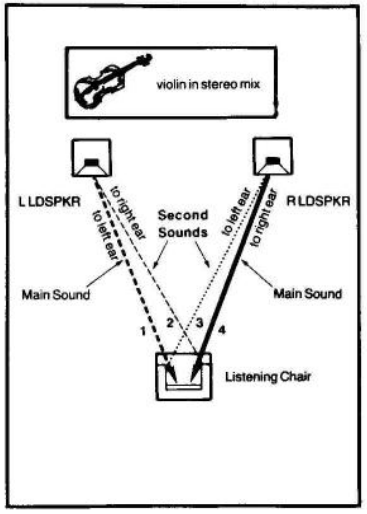
Look at Diagram B – a representation of a live sonic event. Instead of electronically simulating the violin's location, it's actually left of center stage. As a member of the audience, a listener is facing straight ahead, looking at center stage. When a note is played on the violin, the sound arrives first at the left ear then, a fraction of a second later, at the right ear. Our ear/brain system uses the delay timing and phase relationships to locate the sound without having to look at the source. This localizing information is derived from the two sound arrivals.

In real life, a single sonic event – like the violin note – can never cause more than TWO sonic arrivals: One at the left ear and one at the right ear, as opposed to the FOUR arrivals occurring in conventional stereo playback. Those extra, second-sound arrivals confuse our ear/brain system. We can't perceive the location of the sound sources within a stereo recording because the clues are masked.

The Sonic Hologram Generator eliminates those extra sonic arrivals occurring in conventional stereo playback. In part, this is accomplished by cancelling out the unwanted second-sound arrivals from each loudspeaker to the opposite-side ear. Each ear is, then, free to concentrate its attention on the same-side loudspeaker. In other words, left ear hearing the left loudspeaker, right ear hearing the right loudspeaker.



A



B

The CARVER Asymmetrical Charge Coupled FM Stereo Dectector

The FM Stereo Problem

The fundamental FM stereo problem is simple: the broadcast system was designed over 30 years ago before the advent of stereo. When stereo came along, two channels were forced to fit where one channel went before. The result: a giant step backwards in terms of noise-free, distortion-free reception for all but nearly ideal and perfect reception conditions.

Your CARVER Receiver 2000 can drastically reduce multipath and distant station noise and still provide fully separated stereo reception with space, depth and ambience. We're tempted to say, sound **quality** as it was intended over 30 years ago. Back then, FM was a noise-free, wide-band alternative to static-filled AM. But it was in mono. Unfortunately, the stereo transmission system selected to augment mono FM ended up degrading the ratio of signal to noise FIFTEEN TIMES! (More than 23 dB.).

That's the system we live with today: hiss and often multipath, distortion-filled unless you're in a direct line with a strong station.

Understanding FM

Stereo frequency modulation transmission is a lot more complicated than you might think. But understanding it will clarify both the problems and CARVER's solution.

Stereo FM is not like a 2-track cassette with separate signals next to each other. Rather, there is a Left-Minus-Right and a Left-Plus-Right signal. A receiving circuit adds and subtracts sums and differences to get Left-only and Right-only signals. (As you might have guessed, Left-Plus-Right comes in just fine on mono receivers because it IS mono.) It's that Left-Minus-Right signal that's to blame.

These signals are transmitted at different parts of the audio spectrum and unfortunately L - R is extremely prone to mishaps on the way to your home.

Audio Ghosting/Multipath

To get stereo FM perfectly, you'd have to be the only house in the middle of a vast flat plain with no other buildings anywhere on the plain.

Because any protruding mass – hills, mountains, skyscrapers, other antennas, even bridges – looms up to reflect signals while on their way to your tuner.

Then you get TWO signals, one directly, and one or more a fraction of a second later, after it's taken a longer angular path of bouncing off something.

(This happens with TV and AM, too. AM isn't audibly affected, but you can see the frustrating result on TV: a second, third and fourth image.)

These additional images are disastrous to FM reception because they reinforce and then remove part of the signal alternately. As the main signal deviates in frequency, it beats with the reflective signal, causing constructive and destructive interference patterns which bear no resemblance to the original signal. An engineer calls these "beats" phase and amplitude modulation.

While modern stereo FM receivers have made much of correcting the amplitude modulation component of this interference, they have never addressed the truly audible distortion caused by the phase modulation part.

All other FM receivers are tricked into reading phase modulation as frequency modulation, which is decoded and made into a brand new signal.

Thus instead of just degrading the existing signal, multipath reception problems actually CAUSE NEW AUDIBLE SOUNDS. And we've all heard how bad these sounds sound.

Your CARVER Receiver 2000 eliminates these distortions whenever the ASYMMETRICAL DETECTOR button is engaged. We recommend leaving the ENGAGE button "IN" all the time and the NOISE button "OUT" for normal listening. For severe multipath reception problems, push the NOISE button "IN" to additionally activate the multipath reduction mode of the circuit.

AM Stereo

Perhaps not quite yet, but as more AM stations start broadcasting in stereo, you will find yourself listening more and more to AM Stereo, especially at night. At dusk many daytime stations go off the air, others reduce power, thus leaving clear channel stations open for long-distance reception.

The net result is the ability to receive, with a good AM antenna, AM stations broadcasting in stereo from cities many hundreds of miles distant, as Seattle listening to San Francisco, for example. Some reception may be so reliable that you will want to set the station frequency into memory for tuning at the touch of a button!

Your CARVER 2000 receiver utilizes the MOTOROLA(tm) CQUAM(r) system to provide discrete left and right channel inputs to the amplifiers. This is not quasi-stereo, but the true stereo signals broadcast by any AM station that uses the Motorola(tm) CQUAM(r) system.

In the absence of stereo-encoded information, AM output is the same broad, high quality monaural signal you are probably familiar with.

A stereo pilot signal is transmitted with an AM Stereo broadcast, much the same as is the pilot signal for FM Stereo. Presence of the pilot causes the decoder to switch the receiver to stereo and light the stereo LED. It's that simple.

If the signal is a strong one, the switch to stereo is almost immediate (Under one second). If tuned to a weak AM Stereo station, the pilot is monitored for a longer period of time (between one and two seconds) before the receiver is switched to stereo.

If the carrier level drops below the threshold for stereo decoding or if the pilot signal is lost suddenly, the stereo LED goes out as the receiver switches to monaural.

TROUBLESHOOTING

ANALYZING WHAT'S WRONG

Isolating the problem is the first step in tracking down the reason why the equipment doesn't work or do what you want it to. Because of the complexity of a large system, with its connecting cables and power cords, only general principles and particular considerations about receiver operation can be given here.

Using the owner's manuals for the various components may be necessary. In any event, disconnecting each component will prove that it is not the cause if the trouble persists.

New high-technology equipment may have bi-directional switching, which means that if something is merely connected, the equipment goes to a preferred (default) mode of operation. This is especially true of video equipment, where the audio circuits are sometimes open to the destination from another undesired source. Simple inline audio switching devices can prevent such unwanted mixing of signals.

Here is a guide to some of the most basic and common difficulties--and how to correct them.

1. Is there power to the receiver? The CARVER logo in the display panel is always lit when the receiver is on.
2. If there are no lights, unplug the unit and check the fuse at the rear panel. Replace it with a fuse of **exactly** the same type and rating.
3. Check for power from the outlet if the receiver won't come on. Plugging in a lamp can tell you quickly if the circuit is live. Check the branch circuit's breaker or fuse at the main panel.

Note: Enough audio equipment on a branch circuit can trip a breaker, just as running an amplifier at very high output levels into less than 4-Ohm loads can blow the fuse at the back panel. Just about any amplifier designed for noncommercial use will pop a fuse from time to time, if only because the fuses themselves aren't perfect.

4. Make sure the audio source is working and sending signals when it is supposed to.
5. If the receiver is on and the LEDS in the power meter are operating, check the settings of the SPEAKERS switch, and the TAPE switches. The Tape MONITOR switch must be in its center position unless you are listening to a tapedeck.
6. Is everything plugged in and connected properly? Here is where consulting the various owner's manuals can help.
7. Is the receiver set to an inactive input? Switch to TUNER to see if you have sound from the amplifier, for example, if you can't get the other input source to play.
8. Check the sound controls; VOLUME and BALANCE for proper settings. No sound in one channel, for instance.
9. No program at the source? FM stations have been known to transmit silence for an extended period of time. Change stations.
10. Loud howl, squeal, or whistle? Feedback from live microphones are the prime offenders. Turn off the Tape MONITOR or turn down the volume or separate the system and the microphones by a greater distance.
11. Thin, shrill or distorted high end. TREBLE control set too high. Phono cartridge wired out of phase, speakers wired out of phase, or their tweeter (brilliance) controls set too high.
12. Try disconnecting the VCR or laserdisc player if you get more than one audio source on a recording. That video switcher may not be the answer to your prayers if you have much audio gear too, unless it also switches stereo pairs.

SERVICE/REPAIR

For assistance and technical information beyond the scope of this manual please contact:

CARVER Corporation

Customer Service

19210 33rd Avenue West, P.O. Box 1237,
Lynnwood, WA 98046
or call (206) 775-6245

Your inquiry will be responded to promptly: We are glad to help. You may be directed to a CARVER Authorized Service Center, or asked to return the unit to the factory. Have the serial number of the unit handy as we must have it before we can authorize the unit's return. If the unit has to be shipped, it should be packaged properly and insured against shipping damage. Your CARVER dealer may be able to offer additional assistance.

PROTECTION CIRCUITRY

No shortcuts have been taken in our commitment to the protection of your speaker systems and the receiver. The CARVER Receiver 2000 has a full complement of protection circuits that includes a sophisticated form of fault-sensing of a dead short across the speaker terminals (the destroyer of output transistors and miscellaneous circuitry). There are no current limiting devices, which can produce audible distortion on program peaks.

The Receiver prevents the following conditions from affecting the outputs by shutting off, in most cases the sound channels immediately:

- Excessive out-of-phase infrasonic (low frequency) oscillation - below 20 Hz. Dropping the tone arm, for example.
- Significant DC offset - 2 to 4 Volt DC-component at the outputs.
- Sustained Clipping - a detector shuts down the amplifier if clipping persists.
- Internal low-level supply imbalances and faults.
- Amplifier overheating 90°C thermal sensor.
- Excessive voice-coil temperatures -Monitors long term average power output, frequency weighted for tweeter protection.

Operation is automatically restored once the offending condition has been corrected. Plainly stated, nothing gets to your speakers but the music.

PATENT NOTICE

The circuitry and application of the Carver Sonic Hologram Generator are protected by patents. Purchase of the Carver Receiver 2000 gives you an implied license to use it to play recordings, but not to make recordings.

Of course, by connecting a tape recorder to the set of Pre Output jacks it is possible to make sonic holography-encoded tapes which will exhibit holographic imaging in normal stereo playback. You may make a few recordings of this type, to demonstrate holography to friends or to experiment with the playback of sonic holography-encoded cassettes in a car. (Note: Of course any copying of recordings may be a violation of the copyright of the performing artist, producer, or manufacturer of the recording.)

You are not licensed to make Sonic Hologram encoded recordings for commercial sale.

SPECIFICATIONS

PRE-AMPLIFIER & AMPLIFIER

Minimum Audio Output Power at no more than 15% Total Harmonic Distortion into 8 ohms, over the audio spectrum 20-20,000 Hz	: 200 watts per channel (RMS power, both channels driven)
Frequency Response (20-20,000 Hz)	: Flat
IM Distortion	: 0.05%
Gain: PHONO	: 35 dB MM
AMPLIFIER	: 26 dB
AUX, TUNER, VIDEO/DAD	: 17 dB
TAPE IN 1, 2	: 17 dB
Tone Control Action BASS (100 Hz)	: ±8 dB
TREBLE (10 kHz)	: ±8 dB
MID RANGE (1.5 kHz)	: ±6 dB
AM Filter (10 kHz)	: – 15 dB
Signal-to-Noise Ratio	
PHONO	: 82 dB
AUX and TAPE IN 1, 2	: 90 dB
TAPE OUT 1, 2 Level	: Maximum 4 volts
FM TUNER	
Sensitivity (IHF)	: 1.8 µV
Sensitivity for 50 dB Quieting Mono, Stereo	: 3.1 µV, 5.0 µV
Limiting Sensitivity (– 3 dB)	: 1.5 µV
Signal-to-Noise Ratio (1000 µV)	: 77 dB
Image Rejection	: 82 dB
IF Rejection	: 80 dB
Capture Ratio	: 1.0 dB
Harmonic Distortion	
Mono	: 0.15%
Stereo	: 0.2%
AM Supression	: 80 dB
Stereo Separation (1 kHz)	: 40 dB
AM TUNER	
Sensitivity Terminal	: 20 µV
Radiated	: 250 µV/m for 20 dB S/N
Distortion (5mV/M)	: 0.9%
Selectivity	: 42 dB
Image Rejection	: 45 dB
IF Rejection	: 34 dB
AGC Figure of Merit	: 50 dB
AM Stereo Separation (1 KHz)	: 30 dB

VIDEO SYSTEM CONNECTION

70 MM surround sound from stereo-output VCR's or Laser Disc players. If your VCR has a stereo output, you can enjoy the full ambiance of theater surround sound as well as the three-dimensionality of Sonic Holography.

Begin by connecting the stereo audio output from your video recorder (or video disc player) into the Receiver 2000's VIDEO INPUT. This will allow you to listen to your video recorder's audio soundtrack through your hi-fi system.

Now you can experience Sonic Holography's effects on your favorite stereo-recorded movies, and can control volume and tone remotely as you would any other sound source hooked into the Receiver 2000.

But you can go a step further and recover full video surround sound rear channel information as well. Simply connect a second pair of speakers to the Receiver 2000's "B" speaker terminals by carefully following this hook-up diagram.

Place the second set of speakers in the rear of your viewing room. Note that only two of the four "B" speaker terminals are used and that another connection is made **between** the two speakers.

The Receiver 2000's SPEAKER SELECTOR SWITCH **must** be set in the "A + B" position when using this 4-speaker hook-up to enjoy surround sound on video tape movies.

When listening to video soundtracks through your stereo system, simply set the Receiver 2000's SOURCE SELECTOR to VIDEO.

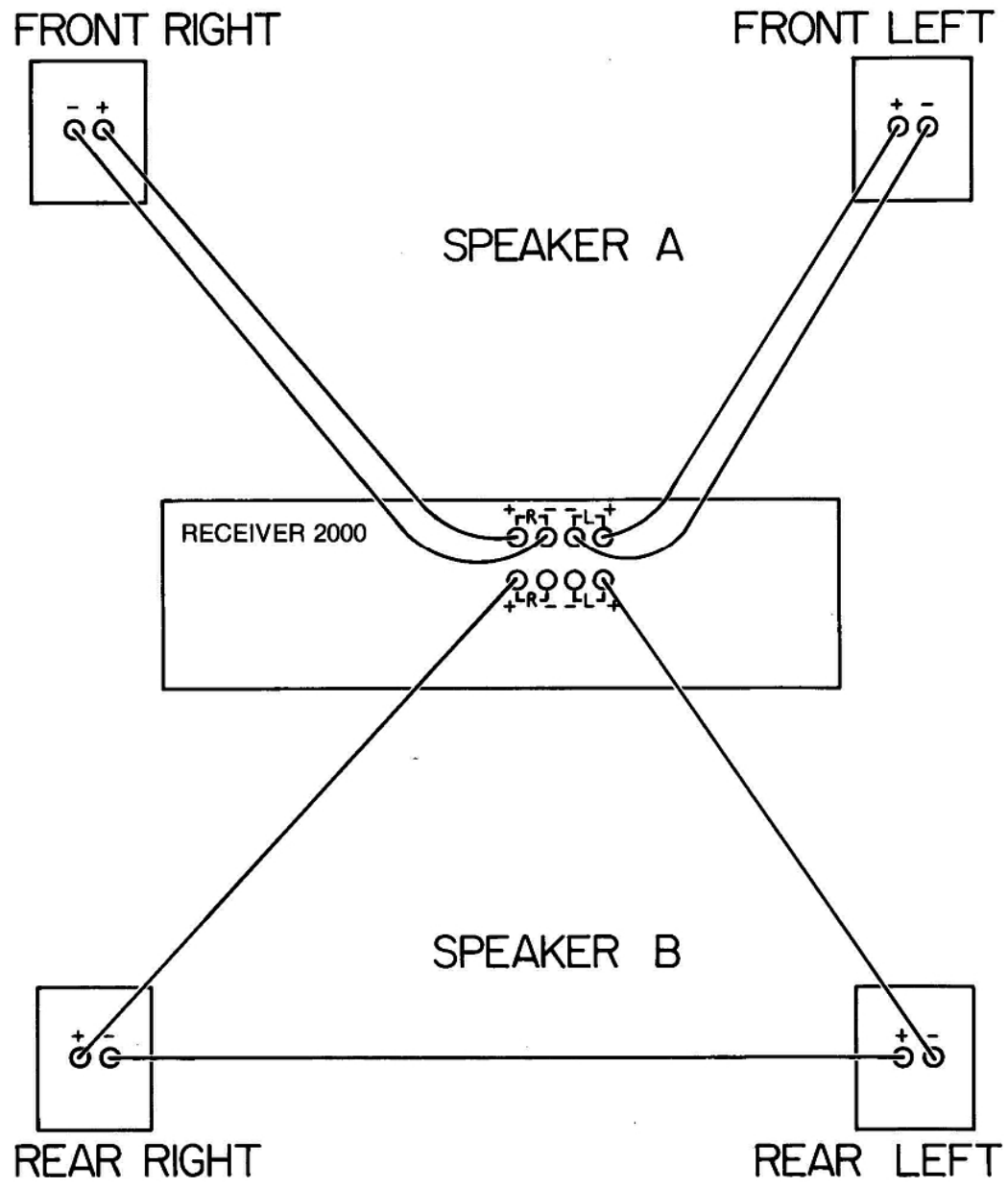
Mono-output VCR's can also be connected through the Receiver 2000. Since this common type of VCR has only one audio out and the Receiver 2000 has a stereo input, it is necessary to devise a way for signals to run into both left and right channels of the Receiver 2000.

While this can be solved simply by pressing the MONO Signal button the Receiver 2000, we recommend the purchase of an inexpensive "Y" cord which splits one signal into two identical signals. This accessory can be obtained from most Carver dealers or audio hobbyist stores.

Connect a signal cord from the single audio output on your video cassette recorder to the single end of the "Y" cord.

Connect the dual end of the "Y" cord to the VIDEO INPUTs on the back of the Receiver 2000.

When listening to video soundtracks through your stereo system, simply set the Receiver 2000's SOURCE SELECTOR to VIDEO.



Carver Corporation
Limited Warranty

NOTICE: The following warranty information is exclusive to the United States only. Please see your Carver dealer or distributor for the correct warranty information in your area or locale.

Carver Corporation is proud of its products which have been built with care using advanced technology and premium parts. Your unit has been crafted to perform properly for many years. Carver Corporation offers to you, the owner of a new Carver product, the following warranty:

The Carver Corporation Warranty for each of its products is in effect for two years from the date of original retail purchase. The Carver Corporation Warranty covers defects in materials and workmanship. However, the following are excluded: a) damage caused during shipment, b) damage caused by accident, misuse, abuse or operation contrary to instructions specified in the Carver Corporation owner's manual, c) units where the serial number has been defaced, modified or removed, d) damage resulting from modification or attempted repair by any person other than authorized by Carver Corporation.

The Carver Corporation Warranty extends to the original owner or subsequent owner(s) during the two-year warranty period as long as the original dated purchase receipt is presented whenever warranty service is required.

If your Carver Corporation product ever requires service, write to or call Carver Corporation (Attention: Customer Service Department), 19210-33rd Ave. W., P.O. Box 1237, Lynnwood, Washington 98046, (206)775-6245. You will be directed to an authorized Carver Corporation Service Station or receive instructions to ship the unit to the factory. Please save the original shipping carton and packing materials in case shipping is required. Please do not ship by Parcel Post. Be sure you have received authorization from Carver Corporation and include a complete description of the problem, the associated components and connections, and a copy of the purchase receipt. Initial shipping costs are not paid by Carver Corporation; return shipping costs will be prepaid if repairs were covered by the scope of this Warranty.

All implied warranties, including warranties or merchantability and fitness for particular purpose, are limited in duration to the two-year length of this warranty, unless otherwise provided by state law.

Carver Corporation's liability is limited to the repair or replacement, at our option, of any defective product and shall not, in any event, include property or any other incidental or consequential damages which may result from the failure of this product.

Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. We suggest that you attach your purchase receipt to this Warranty and keep these in a safe place. Thank you for your choice of a Carver Corporation product.