OWNER'S MANUAL

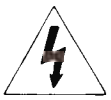
Sonic Holography® Preamplifier Tuner
MODEL CT-Seven

CARVER

Powerful · Musical · Accurate

CARVER

Powerful · Musical · Accurate



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user of 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 of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Safety Instructions

1 Read Instructions - All the safety and operating instructions should be read before the Preamp/Tuner is operated.

2 Retain Instructions - The safety and operating instructions should be retained for future reference.

3 Heed Warnings - All warnings on the Preamp/Tuner and in the operating instructions should be adhered to.

4 Follow Instructions - All operating and other instructions should be followed.

5 Water and Moisture - The Preamp/Tuner should not be used near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

6 Ventilation - The Preamp/Tuner should be situated so that its location or position does not interfere with its proper ventilation. For example, the Preamp/Tuner should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

7 Heat - The Preamp/Tuner should be situated away from heat sources such as radiators, or other devices that produce heat.

8 Power Sources - The Preamp/Tuner should be connected to a power supply only of the type described in the operating instructions or as marked on the Preamp/Tuner.

9 Power-Cord Protection - Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the Preamp/Tuner.

10 Cleaning - The Preamp/Tuner should be cleaned only as recommended in this manual.

11 Non-use Periods - The power cord of the Preamp/Tuner should be unplugged from the outlet when unused for a long period of time.

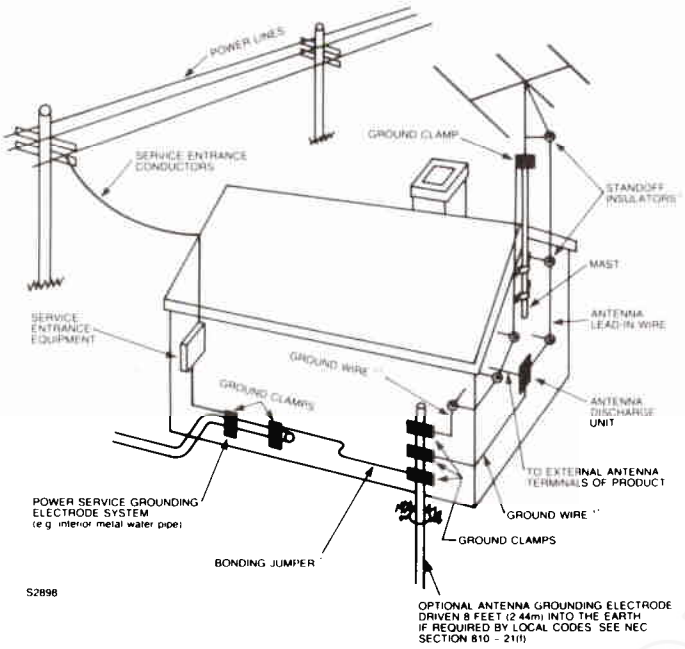
12 Object and Liquid Entry - Care should be taken so that objects do not fall into and liquids not spilled into the inside of the Preamp/Tuner.

13 Damage Requiring Service - The Preamp/Tuner should be serviced by qualified service personnel when:

A. The power-supply cord or the plug has been damaged; or
B. Objects have fallen, or liquid has been spilled into the Preamp/Tuner; or
C. The Preamp/Tuner has been exposed to rain; or
D. The Preamp/Tuner does not appear to operate normally or exhibits a marked change in performance; or
E. The Preamp/Tuner has been dropped, or the cabinet damaged.

14 Servicing - The user should not attempt to service the Preamp/Tuner beyond those means described in the operating instructions. All other servicing should be referred to qualified service personnel.

EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 – "RADIO AND TELEVISION EQUIPMENT"



a. Use No. 10 AWG (5.3 mm²) copper, No. 8 AWG (8.4 mm²) aluminum. No. 17 AWG (1.0 mm²) copper-clad steel or bronze wire, or larger, as a ground wire.
b. Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4–6 feet (1.22–1.83 m) apart.
c. Mount antenna discharge unit as close as possible to where lead-in enters house.
d. Use jumper wire not smaller than No. 6 AWG (13.3 mm²) copper, or the equivalent, when a separate antenna-grounding electrode is used. See NEC Section 810-21 (j).

Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

PORTABLE CART WARNING

15 Power lines - An outdoor antenna should be located away from power lines.

16 To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

Pour prévenir les chocs electriques ne pas utiliser cette fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames peuvent étre insérées à fond sans en laisser aucune partie à découvert.

17 Grounding or Polarization - Precautions should be taken so the grounding or polarization means of the receiver is not defeated.

18 Outdoor Antenna Grounding - If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges.

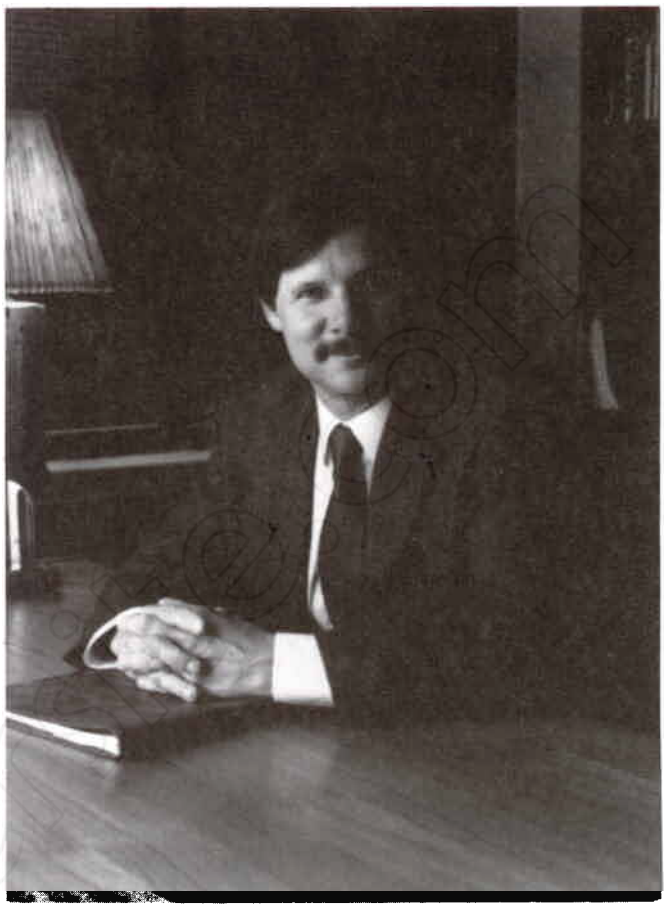
Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

* Internal line voltage selector switches should only be reset by qualified service technicians for proper attachment plug for alternate voltage. See an authorized dealer for more information.

* See your Authorized Carver Dealer for information on the attachment plug for alternate line voltage use. This pertains to dual voltage units only.

Introduction

A Message From Bob Carver



Dear CARVER Customer,

Thank you for choosing CARVER electronics. We at CARVER CORPORATION realize that there is an abundance of home electronics from which to choose, and the differences between the various models are not always apparent at first glance. CARVER CORPORATION strives to produce for you the finest in audio reproduction equipment which integrates the latest and best technology with the most competitive price possible.

Each piece of our electronics is feature-packed with advances that are unrivaled. When you purchase our products you are receiving electronics that will provide you with years of enjoyment.

The CARVER Sonic Holography® Preamplifier Tuner Model CT-SEVEN gives you FM stereo performance unmatched by that of any other tuner. 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 (A.C.C.D.), the stereo signal arrives at your ears virtually noise-free. You hear fully separated stereo with space, depth, and ambience.

The CARVER Sonic Holography® feature creates new dimensions in listening. The Sonic Holography® Sound Processing System produces a sound image which is three dimensional. Musical instruments and other sound sources are displayed before you, extending well beyond the limits of the loudspeakers. Your favorite music and video soundtracks come alive with stunning images.

I am proud to present to you the best in craftsmanship and design found in CARVER electronics.

Bob Carver

Robert W. Carver
President, CARVER CORPORATION

Table of Contents

1

Prior to Installation

NOTE: Do not connect the Model CT-SEVEN to AC power until all signal connections have been made and the installation is complete.

Unpacking Your Preamp/Tuner

Make a note of the serial number which is located on the back of your Preamp/Tuner. Record it in the space provided for convenient reference. You will need to refer to this number in the event you require service or if it is stolen.

Model CT-SEVEN

Serial number 90806669

Purchased at _____

Date _____

Please save the box, as well as all of the internal packing materials!

This container is the best way to store and move your new Preamp/Tuner. If your Preamp/Tuner should need repair, the original container is ideal for shipping to a CARVER Service Center.

Upon opening the box, please check for any visible sign of damage that does not appear on the outside of the box. If you do encounter what appears to be concealed damage, please consult your Dealer before proceeding to further unpack the unit.

If no damage is found, gently lift out the unit by grasping the handles. After lifting the Preamp/Tuner out of the box, gently lift first one side, then the other and remove the molded side packing material. Inside the box you will also find the Remote Control, batteries, and an Antenna.

A Definition of a Preamplifier Tuner

A Preamplifier Tuner is a new generation of stereo equipment designed to become the focal point of your home electronics center.

It is designed to easily accommodate and interface with all of your other electronic entertainment devices including your VCR.

Our Model CT-SEVEN is capable of routing the audio signal of several different types of components, as well as supplying the AC power requirements of up to four different components.

A Preamp/Tuner is comprised of two main control areas that process the audio signal. Within the chassis you have the Tuner and the Preamplifier

that have been integrated into a single convenient package and are controlled by an infra-red Remote Control unit.

1 Tuner

The Tuner allows you to select and listen to AM and FM radio signals. In addition to being able to log or store your favorite radio stations in a convenient memory for rapid access, your CARVER Tuner also incorporates a special section called the ASYMMETRICAL CHARGE COUPLED FM DETECTOR, or A.C.C.D. for short. This is a patented circuit which allows the Tuner section of your Preamp/Tuner to create quality reception from weak stations. Refer to Section 4 for more details on this circuit.

2 Preamplifier

The Preamplifier is the control center of your Preamp/Tuner system. It directs and regulates the flow of signals inside your system. If you want to select the Tuner, or perhaps a CD player to listen to, you route the signal selection with your Preamplifier. In addition to source selection, your Preamplifier also prepares and delivers all of the signals to the Power Amplifier to drive your Loudspeakers. Refer to Section 2 for additional information on Front Panel Controls.

2

Front Panel and Controls

Operation of Front Panel and Controls

1 POWER (AC Power Switch)

This is a push on/push off switch that controls not only the master AC function of the Preamp/ Tuner, but also two of the SWITCHED AC plugs found on the rear panel. When engaged, a slight delay of 1 1/2 seconds occurs until the Preamp/ Tuner is fully energized. This start-up delay is designed to allow the unit an opportunity to self-check all of its internal circuitry before bringing all to an on-line status.

2 MEMORY (Memory pre-sets)

The nine buttons allow you to log and store your favorite AM and FM radio stations for rapid access. Please refer to Section 4 for more details.

3 AUTO (Tuning)

This function allows your TUNER to seek the strongest, clearest radio stations and to pass over those signals that are either too weak or distorted to be fully enjoyed without using the FM A.C.C.D. button (#18). In addition, if this switch is OFF (indicated by the LED status light), the TUNER will be in its MANUAL TUNING Mode, which will require you to depress either the UP or DOWN switch until you reach the desired station. When NOT in AUTO Mode, the LED automatically shifts to MANUAL (#4).

4 MANUAL (Tuning)

This switch places your Tuner into MANUAL mode, and is interactive with the AUTO (Tuning) Switch as described in (#3) above.

5 and 6 FM-AM (Selectors)

These two switches select the band you want your TUNER to receive, either AM or FM.

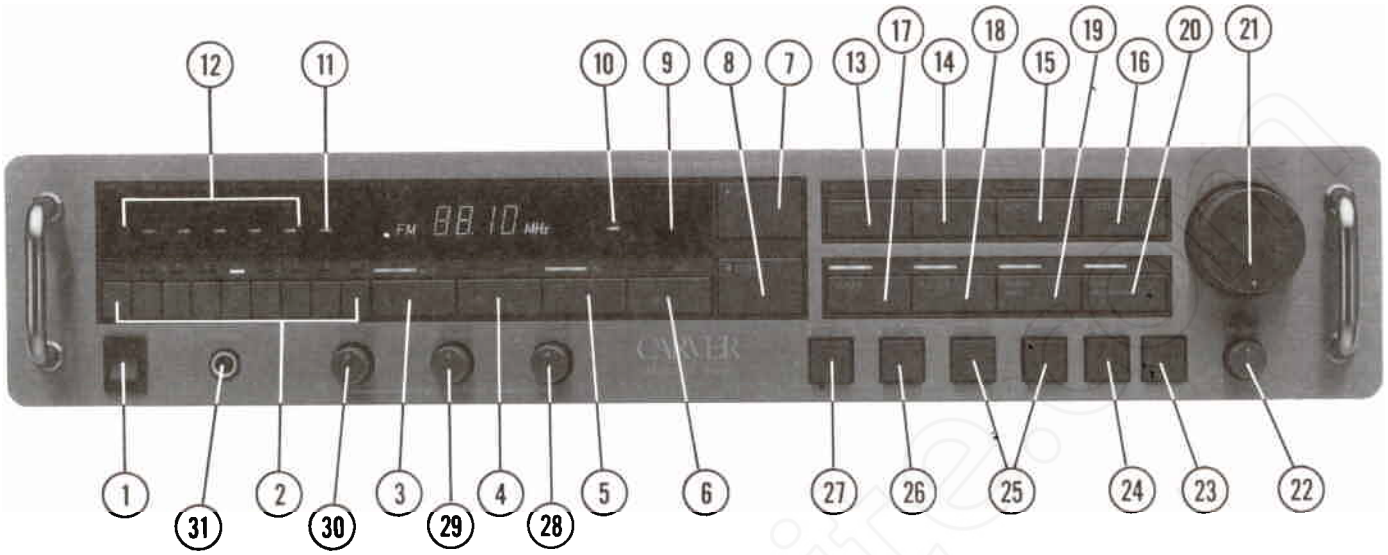
7 and 8 UP DOWN (Tuner Control Buttons)

When depressed, these controls allow you to select the AM or FM radio station of your choice. These controls are interactive with AUTO and MANUAL controls.

9 REMOTE SENSOR (Remote Sensor window)

This small rectangle is the sensor window for the Remote Control. Your Remote Control functions when it is aimed in direct line-of-sight with this window.

Figure 1 Front Panel



10 STEREO

This LED indicates that you are receiving a true stereo signal from the source.

11 LOCKED (Digital Display Readout)

This LED display indicates that your Tuner is locked on to the exact AM or FM frequency shown in the digital display readout.

12 SIGNAL (Signal Strength Meter)

These LEDs indicate the relative incoming signal strength of AM or FM broadcast. With all LEDs illuminated, your TUNER section will be receiving a maximum signal.

13-17 Source Selection

The five control switches are activated one at a time. Each switch has a small rectangular LED directly above which when illuminated gives visual confirmation that the "Source" is engaged. The different main sources are as follows:

13 PHONO

Activates the PHONO jacks located on the rear panel. The turntable that is connected to these jacks must have a moving-magnet phono cartridge. A moving-coil cartridge will require a preamp for proper signal gain.

14 CD

This switch activates the Compact Disc input jacks for playback.

15 VIDEO 1

Activates AUDIO inputs for the VIDEO jacks on the rear panel. This circuit is designed for the Audio section derived from a Video Cassette Recorder (VCR), Laser Disc Player, a satellite receiver, output signal from a stereo or audio-out signal from an MTS-Stereo Television Set.

16 VIDEO 2/AUX

This switch selects the audio from the VIDEO 2/ AUX source.

The switch when engaged illuminates the LED and activates any high-level source connected to the AUX input jacks on the rear panel. This could be used for the audio component of a computer, computer game, ham radio or scanner, portable electronic key board, extra tape deck, etc.

17 TUNER

This activates the AM or FM Tuner of the Preamp/Tuner.

18 A.C.C.D. (Multipath Noise Reduction Circuit)

This switch engages the patented ASYMMETRICAL CHARGED COUPLED FM DETECTOR, and the MULTIPATH REDUCTION CIRCUIT incorporated in your Preamp/Tuner. To receive weak/multipath signals such as those produced by a distant or weak FM radio station, switch OFF the AUTO (Tuning) switch and tune to the desired station. If you are able to see the STEREO indicator, depress the A.C.C.D. switch to restore the sonic signature of the broadcast and recover a previously noisy station. The A.C.C.D. LED is lit when this button is engaged.

19 AUDIO MUTE

When AUDIO MUTE is depressed on the front panel or Remote Control, this LED illuminates. The AUDIO MUTE function reduces the volume level by 90%. Press again to release and restore the original sound level.

20 SONIC HOLOGRAM

This switch controls the built-in Sonic Holography® circuit. When engaged, and set-up conditions have accurately been met, this circuit creates music dimensions not normally realized with conventional stereo. The SONIC HOLOGRAM® LED is lit when this button is engaged. Refer to Section 5 for more details about this amazing processor.

21 VOLUME (Master Gain)

This rotary control sets the power output, or gain to your amplifier. When the knob is rotated fully counterclockwise, the volume or gain to your amplifier is at its lowest point. The VOLUME can also be controlled using the Remote Control.

22 BALANCE (Balance Control)

This rotary control allows you to shift the center balance between your loudspeakers to adjust for different room acoustics or loudspeaker placement. With the knob in its vertical center position, both amplifier channels will be receiving the same amount of output from your Preamp/Tuner. Rotating the knob to the left, or counter-clockwise will increase the power to the left, as well as decreasing the power to the right, and vice versa.

23 LOUDNESS

This switch creates a proper tonal balance in your system when listening at lower volume levels. This overcomes the human ear's reduced sensitivity at low listening levels by compensating the loss of low and high frequencies. This circuit should not be engaged at higher listening levels.

24 MONO

Engaging this switch allows your entire sound system to reproduce the same signal out of both the left and right speakers with the resulting signal composite being one of pure L + R, and not presenting a stereo sound stage. This is best used when listening to noisy stereo signals or a video game.

25 DUBBING
T1—>T2 T2—>T1

When the T1—>T2 switch is depressed, you can directly dub the music from the Tape deck connected to TAPE 1 into the deck on TAPE 2. The same is true if you depress the switch T2—>1 position, but now the TAPE 2 circuit will be in control, and will send its output signal directly to the input jacks of TAPE 1. This is handy when copying a cassette to a reel to reel recorder or vice versa.

26 T1 T2 (Tape Selector)

This switch allows you to select between two different tape players. When the switch is in the out position, TAPE 1 is engaged and when the switch is depressed, TAPE 2 is engaged.

27 TAPE MONITOR OFF ON

With the switch in the OFF position, neither of the tape decks will be engaged in the circuit. Depressing the switch engages the circuit and input jacks located on the rear panel.

NOTE: When either T1 or T2 is engaged, no other source selection switches will enter the signal path. Please check this switch if you encounter problems.

TONE CONTROLS:
28 TREBLE

This rotary knob adjusts the high frequency level of the source material. Turning the knob clockwise increases the amount of high frequencies and turning counterclockwise decreases high frequencies.

29 MIDRANGE

The knob controls the level of the midrange frequencies.

30 BASS

The knob controls the low or bass tonal frequencies.

31 PHONES (Jack)

This is for private listening with quality headphones. Standard headphones are recommended for connection to this output port. If you have an exotic electrostatic design of headphone, please refer to the manufacturer's product manual.

Remote Control

Two AA batteries are needed to operate your Remote Control unit. Insert the batteries supplied with your Preamp/Tuner in the back sliding panel. Match the positive (+) and negative (–) polarities as indicated inside the battery compartment.

1 POWER

Switches the MODEL CT-SEVEN ON and OFF.

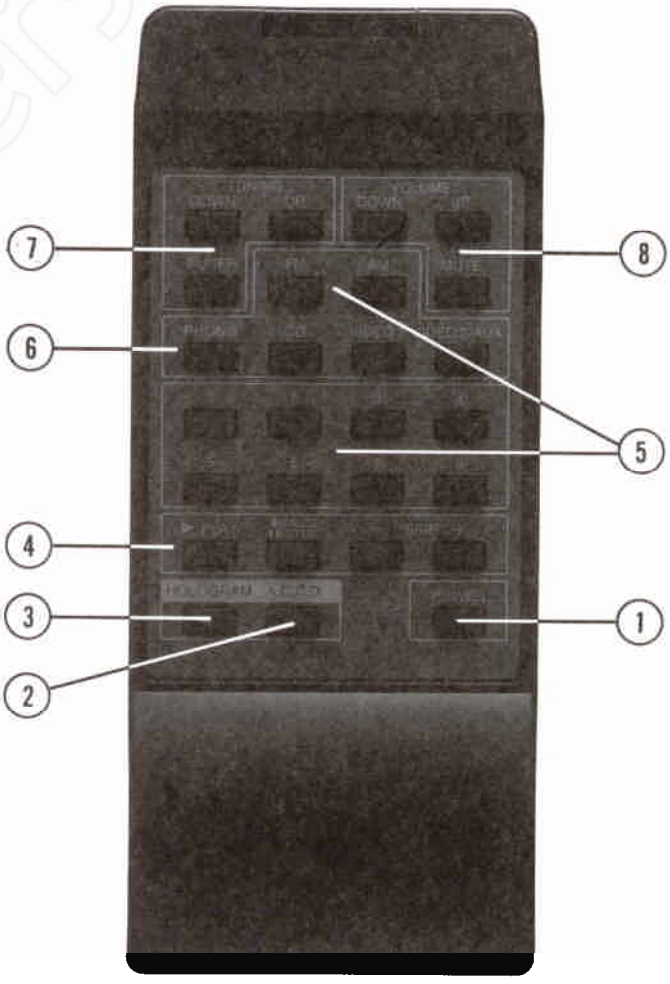
2 A.C.C.D.

This button engages the ASYMMETRICAL CHARGED COUPLED FM DETECTOR and the MULTIPATH REDUCTION CIRCUIT.

3 HOLOGRAM

Selects the SONIC HOLOGRAPHY® circuit ON or OFF.

Figure 2 Remote Control



4 CD (Player Functions)

PLAY PAUSE STOP SKIP – +

PLAY
This button begins the play of a disc in a CARVER CD player.

PAUSE/STOP
This button pauses or stops the disc in CD player.

SKIP (–) (+)
Lets you reverse or go forward on the disc in the CD player.

NOTE: The CD functions control the CARVER DTL-50 or the DTL-200 CD players and newer models.

5 FM/AM and **1-8** Pre-sets

FM/AM select buttons and buttons numbered one through eight provide pre-set programming of eight stations for FM and eight for AM.

6a PHONO

This button selects the Turntable.

6b CD (Compact Disc Player)

Selects the CD unit.

6c VIDEO 1

Selects the VIDEO audio inputs.

6d VIDEO 2/AUX

This button engages the auxiliary unit connected to the rear panel AUX jack.

7a TUNER

This button selects the AM/FM tuner.

7b TUNING DOWN UP

These buttons select the AM/FM stations. When reaching the highest frequency in UP tuning mode, your Preamp/Tuner will scan the band over again if AUTO is selected.

8a VOLUME DOWN UP

These buttons increase or decrease the listening level to the speakers for all functions. It will vary the volume from zero to maximum.

8b MUTE

When depressed, this function reduces the volume level by 90%. Pressing this button again will increase the volume level to normal. The LED on the front panel will light when MUTE is selected.

3
Rear Panel and Connections

NOTE: Connect Left input cables to Left input jacks. Connect Right input cables to Right input jacks. Similarly, connect Left and Right output cables to proper Left and Right output jacks. This is important in maintaining proper phasing within your system.

Rear Panel

1 GROUND (Phono Ground Screw)

Connect the ground wire (typically green or black) from your turntable to this screw. This will eliminate hum.

2 PHONO (Phono Jacks)

Connect turntable with moving-magnet cartridge to these jacks. This circuit is activated by depressing the PHONO switch on the front panel of your Preamp/Tuner.

3 CD (Compact Disc Player)

Connect the outputs of your Compact Disc player to these jacks.

4 VIDEO 1

Connect any high-level source as described in Section 2. These jacks are activated when the VIDEO 1 switch is engaged on the front panel.

5 VIDEO 2/AUX

Connect the outputs of your VIDEO 2/AUX sources.

6 TAPE 1 IN (Tape 1 Input Jacks)

These jacks are for the line-out, or incoming signal from a tape deck, and are utilized to listen to the signal coming from the tape deck. The TAPE MONITOR switch must be in the TAPE 1 position to activate this circuit.

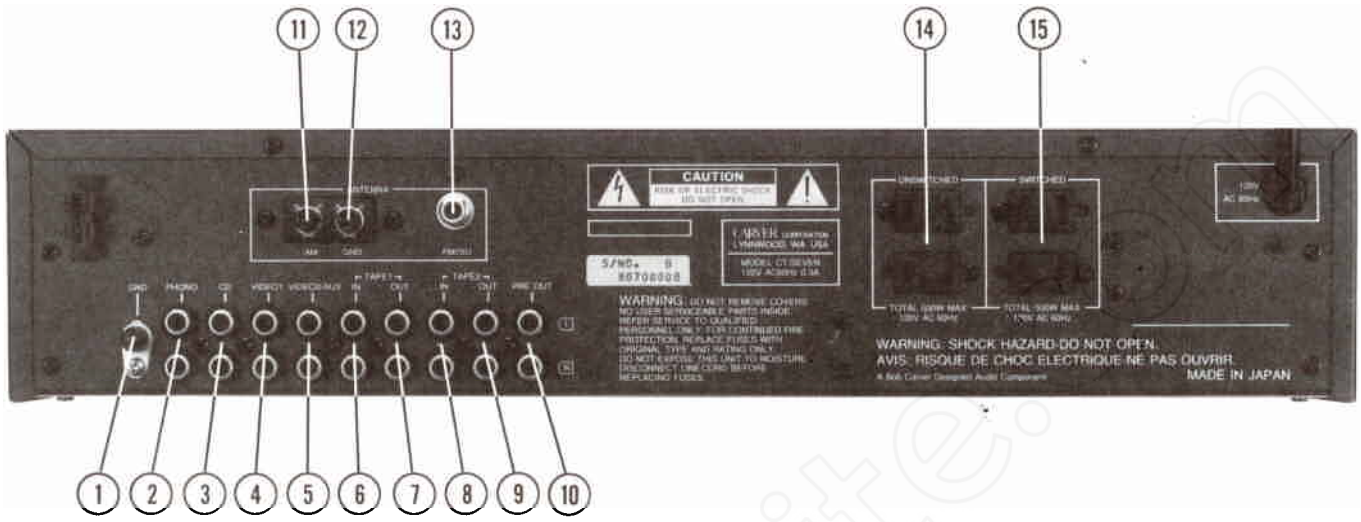
7 TAPE 1 OUT (Tape 1 Output Jacks)

These jacks send the signal from the Preamp/ Tuner to the inputs of the tape deck. These must be properly connected before the tape deck will be able to record or monitor any signals.

8 TAPE 2 IN (Tape 2 Input Jacks)

These are the same as described in (#6), but are

Figure 3 Rear Panel



for a second tape deck source, and are activated by the T2 position on the Front Panel.

9 TAPE 2 OUT (Tape 2 Output Jacks)

These are the same as the description found in (#7) above, but are designed for a second tape deck.

10 PRE OUT

Use this output to drive an amplifier.

11 AM Antenna Mounting Bracket

Connect the supplied plastic AM Loop antenna to this terminal. Refer to System Configuration Figure 4.

The AM loop antenna snaps into these supports. **This antenna is adequate for most locations** for AM reception. Adjust the antenna for best reception. The antenna may also be wall mounted with the supplied bracket.

ANTENNA
12 AM and GND (Screw Terminal)

Connect an external AM antenna here for long distance AM reception. In most cases, the supplied AM loop antenna will provide excellent reception. Connecting a ground wire to the GROUND terminal is optional when using an internal antenna but its use is recommended if an outside external antenna is used. See Notice in front of this manual.

13 FM 75 OHM (Antenna Terminals)

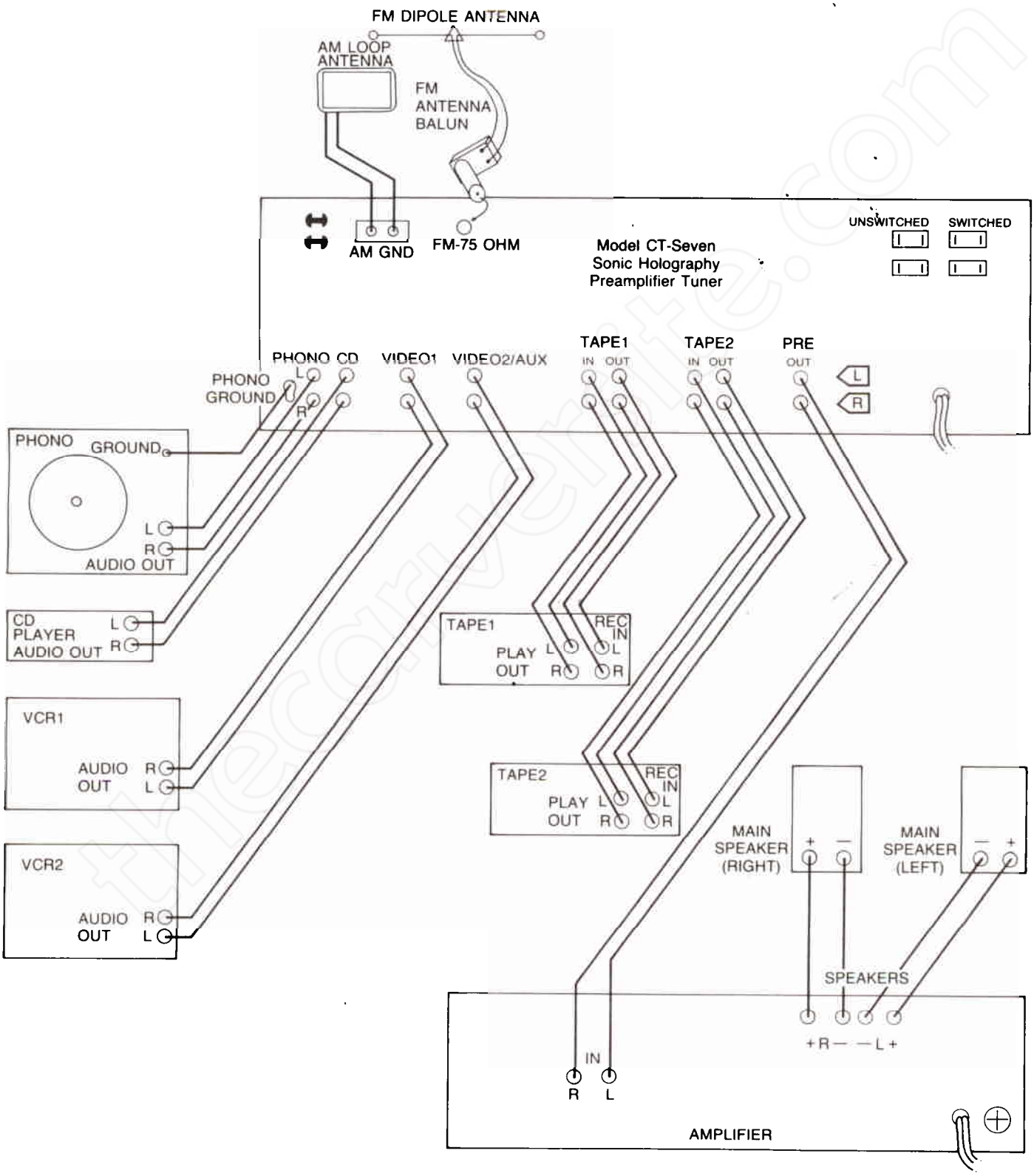
You can either connect directly to your local Cable Television System for FM (consult your Cable Operator) using coaxial cable, or use the supplied 75/300 ohm adaptor and dipole ribbon antenna. Caution should be used when connecting your Preamp/Tuner to an external outside TV/FM antenna. See Notice located in the front of this manual. If uncertain, please refer to qualified personnel. If hum occurs when using the 75 ohm terminal, install a 75/300 ohm balanced transformer to the coaxial cable, and reconnect to the supplied 300 ohm to 75 ohm adapter to break the ground loop that is causing the offending hum.

14 UNSWITCHED (Unswitched Convenience AC Power)

The two outlets are NOT turned on and off with the main POWER switch on the Preamp/Tuner, but are always ON. They can be used to supply

System Configuration

Figure 4



power to any accessory up to 500 watts total.

15 SWITCHED (Switched Convenience AC Power)

These two switches are similar to #14 above. These power outlets provide 110 volts AC. The SWITCHED outlets are controlled by the Main Power Switch of the Preamp/Tuner. They will accommodate any additional accessory with a power rating of up to 500 watts total.

Amplifier Connections

Locate the Right and Left input jacks of your amplifier. Using a good quality signal cable, connect the wire coming from the Right main output from the CT-Seven to the Right input jack of the amplifier.

CD Player, Cassette Deck, and DAT Connections

To connect a cassette recorder/player or Digital Audio Tape recorder/player (DAT) you will use the bank of input/output jacks shown as numbers 6-7-8-9 on Figure 3. High quality interconnect cables are recommended. Also achieving proper phasing is important in being able to make and play back recordings. We recommend that you connect each lead one at a time to eliminate possible confusion.

Antenna and Cable (CATV) Connection

Potential hazards can arise from an improperly installed antenna. Electrical hazards can result from an external antenna as well as connection to your local Cable Television system. Please refer to the Safety Instructions.

4

Using Your AM/FM Tuner with A.C.C.D.

Tuner Controls

Auto/Manual Tuning

This function allows your TUNER to seek radio stations that have the strongest and clearest signals and to automatically "lock on" to them. It also has the option to pass over those signals that are either too weak or distorted to be fully enjoyed without using the FM A.C.C.D. If this switch is OFF, indicated by the LED status light to the immediate right of the switch, the TUNER will be in its MANUAL Mode. In this mode, depress either the UP or DOWN switch until you reach the desired station.

AM FM (Band Selection)

Select by pushing the FM button for FM broadcasts or the AM button for AM broadcasts. The Digital Display of the Preamp/Tuner provides visual confirmation of the AM or FM band you have selected.

1-8 (Memory Preset Selection)

The series of nine switches have built-in LEDs. The far right button is labeled SET. It is used to "log" your favorite stations into memory. You can **SET up to 16 of your favorite stations** using eight stations for FM and eight for AM. To use this feature, simply tune to your favorite AM or FM station and push the SET button. Then, while the SET button is illuminated, push any one of the PRESET buttons numbered 1-8. Your selection is now logged into the memory section of the Tuner, and will remain there until you change it. To **delete old stations from memory**, simply replace with new stations and the old ones will be erased.

1-8 Memory Presets will not become erased when your Preamp/Tuner is either switched OFF, or unplugged for short periods of time. If your Preamp/Tuner is unplugged for more than a few hours, you will need to re-enter the stations into Memory.

Using A.C.C.D. for Very Weak Stations

The ASYMMETRICAL CHARGED COUPLED FM DETECTOR, and MULTIPATH REDUCTION CIRCUIT are patented circuits incorporated in the Tuner of your Preamp/Tuner. Only the CARVER Preamp/Tuner has these circuits which improve reception of weak/multipath ridden signals such as ones produced by a distant or weak FM radio

power to any accessory up to 500 watts total.

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station. To fully utilize, switch OFF the AUTO switch and tune to the desired station. If the STEREO LED remains constantly illuminated, depress the A.C.C.D. button to capture the previously noisy signal.

Using A.C.C.D. to Eliminate Multipath

Multipath distortion occurs when the station is not weak, but the reception is unsatisfactory. To eliminate this problem, depress the A.C.C.D. button to let only one signal, the best signal, enter your Tuner.

To receive 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. Any protruding mass - hills, mountains, skyscrapers, other antennas, even bridges will 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 disasterous 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 tuners have made advances towards correcting the amplitude modulation component of this interference, they have never addressed the truly audible distortion caused by the phase modulation part.

Without being too technical, all other FM tuners are tricked into reading phase modulation as frequency modulation, which is decoded and made into a brand new signal. So, instead of just degrading the existing signal, multipath reception problems actually cause new audible sounds. And we have all heard how bad these sounds are.

Your CARVER Preamp/Tuner eliminates these distortions whenever the ASYMMETRICAL CHARGED COUPLED FM DETECTOR button is engaged.

5

CARVER Sonic Holography®

Principles of Sonic Holography®

Sonic Holography® Sound Processing System will greatly increase your listening pleasure and enjoyment by bringing a completely new perspective to your favorite music, as well as a totally new dimension to the audio soundtrack of all video sources.

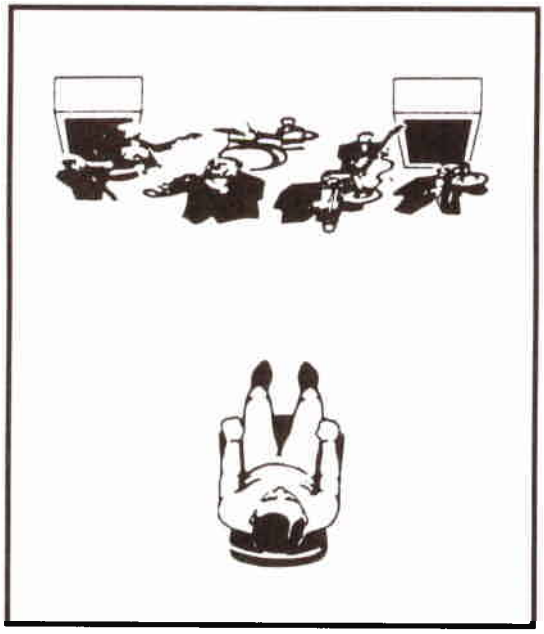
For years sophisticated systems for recording and reproducing stereo have been offered as being supposedly capable of further enhancing the "you-are-there" feel of a movie or musical performance. However, certain problems with conventional stereo playback would always limit this "enhanced realism" to the space between the loudspeakers. Even with the addition of digital delays and other ambience-restoring equipment or loudspeaker systems, perceived realism was still a problem.

Conventional stereo does not begin to approach the sound quality of a live sonic event. Stereo reproduction is subject to fundamental distortions of spatial perspectives that just do not occur in real life. Everyone has become accustomed to the limits of stereo and has learned to listen to normal stereo imaging because they enjoy the music, not because it sounds like a real live performance. But remember, the ultimate goal of a stereo sound system is not just to play back good sounding music. The ultimate goal of a sound system is to re-create the performance.

Bob Carver researched the way people perceive sound and applied the research to the stereo listening experience. CARVER's logical problem-solving breakthrough brings an actual improvement in the quality of listening through complex processing of the stereo signals, and a change in relationship between the listener and loudspeakers. Now, instead of flat, "between-the-loudspeaker" imaging associated with conventional stereo, CARVER's Sonic Holography® Sound Processing System paints a sonic picture that is remarkably believable and convincing. Refer to Figures 5 and 6. A listener can actually pinpoint the location of individual artists and instruments far beyond the limits of the standard left/right loudspeaker arrangement. At times, sound even seems to come from outside the listening room.

The ambience or acoustic signature of a recording's location is vital to the sound of a live musical event but masked in conventional stereo playback. With Sonic Holography® the tonal effect makes your favorite music a full, three-dimensional experience of unparalleled realism and creates a sense of being there.

Figure 5



Conventional stereo: The sound is heard, more or less on a flat curtain of sound between the two speakers. There are Volume differences only and the timing cues are gone.

Figure 6

Sonic Holography®. The sound is reproduced much like that of a concert performance, complete with timing, phase and amplitude cues.

Correct Loudspeaker Placement

NOTE: To fully generate and enjoy three dimensional musical images in Sonic Holography® follow the instructions and recommendations for positioning your loudspeakers, as well as the recommended listening area.

Making Sonic Holography® work properly requires attention to many factors that usually are not considerations for normal stereo playback. The two most important factors are the accurate relationships between the loudspeakers and your listening chair, and dealing with reflected sounds off of various surfaces in the listening room i.e. windows, doors, drapes, etc.

It may be that the initial loudspeaker/listening chair placement will not work on a day-to-day basis in your listening room. While the relationship 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.

To perform the set-up you will need a tape measure and a listening chair. To arrange your loudspeaker system and listening position for Sonic Holography®, follow these three steps:

Steps for Loudspeaker and Chair Placement

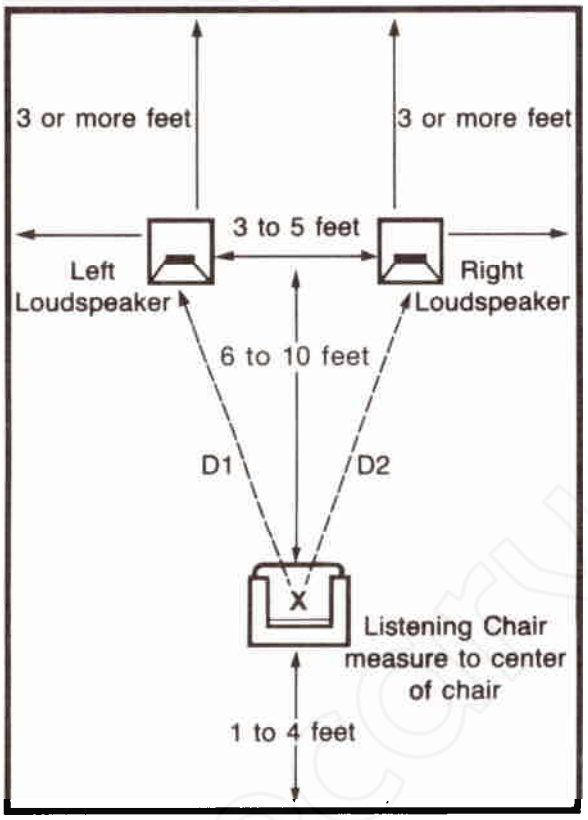
Step One: Move your Loudspeakers away from the side walls, rear wall, and other reflective surfaces as shown in Figure 7. The loudspeakers should be at least three feet from reflecting surfaces - measure from the wall behind the speakers, side walls and nearby adjoining corners.

Unless your loudspeakers are designed to rest on the floor, place them on stands. The ideal height occurs when the midrange/high-frequency drivers are ear level with the seated listener. Move the speakers three to five feet from center-to-center. The loudspeakers should be positioned to place the listening chair on the axis with direct sound from each.

Step Two: Place the listening chair six to ten feet in front of the loudspeakers. It is ideal to have a rear wall one to four feet behind the chair. If this is not practical, move the chair closer to the loudspeakers, not up against the rear wall.

Step Three: Measure the distance 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 Figure 7) exactly the same. Accuracy within 1/4 inch is desired. For odd shaped speakers measure from the center of the midrange driver to the chair.

Figure 7



System Verification

When you have established the correct initial relationship between your loudspeakers and your listening chair, you will be able to experience Sonic Holography® almost right away. We recommend you take a couple of minutes to properly check your stereo system:

1 **Visually check and confirm that all of your components are connected in-phase - all left channel outputs to the left channel inputs, right-channel outputs to right channel inputs.**

2 Check and confirm that the loudspeakers are properly wired correctly in-phase. Positive (+) loudspeaker output from the amplifiers should be connected to the positive terminals usually RED on the loudspeakers and negative (–) amplifier outputs to the negative terminals usually BLACK on the loudspeakers.

3 If your system uses an external equalizer to flatten room response, we recommend that it be switched out of the stereo system's signal path upon initial set-up. The simple act of moving the loudspeakers to the proper position will drastically alter room response. Any room curve that your equalizer has developed will no longer be valid. Experiment with Sonic Holography® before re-equalizing the room. Room response will also be altered by any sound treatments used to reduce any unwanted room reflections, so wait until all phases of the set-up are completed before readjusting the equalizer.

4 If you use a turntable, inspect the phono stylus and cartridge for proper phasing, wear, and tracking. Other than possibly damaging your valuable LPs, a worn cartridge/stylus can upset the balance of the recording before it gets to the stereo system. This can simulate certain acoustic problems that cause strong one-sided imaging, with weak imaging on the other side.

5 Set the BALANCE control of your Preamp/Tuner to the center balance position.

6 Be sure that the program material used during the initial set-up is really recorded in stereo. If you have selected older recordings either LP or CD format, be sure to check the liner notes or jacket to confirm this. Recordings that are labeled "re-channeled for stereo playback" are just monaural recordings; you will not create a successful Holographic image with only a few instruments and the human voice for first-time attempts at Sonic Holography®.

What to Listen For

The musical instrument symbols in Figure 6, identify individual instruments, vocal artist, 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 will be able to perceive a sonic sound 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 linger in space. Some sound images will seem to clearly emerge from outside the walls of the listening room. From your listening chair, you get the feel of the sonic signature or ambience of a location where the recording was made.

Sonic Holography®

Select music for your turntable or your CD Player. Engage the SONIC HOLOGRAM switch on the front panel of your Preamp/Tuner or use your Remote Control. Sit back, relax and enjoy the amazing depth and renewed life that Sonic Holography® restores to your music.

Sonic Holography® requires a brief period of time to learn to hear the full effect and may also require a few adjustments to fully optimize the listening room's acoustics for the best results. If you have performed the initial set-up instructions described above, you should get a Holographic image right away. If this is not happening, go back and make sure that the loudspeakers and your listening chair are accurately positioned as shown in Figure 7. Retrace your steps and repeat the instructions to achieve the desired result.

Because Sonic Holography® is a totally unique and pleasurable experience, it is worth the time spent to insure that it is properly set-up.

Fine Tuning the Holographic Image

After listening to Sonic Holography® with your stereo system properly set up, you will be in a position to begin fine tuning the complete system - in short, the room, loudspeaker placement, your ears, and the room's acoustics. The subject of loudspeaker/listening room interactions, and how our ear/brain perceive this interaction, is somewhat complex.

Different listening rooms, as well as loudspeaker systems have variations in response or interaction with each other. We recommend that you use the same musical selection during each listening session while fine tuning Sonic Holography®. Your Remote Control will assist in your evaluation process. As soon as you have acoustically located the musical images in space, switch OFF the Sonic Hologram switch with your Remote Control. The effect you should hear is that of the soundstage "falling back", or "collapsing flat". When you re-engage the Sonic Hologram switch, you will instantly notice the soundstage developing a renewed sense of depth. This effect is especially pleasing when used with state of the art movie soundtracks.

In some instances, undesired room reflections may cause the Sonic Hologram to perform poorly. Acoustically absorbant material such as thick carpet, heavy drapes and overstuffed furniture all help reduce reflections. The relative position of open doorways or hallways in relation to loudspeaker placement will affect Holographic imaging. Feel free to experiment with furniture placement and positioning of the speakers relative to doorways.

From the stunning reverberation of a Gothic cathedral to the subtle sonic signature of a recording studio, this sense of definition helps to make the Sonic Hologram a convincing experience.

6

Technical Information and Service Assistance

Troubleshooting Guide

WARNING: The Preamp/Tuner must be turned OFF for at least one minute before any AUDIO cables may be disconnected.

Problem	Probable Cause	Solution
No display LEDs	No power to Preamp/Tuner.	Check 120 volt AC cord connection. Check the wall outlet.
No sound on AM/FM	AUTO TUNING is not engaged. Tuner function is not engaged.	Use MANUAL TUNING or tune to stronger station. Engage TUNER function.
No sound on AM	No AM loop antenna connected.	See System Configuration.
No sound on CD, PHONO, or AUX inputs	Selected function is not engaged.	Select desired function. Check connection for selected input.

Problem	Probable Cause	Solution
No sound from speakers	Speakers wired incorrectly. TAPE selector not in OFF position.	Refer to System Configuration diagram for proper wiring. Select TAPE OFF position.
No sound in one channel	BALANCE control is not centered. Speaker wiring incorrect.	Center BALANCE control. Refer to System Configuration diagram.
Thin shrill or distorted sound	TREBLE control set too high. Speaker wired incorrectly.	Re-adjust TREBLE control for desired sound. See System Configuration diagram.
Hum or buzz when PHONO selected	Missing ground wire from turntable.	See System Configuration diagram.
REMOTE CONTROL is dysfunctional	Dead or missing batteries. Using REMOTE too far from REMOTE SENSOR window. Signal is blocked or not aimed at REMOTE SENSOR window.	Insert or replace with new AA batteries. Correctly aim REMOTE CONTROL.
No sound in TAPE 1 or TAPE 2 OR TAPE 1 or TAPE 2 will not record	Tape decks wired incorrectly.	See System Configuration diagram. Select appropriate TAPE.
No stereo sound	MONO is engaged.	Disengage MONO button.
Won't retain stations in memory	Preamp/Tuner unplugged for more than 3 days.	Power up Preamp/Tuner at east every 3 days. Leave Preamp/Tuner plugged into live AC outlet and use Preamp/Tuner Power Switch to power up accessory equipment.
Won't receive any stations OR AUTO won't stop at any stations	No FM antenna connected or it is improperly connected.	See System Configuration diagram.
FM stations sound weak	A.C.C.D. not engaged. Poor antenna or mis-oriented antenna.	Engage A.C.C.D. Install outdoor antenna or re-orient antenna for maximum signal strength.

Problem	Probable Cause	Solution
Insufficient VOLUME from Preamp/Tuner	MUTE is engaged on REMOTE CONTROL.	Turn VOLUME down and then disengage MUTE button on REMOTE CONTROL.
REMOTE CONTROL does NOT control CD player	Not using CARVER DTL 50, 200, or newer models of CARVER CD players.	Use your REMOTE CONTROL included with your CD.
No sound from VIDEO 1 or VIDEO 2/AUX	VIDEO 1 or VIDEO 2 incorrectly connected.	Check System Configuration diagram.
	Wrong VIDEO selected.	Select VIDEO which is connected.
No power to SWITCHED outlets	POWER switch not engaged.	Engage POWER switch on front panel.
Accessory units stay ON all the time	Accessory unit plugged into UNSWITCHED outlet.	Move accessory plug to SWITCHED outlet on Preamp/Tuner rear panel.

Specifications (Nominal)

PREAMPLIFIER SECTION

Total Harmonic Distortion.
20 Hz to 20 kHz <.01%
IM Distortion: 0.05%

Input Sensitivity for 1 volt output, Phono 2.7 mV
High Level 180 mV
Tone Control Turnover Frequency: 100Hz, 1 kHz, 10 kHz

Tone Boost/Cut: 8 dB Bass and Treble
6 db Midrange
Signal-to-Noise Ratio (A-weighted, 1 Volt output):
98 dB

Maximum Output Level: 8 Volts

TUNER SECTION

FM IHF Usable Sensitivity: 10.3 dBf (1.8 uV)

Alternate Channel Selectivity: 72 dB

FM Signal-to-Noise Ratio: 78dB

FM Capture Ratio: 1.5dB

FM Harmonic Distortion: 0.10%

AM Suppression: 62 dB

Stereo Separation: 50 dB

Frequency response ± 1 dB @ 65 dBF input: 10Hz-15kHz

AM Selectivity: 25 dB

AM Image Reject: 46 dB

AM IF Rejection: 65 dB

Weight: 11.5lb
Width: 19"
Depth: 12.25"
Height: 3.5"

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Care of Your Model CT-SEVEN Preamp/Tuner

Protect your Preamp/Tuner from moisture and excessive dust. Avoid dropping your Preamp/Tuner. The front panel may be cleaned with a soft cloth and a solution of diluted ammonia to remove fingerprints and film buildup. Never use detergents or abrasives. If you suspect a problem, try some simple troubleshooting first. Frequently, a problem lies elsewhere in the system or even in the connection cables.

Service Assistance

NOTE: Fill out and mail the WARRANTY REGISTRATION CARD which is enclosed in a separate envelope with the CARVER LIMITED WARRANTY.

If your CARVER product should require service, we suggest you contact the Dealer from whom you purchased your unit. Should the Dealer be unable to take care of your needs, you may contact CARVER Customer Service Department by phoning (206) 775-6245, or by writing CARVER CORPORATION, Customer Service Department, P.O. Box 1237, Lynnwood, WA 98046. We will then direct you to one of our National network of factory trained and authorized Warranty Service Centers, or give you detailed instructions on returning the product to us for prompt appropriate action.

We suggest you read the LIMITED WARRANTY completely to fully understand what your warranty/service coverage is, and the duration. You must promptly complete and return the WARRANTY REGISTRATION CARD to validate your LIMITED WARRANTY.

We wish you many hours of musical enjoyment. If you should have questions or comments, please write to:

CARVER CORPORATION
Customer Service Department
P.O. Box 1237
Lynnwood, WA. 98046
(206) 775-6245

Ask your CARVER Dealer to show you the CARVER family of stereo components for your home audio reproduction. Selected CARVER electronics that can accompany your Preamp/Tuner are:

Speakers
Compact Disc Player
Amplifiers, including
- M-4.0t
- M-1.0t
- M-0.5t

Patent Notice

The circuitry and application of the CARVER Sonic Holography® Sound Processing System are protected by United States Patent 4,218,585 and corresponding foreign patents. Purchase of the CARVER Model CT-SEVEN Preamplifier Tuner gives you an implied license to use it to play recordings, but not to make recordings. The ASYMMETRICAL CHARGE COUPLED FM DETECTOR is protected by United States Patent 4,457,012 and 4,415,768.

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