CARVER

C-11 Preamplifier

Owner's Manual

CARVER

CARVER

Powerful · Musical · Accurate

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED PERSONNEL

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

The exclamation point within an equilateral triangle is intended to alert the user 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 operation instructions should be read before the Carver Component is operated.

2. Retain Instructions — The safety and operating instructions should be kept for future reference.

3. Heed Warnings — All warnings on the Component and in these operating instructions should be followed.

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

5. Water and Moisture — The Component 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 Component should be situated so that its location or position does not interfere with its proper ventilation. For example, the Component should not be situated on a bed, sofa, rug, or similar surface that may block any ventilation openings; or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through ventilation openings.

7. Heat — The Component should be situated away from heat sources such as radiators, or other devices which produce heat.

8. Power Sources — The Component should be connected to a power supply only of the type described in these operation instructions or as marked on the Component.

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

10. Cleaning — The Component should be cleaned only as recommended in this manual.

11. Non-use Periods — The power cord of the Component 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 are not spilled into the inside of the Component.

13. Damage Requiring Service — The Component should be serviced only by qualified service personnel when:

A. The power-supply cord or the plug has been damaged; or

B. Objects have fallen, or liquid has spilled into the Component; or

C. The Component has been exposed to rain; or

D. The Component does not appear to operate normally or exhibits a marked change in performance; or

E. The Component has been dropped, or its cabinet damaged.

14. Servicing — The user should not attempt to service the Component beyond those means described in this operating manual. All other servicing should be referred to qualified service personnel.

15. 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 prevenir les chocs electriques ne pas utiliser cett fiche polarisee avec un prolongateur, un prise de courant ou une autre sortie de courant, sauf si les lames peuvent etre inserees a fond sans laisser aucune pariie a decouvert.

16. Grounding or Polarization - Precautions should be taken so that the grounding or polarization means of the Component is not defeated.

PORTABLE CART WARNING

Carts and stands - The Component should be used only with a cart or stand that is recommended by the manufacturer.
A Component and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the Component and cart combination to overturn.

17. Internal/External Voltage Selectors — Internal or external line voltage selector switches, if any, should only be reset and re-equipped with a proper plug for alternate voltage by a qualified service technician. See an Authorized Carver Dealer for more information.

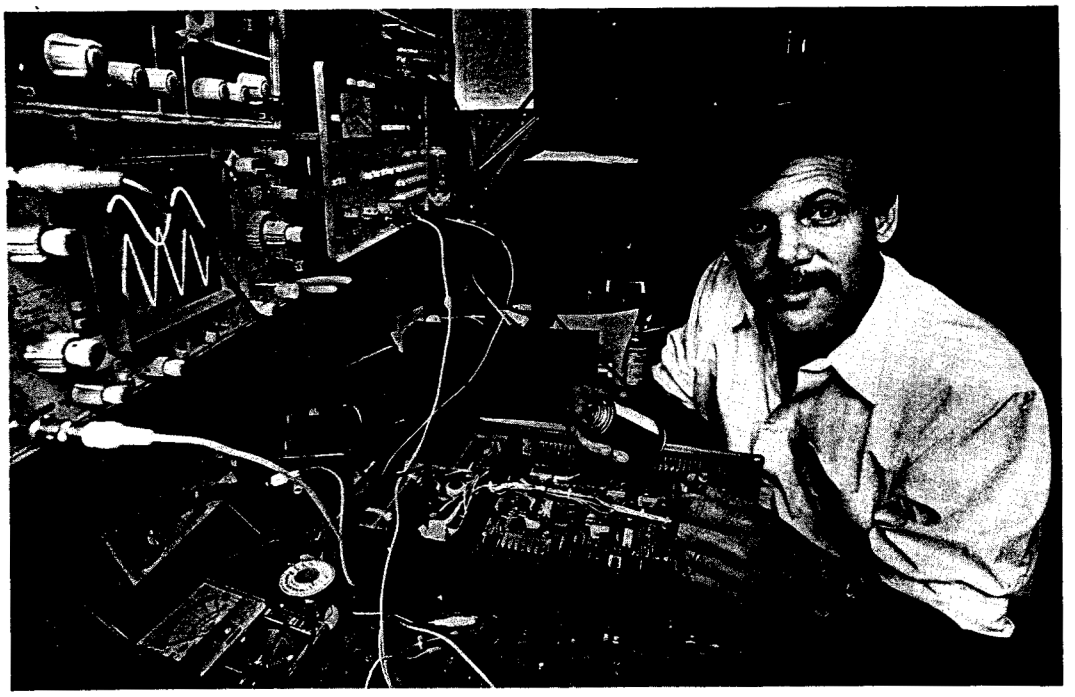
18. Attachment Plugs for Alternate Line Voltage (Dual voltage models only)— See your Authorized Carver Dealer for information on the attachment plug for alternate voltage use. This pertains to dual-voltage units only.

This digital apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant las limites applicables aux appareils numeriques de class a/de class B (selon le cas) prescrites dans le reglement sur le brouillage radioelectrique edicte par les ministere des communications du Canada.

Introduction

A Message from Bob Carver



Congratulations on purchasing a Carver C-11 Sonic Holography® Preamplifier. We believe its sophisticated engineering and meticulous craftsmanship will provide you with many years of listening enjoyment.

At the heart of the C-11 is an audiophile-quality "straight wire" preamplifier with extremely low noise and distortion, high slew rate and wide bandwidth.

Then we have added a high degree of flexibility with a high performance RIAA phono equalization/amplification stages for both moving coil and moving magnet cartridges, variable turnover tone equalization with individual right and left channel controls and mono switch.

Finally, we have of course added our newest and most advanced version of our patented Sonic Hologram Generator. Sonic Holography® will increase listening pleasure and enjoyment by bringing a completely new perspective to your favorite music not possible till now. It will bring you an actual improvement in the quality of listening via complex processing of the stereo signals, and a change in relationships between the listener and loudspeakers. Now, instead of flat, between-the-loudspeaker imaging associated with conventional stereo, Sonic Holography® will paint a sonic picture that's remarkably believable and convincing. You'll experience a heightening of perceived depth, as well as width.

If you are using the C-11 in conjunction with a video system you will be particularly interested in the Precognition Matrix circuitry I have incorporated into this design. It enables more than one person to experience the effect of Sonic Holographyr on video soundtracks by widening the listening area. Yet it dynamically controls the spacial expansion for optimal placement of center channel dialog.

To get the most from your C-11 and Sonic Holography,® be sure to read all safety, installation, and operating information that follows in this manual. By carefully following the initial set-up instructions and recommendations you'll be experiencing the magic of Sonic Holography® in a relatively short period of time.

Again, let me thank you for choosing Carver. I am proud to present to you the best in craftsmanship and design found in the C-11.

Bob Carver

Robert W. Carver
President, CARVER CORPORATION

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1. Prior to Installation

Unpacking

Carefully unpack your C-11 and keep the original carton and packing materials for moving, shipment, or long-term storage.

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

Important Paperwork

Make sure to save your sales receipt. It is extremely important to establish the duration of your Limited Warranty, and for insurance purposes.

Next, make a note of the serial number which is located on the back of the C-11. Record it in the space provided below for convenient reference.

Model C-11

Serial Number: _____

Purchased at: _____

Date: _____

Finally, take a moment to fill out and return the Warranty Card that came with the C-11 and return it to Carver.

2. Front Panel

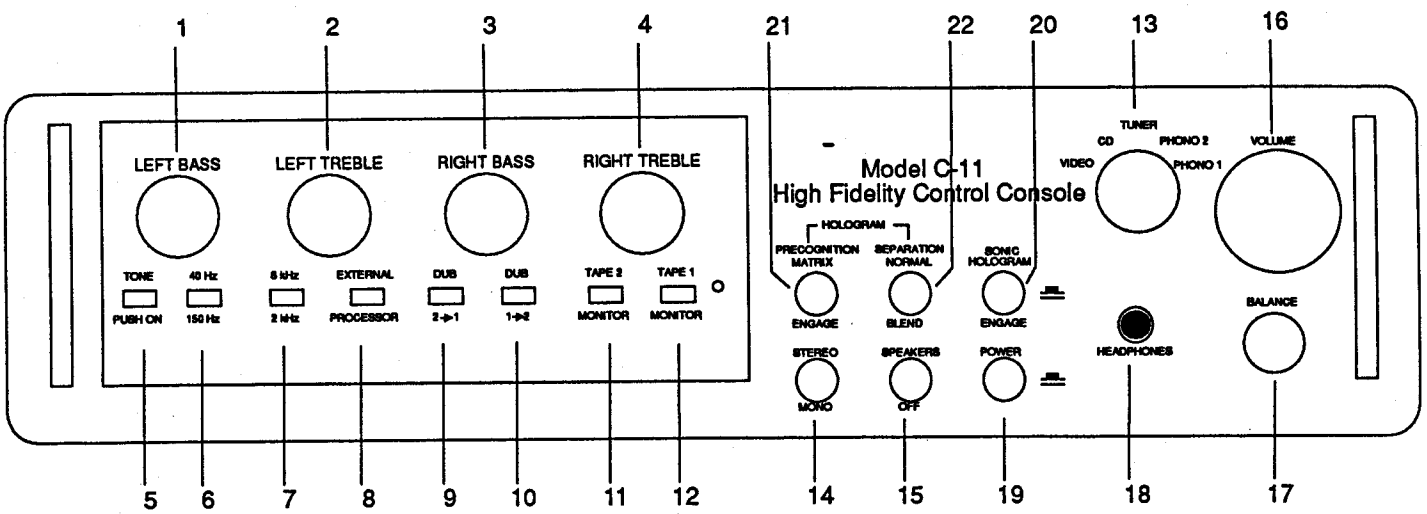

Figure 1 Front Panel

The following is a brief description of the function of each C-11 front panel button and control. See Figure 1.

1-4. Treble and Bass Tone Controls. Individual right and left tone controls have been provided on the C-11. At their center detent position, there is no boost or cut. Maximum rotation in either direction produces +6dB/-3dB of treble equalization and +7/-4dB of bass equalization. Note that to produce an overall change in bass or treble equalization, you must adjust both right and left channels.

5. Tone (defeat). While the C-11's tone controls have no effect at their center detent position, you can also totally eliminate equalization circuits from the signal path by leaving this control in the OUT position. When the TONE button is pressed IN, adjusting the TONE CONTROLS (1-4) and FREQUENCY TURNOVER SWITCHES (6 & 7) will have an effect.

6 & 7. Frequency Turnover Controls. The point in the frequency spectrum where shelving boost or cut begins is switchable with these two buttons. The 8kHz/2kHz button, changes treble tone control from relatively high in the treble to the high midrange band. In the 2kHz position, it is handy for increasing the audibility of hard-to-understand female vocals and for boosting presence on material which seems distant. The 40Hz/LOUDNESS switch changes the effect of the bass tone control. The LOUDNESS setting represents a traditional 150Hz. The alternative setting, 40Hz is extremely low and will enhance low fundamentals without causing boominess in higher octaves. However, it will have little or no effect when used with very small speakers or on material such as FM or pre-recorded cassettes which don't have much 40Hz material to start with.

8. External Processor. This is essentially a "loop" with outputs and inputs. It is intended for use with outboard signal processors such as equalizers, surround sound processors, dynamic ex-

panders, etc. When in the OUT position, no components connected to this loop will affect the sound. The EXTERNAL PROCESSOR circuit may also be used as a place to connect a third deck (although you cannot dub between it and TAPE 1 or TAPE 2), or as an additional input.
NOTE: Silence will result if no components are connected to the External Processor loop when the EXTERNAL PROCESSOR button is pressed.

9 & 10. Dub 2→1 and Dub 1→2. The C-11 provides you with inputs and outputs for two tape decks. The DUB switches allow you to copy material from one cassette deck to another without changing any patch cords. It also allows you to make two copies of the same source at the same time while being able to monitor either tape deck.
IMPORTANT: NEVER PRESS IN BOTH DUB 2→1 and DUB 1→2 BUTTONS AT THE SAME TIME. Not only isn't it necessary, but it will cause a potentially damaging feedback loop with a loud audible squealing in your system.

11 & 12. Tape 1 and Tape 2 Monitors. These buttons activate the C-11's two tape monitor loops. When one or the other is pressed in, you will be able to hear playback from the cassette deck. If both TAPE MONITOR buttons are pushed in at once, TAPE 1 will override TAPE 2.
NOTE: Silence will result if a TAPE MONITOR button is pushed in when the deck is not playing, or if there is no deck connected to that tape monitor loop.

13. Source Selector. This rotary switch determines your input source. VIDEO is intended for the stereo outputs of a VCR, laser disc player or stereo TV tuner. It is an audio-only connection. PHONO 2 is a high-gain moving coil cartridge input while PHONO 1 is for standard moving magnetic cartridges. Note that VIDEO, CD and TUNER are identical inputs and may used for any line level audio input if you don't happen to have one of the sources listed. NOTE: If TAPE 1 or TAPE 2 buttons are pushed in, you will not hear any of the five sound inputs listed on the SOURCE SELECTOR. Instead, their sound will be routed through the appropriate tape monitor loop for recording.

14. Stereo/Mono Switch. When pressed, the left and right stereo channels are combined into mono. This is useful for some older recorded material and for determining phasing of your system and speakers. If you are using the C-11 as part of an audio/video system, you will also find that "monoing" regular non-MTS stereo TV broadcasts will sometimes improve the audibility of dialog.

15. Speakers (On/Off). When pressed, this button completely mutes the main outputs of the C-11, but leaves the headphone output. It is useful when using the phono inputs so that your system is protected from damage caused by accidental tonearm drops, yet eliminates having to re-adjust the volume control each time a new record is played.

16. Volume Control.

17. Balance Control. Adjusts the left/right distribution of sound to your speakers. It is useful when one speaker is closer to your listening position than the other, or with some poorly recorded material which has more of one channel than the other. The sweep of the C-11's BALANCE control is intentionally not linear. That is, small movements off center produce smaller shifts in the stereo image per degree of rotation than near the extreme left and right positions. This makes slight adjustments more convenient.

18. Headphone Jack. All conventional dynamic headphones may be plugged here. Headphone impedance may be from a few ohms to several thousand ohms, although output level may vary depending on impedance. The headphone jack is driven by a separate internal amplifier, designed to provide the extra voltage and current gain needed. The signals present at the headphone jack are identical to those at the C-11's outputs. It is recommended that headphones be unplugged from the C-11 when not being used to avoid risk of damage to them at high volume settings.

19. Power. This is the C-11's ON/OFF switch. It also affects the three SWITCHED convenience receptacles on the back of the unit. The C-11 employs an electronic "clamper" to mute the main outputs and headphone output during turn-on and turn-off. This reduces loud transients which could damage a speaker system. This muting system will turn off the signal to your power amplifier:

A) For about 3 to 5 seconds after initial power-on, whether by the front panel power switch or from a remote or timed switch.

B) Immediately at turn-off, whether by the power switch or by external switches.

Sonic Hologram Section

20. Sonic Hologram. This button activates the Sonic Holographyr circuits in the C-11.

21. Precognition Matrix. This circuit is intended primarily for video purposes. It dynamically extends the width and height of the Holographic image while maintaining proper center channel vocal placement. Sonic Holography® was originally designed to act as a linear processing circuit which provides the same amount of enhancement to all incoming levels of L-R ambient information. The result is that Sonic Holography® without the Precognition matrix is best experienced by one or two listeners directly on the centerline of the sound field. In recent years, however, several new video media have become widely available which provide accompanying high quality audio soundtracks. These include VHS Hi-Fi, digital Laser Discs, CDV's and MTS stereo broadcast television. Dolby® Surround Sound rear channel effects are also encoded on an increasing number of new videocassette movie releases. Each of these technologies, along with larger screen television screens, have helped make the Home Video Theater a practical reality. Precognition circuitry has been developed to widen the effect of Sonic Holography® so that more persons may be seated side by side and still experience its dramatic spacial enhancements.

The C-11's Precognition circuit spreads out the spacial Sonic Hologram image dynamically for the duration of stereo information on the video soundtrack. In other words, its widening effects work in direct proportion to the amount of stereo material present in the soundtrack or program. It is literally able to "think ahead" and expect the occurrence of stereo information before it has begun! The advance cues which Precognition circuitry uses to anticipate stereo information are slight changes in noise floor levels as additional stereo tracks enter the mix. The change in noise level occurs milliseconds before the actual stereo information, allowing the Sonic Hologram Generator to widen its effects from the very beginning of the stereo segment.

PRECOGNITION MATRIX may or may not be used for musical sources, depending on the program source and your own musical tastes. We suggest that you experiment with its effects on type of recordings and FM broadcasts.

22. Separation (Normal/Blend). The NORMAL mode (switch OUT) provides the breathtakingly wide sound field expansion that is characteristic of Sonic Holography®. For most recordings, this is the optimal setting. However, many early stereophonic recordings (many of which are being re-released on compact disc) have extremely exaggerated stereo images with instruments panned hard to the left and right. In this un-natural sort of artificial stereo environment, the Sonic Hologram Generator cannot receive the correct cues and may not be able to work optimally. The BLEND mode (switch IN) reduces stereo separation slightly. You won't notice it, however, because Sonic Holography® will more than replace the minimally reduced left/right separation.

3. Rear Panel

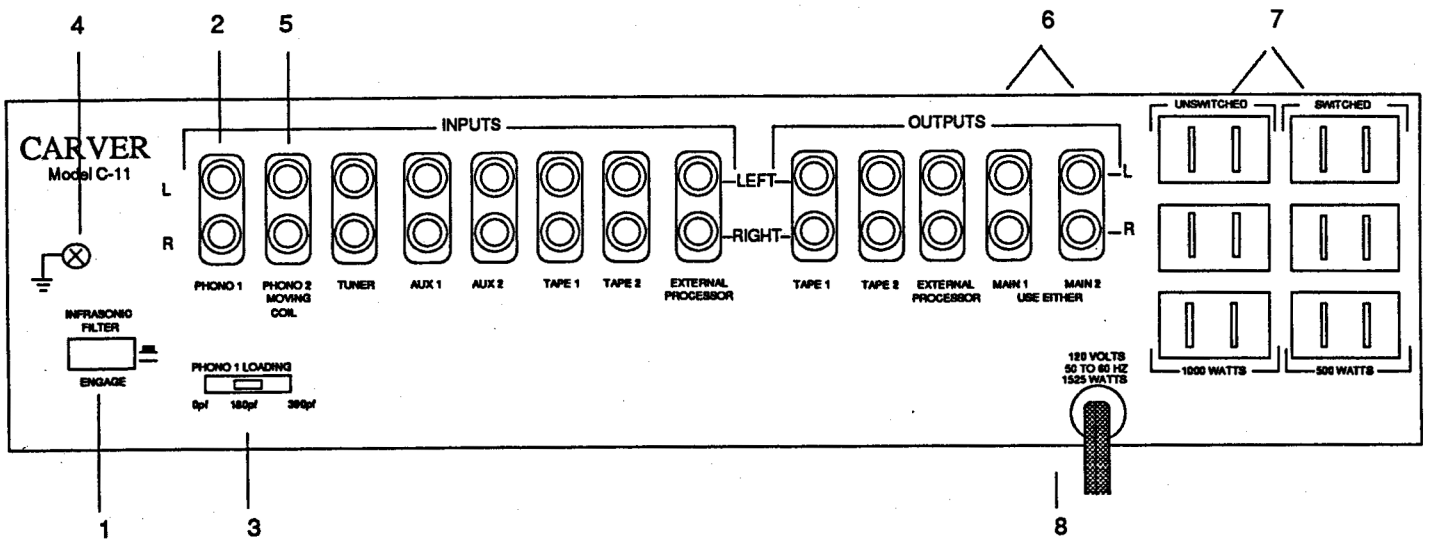

Figure 2 C-11 Rear Panel

Most of the inputs and outputs on the back of the C-11 are self explanatory. The following are descriptions of additional controls and connections which require further consideration.

1. Infrasonic Filter. This push switch corrects for difficulties often encountered with disc playback and should be left in the ENGAGE position if you are using a turntable as a sound source. The INFRASONIC FILTER is an 18dB per octave filter with a -3dB point of 15Hz. Its response is flat within 0.5dB down to 20Hz, then attenuates the preamp's frequency response rapidly at lower frequencies. Records are inevitably contaminated to some extent by subsonic energy, due to normal amounts of record warp, tonearm/cartridge resonance and turntable motor rumble. If not filtered out of the audio signal, this inaudible energy can overload tape decks, waste amplifier power and drive woofers into excessive cone excursions, causing intermodulation distortion and possible woofer damage.

2. Phono 1 Input (M/M). This phono circuit has a total gain of 35dB, appropriate for moving magnet cartridges. Its input impedance consists of 47K ohms resistance in parallel with a known capacitance (as determined by the phono loading switch [3]).

3. Phono Loading (for Phono Input 1 only). With most moving magnet cartridges, this 3-position switch is normally set in the center (180pF) position. However, by design, high inductance cartridges will produce their flattest frequency response only within a specific optimum range of load capacitance. Thus we have provided two more settings to cover the widest possible range of commercially available moving coil pick-ups.

First consult the cartridge manufacturer's specifications, test reports or check with your dealer to determine the total capacitance recommended for the cartridge (as a last resort, assume 150pF).

Now check the specifications of your turntable to determine the capacitance of the phono signal cables and tonearm wiring. Subtract this figure from the total recommended cartridge capacitance.

What remains is the value of input capacitance which should be added by the preamp input:

- If the figure is less than 150pF, set the Phono Loading switch at 0pF.
- If the figure is greater than 350pF, set the switch at 390pF.
- For capacitance figures between 150 and 350, use the 180pF setting.

For example, a certain cartridge has a recommended load of 275pF. The turntable/tonearm on which it is installed as a capacitance of 100pF. 275 minus 100 equals 175pF. Thus the center (180pF) setting would be used.

An alternative is to simply set the capacitance while listening to a recording. With too low a capacitance, the upper midrange will be soft, while the response at the highest audible frequencies will be exaggerated and "peaky", leading to increased surface noise and "edgy" sounds, particularly on violins. Too much capacitance will tend to bring the upper midrange forward but muffle higher frequencies.

5. Phono 2 Input (M/C). PHONO 2 is intended for low output moving coil cartridges. It employs an additional 25dB of linear gain for a total of 60dB to tape outputs. Input impedance is 39 ohms. The C-11 employs a built-in "pre-preamplifier", but this design is free of the compromises usually associated with active gain at this stage. Traditionally, active step-up devices (as compared to expensive passive transformers) have been plagued with noise problems. The C-11 uses a superbly accurate discrete-differential input combined with special high-current transistors which exhibit an almost unheard-of noise figure of 1.0dB at room temperatures. Thus the C-11 yields all the performance advantages of active circuits including zero phase shift, low distortion and smooth high frequency response, while maintaining noise levels within 3dB of the best transformers.

4. Ground. If your turntable has a separate grounding lead (usually a single wire terminated with a spade lug), connect it to the screw directly above the INFRASONIC FILTER button.

6. Main 1 & 2. These are identical outputs. Either may be connected to your main power amplifier(s). The second set may be used to feed a separate amplifier and passive subwoofer, an electronic crossover network, a surround sound system decoder, or routed up to 30 feet to an amplifier in another room.

7. Convenience outputs. A total of six AC outlets are provided on the C-11, so that the entire system can use just one wall outlet for most installations. The three outlets marked SWITCHED are only live when the C-11's power switch is pushed. NOTE: The total power drain on these receptacles should not exceed 500 watts. In order to protect your C-11 from harmful arcing, do not switch the power on or off when high level music is playing and your power amplifier is drawing significant current from the AC line.

In addition, three UNSWITCHED AC outlets are provided which are always live as long as the C-11 is plugged into the wall. A device plugged here may be left permanently on, or may be switched off with its own switch. NOTE: In order to avoid turn-on transients, devices plugged here should either be powered up BEFORE the C-11 is turned on, or while they are bypassed by leaving the External Processor or Tape Monitor buttons in their OUT positions.

8. AC Line Cord. The C-11 itself requires only modest power (equivalent to a small night light) and can be attached to a relatively light extension cord if necessary. However, if you have attached a substantial power amplifier to one of the C-11's switched outlets, a heavy duty extension cord of at least 16 gauge is recommended.

4. Installation

Placement

The C-11 is a solid state device and can be placed in any position including vertically. Heat, at least in normal amounts, shouldn't be any problem for the C-11. It doesn't generate much of its own and isn't sensitive to small amounts. But you should never mount or stack the C-11 directly on top of power amplifiers. Unless your system uses Carver-designed Magnetic Field Amplifiers, conventional power amps can and do generate a lot of heat. In addition, the C-11's chassis could block vents on an amplifier necessary for proper cooling.

Connections

Figure 3 shows a typical system using the C-11.

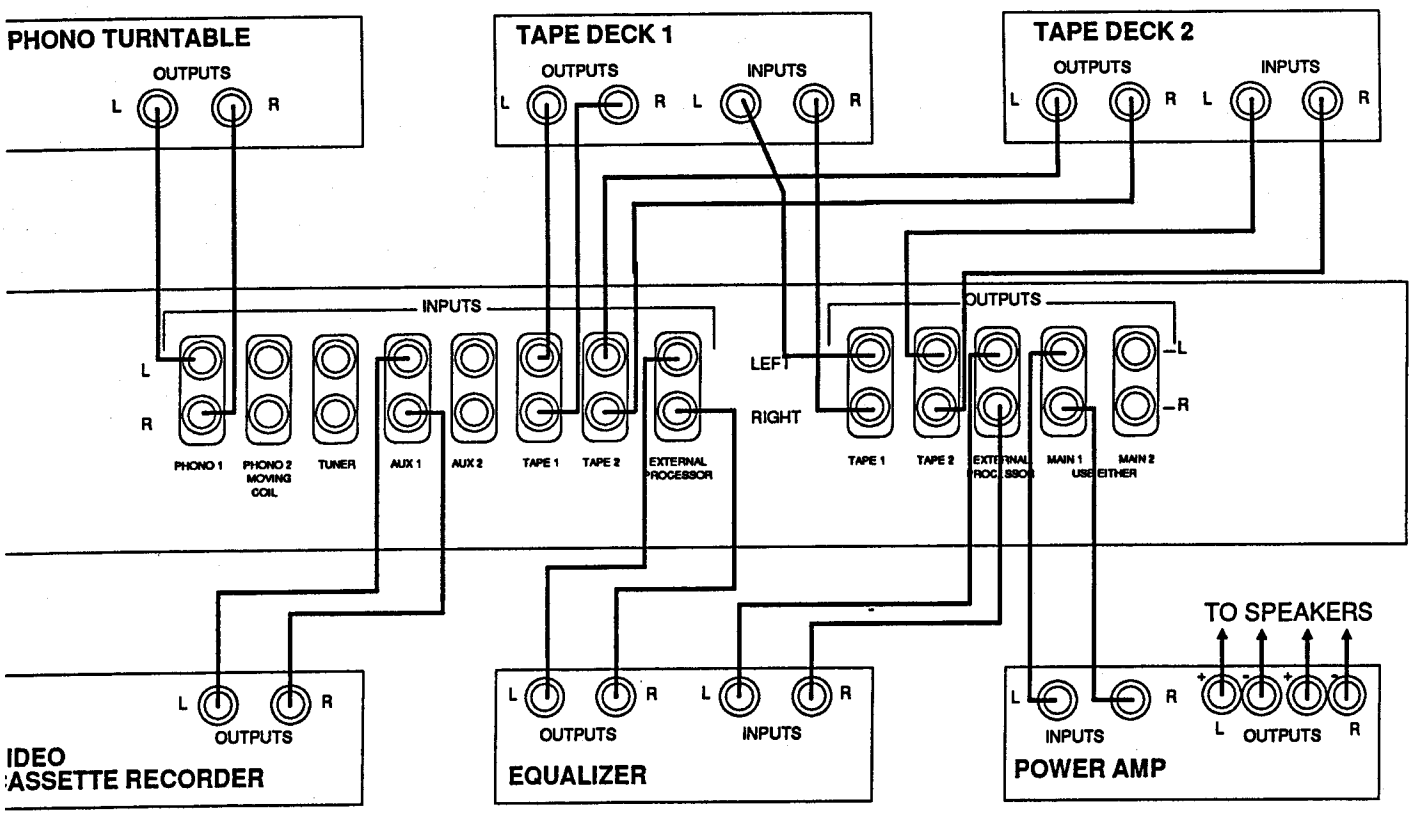

Figure 3 Inter-Component Connections

The following tips will help you get the most out of your system:

- Make sure all components are OFF before making any connections.
- Use high quality interconnects. Cheap, worn or frayed patch cords will not only degrade the sound, but can be a source of hum and RF noise as well. Special higher-quality interconnects are available in many grades. These are often used from CD-to-preamplifier and preamplifier-to-power amplifier connections. Consult your Carver dealer for more information.
- Double-check that "left's go to left's and right's go to right's". It is general practice to use RED patch cord plugs for RIGHT channel connections and WHITE or BLACK patch cord plugs for LEFT connections. Whatever way you choose, remain consistent while hooking up all of your components.
- Make sure that turntable input cables are well away from both power cords and speaker wires to eliminate the possibility of induced hum.

5. Set-Up for Sonic Holography®

After installing and connecting the C-11 to the rest of your stereo system, you'll probably be tempted to begin playing music and playing around with controls. We urge you to resist this temptation for the moment. If you decide to try it anyway, not much will happen because you're only part way there. Successful Sonic Holography® depends on proper loudspeaker placement and other important factors. Read the following section and follow the instructions and recommendations exactly.

Initial Loudspeaker/ Chair Placement

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 1) accurate relationships between the loudspeakers and listening chair, and 2) dealing with reflected sound off surfaces in the listening room.

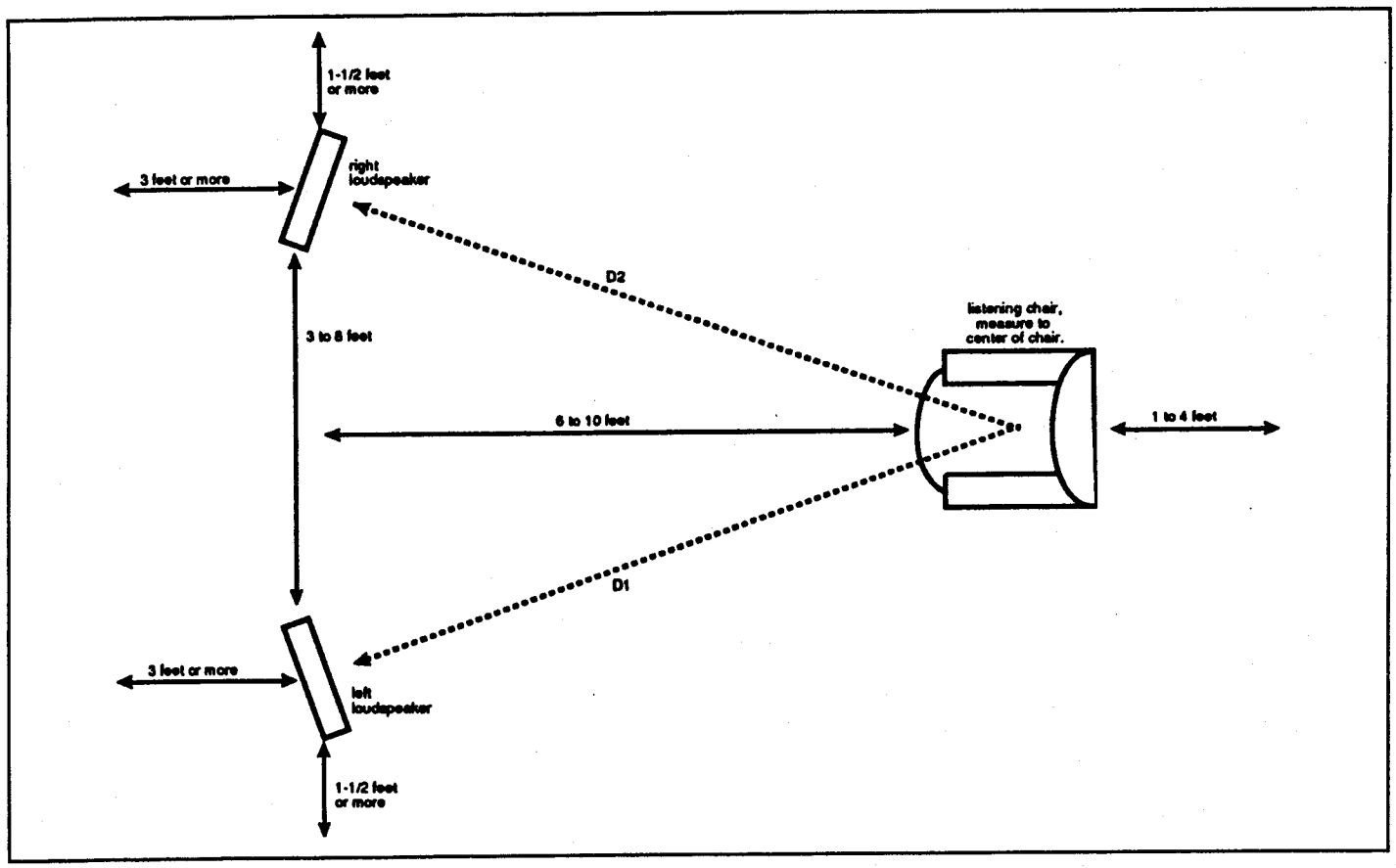

Figure 4 Initial Set Up

The real key to this process are 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 stunningly live imaging Sonic Holography® brings to your favorite music.

Basic Set-Up Steps

To perform the set-up, you'll need a steel tape measure and listening chair. Refer to Figure 4 and follow this 5-step procedure:

1. Make sure the loudspeakers are away from side and rear walls as indicated in the drawing.
2. Move the loudspeakers so they are exactly six feet apart and on direct axis with the listening chair with direct sound from both panels.
3. Adjust the toe-in of the speakers so that the inner edge is ONE INCH closer to you than the outer edge.
4. Place your listening chair so that it is not directly against the rear wall of the listening room.
5. Carefully measure the distance from the CENTER of the left speaker's top woofer to the CENTER of the listening chair. Repeat the measurement for the right speaker. Adjust the chair so that both distances (D1 and D2 in Figure 4) are exactly the same. Accuracy within 1/4 INCH is desired.

The goal of these steps 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.® (It is less critical when the Precognition Matrix is engaged). If you've followed the above instructions, a seated listener in the chair should have a ready-made window for initial experiments with the Sonic Holography® SoundProcessing System. You'll undoubtedly have to make some minor adjustments but this should get things going.

A Properly Functioning Image in Sonic Holography®

Before listening to some musical selections in Sonic Holography,® you should know what you will be listening for. With correctly positioned loudspeakers and listening chair, the Sonic Hologram Generator system should cause musical instruments and other sound sources to spread out in a large 45° to 95° arc in front of you. 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 may even seem to clearly emerge from outside the walls of the listening room.

A "Test Flight"

So far, this manual has discussed the "nuts and bolts" 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.

First, take a couple of minutes to "preflight check" 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 or receiver 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, we recommend that you switch it out of the receiver's signal path. 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. If you are using a record for a sound source, inspect the phono stylus and cartridge for proper phasing, wear, and tracking. 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 C-11's BALANCE control to "center." Set the 3 tone controls to their center (12 o'clock) position.

6. Press the C-11's HOLOGRAM button.

7. Play a stereo recording with only a few instruments and the human voice for first-time attempts at Sonic Holography®.

You should now hear Sonic Holography® in action.

Fine Tuning

Carefully adjusting the following speaker parameters will result in the best possible holographic image:

1. Tilt-back angle and toe-in angles.
2. Distance of speakers and listening chairs from back walls.
3. Room reflections.

Tilt-back and toe-in angles. If you are in a seated position, decreasing the tilt-back angle of most typical speakers will result in more high frequency and less midrange energy at your listening position. It will also lower the soundstage closer to the ground. If you are in a standing position, these effects are reversed. Decreasing the tilt will result in less high frequency energy and will bring the midrange slightly forward.

It is possible to find a tilt-back angle that will allow the tonal balance to remain unchanged from sitting to standing. This specific angle may or may not result in the preferred tonal balance. We recommend that you determine your favorite tilt-back angle while seated. But remember, changing the tilt angle will also change the height of the sonic image. The less tilt, the higher the image. Increasing the tilt angle will, however, often enhance the dimensionality of the soundstage.

Toe-in (the lateral angle of the speakers) also affects Sonic Holography.® When experimenting with speaker angle, make sure that the speakers are equally toed in. This can be done by measuring the distance from the inner and outer corners to the back wall of the listening room.

Distance from back wall. The purpose of keeping the loudspeakers away from the walls is to provide a direct, speaker-to-ear sound path with a minimum of extra, unwanted reflections off surfaces in the room. Just as the second-sound arrivals confuse the ear in normal stereo playback, early arrivals of reflected sound can further confuse the issue and ruin attempts at creating holographic images. Always keep in mind the importance of accurate loudspeaker/ listening chair relationships, keeping the loudspeakers relatively close together (three to five feet, center-to-center).

Room reflections. For the best possible sonic hologram generation, the area around and behind your speakers should be relatively dead. If the back and side walls are too reflective, they may generate additional sound reflections which can interfere with Sonic Holography.®

The object of acoustically treating the listening room is to create what's known as a "live end/dead end" configuration. This design makes the area around the loudspeakers acoustically "dead," while the area around the listener is kept "live." Thus random sound reflections reach a listener long after the direct sound, establishing a uniform sound field. The reflections most in need of correction in your listening room are the usually strong, side-wall reflections that originate from surfaces near each loudspeaker. Any treatment should be applied to the wall extending two feet above and below the midrange and high-frequency loudspeaker elements, standing two to three feet from the leading edge of the loudspeaker cabinet. The treatment itself may be quite simple. Open, full book cases or record shelves, heavy fabric hangings, or draperies made of heavy material will work well as an acoustic treatment for many situations. Sound panels made from cork or acoustical tile can be covered

with a variety of other sound-absorbing materials, too. Since side-wall sound treatments are relatively small (usually less than four feet by four feet), you could use attractive grill cloths or foam panels to improve the appearance. However, loudspeaker grill cloths or covers are not, obviously, effective sound absorbers. Scrap carpeting can be effective when used with other sound-absorbing materials.

Be sure to deal with room reflections equally. If you eliminate the reflections from one wall and not the other, the resulting reflections will create an audible imbalance in the holographic image. The sound images will be well-defined on one side while smeared or fuzzy on the untreated side.

The wall directly behind the loudspeakers should also be as nonreflective as possible, particularly if loudspeakers have been placed a less-than-ideal distance away from it. If there's a large window between the loudspeakers, it should be covered with heavy draperies to reduce reflections off the glass. Of course, if there's no window to worry about, a wall can be treated with sound-deadening panels, or just book shelves and record cabinets extending vertically as high as possible, and completely between the loudspeakers.

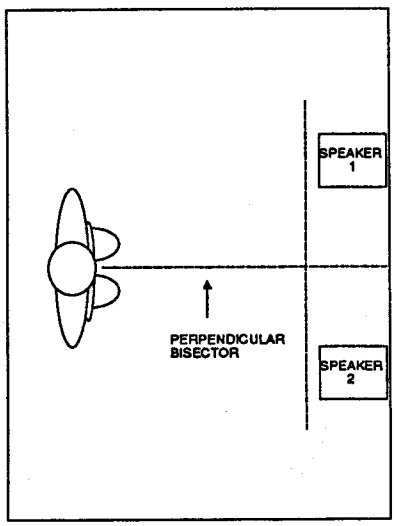

Figure 5 Room A

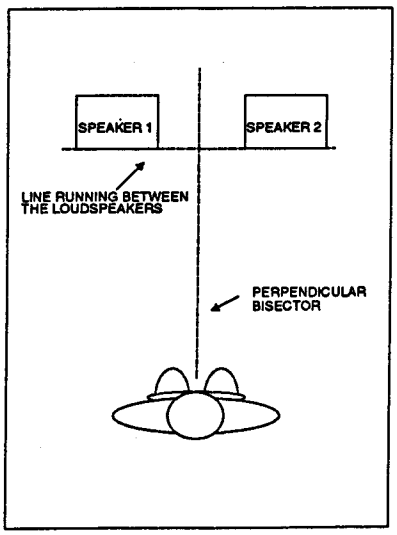

Figure 6 Room B

Sound reflecting off a bare wood or tile floor can also reduce the Sonic Hologram effect even if the loudspeakers are properly elevated on stands. The only possible solution here is to cover the floor with shag or plush-pile carpeting. If installing wall-to-wall carpeting isn't on your agenda when installing your new Carver receiver, use a rug made from similar materials that extends from the base of each loudspeaker stand to a foot short of the listening chair. Upholstered, low furniture, placed somewhat in front of the loudspeakers can also break up floor reflections.

Room Examples

The first two sample rooms show the loudspeakers and listening chair in perfect positions for Sonic Holography.® But, as we've mentioned, it may not be practical to leave them there. It's your mission to find a point where considerations for successful Sonic Holography® can co-exist happily with the aesthetic considerations of room decor. Look at the diagram of Room A:

Here the loudspeakers project the long throw of the room, yielding a large front-to-back depth of the sonic stage. Room B, where the loudspeakers project the short span of the room, has exceptional sonic stage width and moderate front-to-back depth. Naturally the choice of positioning depends on your personal taste, as well as furnishings and overall room arrangement.

Sample Rooms C, D, E and F show configurations that won't work well with Sonic Holography,® though these same set-ups are often quite acceptable for conventional stereo playback. Other than poor loudspeaker placement, side/boundary-wall reflections will destroy chances of a good holographic image taking form.

Better room arrangements are illustrated in Rooms G and H. Room H uses a "trick" to get the loudspeakers almost against the wall behind them. This consists of a sound-deadening panel placed behind the loudspeakers, right against the wall. We'll come back to Room H in a moment.

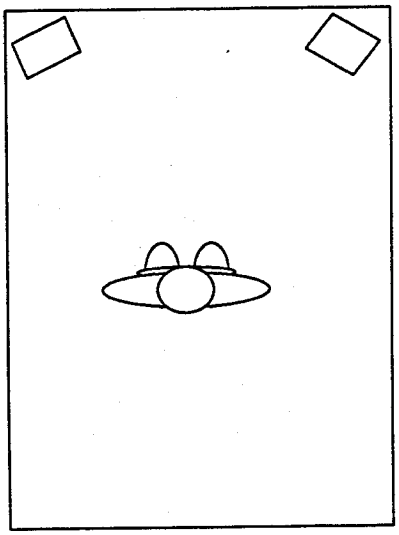

Figure 8 Room C

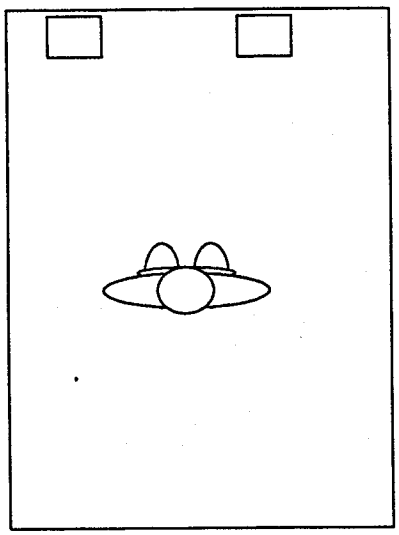

Figure 9 Room D

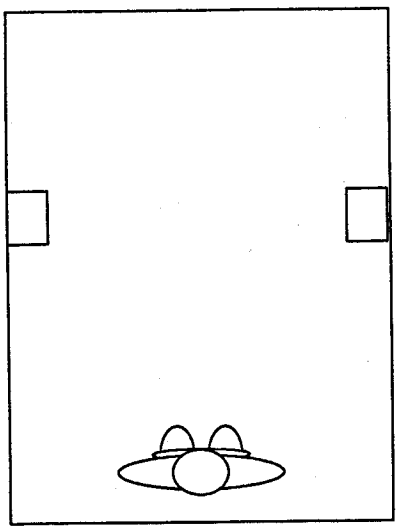

Figure 10 Room E

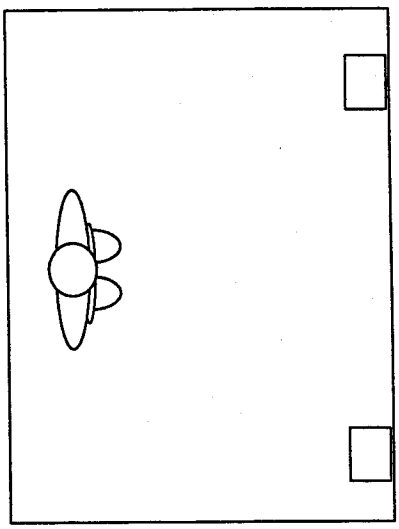

Figure 11 Room F

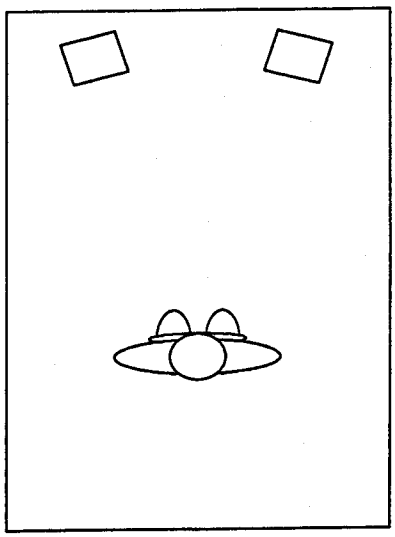

Figure 12 Room G

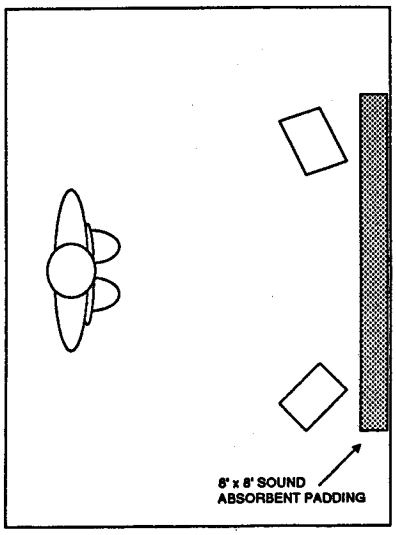

Figure 13 Room H

Refer again to the diagram of Room B which compares favorably to both Rooms G and H. What makes it so good for Sonic Holography®? First, as in the initial set-up, the loudspeakers are away from corners, side walls, and the wall behind the loudspeakers. The listener is seated with a reflective wall about one to four feet behind them. This places the listener in a sound field made up of direct sound from the loudspeakers and reflected sound from the rear wall.

In Room H, with the loudspeakers still away from the side walls and corners, the listener has a nearby rear wall to ensure front-to-back depth in the holographic image. As in any good placement for Sonic Holography,® the loudspeakers are toed-in toward the listening chair. This places the listener on-axis with direct sound from the loudspeakers, further reducing side-wall reflections at the same time.

Loudspeaker Designs and Early Reflections

The Sonic Holography® sound processing system uses signal delays of a fraction of a millisecond. In some loudspeakers, reflections with similar delays can be caused by protruding edge moldings, grillwork, or other front surface irregularities that might dilute an image in Sonic Holography.®

Most modern loudspeakers use sound absorbing materials, rounded corners, or even unconventional designs to reduce these early reflections. In all fairness, most loudspeakers with "conventional" front panels won't have any serious reflection problems that could hurt or weaken holographic images. However, if sound images remain fuzzy and unresolved, even with close attention to all other factors, there's a possibility it could be the result of early reflection off front-panel irregularities. The solution to this problem consists of placing a cut-out of acoustic felt around the various elements in your loudspeakers.

6. About Sonic Holography®

Sonic Holography® is a complex method of processing stereo signals which corrects 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 actual sonic event. Consider Figure 14.

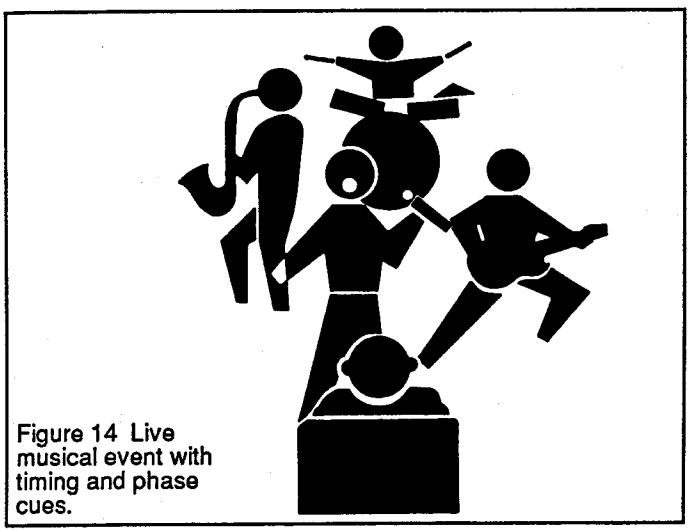

Figure 14 Live musical event with timing and phase cues.

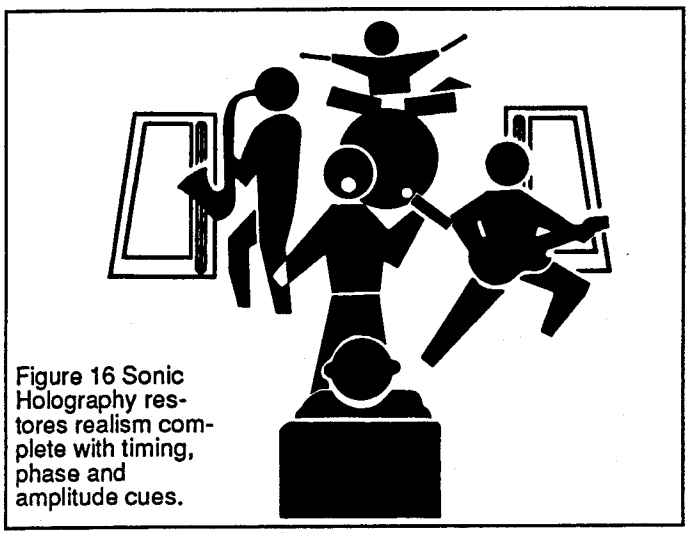

Figure 16 Sonic Holography restores realism complete with timing, phase and amplitude cues.

It shows what occurs during a live musical event. Each ear receives one sound arrival. The timing of these arrivals is processed by your brain and converted to information about where the music is coming from.

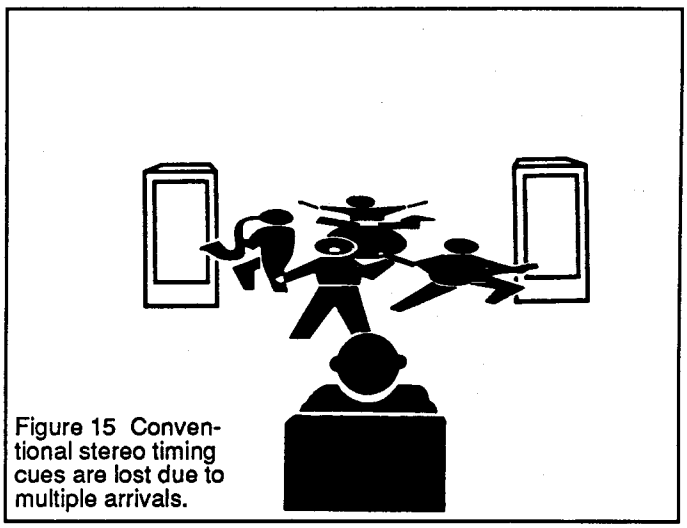

Figure 15 Conventional stereo timing cues are lost due to multiple arrivals.

Figure 15 represents conventional stereo. The recorded sound of the band is reproduced by both left and right loudspeakers. If your left ear ONLY got a sound arrival from the left speaker and your right ear ONLY got a sound arrival from the right speaker we wouldn't need Sonic Holography.® Unfortunately, each ear hears BOTH speakers. This results in each ear getting an extra, confusing sound arrival of information which contradicts the original position of the band. The best your brain can do is "construct" a fuzzy "stereo" image. This problem of FOUR total arrivals is, incidentally,

why stereo is so much more pronounced when you listen to isolated stereo headphones.

To review what we've covered so far, in real life a sonic event (such as the band in our illustration) can never create more than TWO sonic arrivals: One at the left ear and one at the right ear. Stereo playback through speakers causes FOUR arrivals. Those extra, second-sound arrivals confuse our ear/brain system, masking clues as to the exact positioning of the sound sources.

The C-11's Sonic Hologram Generator eliminates the extra sonic arrivals that occur in conventional stereo playback. This is accomplished by cancelling out the unwanted second-sound arrivals from each loudspeaker to the opposite-side ear (Figure 16). Each ear is then free to concentrate its attention on the same-side loudspeaker. In other words, your left ear hears just the left loudspeaker; your right ear hears just the right loudspeaker.

This is accomplished by electronically-generated crosstalk signals from each stereo channel and feeds them to the opposite-side channel. The signals your new receiver generate are virtually identical to the unwanted acoustic second-arrivals that confuse our ear/brain systems. The difference is that they're phase inverted. When these mirror-image signals are reproduced by the loudspeakers, they cancel the acoustic cross talk signals arriving from the opposite loudspeaker. Of course, this is a very simplified explanation of how the Sonic Holography® Sound Processing System works. In addition to the electronic crosstalk-signals, the C-11 uses delay timing and filtering circuits for creating the same types of filtering and delay caused by our heads.

7. Technical Information and Service Assistance

Specifications

Phono:

RIAA + 0.25dB "extended" RIAA curve
Overload (Phono 1), 100mV @1kHz
Frequency Response: 5Hz - 200kHz +1/-3dB (Infrasonic Filter, Tone, Hologram OUT)

Noise:

Phono 1 - 82dB, IHF A-weighted, below 5mVrms at 1kHz
Phono 2 - 86dB, IHF A-weighted
Line Level - 96dB, IHF A-weighted, below 2Vrms

Infrasonic Filter:

95dBV, IHF A-weighted

Tone:

96dBV, IHF A-weighted

Distortion:

THD - 0.04% or less, below 3Vrms
IM (CCIR or SMPTE) - 0.04% or less
TIM - unmeasurable

Rated Output:

2Vrms

Maximum Output:

6Vrms

Sonic Hologram Generator:

Image Resolution (Precognition off): 5 horizontal, 20 vertical

Size:

19" x 3-1/2" x 10"

Weight:

6lb (2.7kg)

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.

Cleaning

You'll want to wipe off the C-11's front panel and chassis from time-to-time with a soft, dry cloth. If you have something stubborn to remove, use a mild dish soap or detergent sparingly applied to a soft cloth; don't use alcohol, ammonia, or other strong solvents.

Troubleshooting

If you're having trouble or suspect a problem, try some simple trouble shooting first. More likely than not, the problem lies elsewhere in the system - not with the C-11.

No sound.

1. C-11 power off.
2. Line cord disconnected.
3. Poor fit between plug and wall receptacle.
4. Power off at wall receptacle (which with tester or lamp).

No sound (power OK and on).

1. C-11 Input Selector set to inactive output.
2. Either TAPE MONITOR button pushed in with no tape running.
3. EXTERNAL PROCESSOR button pushed with no outboard electronics connected or power off on the outboard unit.
4. C-11 SPEAKER button in OFF position.
5. Selected input not functioning.
6. Input level controls turned down on power amplifier.
7. Speaker cables connected to wrong set of power amplifier speaker outputs.
8. Program source misadjusted. For example, tuner is between stations, tape is on a blank segment, CD player is on pause.

No sound in one channel.

1. Defective cable from C-11 to power amplifier.
2. Speaker wire loose or disconnected.
3. C-11 BALANCE CONTROL fully clockwise or counterclockwise.
4. Imperfect contact in lever or slide switch in program source electronics or signal processor.
5. Speaker fuse blown.
6. Power amplifier malfunctioning.

Loud howl, squeal or whistle.

1. Both DUB switches depressed at the same time while tape decks are in record or source monitor mode.
2. TAPE MONITOR is engaged while microphones are connected to tape deck for recording.

Solo voices or instruments sound thin, shrill or distorted.

1. Treble controls set to maximum boost.
2. Phono cartridge wired out of phase.
3. Improper moving magnet cartridge PHONO LOADING setting.
4. Speakers are connected out of phase.

Sound is weak when PHONO 1 is selected.

1. A moving coil cartridge has been connected to the lower gain moving magnet input. Reconnect the turntable cables to PHONO 2.

Sound is loud and distorted when Phono 2 is selected.

1. Moving magnet cartridge with high output has been connected to high gain moving coil cartridge input. Reconnect to PHONO 1.

Hum and constant noise.

1. Defective signal cables.
2. Improper fit between signal cable plug and sockets.
3. Signal cables have been routed too closely to AC cables, power transformers, motors or TV sets.
4. Turntable or cassette deck may be oriented in such a way that it is picking up induced hum from internal AC wall wiring. Change component's position slightly.
5. Power amplifier is extremely high gain (characterized by the need to use only very low settings of the C-11 volume control). If the amplifier has input level settings, reduce them. If not, contact Carver Corporation Service Department.

Intermittent noise, static or hum caused by RFI interference from CB, TV or AM radio.

1. Determine where the RFI is entering the system by disconnecting individual sound sources, then the C-11, then the power amplifier.
2. Use interconnect cables with better shielding.
3. Wrap turntable input cables in foil.
4. After checking with your power amplifier manufacturer, place 0.01 microfarad capacitor across speaker terminals.

Service Assistance

We suggest that you read the LIMITED WARRANTY completely to fully understand what your service coverage constitutes and its duration. You MUST promptly complete and return the WARRANTY REGISTRATION CARD to validate your LIMITED WARRANTY.

If your C-11 should require service, we suggest you first contact the Dealer from whom you purchased it. Should the Dealer be unable to take care of your needs, you may contact the CARVER Service Department by phoning (206) 775-6245, or by writing CARVER CORPORATION, Service Department, P.O. Box 1237, Lynnwood, WA 98046. We will then direct you to the nearest in our national network of Authorized Warranty Service Centers, or give you detailed instructions on how to return the product to us for prompt action.

We wish you many hours of musical enjoyment. If you should have questions or comments, please write to us at the above address.