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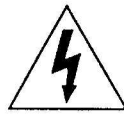
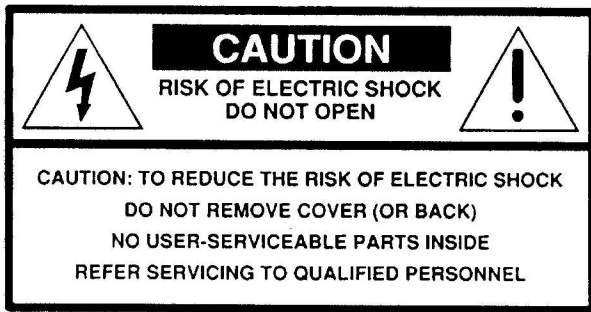
C-19 Vacuum Tube Reference Preamplifier

Owner's Manual

CARVER



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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 partie 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.

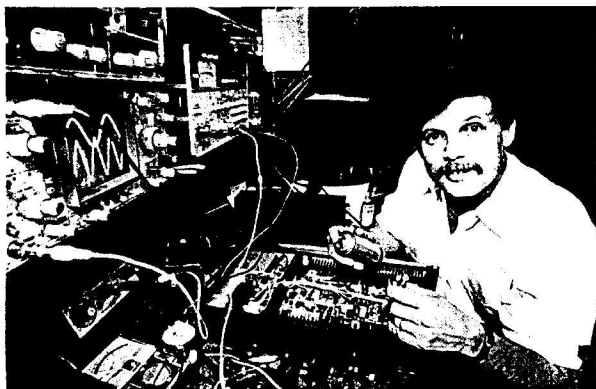
This digital apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les 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.

C-19 HYBRID VACUUM TUBE REFERENCE PREAMPLIFIER

Introduction

A Message From Bob Carver



Congratulations on purchasing a Carver C-19 Hybrid Vacuum Tube Reference Preamplifier. We believe its sophisticated engineering and meticulous craftsmanship will provide you with many years of listening enjoyment.

The C-19 is referred to as a hybrid because it makes use of both solid state and vacuum tube amplification components. I have chosen those points where I felt that tubes would make the most sonic improvement: At the heart of the C-19

is an audiophile-quality "straight wire" preamplifier with 6DJ8 vacuum tubes in the line amplifier, tone control and both phono stages. I have designed the C-19 to have as low noise as possible (tube designs are always a bit noisier than solid state designs, however), along with minimal distortion, wide bandwidth and that gloriously warm sound that only tubes can impart.

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

This hybrid tube/solid state design has been designed to be quite rugged. Because audio preamplification does not deal with extremely high current or voltages, vacuum tubes will last under continuous use for long periods of time, making the C-19 as practical to own and operate as any 100% solid state preamp. Still, vacuum tubes by definition require a bit more care in ventilation and isolation from vibration. To get the most from your C-19, be sure to read all safety, installation, and operating information that follows in this manual.

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-19.

Robert W. Carver, Chairman
CARVER CORPORATION

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1. Unpacking and Placement

Unpacking

Carefully unpack your C-19 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-19. Record it in the space provided below for convenient reference.

Model C-19

Serial Number _____

Purchased at _____

Date _____

Finally, take a moment to fill out and return the Warranty Card that came with the C-19 and return it to Carver.

Placement

Cooling. The C-19 generates slightly more heat than a solid state preamplifier. That's why its top surface has perforations for heat flow...and why you should be careful not to block this passive cooling system by placing another component directly on top of the C-19. It's perfectly OK to set the C-19 atop a CD player or cassette deck, though. But if you are using a traditional power amplifier which gives off a considerable amount of heat, avoid setting any component on top or underneath it. Should the preamplifier end up at the top of a "stack" or sitting alone on a shelf, however, it automatically becomes an inviting place on which to set albums and CD jewel cases. This can not only prevent proper cooling but possibly damage the discs.

Vibration. Tubes are, by their very physical make-up, more fragile than solid state devices. If they're subjected to harsh vibration, they will fail faster. That means you should not place the C-19 extremely close to large loudspeakers, on top of a subwoofer or on an overly flimsy shelf. In this respect, you should treat the C-19 as you would a turntable—any vibration which would cause acoustic feedback or skipping will also affect the overall tube life of the four 6DJ8 tubes inside the C-19.

2. Front Panel

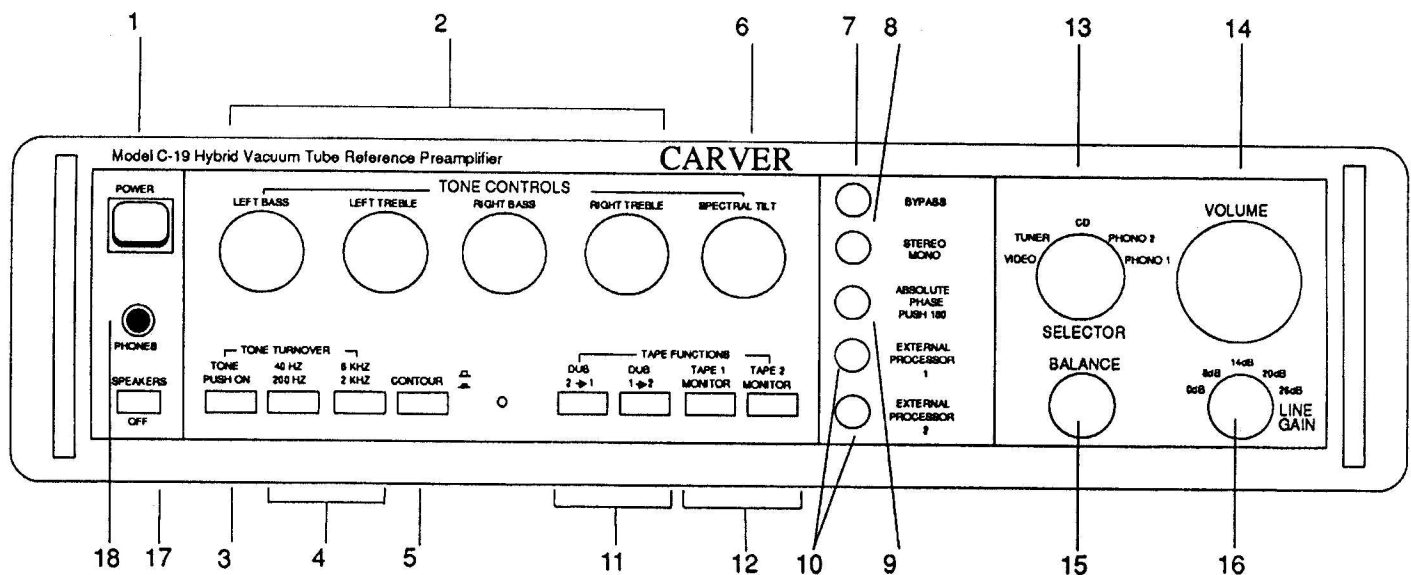


Figure 1 Front Panel

The following is a brief description of the function of each C-19 front panel button and control. See Figure 1.

1. Power. This is the C-19's ON/OFF switch. It also affects the three SWITCHED convenience receptacles on the back of the unit. The C-19 employs an electronic "clamber" to mute the main outputs and headphone output for approximately 45 seconds after turn-on. This allows the C-19's tubes to "warm up". The circuit is designed so that the tubes are gently brought up to their proper operating potential without an initial voltage surge which would shorten their lives. Thus you can safely turn the C-19 off after each listening session (some esoteric designs require that you leave them on virtually constantly!). After you shut off the C-19, another special "clamber" circuit is activated which reduces loud transients which could damage a speaker system.

2. Treble and Bass Tone Controls. Individual right and left tone controls have been provided on the C-19. At their center detent position, there is no boost or cut. Maximum rotation in either direction produces +6dB boost or -3dB treble cut, and +7dB bass boost or -4dB of bass reduction. Note that to produce an overall balanced change in bass or treble equalization, you must adjust both right and left channels, usually the same amount.

3. Tone (defeat). While the C-19'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 and TONE TURNOVER SWITCHES will have an effect.

4. Tone Turnover Controls. The point in the frequency spectrum where shelving boost or cut

C-19 HYBRID VACUUM TUBE REFERENCE PREAMPLIFIER

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/200Hz switch changes the effect of the bass tone control. The 200Hz setting represents a traditional "loudness" boost or cut in the high mid bass area. 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.

5. Contour. This is essentially a loudness control with +6dB boost at 20 Hz and 1.5dB. boost at 20kHz. It is designed for increased audibility at low volumes and should generally not be used in place of tone or Spectral Tilt equalization for listening at normal levels.

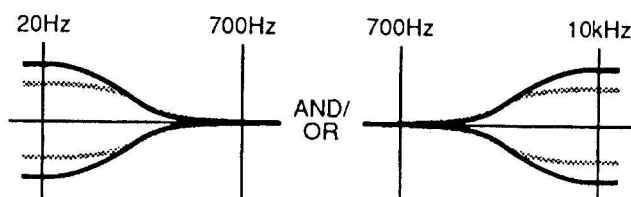


Figure 2 Typical Shelving Equalization

6. Spectral Tilt. This special tone control circuit allows uninterrupted adjustment of the entire 20 to 20kHz frequency spectrum. With a single adjustment, the user can simultaneously adjust both channels' bass and treble without singling out any given vocal or instrumental frequency band. Conventional tone controls use one-pole (6dB/octave) circuits which cause response to begin at a given frequency and reach a "shelf" at another frequency (Fig. 2). As the control is rotated toward its maximum boost or cut, both the starting frequency and shelving levels change. Within limits, this type of equalization can be useful for localized adjustments in bass and treble. However, conventional equalization is not designed to address overall, full frequency range equalization.

In many ways, Spectral Tilt (Fig. 3) is the antithesis of the C-19's conventional localized tone controls:

1. It operates over the entire 20-20kHz frequency bandwidth.
2. It simultaneously boosts AND cuts.
3. Its maximum boost and cut is just 3dB.
4. Its "pivot point" is at 700kHz.

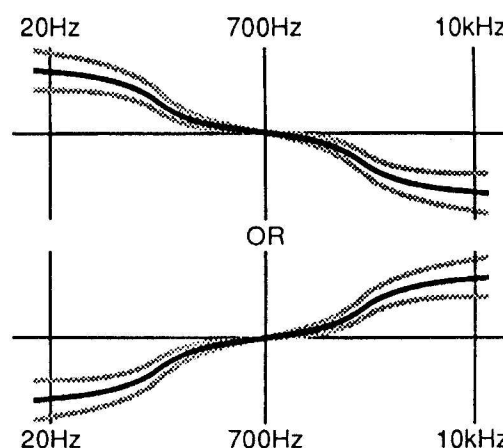


Figure 3 Carver Spectral Tilt Equalization

This allows the user to apply comprehensive yet gentle tone adjustment for a broad range of applications. For example, the equalization tastes of producers, engineers, and mastering technicians vary widely. Some prefer a "bright" sound; others a bass-heavy "tubby" sound. Because these mixdown and mastering adjustments are generally made with broadband equalization, conventional tone controls—even graphic equalizers are not well suited to reducing the effect. Carver's Spectral Tilt can add or reduce warmth, brightness, fullness, etc., without exaggerating any specific frequency band. It is thus especially well suited to compensating for overly reflective or absorptive room acoustics.

7. Bypass. This switch removes all tone controls including bass, treble and Spectral Tilt from the signal path. It does not remove the Infrasonic Filter or loudness equalization circuits, however.

8. 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-19 as part of an audio/video system, you will also find that "mono-ing" regular non-MTS stereo TV broadcasts will sometimes improve the audibility of dialog.

9. Absolute Phase. This control can be used to compensate for a little-understood phenomenon caused during the recording process. Essentially, left and right are interchanged somewhere during the miking, recording, mixing or mastering in such a way that the sound stage become "mirror imaged". This is different than having a system "out of phase" (In that case, the polarity of speaker connections and/or components in your system has been reversed resulting in cancellation of bass or poor imaging). When absolute phase is reversed, it is as if you are sitting *behind* the orchestra or performers. You get a great stereo image, but it is a *mirror* of the correct positioning. Furthermore, it is as if you

are sitting behind your *speakers* as well: When a woofer should be pushing out towards you—causing a pressure wave of bass—it will actually be retreating *away* from you first. This is pretty esoteric stuff, but careful experimentation with the ABSOLUTE PHASE control will reveal that a certain percentage of your musical recordings have been recorded with phase exactly opposite that of the majority of your collection. Switching the button back and forth will explain the sonic difference very quickly.

10. External Processor. These are essentially "loops" with outputs and inputs. They are intended for use with outboard signal processors such as equalizers, surround sound processors, dynamic expanders, etc. When in the OUT position, no components connected to either of these loops will affect the sound; when pressed IN, any sound processing, enhancement, etc. will affect the sound at the C-19's outputs. EXTERNAL PROCESSOR 1 and 2 circuits 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 an External Processor loop when the appropriate EXTERNAL PROCESSOR button is pressed.

11. Dub 2 → 1 and Dub 1 → 2. The C-19 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.

12. Tape 1 and Tape 2 Monitors. These buttons activate the C-19'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 be 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. Volume Control. Used for normal volume control operation. It may be thought of as controlling the amount of *input* to the C-19. With most systems, this is the only gain control you'll need to adjust. See entry 16 (Line Gain Control) below.

15. 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-19'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.

16. Line Gain Control. For "fine tuning" volume and solving special problems which often crop up with esoteric input sources and power amplifiers. LINE GAIN may be thought of as controlling the overall *output* of the preamplifier and has several handy functions. First, it lets gives you more flexibility in how the MASTER volume control operates. Only a slight turn of the VOLUME CONTROL raises sound levels very high, you've essentially lost use of the rest of its rotation. Slight increases and reductions in volume become difficult since so little rotation causes such large changes. In a case like this, reducing the LINE GAIN CONTROL will "regain" use of more of the master VOLUME control's rotation. On the other hand, you may have a power amplifier which requires a relatively high input signal level. If so, turning the C-19's master VOLUME control up all the way up still may not achieve the desired volume. To better match power amplifier and preamplifier, adjust the LINE GAIN CONTROL to a higher level. Generally, the LINE GAIN CONTROL should not require constant adjustment. With most input sources and power amplifiers it can be left the 20dB setting.

17. Speakers (On/Off). When pressed, this button completely mutes the main outputs of the C-19, 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.

18. Headphone Jack. All conventional dynamic headphones may be plugged in 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-19's outputs. It is recommended that headphones be unplugged from the C-19 when not being used to avoid risk of damage to them at high volume settings.

3. Rear Panel

Figure 4 shows the back side of the C-19. Most of the inputs and outputs are self explanatory after you check out the hook-up diagram (Figure 5) in the next section. The following are descriptions of additional controls and connections which require further consideration.

1. Phono 1 Input (MM). 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 fixed capacitance of 150pF.

2. Phono 2 Input (MC). 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 switchable between 39 ohms and 240 ohms (see item 4). The C-19 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-19 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-19 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.

3. 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.

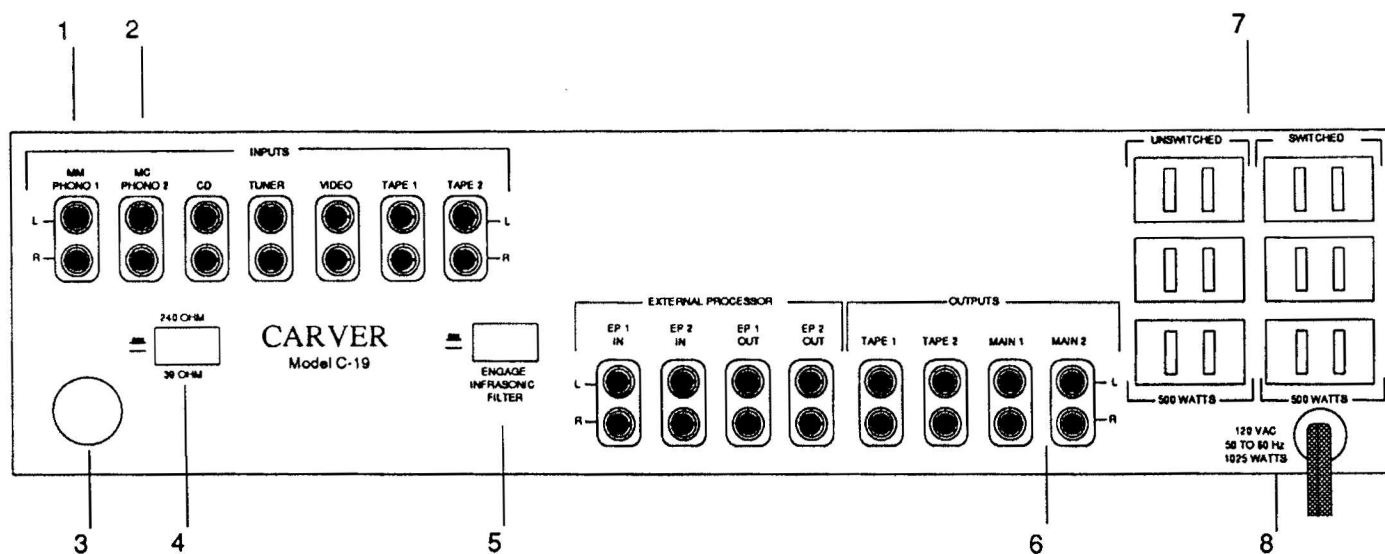


Figure 4 Rear Panel

4. Moving Coil Input Impedance Switch. Most moving coil cartridges are designed to operate with a 39-ohm input impedance. However, some designs require a higher, 240-ohm impedance. Consult the information which came with your moving coil cartridge or ask your dealer or the manufacturer. You can also simply experiment with the switch while listening to the cartridge as it is playing a familiar disc. If the sound is muffled and lacking in treble, the IMPEDANCE SWITCH is set too low. Use the 240-ohm setting. If the sound is peak, edgy and shrill, impedance should be lowered to the 39-ohm setting.

5. 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.

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-19, 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-19's power switch is pushed.

NOTE: The total power drain on these receptacles should not exceed 500 watts. In addition, we do not recommend that you plug *any* power amplifier into a switched socket. If you insist, make sure it's a relatively low-powered amplifier (100 watts or under) and 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. This will protect your C-19 from harmful arcing.

In addition, three UNSWITCHED AC outlets are provided which are always live as long as the C-19 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-19 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-19 itself requires only modest power (equivalent to a clock radio) 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-19's switched outlets, a heavy duty extension cord of at least 16 gauge is recommended.

4. Installation

First, make sure you have read the Safety Warnings in the front of this manual and the Placement suggestions on page 6.

Figure 5 shows a typical system using the C-19.

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.

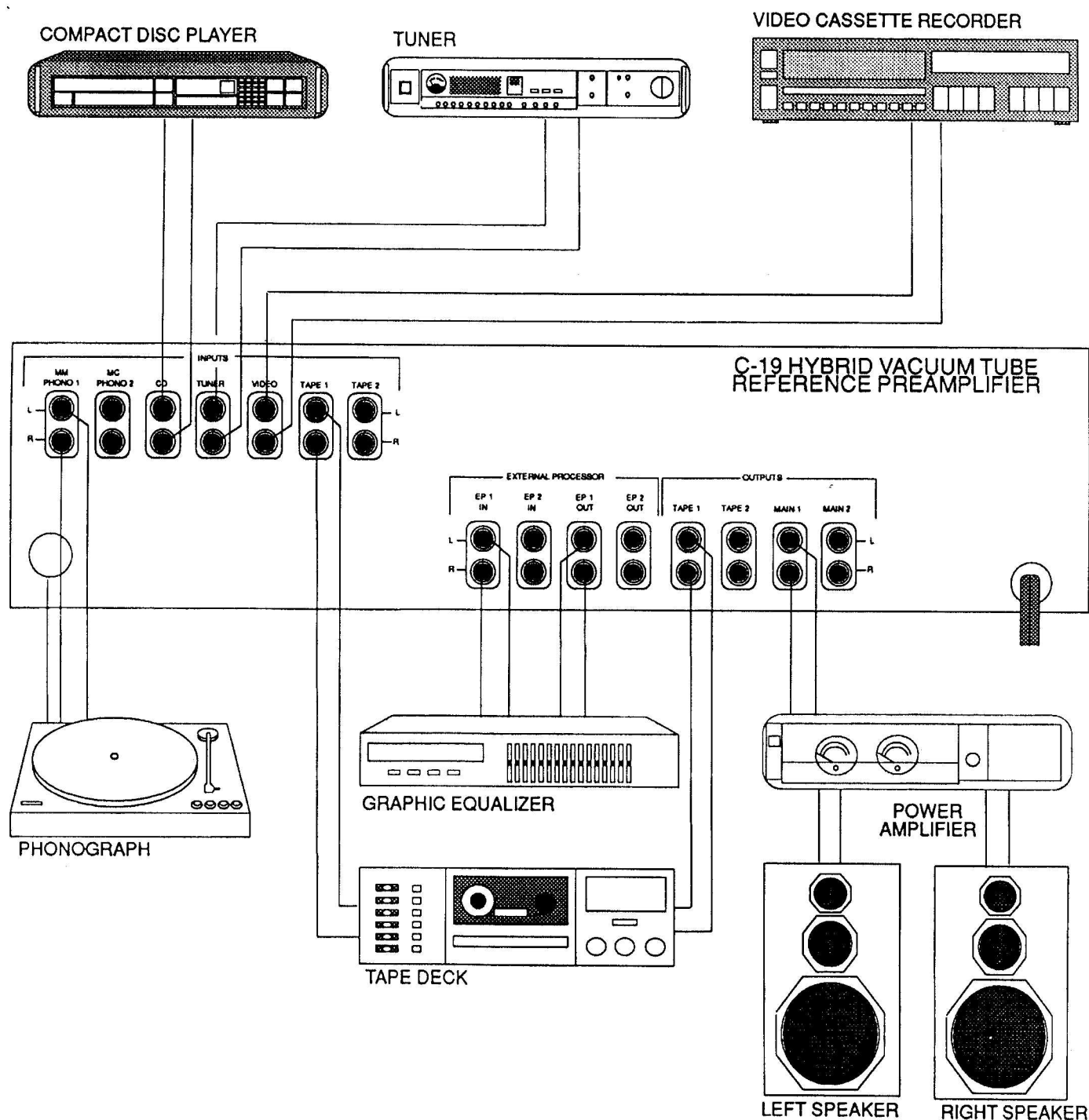


Figure 5 System Connections

5. Operating Tips

Turning the Power On

The Power button, located in the upper left corner of the C-19, turns on the C-19 as well as the three switched AC outlets and the devices connected to them. Before you press the Power button, it is good practice to turn the Volume Control to LOW.

You may leave the Power button permanently engaged, using an external remote or timed switch to turn on the C-19. If you choose this option, be sure the external device or switch is rated to handle the full power draw of your system.

Selecting Stereo or Mono

The C-19 can operate in either stereo or mono mode. Use the Stereo/Mono pushbutton to select the appropriate mode.

In Mono mode, the two independent stereo channels of the C-19 arrive at the Main Outputs in parallel. The Mono switch effectively combines or "sums" left and right inputs so that both channels of the Main Outputs have identical signals. Stereo/Mono does not affect the Tape or External Processor outputs.

The most common use for this switch is in checking loudspeaker phasing. Play any stereo or mono recording, then press the Mono button to determine whether a solid "center" image develops between your speakers. Reverse the polarity (+,-) of one speaker connection and recheck. The polarity position which develops a clear "center" image between the speakers with fullest bass content, is the "in-phase" position for the speaker wiring.

When playing old monophonic discs, press the Mono button to cancel any "vertical" (L-R) rumble and surface noise.

When listening to a single-channel signal (such as TV audio), you may either use a "Y" cord at the selected Auxiliary or other high-level inputs, or

press the Mono switch, to yield output to both channels of the C-19's Main Outputs.

Selecting the Input Source

You can listen to any of the program sources connected to the C-19 by turning the Selector control on the front panel. Signals from the selected source are presented to the Main Output and, if neither Dub switch is engaged, to the Tape and External Processor Outputs for recording.

We recommend that you insert "shorting plugs" in all unused inputs, to eliminate any audible "ticks" when the Selector control is rotated through an unused input. Do not install shorting plugs in any of the output jacks; this would short circuit the preamplifier output.

Adjusting the Volume

The Volume control on the front panel is the master level control for the stereo system. Since input signal levels vary from one source to the next, as well as from one disc, tape, or FM station to the next, it is normal to adjust the Volume level from time to time.

The control, a continuous-taper potentiometer, allows smooth transition from one level to another. The taper rate of the potentiometer was chosen to provide maximum flexibility and compatibility with other components. For typical input signal levels, the Volume control can mute the C-19's Main Outputs completely at its full-counterclockwise setting.

The frequency responsiveness of the human ear varies at different sound levels. To automatically adjust for these differences, try depressing the LOUDNESS switch at low volume levels.

Adjusting the Balance

The Balance control adjusts the relative levels of the two stereo channels. In its center-detent position, the levels are exactly equal. Turn the

control clockwise to reduce the left channel's level; counterclockwise to reduce the right channel's level.

Small movements off center produce smaller shifts in the stereo image per degree of rotation than near the extreme left and right position, which makes slight trimming of levels more convenient.

Adjusting the Tone

The C-19's tone-control stage appears in the signal path after input selection, and Tape and External Processor switching. The Tone controls may be switched in or out of circuit with the TONE/PUSH ON switch. By repetitively turning tone control off and on, you can quickly compare the tone-contoured signal to the laboratory-flat frequency response of the C-19 high-level line amplifier.

The tone controls provide separate left and right controls for adjusting the Bass and Treble tonal balance of each channel. Normally, Bass and Treble are adjusted equally in both channels, but there are circumstances in which different settings for the channels may be useful:

- Source imbalances of a phono cartridge or tape recorder
- Asymmetry in listening room acoustics

The routine use of the tone controls will enhance your musical experience. Begin with identical signals—pink-noise (MONO) or FM interstation hiss—in the two channels. Using the Balance control, listen alternately to each channel. Adjust the relative settings of the tone controls until the two channels sound as nearly alike as possible. If available, a Real-Time Analyzer is a useful reference.

In addition, turnover controls alter the effect and range of both Bass and Treble controls. The frequencies listed on these switches—40 Hz/200 Hz, 8 kHz/2 kHz—indicate the approximate point in the audible spectrum where the tone controls begin to have an effect.

The Tone Controls are asymmetrical in boost and cut. They have been designed to be appropriate to real music listening situations. With both turnover switches depressed, boost exhibits minimal "shelving," and reaches a maximum of +12 dB at full clockwise rotation. With both turnover switches out, boost is reduced to a maximum of +10 dB, but shelving still occurs only at the extremes of the audible spectrum. Bass may thus be boosted without the "boom" associated with shelving in order to increase deep "punch" without mid-bass "fainess." Treble boost causes greater definition without the "shrillness" which results from treble-boost shelving.

In the cut (counterclockwise) position, treble and bass are not "rolled-off," as with most tone

controls. Instead, energy output in the upper and lower ranges is reduced while maintaining flat frequency response in those ranges. Cut does not exceed -5 dB, since frequency response attenuation beyond this yields a characteristic "dead" sound. Cut is not substantially affected by the tone-turnover frequency switches. This shelving characteristic for the cut mode is useful if a recording sounds too "bright." The relative harmonic energy can be reduced without affecting the balance of the harmonic content. Thus, a violin still sounds like a violin, retaining its "air" and "sheen," while reducing excessive "brightness."

The controls described so far allow you to make the relatively coarse adjustments available on most modern systems. Since the boost rate is fixed over its entire effective range, you cannot always achieve the optimum equalization. Sometimes, for example, the higher bass frequencies are boosted when only the lower bass frequencies need to be. To resolve this problem, CARVER has added a breakthrough tone adjustment circuit to the traditional array. The C-19's Tilt control allows you to fine tune the equalization adjustment in a way that other systems do not.

The Tilt control adjusts the entire audio spectrum from 20 Hz to 20,000 Hz in an uninterrupted fashion, resulting in a smooth frequency contour with virtually no recognizable corner frequency. As you rotate the control clockwise, bass response increases as treble response decreases. The opposite is true as you turn the control counterclockwise. Tilt slope is continuously adjustable from ± 3 dB at 20 Hz to ± 2 dB at 20 kHz.

Using Headphones

The C-19 supports all conventional dynamic headphones, except electrostatic models. Headphones are connected to the headphone jack located in the lower left corner of the front panel. You may use headphone extension cables and "Y" connectors to drive two identical sets of headphones.

Headphone impedance may be from a few ohms to several thousand ohms, although output level may vary depending on impedance. A separate internal amplifier drives the headphone jack to provide the extra voltage and current gain it needs. The signals present at the headphone jack are identical to those at the Main Outputs and are equally affected by the Volume, Balance, and Tone controls.

Normally, you should depress the Speakers Off switch when listening to headphones so that the level may be adjusted by the Volume control without overdriving the power amplifier or speakers. Neither the Main Outputs nor the speakers are muted by simply inserting a plug into the headphone jack. To protect the headphones from damage at high Volume

The Infrasonic Filter's response is flat within 0.5 dB down to 20 Hz, then attenuates the preamp's frequency response rapidly at lower frequencies.

You can choose whether or not to use infrasonic filtering by depressing or releasing the ENGAGE INFRASONIC FILTER button on the rear panel. The need for infrasonic filtering increases with volume level. Although you may not need the filter at background levels, we recommend its use when recording discs or playing back at high levels.

"Group delay," an unavoidable consequence of the rapid attenuation of subsonic response, can, under certain musical circumstances, have a just perceptible consequence in the audio passband. Infrasonic filtering is thus somewhat of a compromise, but the advantages of its use commonly far outweigh the disadvantages.

Since the filter is located between the selector switch and the Tape Outputs, its effects apply to all input sources except Tape, and removes subsonic content from the signal fed to tape recorders as well as to the main power amplifier.

6. Technical Information and Service Assistance

Specifications

Phono:

RIAA - + 0.25dB "extended" RIAA curve
Overload (Phono 1) - 100mV @1kHz
Frequency Response - 1Hz - 60kHz +0, -0.3dB
(Infrasonic Filter, Tone OUT)

Noise:

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

Infrasonic Filter:

95dBV, IHF A-weighted

Tone:

85dBV, IHF A-weighted

Distortion:

THD - 0.07% or less, below 3Vrms
IM (CCIR or SMPTE) - 0.04% or less
TIM - unmeasurable

Rated Output:

2Vrms

Maximum Output:

7Vrms

Size:

5" H x 19" W x 10" D

Weight:

8 lbs.

Cleaning

You'll want to wipe off the C-19'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 troubleshooting first. More likely than not, the problem lies elsewhere in the system—not with the C-19.

No sound.

1. C-19 power off.
2. Line cord disconnected.
3. Poor fit between plug and wall receptacle.
4. Power off at wall receptacle (check with neon tester or lamp).

No sound (power OK and on).

1. C-19 Input Selector set to inactive output.
2. Either TAPE MONITOR button pushed in with no tape running.
3. Either EXTERNAL PROCESSOR button pushed with no outboard electronics connected or power off on the outboard unit.
4. C-19 SPEAKER button in OFF position.

6. TECHNICAL INFORMATION AND SERVICE ASSISTANCE

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-19 to power amplifier.
2. Speaker wire loose or disconnected.
3. C-19 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 coil cartridge INPUT IMPEDANCE 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-19 volume control). Re-adjust the LINE GAIN level settings.

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-19, 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-19 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.

C-19 HYBRID VACUUM TUBE REFERENCE PREAMPLIFIER

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