

CARVER

Model C-2
Stereo Preamplifier

OWNER'S MANUAL

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INTRODUCTION

Congratulations on your purchase of the Carver C-2. We believe its sophisticated engineering and meticulous craftsmanship will provide you with many years of listening enjoyment.

The C-2 is a high-performance console preamplifier with precise RIAA phono equalization, low distortion, high slew rate, wide dynamic range, and a high degree of control flexibility.

NOTICE TO PURCHASER

IT IS O.K. TO BEGIN USING YOUR NEW C-2 WITHOUT FIRST READING THIS OWNER'S MANUAL. YOU CANNOT HURT IT, AND IT CANNOT HURT YOU. If you have previous experience with stereo components, you probably can complete the input/output connections and make normal use of the basic preamplifier functions without special instructions.

This manual was prepared with unusual thoroughness and care, and we recommend that you read it in its entirety at your earliest convenience. You will find that even some of the "conventional" parts of the C-2 are in fact not conventional at all.

We also recommend that you record the following information here, for possible future reference:

C-2 Serial No.: _____

Purchase Date: _____

Store Name and Address: _____

UNPACKING

The C-2 is not fragile, but it is a precision instrument and deserves to be handled with care. As you unwrap it, we recommend that you return all packing materials to the carton and then store the carton in a convenient place. It has been designed to provide the safest protection for the C-2 and should be used whenever you ship the unit, e.g. when moving to a new address or returning the unit for servicing.

CAUTION NOTICE

To prevent a fire or shock hazard, do not expose this unit to moisture or rain. If it accidentally becomes wet, disconnect its AC power cord until the unit is thoroughly dry, inside and out.

Before connecting or disconnecting cables, unplug the C-2's AC power cord or switch off the power to each component in the stereo system — especially the power amplifier. If the power amplifier lacks an on-off switch, unplug its own power cord.

Do not remove the top or bottom cover of the C-2. There are no user-

serviceable parts inside. Refer all servicing to qualified personnel; unauthorized servicing may void the warranty.

INSTALLATION

The C-2 is an all-solid-state design and may be operated horizontally, vertically, or at any angle. It has no special ventilation requirements, but it should not be operated in a totally enclosed cabinet.

Its location relative to other stereo components is generally not critical, with one exception: the power transformers of some power amplifiers radiate a severe external hum field, so it may not be practical to place the preamp adjacent to or stacked with the power amp. (Such power amplifiers should also be kept away from turntables, phono signal cables, and the playback heads of tape recorders.)

Typically the preamp must be located close to the turntable in order to keep phono signal cables short; begin by locating the turntable on a stable, vibration-free surface and then arrange the preamp and other system components in convenient locations nearby.

On the other hand, in many systems it would be a worthwhile convenience if the preamp could be located within arm's length of the prime listening seat, while keeping the turntable on a stable vibration-free shelf. Often this can be done simply by using extra-long connecting cables. Such cables increase the risk of hum and radio interference; if neither problem arises, then the remaining concern is the capacitance of the cable as it relates to the "load" requirements of your phono cartridge. If its manufacturer specifies that the cartridge should be used with a relatively low value of load capacitance (e.g. 250 pF or less), then you can't use a long cable unless it is of special low-capacitance design. With cartridges designed for a load capacitance of 400-500 pF, or with low-inductance cartridges, which are insensitive to cable capacitance, you may find that you can use long connecting cables with no adverse effect on the sound. For reference, the lowest-capacitance audio cables typically add about 15 pF per foot of cable length; garden-variety audio signal cables may add as high as 50 or 100 pF per foot of length.

USING YOUR C-2: A QUICK OVERVIEW

Doubtless you are eager to begin using the C-2. Therefore this chapter provides a very condensed summary of the essential information that you need to hook up and use the preamp, without waiting to read the entire owner's manual.

NOTE: The C-2 is different from most preamplifiers in many not-so-obvious ways. In order to get full benefit from the original design of the C-2, you owe it to yourself to read the rest of this manual at your earliest convenience.

Now, to get started. The diagram on the facing page illustrates in typical fashion the connection of stereo components to the C-2. Before making connections it is wise to switch off each component's power switch and unplug its AC power cord from the socket. Connect all of the signal cables, then plug in the AC line cords, and finally turn the system components on.

The illustration identifies the control knobs and pushbuttons on the front panel of the C-2. To begin, all of the pushbuttons should be OUT, except the following:

The POWER button should be IN in order to turn the preamplifier on.

The INFRASONIC FILTER button should be IN.

The TONE button should be IN if you want to use the Bass and Treble controls.

Initially, all of the control knobs (Bass, Treble, Balance, etc.) should be set to the 12 o'clock position, except as follows:

The VOLUME knob should be turned down (counter-clockwise) when the POWER is first switched on, and then can be adjusted for a pleasing loudness level.

REAR PANEL CONNECTIONS

PHONO

The phono stage of the C-2 is front panel gain-selectable; it is designed for use with either a moving magnet or moving coil cartridge.

MOVING MAGNET:

When using the C-2 with a moving magnet cartridge simply connect the signal cables from your turntable to the phono input of the C-2. This is the standard RIAA input for conventional magnetic cartridges (moving-magnet, induced-magnet, variable-reluctance, moving-flux). It should also be used for "high-output" moving-coil cartridges having a rated output of at least 1mV (e.g. Dynavector 10X, Adcom XC, Satin M117, et al). The Phono input impedance is 47k Ω resistance in parallel with a 100 pF capacitance.

SELECTING INPUT CAPACITANCE. Most modern phono cartridges are relatively insensitive to the capacitance of connecting cables and the preamp input. For the vast majority of modern pickups, the factory value of 100 pF in combination with the capacitance associated with the turntable cables will yield a net value that we believe will lie closely within the normal specific range of optimum capacitance. Hence, it's generally NOT necessary to add any capacitance to the pre-amp PHONO LOADING input for moving magnet pickups. However, some high-inductance moving magnet and induced-magnet pickups will exhibit flattest frequency response only within a specific narrow optimum range of load capacitance values. In order to select the best value of preamp input capacitance, you first must determine the total capacitance recommended for the cartridge. (See the manufacturer's specifications or refer to magazine reviews.) Then subtract the capacitance which is contributed by the phono signal cables and tonearm wiring of your turntable. (Again, check the maker's specifications, test reports, or assume a typical value of 150 pF.)

What remains is the value of input capacitance which should be added to the cartridge. Subtract 100 pF from this value and add it to the cartridge load. This capacitor should be soldered to a phono jack, one end soldered to the protruding metal finger, the other end to the outer ground shell, and inserted into the PHONO LOADING input.

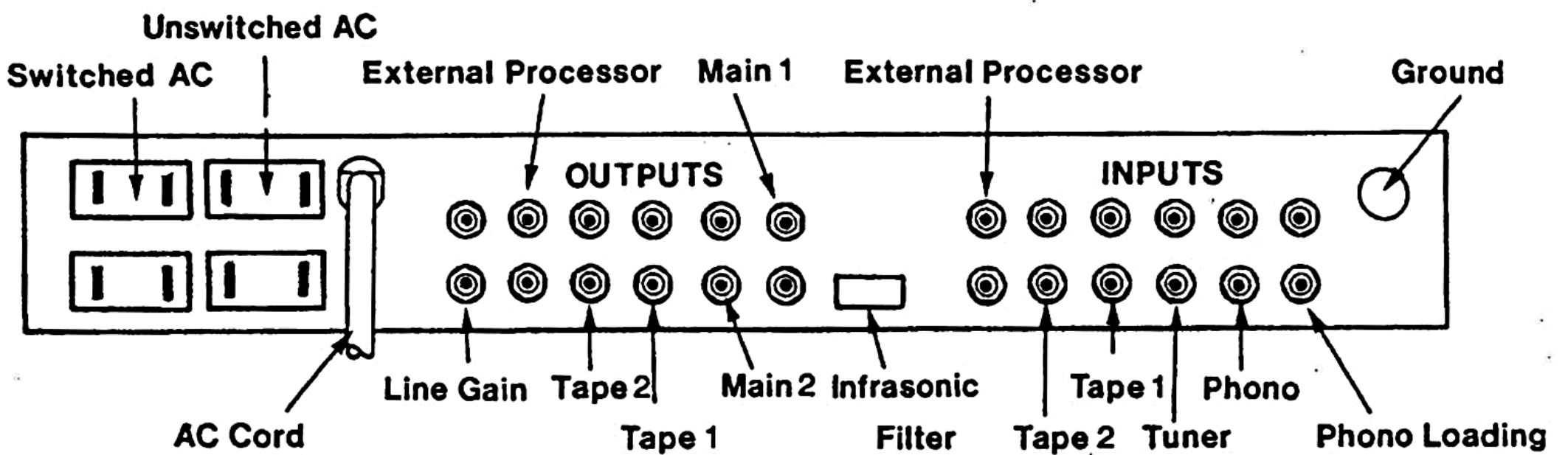
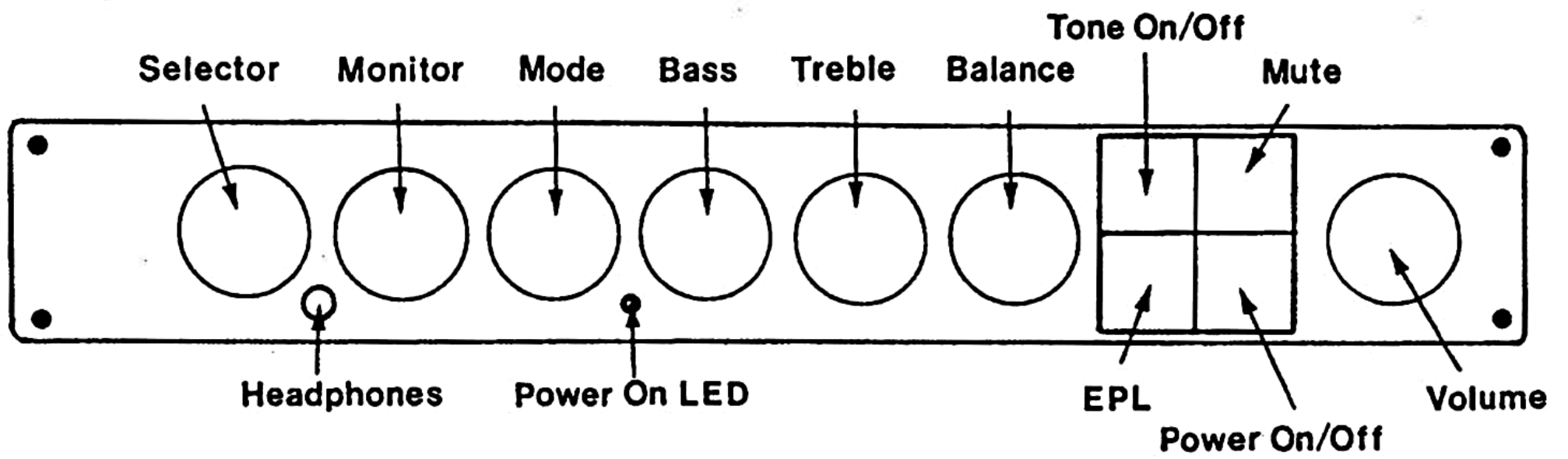
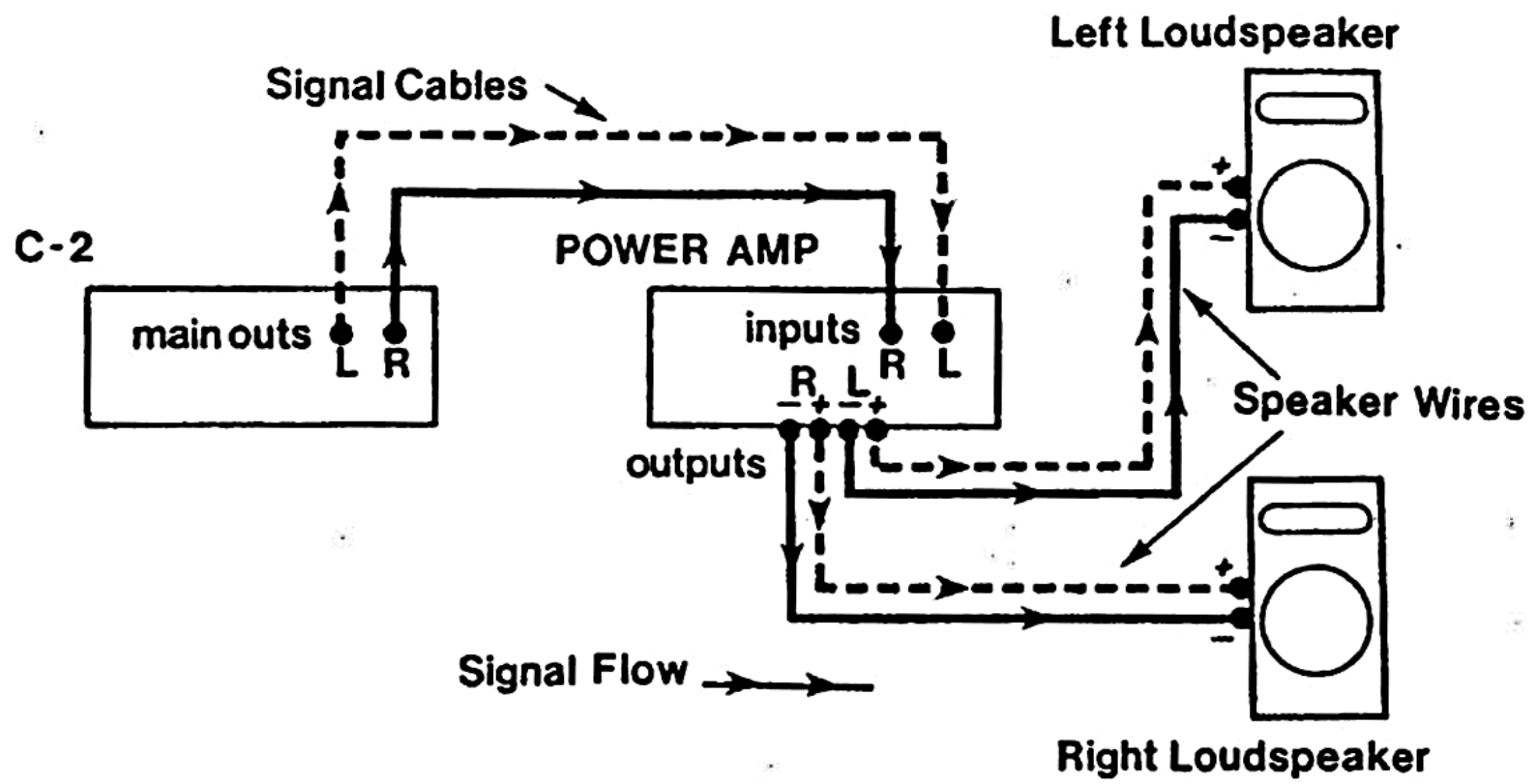
An alternative approach is to set the capacitance by listening to recordings. Typically, with too low a capacitance the upper-midrange (the soprano voice range) will be "soft" while the response at the highest frequencies will be slightly emphasized. Too much capacitance will bring the upper-midrange forward and roll off the extreme highs.

MOVING COIL:

When using a moving coil cartridge it is necessary to take an additional step before connecting the turntable signal cables. A load resistor, which is appropriate to your cartridge, must be installed into the phono loading unit. The input jack next to the phono jack is used to load the phono pickup. It is labeled PHONO LOADING. For moving coil pickups we provide 240 Ω 1/4W resistors already soldered to phono jacks (Carver PN# 602-00227-00). They should be inserted into the PHONO LOADING inputs. Other combinations of resistance and/or capacitance may be used if you wish. Since the basic input impedance is 47 k Ω in parallel with 100 pF, any load inserted into the PHONO LOADING will be effectively in parallel with the basic input impedance. However, since 240 Ω is very much lower than 47 k Ω , the combination of the two results in a value very close to 240 Ω . Normally, we recommend a 240 Ω resistor. However, a few M.C. cartridges may sound peaky in the extreme high frequencies if not loaded with very low values (values around 3 Ω). Hence, if the cartridge nominal impedance is 15 Ω or higher, the 240 Ω is recommended. If the nominal is below 15 Ω , then we recommend a 3.9 Ω or the nominal, whichever is higher. The best signal to noise ratio results with the higher values because the pickup signal is not loaded down as much. So, the extreme low resistance values are only recommended if they absolutely must be used to prevent peakiness at the very highest frequencies.

Refer to the instructions supplied with your turntable or tonearm to discover which signal lead carries the Right channel signal and which the Left. When plugging the cables into the preamp's sockets, be sure that each plug is inserted fully into the socket, making a tight fit.

Each plug consists of a protruding metal finger which should be a good friction fit as it goes into the socket, plus a metal skirt which should fit tightly on the metal exterior of the socket. If the fit is too loose or too tight, use small "needle-nose" pliers to bend the individual leaves of the skirt slightly in or out. It is also a good practice to rotate or twist the plug on its axis as it goes into socket; thus any corrosion or oxidation on the plug and socket surfaces will be scraped away, making a good distortion-free, metal-to-metal contact.



GROUND

If your turntable is equipped with a separate ground wire, try connecting it to the preamplifier's GROUND post and note whether this connection minimizes hum. If it does, make the connection permanent. If you have two turntables, try connecting both ground wires to the GROUND post.

Normally these are the ONLY connections made to the GROUND post. All other components in the stereo system are grounded through their signal cables, and if you connect additional grounding wires among stereo components the result will be the formation of ground-current loops and an INCREASED hum level.

In some systems it may prove beneficial to connect a wire from the preamplifier's GROUND post to a true electrical earth ground such as a cold-water pipe; see the separate section on Hum.

TUNER INPUTS

Connect the signal cables from an FM or FM/AM tuner to these jacks. If your tuner has both "fixed" and "variable" output jacks, it usually is preferable to use the "variable" jacks. Then you can adjust the tuner's Output Level control so that, when you switch from Phono to Tuner, the volume level of the sound is approximately the same.

AUX INPUTS

Connect any other "line-level" signal sources to these jacks. Examples include a Digital Audio Disc player, TV-sound tuner, a separate AM radio tuner, the output of a spare tape machine, the output of a separate microphone preamp or mixer, etc. Note: if you want to connect the sound signal directly from an operating television set, first check with a TV service technician to be sure that the set's circuitry is isolated from the AC power line via a power transformer. In general, console and projection TV's are safe in this respect, but some portables are not.

The Tape 1, Tape 2/Aux or Tuner inputs may all be used as auxiliary inputs.

TAPE 1 and TAPE 2 INPUTS

You can connect cables from the line-level playback outputs of two tape recorders to these jacks. The output jacks may be identified as LINE OUT, PLAY, or MONITOR. If you are using a separate tape noise-reduction system (Dolby, DBX, etc.) with a recorder, then the recorder's playback outputs will be connected to the processor; in this case it is the processor's playback outputs which should be connected to the C-2's Tape 1 or Tape 2/Aux inputs.

If you are connecting two tape recorders it normally makes no difference which is connected to TAPE 1 and which to TAPE 2.

If your tape recorder is equipped with a DIN five-pin input/output socket as well as conventional phono jacks, make the connections to the phono jacks; usually these will provide the best match to the C-2 in terms of impedance, sensitivity, and minimum noise. If the recorder is equipped only with a DIN socket, then you can obtain an adapter cable with a DIN plug on one end and phono plugs at the other for connection to the C-2. If you have two tape recorders and two aux signals in addition to a processor

which must go into the external processor input, you will be able to dub in one direction only. (For example, from Tape Recorder #1 to Tape Recorder #2). This is because the Tape 2 input is shared with the Aux input. You will have to decide which tape machine will be the "master" and which will be the "slave".

EXTERNAL PROCESSOR INPUTS

These jacks enable the connection of any of a large range of signal processing accessory devices. Examples include:

- A graphic equalizer or parametric equalizer.
- A dynamic noise filter, impulse noise suppressor ("tick-and-pop filter"), or scratch filter.
- A dynamic-range expander, compressor, or limiter.
- The special equalizer unit supplied with some loudspeakers, notable certain models from Bose, ElectroVoice, KLH, and Infinity. Alternatively, such a speaker equalizer may be connected between the C-2's Main Out jacks and the power amplifier's input jacks, leaving the External Processor loop free for other accessories. If the equalizer lacks a Flat or Bypass setting, and if you want to use the power amplifier to drive electrostatic headphones or other loudspeakers not requiring equalization, then the equalizer should be connected to the External Processor jacks where it can be engaged or bypassed at will.
- Any other special-purpose filter or equalizer, e.g. the Cotter audio-bandpass filter or the Allison Electronic Subwoofer.
- The "front" outputs from an external "spatial ambience" matrix decoder or time-delay unit. Usually, however, these signals will be connected directly to the power amplifier inputs so that the preamp's controls can serve as "master" controls governing the sound of all speakers in the system.

In general, devices whose operation depends on the setting of a threshold or sensitivity control (such as an impulse-noise suppressor) should be connected to the External Processor jacks because the signal levels there will not be affected by the settings of the preamp's Volume and Tone controls. But devices such as equalizers, which are not sensitive to signal level, may be connected either in the External Processor loop or at the preamp's Main Output; the choice is a matter of convenience.

The External Processor loop is located AFTER the TAPE input/output circuits in the C-2's signal path. Therefore signal-processing accessories connected in the External Processor loop can be used to process the playback signal from a tape recorder, but cannot be used to modify or improve the signal being fed to a tape deck for recording.

You may connect a spare tape recorder to the External Processor jacks instead of an accessory device. Functionally, the External Processor input/output connections are similar to the two TAPE connections, except that the "dubbing" function operates only between the two sets of TAPE jacks. So a recorder connected in the External Processor loop can be used for normal recording and playback, but tapes cannot be dubbed (copied) from this deck onto a recorder connected to TAPE 1 or TAPE 2.

EXTERNAL PROCESSOR OUTPUTS

Connect a signal cable from these jacks to the line-level input jacks of the signal-processing accessory (or other device) whose playback cables have already been connected to the C-2's External Processor input jacks.

TAPE 1 and TAPE 2 OUTPUTS

Connect cables from these jacks to the line-level input jacks of your tape recorders. Be sure that the cable from TAPE 1 OUT goes to the same machine whose playback cable is connected to the TAPE 1 INPUTS.

If one of your recorders is connected to an outboard noise-reduction unit (Dolby, DBX, etc.), connect the cable from the C-2 to the unit's "from amplifier" input jacks rather than the recorder's own input jacks.

PREAMPLIFIER GAIN CHANGE

The line level gain of the C-2 is set at 15 dB by the factory. The 15 dB gain setting is usually very desirable. However, should you have a cartridge with lower than normal output, a low or moderate gain power amplifier, or possibly a combination of the two, you may wish to increase the line level gain section of the C-2 by 10 dB for an overall gain of 25 dB.

To increase the overall gain, simply install a shorting plug into the rear panel jack marked LINE GAIN.

MAIN OUTPUT

Connect a cable from these jacks to the input jacks on your power amplifier. (The power amplifier, of course, should be turned off when making this connection.) The spare set of Main Output jacks can be used to feed signals to a second power amplifier driving additional speakers, to feed processed signals to a tape recorder, etc.

If you are bi-amplifying your speakers with the aid of an electronic crossover, connect the cable from Main Out to the crossover's input jacks; then connect cables from the crossover's High and Low range outputs to the appropriate power amplifiers.

If your speakers require the use of a special equalizer and you have not connected it to the External Processor input/output jacks, then connect the cable from the Main Outputs to the equalizer's inputs, and a second cable from the equalizer's outputs to your power amplifier's input jacks.

The output impedance of the C-2 is 600 Ω , so it can drive power amplifiers having virtually any input impedance. And if you are using powered loudspeakers (with built-in amplifiers), or if you choose to locate your power amplifier close to your speakers in order to avoid any deleterious effects due to long speaker wires, you can safely use long connecting cables from the C-2 to the power amplifier inputs. Conventional cables as long as 30 feet, or special low-capacitance cables as long as 60 feet, may be connected between the preamplifier and the power amplifier without difficulty.

FUSE

This fuse protects the preamplifier in case of accident or internal malfunction. If it blows, the preamplifier will not function. Do not substitute a larger value fuse. If the fuse blows, return the preamp for servicing.

AC SOCKETS

The C-2 is equipped with two "switched" AC convenience outlets whose power is switched on and off by the C-2's own front-panel power switch. These can be used to supply AC power to all-electronic products such as tuners and power amplifiers. The switch is a heavy-duty unit and can safely be used to switch on power amplifiers of up to 1000W or continuous duty devices up to 500W.

In addition, two "unswitched" AC convenience outlets are provided; these are always "live" as long as the C-2's power cord is plugged into a wall socket. The unswitched outlets should be used to supply AC power to mechanical devices (turntables, tape recorders) which should be turned on and off with their own power switches. The unswitched outlets can also be used to supply power to devices which are intended to be left permanently on (e.g. to avoid turn-on transient "thumps").

AC LINE CORD

After completing connections to the power amplifier and other system components, plug the AC line cord into a convenient wall outlet supplying 110-120V ac.

The supplied line cord is a heavy-duty wire capable of carrying the large currents required by power amplifiers which may be plugged into the C-2's convenience outlets.

The C-2 itself requires only a modest amount of power, so it can be operated from ordinary AC extension cords if desired. But if you have a substantial power amplifier connected to one of the convenience outlets, a heavy-duty extension cord must be used, one made of wire no higher than 16-gauge, preferably 14-gauge.

THE FRONT PANEL:

PREAMPLIFIER CONTROLS

POWER

The POWER switch turns the C-2 on and off, and also switches power to any equipment (e.g., tuner, power amplifier) whose AC line cord is plugged into the SWITCHED AC outlets at the rear.

To avoid any unpleasant surprises, it is always wise to turn down the VOLUME control before switching the power on.

If you prefer, you may leave the C-2's POWER switch permanently engaged and use an external switch or a clock timer to turn the stereo

system on and off. But if you have a substantial power amplifier plugged into the AC convenience outlets on the rear panel, then such an external switch or timer must be a heavy-duty unit rated to handle the amplifier's AC power requirements.

HEADPHONES

All conventional headphones (i.e., all except electrostatic models) may be plugged in here; the headphones may have any impedance from a few ohms to several thousand ohms. The signals fed to the headphone amplifier are essentially identical to those fed to the Main Output jacks; i.e., they are equally affected by the Volume, Tone, and other controls.

The HEADPHONES socket is a standard 3-contact $\frac{1}{4}$ " stereo phone jack accepting normal tip/ring/sleeve plugs. The wiring to the phone jack is correct for most headphone models: the tip of the plug carries the left-channel signal, the ring contact on the plug carries the right channel, and the sleeve of the plug is the common ground. In a few headphones the wiring is reversed (tip to right and ring to left); with these you can either reverse the phones on the head or have a technician re-wire the plug on the headphone cable. If you are not sure of the plug wiring, you can check it with the aid of the BALANCE control: as the control is turned to the right (clockwise) the sound should go to the right earcup.

You may freely use headphone extension cables. If you want to use a headphone Y-connector to drive two headsets simultaneously, they should be identical models; connecting together two headphones which differ widely in impedance usually will cause a substantial loss of volume in the headset having the higher impedance (or in both).

Normally when you listen to headphones you should depress the MUTE switch in order to cut off the output signal to the power amplifier, thus muting the loudspeakers. The speakers are not automatically silenced when a plug is inserted into the HEADPHONES jack. With the MUTE button engaged, you can freely adjust the Volume control for headphone listening without fear of accidentally overdriving the loudspeakers.

The HEADPHONES socket can also be used as an extra convenience output (instead of the spare pair of Main Output jacks at the rear panel) to feed signals to a tape recorder or a second power amplifier. The output signal, of course, will be affected by the Volume, Tone, and other preamp controls. You will need an adapter cable (Radio Shack #42-2477 or equivalent) to convert from the 3-contact phone plug to a pair of standard phono jacks.

VOLUME and BALANCE

The VOLUME control is the master gain control for the stereo system. As a general rule you should turn it down when switching between input signals and when cueing the phonograph stylus in the groove; then turn it up to the desired loudness level. It is normal to find that the preferred setting of the VOLUME control will differ from one program source to another, from one record to another, and from one FM station to another.

The BALANCE control adjusts the RELATIVE gains of the two stereo channels. In its detented position, (with the pointer dot at 12 o'clock) the two channels have equal gain. Rotating the control toward the right (clockwise) shifts the stereo image toward the right by reducing the output level in the left channel, and conversely, rotating the control toward the left (counter-clockwise) shifts the image toward the left. The control is designed so that small movements of the control off-center produce small shifts of the stereo balance, while large rotations of the control will turn the unwanted channel completely off.

Since obvious left-right balance errors in recordings are relatively rare, it is often assumed that the normal and "correct" setting of the BALANCE control is at its detented center position. But in fact small balance errors, typically 1 to 2 dB in magnitude, are often present in recordings and in stereo components. These are too small to produce an obvious left-right balance shift, but they are still audibly significant because they affect the perceived "depth," detail, and ambience in the stereo image. Feel free to experiment with small rotations of the BALANCE control in either direction from center, to find those settings which yield the best resolution of depth and detail in the stereo sound field.

There are several common causes of small balance errors. One is the phono cartridge: some phono pickups have precisely equal output levels in both channels, but many exhibit channel balance errors of 1 to 2 dB, differing from sample to sample, because of normal construction tolerances.

Tape recorders also commonly have input-to-output balance shifts of 1 or 2 dB because of normal tolerances in the settings of recording bias, internal calibration controls, and the "tracking" of the two sections of ganged Record Level and Output Level controls. Balance errors may even differ from one brand or sample of tape to the next.

Loudspeakers typically differ in sensitivity ("efficiency") by ± 1 dB or more from sample to sample due to normal construction tolerances, and may vary further if you haven't matched the settings of their midrange/tweeter controls. Moreover, if one speaker is located near a wall and the other near an open doorway, their output may be differently reinforced by room acoustics.

In each stage of the stereo system's electronics the two channels can be expected to be well matched. But in an elaborate system with many signal-handling stages (phono preamp, tone-control stage, preamp output stage, peak limiter, equalizer, power amplifier, etc.) the tiny balance errors in each stage can add up to a significant total.

INPUT SELECTOR

This switch selects the program source which is to be heard; the same program source is also connected to the tape recording circuits. The input selector also sets the gain of the phono stage. If you use a moving magnet phono cartridge, set the switch to M.M. If you use a moving coil phono cartridge, set it to M.C. When you switch to a position of the INPUT SELECTOR which has no program source connected to it, you may hear some "crosstalk" (leakage of signal from adjacent positions of the switch).

This can be eliminated, if desired, by installing "shorting plugs" in the unused jacks on the rear panel. (DO NOT install shorting plugs in unused OUTPUT jacks. This would short-circuit the output of the preamplifier.)

INFRASONIC FILTER

The selected input signal passes through an infrasonic filter which has no effect on the audible tonal balance of most recordings (even those with prominent deep bass) but rolls off rapidly at frequencies below 20 Hz. When the INFRASONIC FILTER switch is out, this filter is bypassed; when the button is depressed the filter is engaged. It is a good practice to leave the filter switched on permanently.

The filter's "group delay," an unavoidable consequence of its rapid infrasonic attenuation, may produce a just-perceptible alteration of low-frequency transient response. But in general any audible effect of the filter will be beneficial, since reproduction of infrasonic signals yields no benefit. These unwanted signals include switching thumps, turn-on transients of associated components, the thump produced in some FM tuners when tuned past a station, and the transient produced when the phono stylus sets down in the groove. If reproduced at high gain through a powerful amplifier, such signals can damage loudspeakers.

Phonograph output signals are also contaminated with strong infrasonic waveform components due to small and large disc warps, motor rumble (especially in direct-drive units), acoustic feedback and other externally induced vibrations sensed by the phono stylus, all of these amplified by the tone arm resonance (due to the stylus compliance interacting with the effective arm mass). These signal components occur primarily in the frequency range from 2 Hz to 15 Hz; if not stripped off the audio signal by an effective infrasonic filter they will tend to waste amplifier power and cause excess woofer cone motion, resulting in audible intermodulation distortion (muddy bass).

Since the INFRASONIC FILTER is located in the preamp circuit ahead of the tape outputs, it will also prevent low-frequency overload of recordings by infrasonic contamination. However, it cannot remove any low-frequency switching thumps produced by the tape recorder itself; so if you have a recorder which produces such thumps when going in or out of the playback mode, reduce the setting of the VOLUME control until the recorder's output has stabilized.

MONITOR

TAPE 1 (T1), TAPE 2 (T2) - There are two ways to listen to the playback output from a tape recorder. One way is to use the MONITOR switch and select either T1 or T2. This MONITOR switch permits the output from the tape machine to be heard regardless of the setting of the INPUT SELECTOR. (If no tape machine is connected to the input jacks, or if one is connected but not operating, then rotating the MONITOR switch away from OFF will produce silence.)

The tape MONITOR switch controls only the selection of what signal is heard. It has no effect on which signal is fed to the preamps TAPE OUT jacks for recording; that selection is controlled exclusively by the INPUT selector.

The principal purpose of the tape MONITOR switch is to allow you to listen to tape playbacks and to "monitor" the quality of new recordings while they are being made.

The identity of that output signal depends on the recorder's own controls. In the playback mode, of course, the signal is reproduced from the tape. With a two-head recorder, when you put it into the recording mode, normally the recorder's input signal will also be present at the output jacks after passing through the recorder's Recording Level control and input circuitry. In the case of a three-head recorder, when it is in the recording mode its output signal will either be the input signal or the freshly recorded playback signal from the tape, depending on the setting of the recorder's own monitor (Tape/Source) switch. So, with a three-head recorder you can instantly compare the recorded signal with the incoming signal and detect any recording faults.

Two special situations deserve mention (1) If you are using an external "single-pass" noise-reduction system with the recorder (e.g., a Dolby or DBX unit of the type which must be switched between recording and playback modes), then the monitor output of the system during recording may be an "encoded" version of the input signal with a substantially altered tonal balance. (2) If a Dolby-encoded FM broadcast is fed through a recorder having a built-in FM Copy mode, then the recorder's output may be a decoded version of the broadcast. In this case the TAPE MONITOR switch will enable you to hear the decoded sound. Thus the uses of the MONITOR function are varied, but the operating rules are simple: To listen to phonograph records, radio broadcasts, or program sources connected to the preamp's AUXiliary inputs, leave the TAPE MONITOR switch disengaged (OFF). You will hear the program source chosen by the Input Selector. To hear the output from tape recorder #1, switch the MONITOR to T1. To hear the output from tape recorder #2, switch the MONITOR to T2. As described earlier, the TAPE MONITOR switch (in conjunction with the SELECTOR switch), chooses what signal you will listen to. The selector switch chooses the signal which will appear at the preamp's Tape Output jacks for recording. Again, the operation rules are simple. To copy a tape from recorder #1 to recorder #2, put the Input selector to TAPE 1 and set recorder #2 in the record mode. To copy a tape from recorder #2 to recorder #1, put the Input selector to TAPE 2 and set recorder #1 in the record mode.

EXTERNAL PROCESSOR

Any external signal-processing accessory, such as a graphic equalizer or DBX disc decoder (for processing playback signals only), can be connected to the EXTERNAL PROCESSOR input/output jacks on the rear panel, and can be engaged or bypassed at will by means of the EXTERNAL PROCESSOR switch.

Thus if you have a special loudspeaker equalizer connected to these jacks, you should depress the EXTERNAL PROCESSOR button to engage the equalizer when listening to the speakers which require the equalization. When listening to headphones or to other speakers which don't require the equalization, switch out the EXTERNAL PROCESSOR.

If you have no equipment connected to the External Processor jacks, or have equipment connected but not operating, then depressing the EXTERNAL PROCESSOR switch will produce silence.

You may connect an extra tape recorder to the External Processor jacks and use the EXTERNAL PROCESSOR switch as another Tape Monitor switch. A recorder connected to these jacks can be used to record from the program sources chosen by the Input Selector switch, and can also copy tapes from recorders connected to either set of Tape input/output jacks (by engaging the corresponding Tape Monitor switch). In this case the DUB switches are not used.

STEREO/MONO (MODE)

Rotating this switch combines the two stereo channels together into mono. This has two principal applications. (1) When playing old monophonic records, switching the preamp to mono will cancel any vertical rumble and vertically modulated groove noise, yielding quieter playback. (2) When listening to a monophonic program source (e.g., TV audio), which is connected to only one input jack, switching to mono will couple the signal into both output channels and thus to both loudspeakers for listening.

For all normal listening to conventional stereo program sources, the STEREO/MONO switch should be set to stereo. Rotating this switch to "R" will cause the right channel input signal to appear at both Left and Right outputs. Similarly, setting the switch to "L" will cause the Left channel to appear at both outputs.

TONE CONTROLS

The C-2 is equipped with controls for adjusting the Bass and Treble tonal balance in each channel. In general, moderate rotations of the Bass and Treble controls away from center will prove to be most useful in correcting the tonal balance of recordings. Maximum boost of either Bass or Treble should be used with caution and only at modest loudness levels. Sustained operation at high volume levels with full Bass or Treble boost may call for more energy than your power amplifier can deliver and more than your loudspeakers can safely accommodate.

TONE ON/OFF

When the TONE button is disengaged (out), the tone control circuits are completely bypassed, and adjustment of the Bass and Treble controls has no effect. The TONE button must be depressed in order for the tone controls to affect the sound. Thus you may set the Bass and Treble controls to a desired setting and then, by switching the TONE button in and out, make instant comparisons of the corrected sound versus the "flat," uncorrected sound to evaluate the effect of the tone controls.

The tone controls have been designed to be musically useful, and we encourage their routine use to enhance your enjoyment of musical sound.

MUTE

This switch silences the output of the C-2 at the Main Output jacks, without affecting the signal fed to the HEADPHONES jack. By depressing the MUTE button you can mute the loudspeakers in order to listen to headphones.

IN CASE OF DIFFICULTY

HUM

Under normal operating conditions you will not hear any hum originating in the circuitry of the C-2. There is one exception to this rule: If you have a

high-gain power amplifier and unusually sensitive (i.e., efficient) loudspeakers, normal listening levels will involve using abnormally low output levels from the preamp, and those small signals might then pick up a bit of hum or hiss in the preamp's circuits. Such situations usually are characterized by a need to use only low settings of the Volume control, with settings above 12 o'clock yielding excessively loud sound. In this case, be certain that the LINE GAIN is set to the normal gain. This is accomplished by making certain that no shorting plugs are installed in the LINE GAIN jacks.

Except for the condition described above, audible hum will nearly always be found to be due to problems external to the C-2 — usually in the signal source, i.e., the turntable or tape deck. Many turntables, for example, have a hum field in the vicinity of the platter (due to the turntable's motor or internal power transformer) which is acceptably low with moving-magnet cartridges but audibly bothersome with moving-coil cartridges. You should experiment with reversing the AC power cord of the turntable (preferably with the motor running and the cartridge suspended midway over the platter, held up via the cueing control) to see which orientation of the plug minimizes the audible hum. The hum may also vary with the location and orientation of the turntable with respect to AC wiring in the walls, making it necessary to move the turntable to another part of the room. Both turntables and tape decks, of course, are sensitive to the external hum fields created by many power amplifiers, and sometimes to the hum fields of other household appliances (such as a refrigerator on the other side of the wall). It is important that signal cables in general, and the turntable signal leads in particular, should not run close to and parallel with AC power cords, nor close to a power transformer or motor (including that in the base of the turntable).

In some cases hum may be minimized by connecting a heavy stranded wire from the preamp's Ground post to a true earth ground — which may turn out to be any, all, or none of the following: the third (round) hole in an electrical wall socket in modern U.S. homes, a steam radiator, or a cold water pipe.

However, if your power amplifier employs a three-wire power cord, the stereo system may already be grounded through that, in which case another grounded wire from the preamp will create a "ground loop" and make the hum worse. As for the various components within the stereo system, they are mutually grounded via the shields of the signal cables and should not be interconnected with additional grounding wires, for the same reason (except, of course, the turntable, whose grounding wire usually — but not always — should be connected to the preamp Ground post).

Finally we come to the other common source of hum problems: The signal cables and their associated plugs. Inexpensive cables often have mediocre wrapped shielding, so better cable may make an audible difference. And it is important that the plug at each end of every cable makes a good, tight fit in its mating socket. (In this, don't neglect the "source" end of the turntable signal cables, which in many tables are plugged into sockets underneath rather than being soldered to terminals within the turntable's base.) Crimp the leaves of the phono plug's skirt slightly inward, if necessary, to ensure that it has a tight friction fit on the exterior of the phono jack. When plugging in each cable, use a rotary twisting motion as the plug goes into the jack, in order to scrape away any invisible surface corrosion and make a clean metal-to-metal contact. Finally, in many inexpensive molded cables, the wire breaks where it makes contact with the plug; this problem can be identified by wiggling the

cable and listening for an intermittent signal connection or intermittent hum.

RADIO-FREQUENCY INTERFERENCE

Radio-Frequency Interference from CB, TV, AM, and other radio transmitters is a common problem, and like hum it usually can be traced to a condition external to the C-2. If you encounter RFI, the first step is to depress the MUTE button to mute the preamp's output. If you still hear the interference it is being detected and amplified in the power amplifier. Sometimes RFI gets into the power amp via the signal cables running from the preamp, and may be cured by substituting cables with better braided or foil shielding. More commonly, RFI enters the power amp through its output terminal, with the speaker wires acting as receiving antennas. In this case it might be cured by connecting a 0.01 to 0.1 microfarad disc capacitor across the speaker terminals in each channel, but be sure to check with the amplifier manufacturer first: Some power amps become unstable and burn out when certain values of capacitance are connected at their output terminals. A simpler cure is to place the power amp near the speakers and use short wires; then use extra-long well-shielded signal cables from the preamp to the power amp, which shouldn't cause any problems.

If the interference disappears when you mute the output of the preamp, then the interference is part of the signal and probably is entering the preamp from one or more of your signal sources. Use the Input Selector and Tape Monitor controls to identify which signal sources are picking up the interference. Usually turntables and tape decks are most vulnerable to RFI. If the RFI is coming in through the phono signal leads, cables with better shielding might help. Other options include wrapping the signal cables with aluminum foil which is then connected to the Ground post; or forming a loop in the cables, adjusting the size of the loop to tune out the interference, and taping it in place. And as with hum, try tightening all phono plugs and twist them in their sockets to get good metal-to-metal contact.

RFI in tape decks may enter via signal cables, but more commonly the interference is picked up directly in the playback head and its associated internal wiring, so a cure is likely to involve a trip to the factory or service shop for approved modifications. Or you might be able to reduce the interference to tolerable levels simply by turning the tape deck 90 degrees or moving it to another location in the room.

PROBLEM SOLVING: DIAGNOSTIC HINTS

In view of the C-2's input/output flexibility, the many connecting cables to and from the components which may be connected to it, and the large number of possibilities for mis-set switches both on the C-2 and on the various ancillary components operating with it, obviously it is impossible to offer a complete troubleshooting guide to all of the problems which could, in principle, occur. Most such potential problems will be avoided simply by following the instructions in this owner's manual and the instructions supplied with associated products, and many other possible problems will be prevented simply by the excellent reliability of modern, solid-state components.

So in this section we will provide a guide to some of the most basic and common difficulties which may arise from time to time, and suggestions as to their probable cause. To illustrate the sort of thought process which is useful in tracking down problems, we begin with the most basic: no sound

because the preamp's power is off. Was the preamp's AC line cord accidentally pulled partially out of its wall socket during housecleaning earlier in the day? Did something else on that same household branch circuit (including the power amp or other component plugged into the preamp's AC convenience outlets) cause a current surge which blew the fuse or circuit breaker protecting that entire branch circuit? In some houses having duplex AC wall sockets, the lower one is permanently live while the upper one (intended for lamps) is controlled by a switch near a doorway. Was the preamp's cord accidentally plugged into the upper socket? Is the preamp's AC cord plugged into a clock timer which is presently off or unplugged from the wall?

PROBLEM: NO SOUND

SUGGESTED CAUSES

1. Preamp power off, power amp off.
2. Line cord unplugged (preamp or power amp).
3. Fuse blown (preamp or power amp).
4. Power off at wall socket (check with lamp).

PROBLEM: NO SOUND (POWER ON)

SUGGESTED CAUSES

1. Input Selector set to inactive input.
2. Tape Monitor switch rotated with no tape machine running.
3. Mute button depressed.
4. External Processor button depressed with no processor connected, or with a signal processor connected but not operating.
5. Input level controls turned down on power amplifier.
6. Input or output signal cables disconnected.
7. Selected program source not operating.
8. Output level control turned down at program source.
9. Program source misadjusted (for example, FM tuner tuned between stations with Muting circuit engaged).

PROBLEM: NO SOUND IN ONE CHANNEL

SUGGESTED CAUSES

1. Defective cable from preamp to power amp or from program source to preamp.
2. Speaker wire loose or disconnected.
3. Balance control fully clockwise or counter-clockwise.
4. Imperfect contact in switch (especially any level or slide switch in a program source or signal processor, as well as the various signal-routing switches in the preamp).

PROBLEM: LOUD HOWL, SQUEAL, OR WHISTLE

SUGGESTED CAUSES

1. Tape Monitor engaged while microphones (in the same room as the speakers) are connected to tape deck for recording.
2. Acoustic feedback from turntable.

PROBLEM: SOLO VOICES OR INSTRUMENTS SOUND THIN, SHRILL, OR DISTORTED

SUGGESTED CAUSES

1. Treble controls set to maximum boost.
2. Phono cartridge wired out of phase.
3. Speakers wired out of phase.

If these suggestions do not help, or the problem you encounter falls outside the scope of this manual, please write: (*)

Carver Corporation Technical Services
P.O. Box 664
Woodinville, WA 98072

or call (206) 483-1202. Your inquiry will be promptly answered. You may be directed to a Carver-authorized service center, or asked to return the unit to the factory. We must have the serial number of your unit before we can authorize its return. Your dealer, if convenient, may also offer assistance and may be consulted.

(*) Applies to U.S. customers only.

SPECIFICATIONS

PHONO INPUTS

| | |
|--------------------|--|
| Frequency response | RIAA \pm 0.25 "extended" curve |
| Overload | M.C. 15 mV M.M. 100 mV |
| Gain | M.C. 53 dB M.M. 35 dB |
| Noise | M.C. 77 dB, IHF A-weighted re 500 μ V. M.M. 83 dB, IHF A-weighted re 5 mV. |
| Input impedance | M.C. 47 k Ω paralleled with 100 pf M.M. 47 k Ω paralleled with 100 pf Both M.C. and M.M. may be loaded externally. |

HIGH LEVEL INPUTS

| | |
|--------------------|---|
| Frequency response | -3 dB at 3 Hz and 80 kHz |
| Infrasonic filter | 18 dB/octave below 20 Hz $f_3 = 15$ Hz |
| Gain | HI 25.0 dB LO 15.0 dB |
| Output impedance | 600 Ω |
| Input impedance | 100 k Ω in parallel with 150 pf |
| Noise | 96 dB, IHF A-weighted re 2V |

DISTORTION (total preamp)

| | |
|-----------|---------------|
| IM, CCIR | 0.05% or less |
| IM, SMPTE | 0.05% or less |
| TIM | Unmeasurable |
| THD | 0.05% or less |

POWER REQUIREMENTS

| | |
|--------|-------------------------------------|
| | 120V, 60 Hz; 240V, 50 Hz (optional) |
| Size | 17.3" w x 9" d x 2.55" h |
| Weight | 6.5 lbs. |

Carver Corporation Limited Warranty

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

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

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

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

If your Carver Corporation product ever requires service, write to or call Carver Corporation (Attention: Customer Service Department), P.O. Box 664, 14304 N.E. 193rd Place, Woodinville, Washington 98072, 206-483-1202. You will be directed to an authorized Carver Corporation Service Station or receive instructions to ship the unit to the factory. Please save the original shipping carton and packing materials in case shipping is required. Please do not ship by Parcel Post. Be sure you have received authorization from Carver Corporation and include a complete description of the problem, the associated components and connections, and a copy of the purchase receipt. Initial shipping costs are not paid by Carver Corporation; return shipping costs will be prepaid if repairs were covered by the scope of this Warranty.

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

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

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

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

Carver Corporation
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