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***Powerful • Musical • Accurate***

C-20v Audio/Video  
Dolby Pro-Logic Preamplifier

Owner's Manual



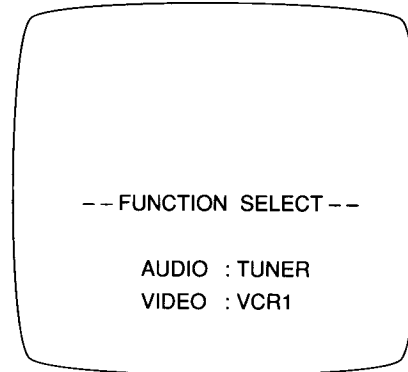
CARVER

When a button is pressed while the on-screen display function is activated, the information associated with the button is displayed on the TV monitor screen.

1. When a function selector button is pressed:

**AUDIO:** Displays the current audio source.

**VIDEO:** Displays the current video source.

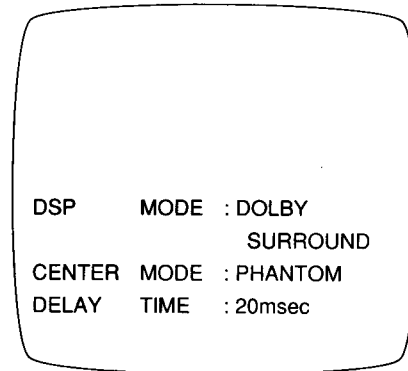


2. When a button related to DSP mode is pressed:

**DSP MODE:** Displays the current surround mode.

**CENTER MODE:** Displays the current center mode.

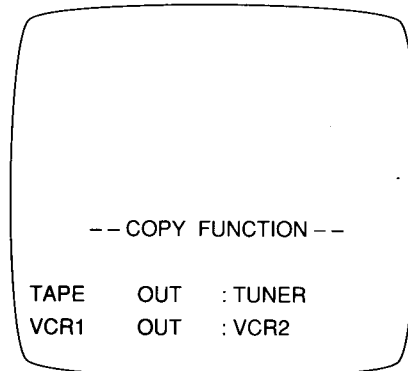
**DELAY TIME:** Displays the current delay time.



3. When the TAPE COPY or VCR1 COPY button is pressed:

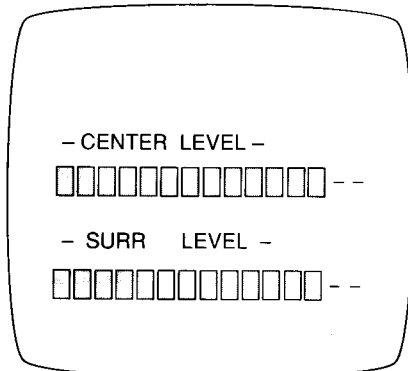
**TAPE OUT:** Displays the audio source being output at the audio TAPE OUT jacks.

**VCR1 OUT:** Displays the video/audio source output at the VIDEO/S-VIDEO and audio VCR1 OUT jacks.



4. When the CENTER or SURROUND VOLUME control buttons are pressed:

Bar graphs of the center and surround volumes appear in the screen, showing their relative volume levels. The figure to the right shows the default setting of the Center and Surround volume controls after VR RESET is pushed.



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

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

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 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.

ATTENTION — Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.

**WARNING – TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

**PORTABLE CART WARNING**



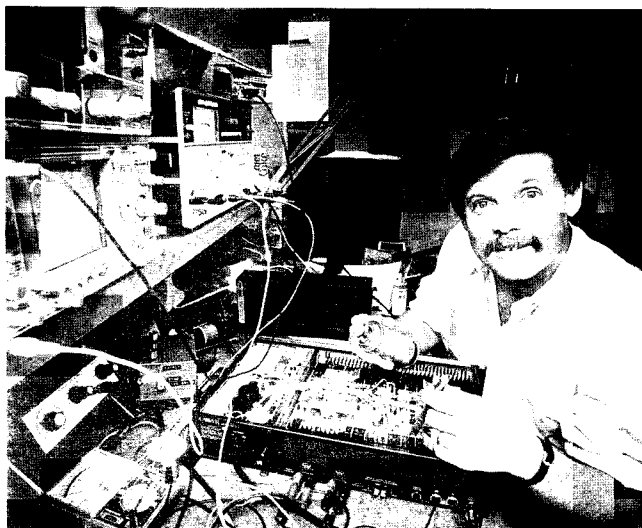
Carts and stands - The Component should be used only with a cart or stand that is recommended by the manufacturer. A Component and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the Component and cart combination to overturn.

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# C-20v

## 2. A Message from Bob Carver



Congratulations on your purchase of a new Carver C-20v Audio/Video Pro-Logic Preamplifier. We expect that its sophisticated engineering and meticulous craftsmanship will provide you with many years of listening enjoyment.

At the heart of the C-20v is the power of DSP (Digital Signal Processing), which is used to perform the intricate decoding and logic steering of the Dolby Pro Logic Surround encoded audio signal. This functions in the same way as the decoding found at the heart of Dolby Stereo cinema processors used in many state-of-the-art movie theaters. The key to the system is center channel active logic steering that provides a natural sound stage and a realistic simulation of the environment seen on the video screen, independent of viewer position.

The C-20v also features an auto-balance circuit that continuously monitors and adjusts the relative levels of the source material input for proper decoding.

Other DSP modes include "Movie Surround", which provides extended surround delay of up to 90mS. For conventional stereo sources, we have provided a "Hall 1" and "Hall 2" ambience

generator that convincingly simulates the sound of two different-sized concert halls. For monophonic sound sources, such as many sports broadcasts and older movies, the C-20v has a "matrix" stereo synthesizer that adds a worthwhile spacial dimension. The "3-Channel Logic" mode provides a center "fill" channel for stereo systems that require the left and right speakers to be located far apart.

As an audio/video preamplifier, the C-20v provides the flexibility you need to integrate today's modern audiovideo components. In addition to the four audio-only inputs and five audio/video inputs, the C-20v has five S-video input and three S-video output connectors.

The C-20v allows you to dub any audio source to a tape recorder and any video source to a VCR quickly and easily, with the push of a button. And you can proceed with the recording while you are watching or listening to a different program.

The "on-screen display" is a feature you will come to appreciate as a useful complement to the 20-character alphanumeric display on the front panel. This can be used to quickly inform you of the status of all the C-20v settings at a glance, right on your TV screen.

Your C-20v preamplifier was designed by people with a lifetime commitment to providing the world's finest components for music reproduction and home entertainment. Thanks for placing your confidence in Carver, and we hope your new preamplifier will provide many years of listening enjoyment.

Very truly yours,

Bob Carver  
Chairman of the Board

## 3. Features and Specifications

### C-20v Special Features

- Advanced Dolby Pro Logic with adjustable delay
- DSP with continuously adjustable delay time from 0-90mS
- Enough inputs and outputs for the most sophisticated audio/video system, including:
  - Nine audio inputs
  - Six audio outputs
  - Five composite video inputs
  - Five S-Video inputs
  - Three S-Video outputs
- On-screen function display and front panel dot-matrix display
- Independent tape dubbing function
- Full function remote control
- Motor-driven master volume control can be operated from the remote control

### Specifications

#### Audio Section

##### Frequency Response:

20Hz to 20kHz ( $\pm 0.5$ dB) at Left and Right Out

20Hz to 20kHz ( $\pm 0.5$ dB), at Center Out  
(Wide mode)

40Hz to 7kHz (+1, -3dB), at Surround Out

##### Gain

Line Level: 16.5dB ( $\pm 3$ dB) at Main Out,  
with Master Volume fully CW

0dB ( $\pm 3$ dB) at Tape Out

25dB ( $\pm 3$ dB) at Center Out

25dB ( $\pm 3$ dB) at Surround Out

Channel Tracking:  $\pm 3$ dB (0 to -60dB)

##### Signal-to-Noise (IHF A-weighted)

Left and Right Out:  $\geq 80$ dB at Left and  
Right Out (Stereo Mode)

$\geq 70$ dB at all outputs  
(Dolby Surround Mode)

All measurements referenced to 0.5Vrms output level  
at 1kHz, with gain set for unity

##### Distortion

THD:  $\leq 0.01\%$  with 2.0Vrms at Main  
Out, 20-20kHz

##### Sensitivity (for 0.5Vrms at Main Out with Master Volume fully CW)

Line Level: 75mV

Maximum Input Level: 2.2Vrms (Dolby Surround  
Mode)

Input Impedance: 47 kilohms

##### Maximum Output

Main Out (F, C, S): 7Vrms into 100 kilohms

##### Output Impedance

Main Out (F, C, S): 600 ohms  
Tape Out, VCR Out: 1000 ohms

Channel Separation  
(Dolby Surround):

$\geq 35$ dB @ 1kHz

Stereo Separation:

$\geq 75$ dB, 100Hz-10kHz

##### Tone Controls

Bass Eq: 4-positions  
OFF, +3dB, +5dB, +7dB  
( $\pm 1$ dB) at 80Hz

# C-20v

## Video Section

Frequency Response:  
5Hz to 7MHz ( $\pm$  3dB) at all Video Outputs

Signal-to-Noise:  $\geq$  57dB (100% White Video Input Signal, 10kHz - 4.2MHz)

Sensitivity (for 1Vp-p at S-Video Outputs with 75 ohm termination): 1.0V p-p

Input Impedance: 75 ohms, all video inputs

Output Impedance: 75 ohms at all video outputs

On Screen Display: NTSC Standard (USA/Canada)

## General

Power Consumption: 25 Watts

Power Requirements:  
120VAC/60Hz (USA and Canada)  
Other voltages as required for export

Display: 20-character Alphanumeric Dot Matrix Fluorescent Display

Size (H x W x D): 3.4" x 19" x 13.1"  
86mm x 482mm x 334mm

Net Weight: 11.9 lbs (5.4 kg)  
Shipping Weight: 15.2 lbs (6.9 kg)

Accessories: Handheld Remote Control (RH-20), Two AA Batteries

**Features and specifications are subject to change without notice.**

## 4. Unpacking and Paperwork

Carefully unpack your C-20v and keep the original carton and packing materials for future moving, shipment or long-term storage.

After opening the box, please check for any visible signs of damage that were not apparent from 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. Your receipt 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-20v. Record it in the space provided below for convenient reference.

Model: C-20v

Serial Number: \_\_\_\_\_

Purchased at: \_\_\_\_\_

Date: \_\_\_\_\_

Finally, take a moment to fill out and return the Warranty Card packed with the C-20v and return it to Carver. This provides us with important information about you, our valued customer.

## 5. Installation

### Placement and General Precautions

Observe the following precautions when choosing a location for the C-20v:

- Do not expose the unit to rain or moisture.
- Protect from prolonged exposure to direct sunlight.
- Avoid excessive exposure to extreme cold or dust.
- Avoid exposure to electrostatic discharge.
- Do not place heavy objects on the unit.
- Protect from heat and allow adequate ventilation. Place away from direct sources of heat, such as heating vents and radiators. All components produce some heat during operation, so make sure that ventilation holes are not covered, and that air is allowed to circulate freely behind, beside and above the unit. Excessive heat is the single greatest source of both short-term and long-term component failure.

If a fluid or foreign object does enter the unit, disconnect the power plug and contact an authorized dealer or service center. Do not pull out the plug by pulling on the cord; grasp the plug firmly.

### Getting Started

For information on selection of speakers and amplifiers for surround sound operation, see About Surround Sound on page 24.

No special tools are required to make connections to the C-20v. If you are installing new speaker wire, you may require a wire cutter and wire stripper, or other appropriate tools.

No connecting cables are supplied with the C-20v. RCA-type interconnect cables are often supplied with the source units. Additional cables are available from your Carver dealer.

If installing in a cabinet, provide sufficient cable slack to allow turning the preamplifier around 180 degrees to make all connections. If this is not possible, a small lamp and hand mirror may be helpful in making some connections.

### Connection Tips

Before launching into the actual cable-connecting frenzy of setting up your new system, consider the following tips.

- Make sure all components are OFF before making any connections. It's a good idea to plug in your AC power cord last to avoid accidentally turning on the unit while installing.
- Make sure that "left is hooked to left and right is hooked to right" at each connection. The obvious way to assure this is to assign one hook-up cord plug color to left and the other to right. Generally RED is used to signify RIGHT. White, grey or black then represents left.
- Whenever possible, keep power cords away from signal cables (inputs from CD player, tape deck, etc.) to prevent hum. While hum is less of a problem today than it was in the past, noise can still find its way into your system if a component's power cord becomes too intimately involved with a hook-up cable. Carver components' power cords and convenience outlets are all on the right side of the chassis (when viewed from the back). This allows you to bundle all the component power cords and keep them separate from signal connections.
- Choose reliable hook-up cables (also called interconnects, patch cords or RCA cables). There are lots of different grades of hook-up cables. You can pay more than \$50 per foot for some of them! Whether or not you hear an improvement in sound quality with "audiophile" interconnects is up to your own ears. However, really CHEAP or old connection cables can sometimes DIS-connect themselves inside, causing hum or a loss of sound in one or both channels. Before you send a component in for service, swap hook-up cables to see if they're the culprit.
- For video connections, use connecting cables that are specifically designed for video. Video signals are far higher in frequency than audio and can often benefit from a higher quality interconnect. Several companies make specialized audio/video cables with two audio and one video conductor.

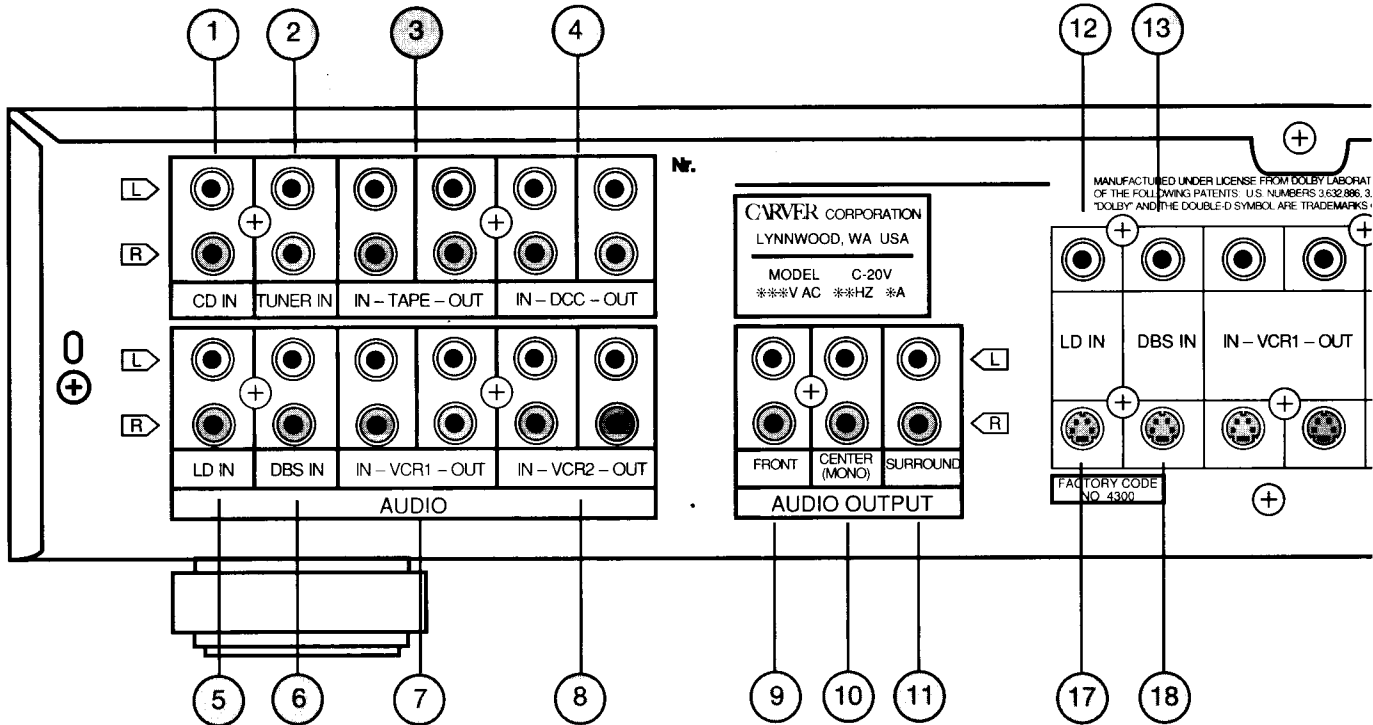


# C-20v

■ **DON'T PANIC.** While there are more than forty possible connections on the back of the C-20v, matching them up with your existing equipment is simple if you make the connections methodically, one at a time. This is the safest way to avoid cross-connecting channels or confusing signal inputs with outputs. Besides, you probably won't use all of them anyway.

tions methodically, one at a time. This is the safest way to avoid cross-connecting channels or confusing signal inputs with outputs. Besides, you probably won't use all of them anyway.

## Rear Panel Connections



### AUDIO INPUTS

#### 1. CD input jacks

Connect to the audio output jacks of a CD player.

#### 2. TUNER input jacks

Connect to the audio output jacks of a tuner.

#### 3. TAPE INput/OUTput jacks

Connect the IN jacks to a cassette deck's output (PLAY) jacks, and connect the OUT jacks to the cassette deck's input (REC) jacks.

#### 4. DCC INput/OUTput jacks

Connect the IN jacks to a DCC (Digital Compact Cassette) deck's audio output (PLAY) jacks, and connect the OUT jacks to the cassette deck's audio input (REC) jacks.

**NOTE:** A second cassette deck or reel-to-reel

can be connected here if you do not own a DCC deck.

#### 5. LD input jacks

Connect to the audio output jacks of a laser disc player.

#### 6. DBS input jacks

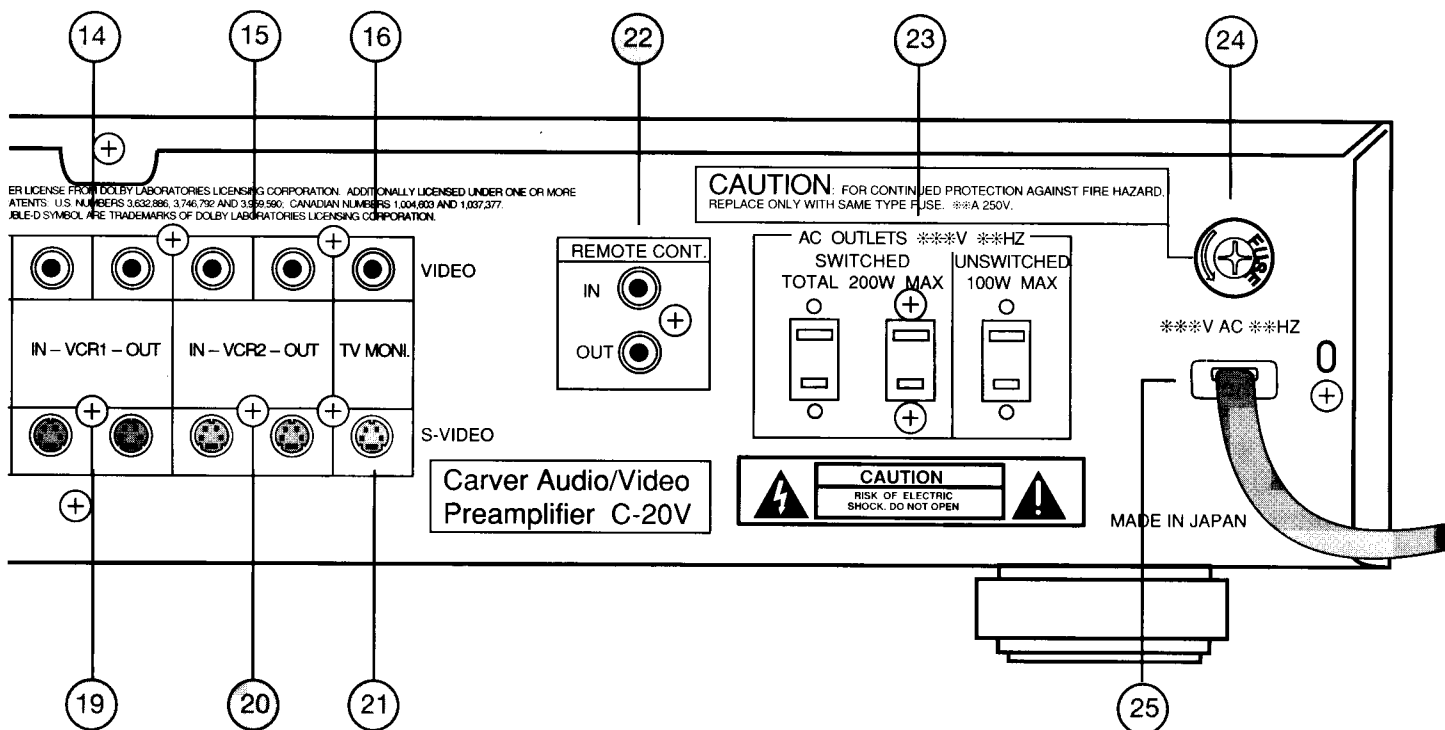
Connect to the audio output jacks of a direct broadcast satellite tuner.

#### 7. VCR 1 INput/OUTput jacks

Connect the IN jacks to a VCR's audio output jacks and the OUT jacks to the VCR's audio input jacks.

#### 8. VCR 2 INput/OUTput jacks

Connect the IN jacks to a second VCR's audio output jacks and the OUT jacks to the VCR's audio input jacks.



**AUDIO OUTPUTS**

**9. FRONT output jacks**

Connect to the input jacks of the amplifier used to drive the main left and right speakers.

**10. CENTER (MONO) output jacks**

Connect one or both to the input jack(s) of the amplifier used to drive the center channel speaker(s). This is a monophonic signal, meaning both output jacks deliver the same identical signal.

**11. SURROUND output jacks**

Connect to the input jacks of the amplifier used to drive the surround (rear) speakers.

**VIDEO INPUTS AND OUTPUTS**

**12. LD video input jack**

Connect to the video output jack of a laser disc player.

**13. DBS video input jack**

Connect to the video output jack of a direct broadcast satellite tuner.

**14. VCR 1 video INput/OUTput jacks**

Connect the IN jack to your main VCR's video output jack, and connect the OUT jack to the VCR's video input jack.

**15. VCR 2 video INput/OUTput jacks**

Connect the IN jack to a second VCR's video output jack, and connect the OUT jack to the VCR's video input jack.

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### 16. TV MONitor video output jack

Connect to the video input jack on your TV. This jack routes the video source selected on the C-20v to your TV monitor.

## S-VIDEO INPUTS AND OUTPUTS

### 17. LD S-Video input jack

Connect to the S-Video output jack of a laser disc player.

### 18. DBS S-Video input jack

Connect to the S-Video output jack of a direct broadcast satellite tuner.

### 19. VCR 1 S-Video INput/OUTput jacks

Connect the S-Video IN jack to the S-Video output (S-OUT) jack on your main VCR, and connect the S-Video OUT jack to the S-Video input (S-IN) jack on the VCR.

### 20. VCR 2 S-Video INput/OUTput jacks

Connect the S-Video IN jack to the S-Video output (S-OUT) jack on a second VCR, and connect the S-Video OUT jack to the S-Video input (S-IN) jack on the VCR.

### 21. TV MONitor S-Video output jack

Connect to the S-Video input jack on your TV monitor.

### Notes on the S-VIDEO input/output jacks

- The circuits for the S-Video input/output jacks and the RCA-type video input/output jacks are separate and thus function independently.
- The input function switches for both the RCA jack inputs and S-Video inputs are coupled. (Both circuits are switched, but signals remain separate.) Therefore, when a component which is not connected to an S-Video input jack is selected, no signal is output through the S-VIDEO MONitor output jack.
- If VCR 1 is connected using both the VCR 1 S-VIDEO jack and the VCR 1 RCA jacks, signals are output to both jacks when VCR 1

is selected. Select whether to monitor the S-Video signal or the RCA jack video signal on the monitor TV side.

- For details on S-Video, refer to the instruction manual provided with your monitor TV.
- **Caution** when using S-Video jacks: Due to the circuit configuration of this unit, be sure to use S-Video connections for both the input and the output of VCR 1. Do not use S-Video cable for the input and RCA jack for the output, or RCA jack for the input and S-Video for the output.
- For connecting S-Video jacks, use commercially available S-Video connection cables. Consult your Carver dealer for availability.

### 22. REMOTE INput/OUTput jacks

Connect the IN jack to the REMOTE OUT jack of another component with RC-5 remote connections, and connect the OUT jack to the REMOTE IN jack of the same component. (For more details on RC-5 remote control, see *RC-5 Remote Control Bus* on page 19.)

### 23. AC OUTLETS

Connect the power cords of components such as a cassette deck and CD player to these outlets.

Both SWITCHED and UNSWITCHED outlets are provided. The two marked SWITCHED provide power only when the C-20v is turned on and is useful for components which you use every time you play your system such as an equalizer or your most-used sound source. The one marked UNSWITCHED is always live as long as the C-20v is plugged into a live outlet. A component connected here may be left on permanently, or may be switched off with its own power switch.

⚠ **Note:** In order to avoid potential turn-on thumps, any program source plugged in here should be switched on BEFORE the C-20v is turned on.

Be sure the total power consumption of the connected components does not exceed the values listed below:

**SWITCHED 200W MAX TOTAL**  
**UNSWITCHED 100W MAX TOTAL**

**C-20v switched outlet warning**

Do not plug a power amplifier into the C-20v switched outlets. Make sure the total power consumption of any other components plugged into these outlets does not exceed 200 watts.

**C-20v unswitched outlet warning**

If you plug a power amplifier into this outlet, be sure not to exceed the 100 watt rating of the unswitched outlet. Consult the power amplifier's owner's manual to determine its overall power consumption if in doubt.

⚡ **Note:** A power amplifier's power consumption rating is different than its rated power. In fact, it is usually much larger than its rated power output, so be sure you are looking at the right specification.

**24. FUSE**

Always replace with the same type fuse indicated on the rear panel.

⚡ **Note:** Continued fuse failure is an indication of an internal problem. Refer to an authorized Carver service center.

**25. AC LINECORD**

Connect to an outlet properly configured for the line voltage specified for your model. If using an extension cord, we recommend 16 gauge or heavier.

**System Configurations**

The following pages contain drawings of typical connections that you might make in your installation. These drawings demonstrate how each of the inputs and outputs on the rear panel of the C-20v are interconnected with other audio and video components.

Your particular installation will probably not use all of the connections shown, although if you are using the C-20v as the center of a full-fledged audio/video system you will use many or most of the connections shown.

The inputs and outputs on the C-20v are labeled to correspond to the most common audio and video components in use today. However, it is perfectly okay to connect components other than those indicated by the labels to unused inputs or outputs, so long as they are line level signals.

**A quick lesson on input/output levels**

Input and output levels for audio equipment are usually divided into three categories.

**Phono level:** This is a very low level signal that comes from the cartridge of your turntable. Because of its extremely low voltage, it has had a special input connection provided on most preamplifiers and receivers in the past. It provided extra gain to increase the signal, as well as reverse RIAA equalization to restore flat frequency response that was altered by the equalization used in making phonograph records.

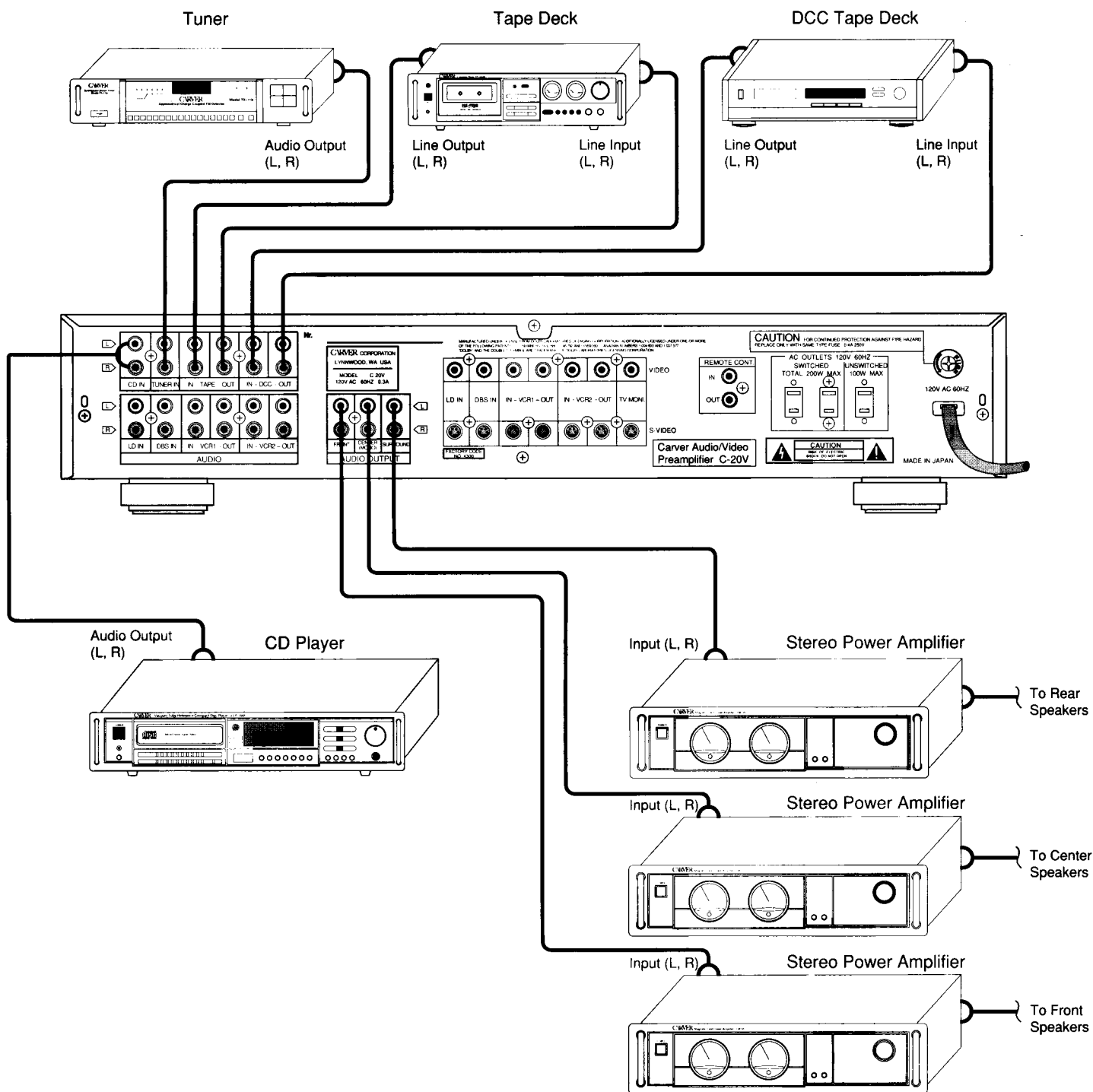
The C-20v does not provide a special "Phono" input. If you have a turntable that you would like to connect to the C-20v, you can use a separate "Phono Preamplifier" to provide the extra gain and equalization required for connection to the C-20v. It can then be connected to any of the audio inputs provided on the C-20v (i.e. CD IN, TUNER IN, TAPE IN, DCC IN, LD IN, VCR 1 IN or VCR 2 IN).

**Line Level:** This is the signal level that comes out of almost all audio components produced today, except for power amplifiers. It ranges from several hundred millivolts to several volts (AC). Any line level signal can be connected to any of the line level inputs on the C-20v. Thus, if you have a DAT (Digital Audio Tape) tape deck, but you don't have a DCC (Digital Compact Cassette) deck, you can connect your DAT deck to the DCC input on the C-20v.

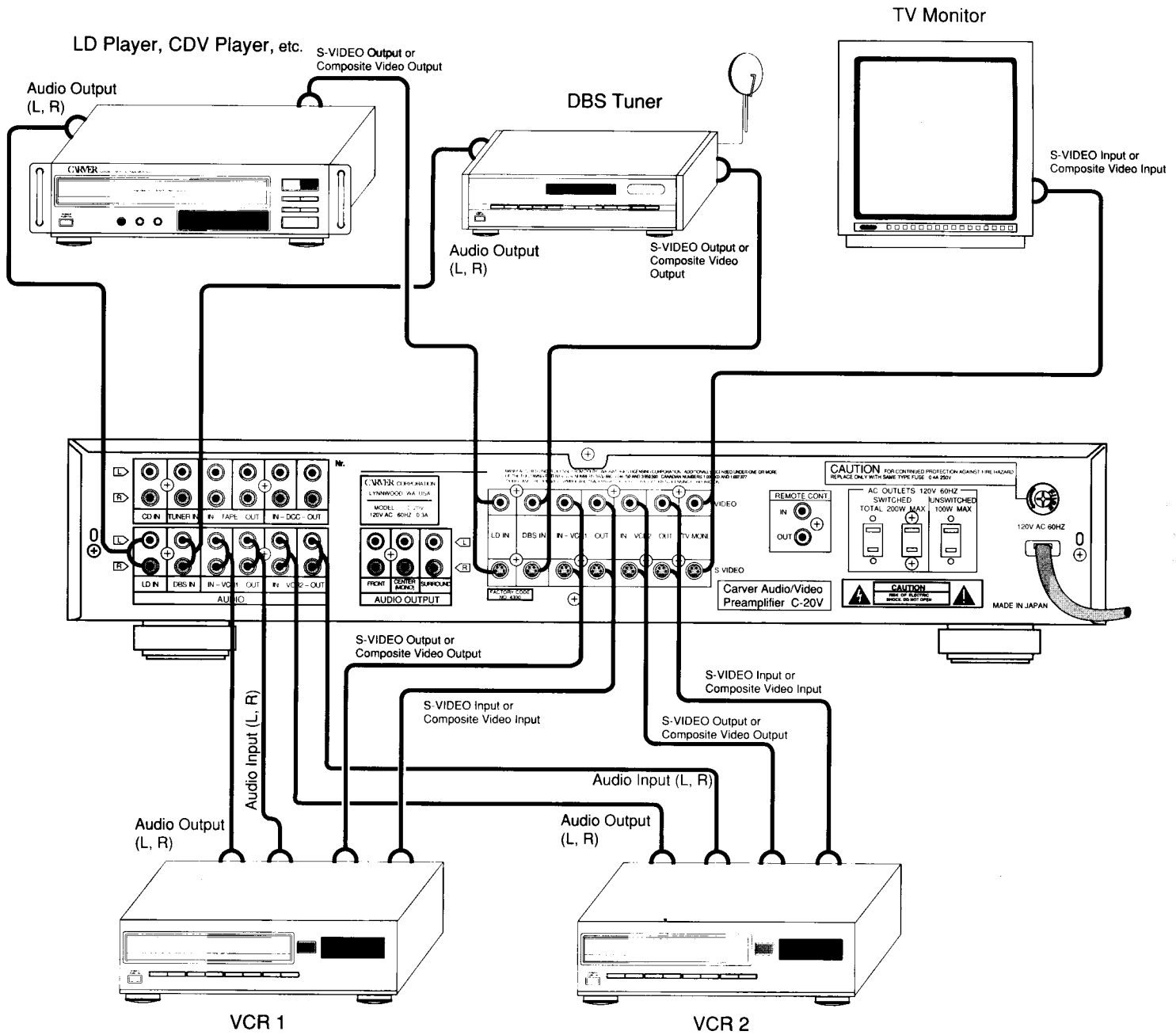
**Speaker Level:** This is the signal level that comes out of the speaker output terminals on a power amplifier or receiver. It can range from several volts to several tens of volts (AC). Some high-powered amplifiers can reach voltage levels approaching that present on a household AC outlet! These connections should only be made to a speaker.

# C-20v

## Connections for Audio Components



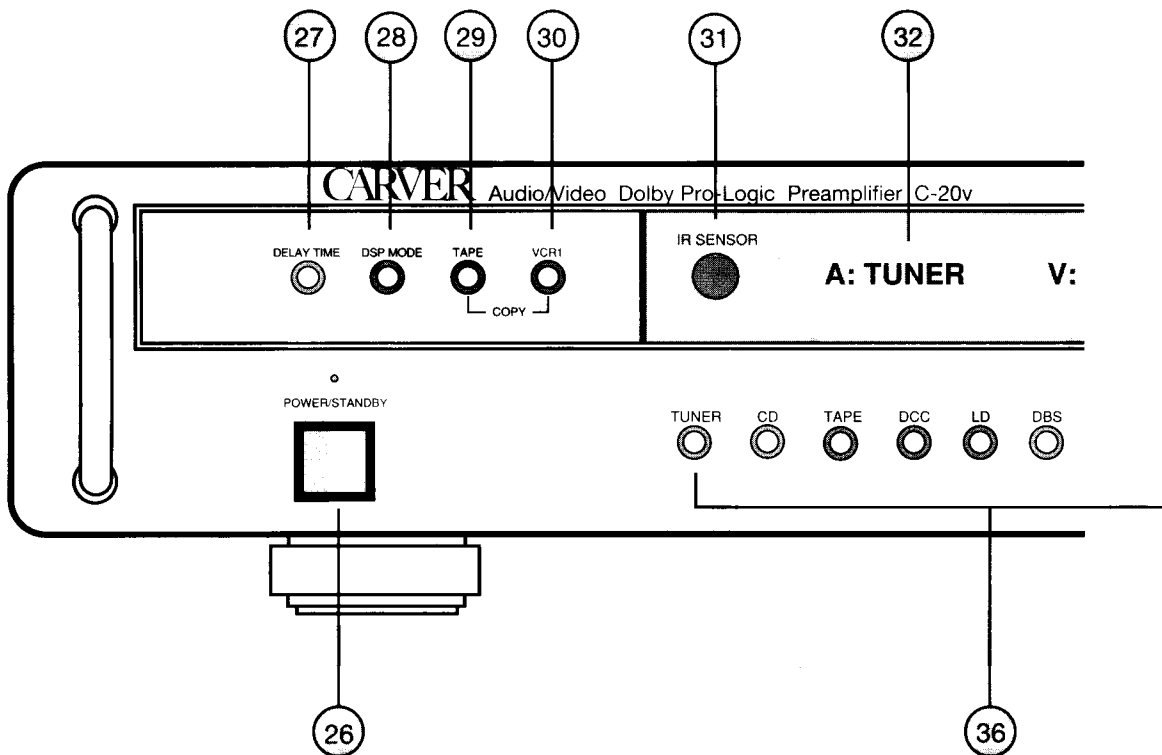
**Connections for Video Components**



# C-20v

## 6. Operation

### Front Panel Features



#### 26. POWER/STANDBY switch and STANDBY indicator

When this switch is pressed in, the power turns ON and status indicators appear in the display panel. The C-20v can only be placed into STANDBY mode by pressing the POWER switch on the remote control. When in STANDBY mode, the STANDBY indicator LED will light. This indicates that the preamplifier can be activated again with the remote control.

If the POWER/STANDBY switch is pressed again, the power to the unit is turned off. The remote control cannot activate the C-20v when the POWER/STANDBY switch is turned off.

#### 27. DELAY TIME

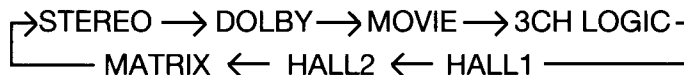
This button is used to select the amount of delay in the surround output for the surround mode you are currently using. When the DSP mode is in DOLBY SURROUND, this button allows you to vary the delay time from 15mS to

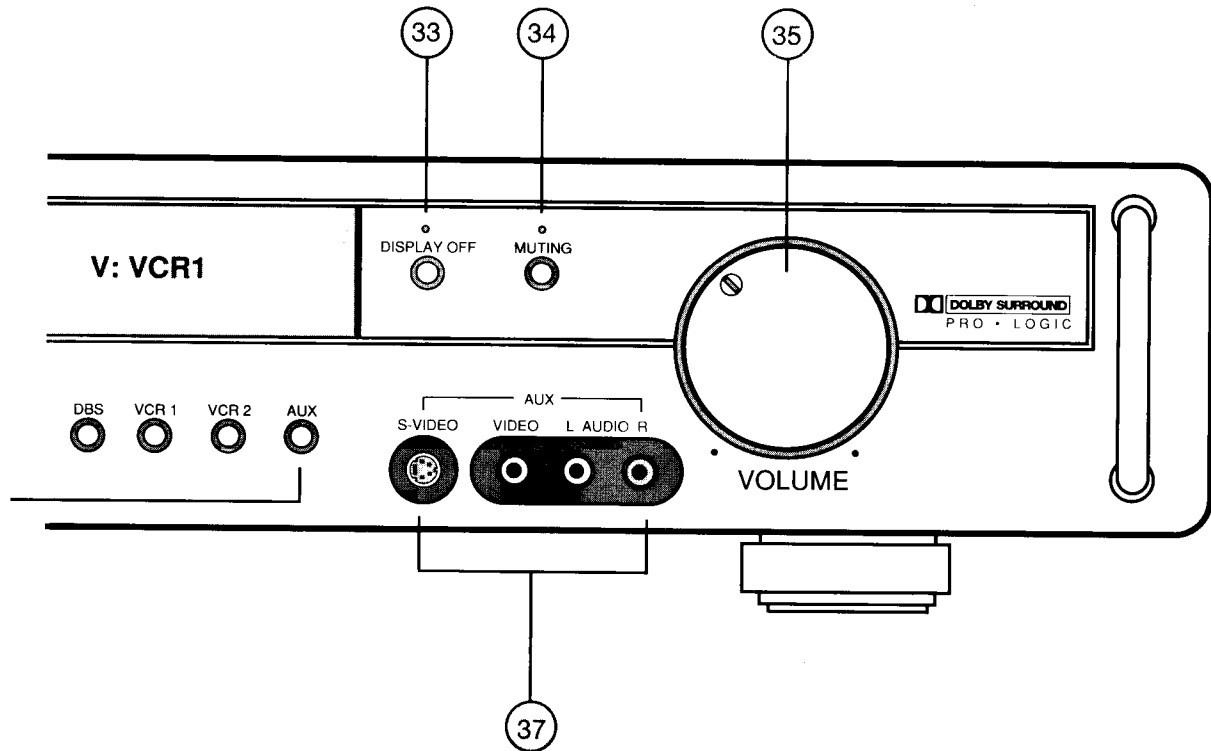
30mS in 5 millisecond increments. When in MOVIE SURROUND, HALL1 or HALL2 SURROUND, or MATRIX SURROUND, the delay can be varied from 0mS to 90mS in 10 millisecond increments.

Pressing this button once will display the current delay time selected. Repeatedly pressing this button will cause the delay time to increment according to the DSP mode selected, as described above.

#### 28. DSP MODE

This button is used to select the surround effect that you want to use on the selected audio or video source. Pressing this button once will display the current surround mode selected. Repeatedly pressing this button will cause the surround modes to alternate in the following order:

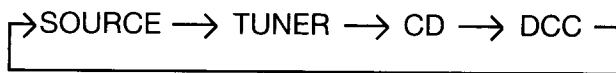




STEREO mode is used for normal stereo playback. All DSP circuits are off in STEREO mode. (See *About Surround Sound* on page 24 for more details about DSP modes.)

**29. TAPE COPY**

Press this button to copy an audio source onto the tape deck connected to TAPE INPUT/OUTPUT jacks. Pressing the button once will display the current audio input source selected to copy to tape. Repeatedly pressing the button will cause the input source selection to alternate in the following order:



This function operates independently of the source selected for listening. In other words, you can copy a CD to tape while you're listening to your favorite radio station.

**Note:** The signal that appears at the TAPE OUTPUT is not always going to be the same as what you are hearing over your speakers, because of this feature. If you want to record what you are hearing over your speakers, TAPE COPY should be set to SOURCE.

**Note:** The signal that appears at the DCC OUTPUT is always the same as the audio source that is selected with the function buttons.

**30. VCR 1 COPY**

Press this button to copy a video source onto the VCR connected to VCR 1 INPUT/OUTPUT jacks. Pressing this button once will display the current video input source selected to copy to VCR 1. Repeatedly pressing this button will cause the input source selection to alternate in the following order:





## C-20v

This function operates independently of the video source selected for viewing. In other words, you can copy a laser disc to VCR 1 while you're watching a program from your DBS tuner.

🔊 **Note:** The signal that appears at the VCR 1 video OUTput (and the VCR 1 audio OUTput) is not always going to be the same as what you are watching on your TV monitor, because of this feature. If you want to record what you are watching, VCR 1 COPY should be set to SOURCE.

🔊 **Note:** The signal that appears at VCR 2 OUTput is always the same as the video source that is selected with the function buttons.

🔊 **Note:** The audio signal that is directed to the TAPE OUTput and DCC OUTput jacks, and the VCR 1 and VCR 2 OUTput jacks is pre-processor; that is, it is the full stereo signal before it is decoded by the Dolby Pro Logic Surround circuit.

### 31. IR SENSOR

This window receives infrared signals from the remote control unit. Aim the remote control at this sensor for proper signal transmission.

### 32. ALPHANUMERIC DISPLAY

Displays the operating status of the C-20v in alphanumeric characters.

### 33. DISPLAY OFF switch and indicator

Pressing this button will cause the display to turn off and the display off indicator LED to light. This does not affect any of the functions of the C-20v. It will still respond to all commands, whether originating from the front panel or the remote control.

Pressing this button again will cause the display to turn back on and the indicator LED to go off.

🔊 **Note:** If the DISPLAY OFF function is active when the C-20v is turned off or put into standby, the display will still be OFF when the C-20v is turned back on.

### 34. MUTING

When this button is pressed, the sound is turned off at all six of the main audio outputs and the muting indicator LED lights. Pressing this button again will return the sound to the original volume setting.

🔊 **Note:** MUTING has no effect on TAPE OUT, DCC OUT, VCR 1 OUT and VCR 2 OUT.

### 35. VOLUME control

Adjusts the sound volume. Turning the control to the right increases the sound volume. This control adjusts the volume for the front, center and rear speakers simultaneously. Operation is also possible from the remote control.

### 36. Function buttons

These buttons are used to select the source to be played. The display shows audio-only sources and video-with-audio sources selected separately.

### 37. AUXiliary VIDEO input jacks

Connect these jacks to the video and audio output jacks of a video camera or other video component. The yellow jack is for video and the red and white jacks are for audio. An S-VIDEO input jack is also provided.

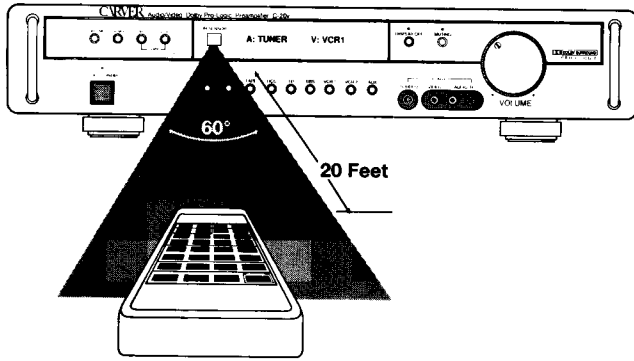
## Remote Control

### RH-20 Handheld Remote Transmitter Batteries

The RH-20 wireless infrared remote requires two AA batteries. Remove the battery compartment door on the back of the remote control by pressing in the direction of the arrow against the tab. Insert the batteries supplied, making sure to match the positive (+) and negative (-) ends with the diagram inside the battery compartment.

**Remote Operation**

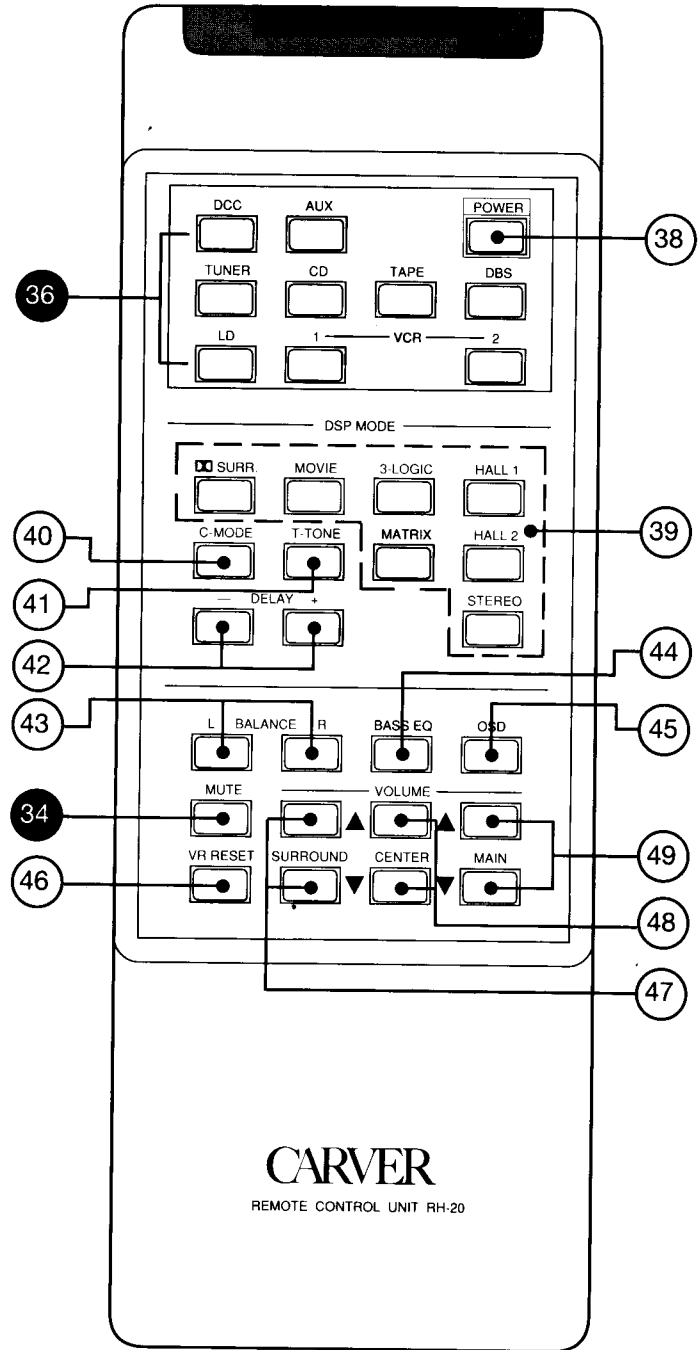
The remote control unit will work in a range of approximately 20 feet in front of and about 30 degrees to either side of the C-20v.



If the remote control begins to occasionally not respond, 1) check its batteries; 2) make sure the infrared projection area on its tip is clean; 3) check that the C-20v infrared remote sensor window is not dirty or blocked from direct line-of-sight with the remote.

If you will not be using the C-20v's remote for a long period of time, be sure to remove the batteries to prevent corrosion damage from leaking batteries.

Two of the remote control's functions are duplicates of C-20v front panel functions. These are indicated by black circles with white numbers on the remote control diagram. Functions that are unique to the remote control are indicated by white circles with black letters.



**36. Function buttons**

Use to select the desired input source. These buttons operate the same as the corresponding buttons on the main unit.

**38. POWER**

Pressing this button puts the C-20v into STANDBY mode, and causes the LED indicator to light above the POWER/STANDBY switch on the front panel. Pressing it again turns the C-20v back on and the indicator LED turns off.

**Note:** This function will not work unless the POWER/STANDBY switch on the front panel is pushed in.

# C-20v

## 39. DSP buttons

These buttons operate the same as the DSP MODE button on the front panel except that the desired mode can be directly selected with the remote control.

### **□□ SURR.**

Pressing this button puts the C-20v into DOLBY SURROUND mode as indicated in the display. (See *About Surround Sound* on page 24 for more information about the DSP modes.)

### **MOVIE**

Use to select MOVIE SURROUND mode.

### **3-LOGIC**

Use to select 3 CH LOGIC SURROUND mode.

### **HALL 1**

Use to select HALL1 SURROUND mode.

### **HALL 2**

Use to select HALL2 SURROUND mode.

### **MATRIX**

Use to select MATRIX SURROUND mode.

### **STEREO**

Press this button to return to normal stereo playback of the audio source.

## 40. C-MODE

This button is unique to the remote control, and is used to select the mode of operation of the center channel. Pressing this button once will display the current center channel mode. Repeatedly pressing this button will cause the center channel mode selection to alternate in the following order:

In DOLBY SURROUND or MOVIE SURROUND:

→ PHANTOM → NORMAL → WIDE →

In 3 CH LOGIC:

→ NORMAL → WIDE →

**Note:** The center channel is off when STEREO, HALL1 SURROUND, HALL2 SURROUND and MATRIX SURROUND are selected. See *About Surround Sound* on page 24 for information about Center Channel modes.

## 41. T-TONE

This button is unique to the remote control and functions only when DOLBY SURROUND, MOVIE SURROUND and 3 CH LOGIC modes are used. When this button is pressed, a test signal is output to the LEFT, CENTER, RIGHT and (except 3 CH LOGIC mode) SURROUND channels in sequence. This can be used to adjust the relative volume levels between the front, center and (except 3 CH LOGIC mode) surround speakers.

See *Surround Level Adjustment* on page 29 for more information.

## 42. - DELAY +

These buttons function for all DSP Surround modes except 3 CH LOGIC (and of course STEREO, which isn't a Surround mode). Pressing "+" causes the delay time for the Surround Output to increase one step, and operates the same as the DELAY TIME button on the front panel. Pressing "-" causes the delay time to decrease one step.

## 43. L BALANCE R

These buttons are unique to the remote control. Use to adjust the sound volume balance between the left and right speakers. Pressing "L" results in decreased right channel volume, and pressing "R" results in decreased left channel volume.

## 44. BASS EQ

This button is unique to the remote control. This works like a "Loudness" button, and can be used to increase the volume of the lowest notes (center frequency = 80Hz) when listening to relatively soft music or soundtracks. Pressing this button once will display the current Bass EQ setting. Repeatedly pressing this button will cause the Bass EQ selection to alternate in the following order:

→ OFF → 3dB → 5dB → 7dB →

**45. OSD**

This button is unique to the remote control. Pressing this button once will activate the ON-SCREEN DISPLAY function and all the current settings of the C-20v will be displayed on your TV screen for 10 seconds, superimposed on the picture. Anytime a function or setting is changed, the display menu for that particular action will be displayed on the screen for 10 seconds. Pressing the button again will turn the ON-SCREEN DISPLAY function off.

See *On-Screen Display* on page 20 for more information regarding its operation.

**34. MUTE**

When this button is pressed, the MUTING indicator on the C-20v front panel lights and the volume of the six main outputs is reduced to zero. Pressing this button again returns all outputs to their previous volume levels. This button operates the same as the MUTING button on the front panel.

**46. VR RESET**

This button is unique to the remote control. Press this button to reset the CENTER and SURROUND volume adjustments, and the L/R BALANCE adjustment to their default positions.

To avoid accidentally resetting these adjustments, this button must be pushed and held for 2 seconds before a reset occurs. (A reset will occur instantaneously if the Center or Surround volume controls, or the L/R Balance controls have been adjusted within five seconds of pushing VR RESET.)

**47. SURROUND VOLUME UP/DOWN**

These buttons control the volume of the surround channel. UP increases the volume and DOWN decreases it. These buttons are active in all Surround modes.

**48. CENTER VOLUME UP/DOWN**

These buttons control the volume of the center channel. UP increases the volume and DOWN decreases it. These buttons are only active when in DOLBY SURROUND, MOVIE SURROUND or 3 CH LOGIC mode.

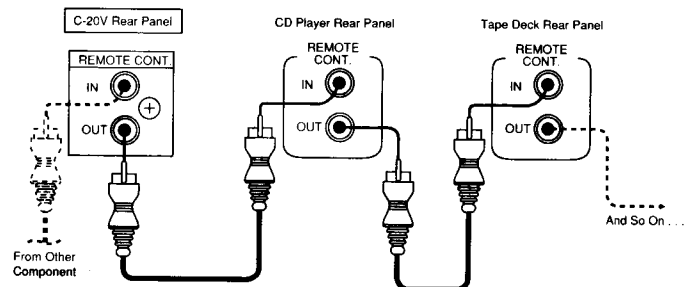
Both the center volume and surround volume levels are memorized and remain at the most recent setting unless VR RESET is pressed, or the C-20v is left unplugged for over a week.

**49. MAIN VOLUME UP/DOWN**

These buttons control the master volume. UP increases the volume and DOWN decreases it. The main volume changes the volume of the surround and center channels simultaneously with the front channel volume so that the overall balance between channels remains the same. Operation is the same as the VOLUME control on the front panel.

**RC-5 Remote Control Bus**

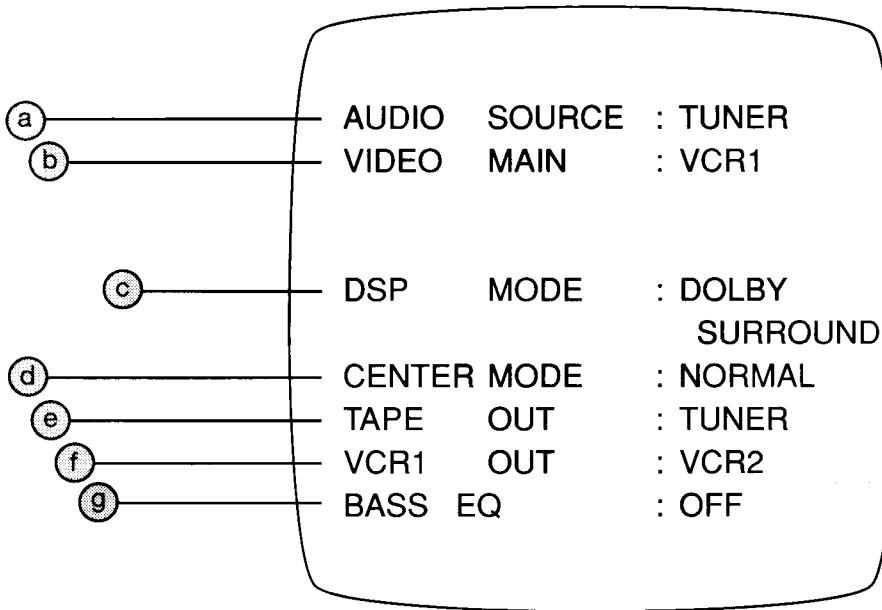
The C-20v can relay remote control commands to, or be controlled by, any components equipped for RC-5 operation. (Refer to the individual component manual to see if the unit is compatible with these bus standards.) To connect components to the remote bus, connect the REMOTE CONT. OUT jack on the rear panel of the C-20v to another component's remote control IN jack using a normal audio/video patch cord. Connect the C-20v's REMOTE CONT. IN jack to another component's remote OUT jack to control C-20v functions from another component. Any number of components may be "daisy chained" in this manner; the connection sequence is not important. If a connected component has an INT/EXT switch next to the remote jack, switch it to the EXT position.



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## On-Screen Display

The ON-SCREEN DISPLAY (OSD) function can be activated from the remote control. When the OSD button is pressed, the following menu will appear on your TV screen.



### a. AUDIO SOURCE

Displays the current audio source being selected. TUNER, CD, TAPE, DCC, LD, DBS, VCR1, VCR2 or AUX may be displayed here.

### b. VIDEO MAIN

Displays the current video source being selected. LD, DBS, VCR1, VCR2 or AUX may be displayed here.

### c. DSP MODE

Displays the current surround mode. STEREO, DOLBY SURROUND, MOVIE SURROUND, 3CH LOGIC, HALL1 SURROUND, HALL2 SURROUND or MATRIX SURROUND may appear here.

### d. CENTER MODE

Displays the current center mode setting. PHANTOM, NORMAL or WIDE may appear here. OFF is displayed when the DSP mode is set to STEREO, HALL1, HALL2 or MATRIX.

### e. TAPE OUT

Displays the current setting for the TAPE COPY function. SOURCE, TUNER, CD or DCC may be displayed here.

### f. VCR1 OUT

Displays the current setting for the VCR1 COPY function. SOURCE, LD, DBS, VCR2 or AUX may be displayed here.

### g. BASS EQ

Displays the current Bass EQ setting. OFF, 3dB, 5dB or 7dB may be displayed here.

# C-20v

## 1. 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.




CAUTION




**RISK OF ELECTRIC SHOCK  
DO NOT OPEN**

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



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



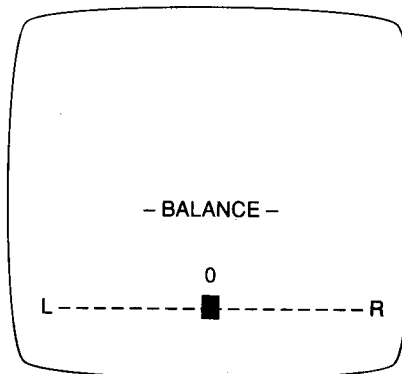
The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**CAUTION: TO PREVENT ELECTRIC SHOCK,  
MATCH WIDE BLADE OF PLUG TO WIDE SLOT,  
FULLY INSERT.**

**ATTENTION: POUR ÉVITER LES CHOCS ÉLEC-  
TRIQUES, INTRODUIRE LA LAME LA PLUS  
LARGE DE LA FICHE DANS LA BORNE COR-  
RESPONDANTE DE LA PRISE ET POUSSER  
JUSQU'AU FOND.**

5. When the BALANCE control buttons are pressed:

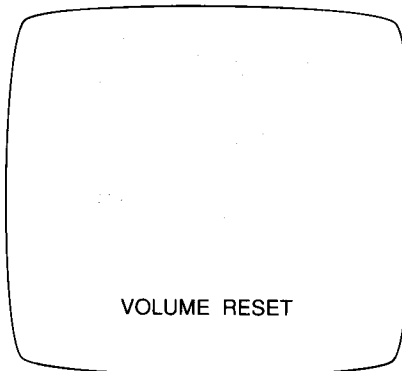
A bar graph of the balance between the left and right channels is displayed on the screen. The cursor moves when the L/R balance is varied. The default position is in the middle.



6. When the VR RESET button is pressed:

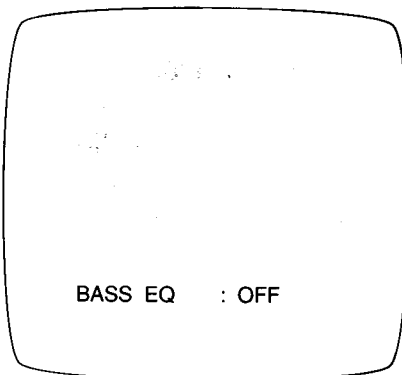
VOLUME RESET is displayed.

When the VR RESET button is pressed while the volume levels or balance bar graphs are displayed, the volume and balance are reset instantaneously. Otherwise, you must hold down the VR RESET button for about two seconds to reset. This is to prevent an accidental reset.



7. When the BASS EQ button is pressed:

BASS EQ: Displays the current setting of the Bass EQ.



8. When the T-TONE button is pressed:

TEST TONE is displayed.

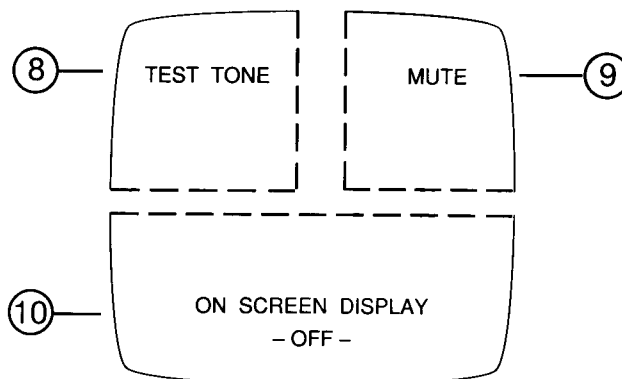
This display only appears when DOLBY SURROUND, MOVIE SURROUND, or 3CH LOGIC are selected.

9. When the MUTE or MUTING buttons are pressed:

MUTE is displayed.

10. When OSD is pushed a second time:

ON SCREEN DISPLAY -OFF- is displayed.



**Note:** The On-Screen Display characters are not output at the S-Video output jacks, or the VCR1 or VCR2 video output jacks.

## Recording

The COPY function of the C-20v makes recording audio or video programs as easy as pushing a button. No more reaching behind your system to change interconnects and mix up connections. All the switching is done internally by the C-20v. The switching circuitry is so sophisticated that you can record a CD to cassette tape, a laser disc to videotape, and watch a blockbuster video on a second VCR in 5-channel surround sound all at the same time!

### Copying to TAPE

The COPY TO TAPE function allows you to record any audio source connected to the TUNER, CD, or DCC inputs onto a tape deck connected to the TAPE OUT jack. Simply press the TAPE COPY button repeatedly until the desired source shows in the display. This function is independent of the source you have selected to play over your speakers. This recording can take place while you are listening to any of the available input sources.

In addition, it is possible to record the audio portion of a video source to tape by selecting COPY SOURCE → TAPE. In this mode, whatever you hear coming over your speakers is what appears at the TAPE OUT jacks on the rear panel of the C-20v. (NOTE: This is the way the DCC OUT jacks always operate.) The only restriction using this method is that you cannot listen to another source while recording, so don't try to switch from LD to CD while you're recording the LD soundtrack or you'll be in for a big surprise when you play back your recording.

Follow these steps to record to tape.

1. Set the VOLUME control to the minimum position.
2. Press the POWER switch on the C-20v to turn on the power.
3. Select the desired COPY function using the TAPE COPY button.
4. Turn on the source component and prepare it for playback.
5. Turn on the tape deck that is connected to the C-20v TAPE OUT jacks. Prepare it for recording by placing it into record standby mode (record pause).
6. Begin playback of the source component and

adjust the record level on the tape deck for optimum recording (refer to the tape deck's owner's manual for information on setting recording levels). Note that the master VOLUME control on the C-20v has no effect on the signal at the TAPE OUT jacks.

7. Reset the source component to the beginning of the program. Push PLAY on the source component and RECORD on the tape deck to begin recording.

### Copying to VCR 1

The COPY TO VCR 1 function allows you to record any video source connected to LD, DBS, VCR2, or AUX to a videocassette recorder connected to the VCR 1 VIDEO OUT jacks or VCR 1 S-VIDEO OUT jack. Simply press the VCR1 COPY button repeatedly until the desired source shows in the display. This function is independent of the source you have selected to play over your system. This recording can take place while you are watching or listening to any of the available input sources.

In addition, it is possible to record any audio source to videotape by selecting COPY SOURCE → VCR1. In this mode, whatever you hear coming over your speakers is what appears at the VCR 1 AUDIO OUT jacks on the rear panel of the C-20v. Therefore the audio IN jacks on the VCR must be connected to the VCR 1 AUDIO OUT jacks on the C-20v. (NOTE: This is the way the VCR 2 AUDIO OUT jacks always operate.) The only restriction using this method is that you cannot listen to another source while recording, so don't try to switch from CD to TUNER while you're recording the CD to videotape or you'll be in for a big surprise when you play back your recording.

Follow these steps to record to videotape.

1. Set the VOLUME control to the minimum position.
2. Press the POWER switch on the C-20v to turn on the power.
3. Select the desired COPY function using the VCR1 COPY button.
4. Turn on the source component and prepare it for playback.
5. Turn on the VCR that is connected to the



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C-20v VCR 1 OUT jacks. Prepare it for recording by placing it into record standby mode (record pause).

⚠ **Note:** If the source component is connected to the RCA video input jacks, then the VCR must be connected to the RCA video output jacks. Likewise, if the source component is connected to the S-Video input jack, then the VCR must be connected to the S-Video output jack.

- Begin playback of the source component and adjust the record level on the VCR for optimum recording (refer to the VCR's owner's manual for information on setting recording levels). Note that the master VOLUME control on the C-20v has no effect on the signal at the VCR 1 AUDIO OUT jacks.
- Reset the source component to the beginning of the program. Push PLAY on the source component and RECORD on the VCR to begin recording.

# 7. About Surround Sound

## Dolby Pro Logic Surround

The Dolby Pro Logic circuitry in your C-20v effectively emulates the overall effect of the Dolby Stereo sound heard in movie theaters. It surrounds your listening room with sound, recreates special effects that localize sounds in relation to the viewing screen, and moves them around to add an extra dimension of reality to the viewing experience.

The first version of Dolby Surround for home was a simplified version with no logic steering and no center channel. Instead, it "passively" decoded the surround channel and created a "phantom" center channel from the left and right front speakers.

Dolby Pro Logic Surround is the second generation in Dolby Surround decoding technology, and features improved spatial articulation and an expanded listening area through use of a true center channel and active logic steering circuitry. The center channel information is derived from the left and right channels and is fed to a separate amplifier and speaker for separation and accurate positioning.

To decode the surround channels, the phase encoded differences between the front channels are extracted, delayed, and processed by a modified Dolby B-type noise reduction. Essentially, the circuit is a digital computer which actively breaks down the encoded signals and reassembles them into four separate channels (Left, Right, Center, Surround).

For convenient operation, the C-20v also contains an automatic balance control to optimize the Pro Logic Adaptive Matrix decoding process. This eliminates the need to adjust the left and right input balance for different programs or sources, an extra step required with some Dolby Pro Logic decoders.

The C-20v goes one step further by performing the Dolby Surround decoding in the digital domain, with state-of-the-art DSP (Digital Signal Processing). This provides an accurate, noise-free environment for decoding and processing the signal. It also creates the complex reverberation signals used to simulate the "HALL 1" and "HALL 2" surround modes.

## Modes of Operation (DSP MODES)

### DOLBY SURROUND

This is the setting you will probably use for watching most Dolby Surround (DOLBY SURROUND) encoded videos. This provides you with left and right stereo for off-screen imaging, a center channel for most on-screen dialog, and a surround channel for ambience and special effects.

There are three center channel modes available in Dolby Surround. "PHANTOM" should be used if you have elected not to use a separate center channel speaker. This mode of operation directs the center channel information equally to the left and right channel speakers, creating a "phantom" center image of the dialog. This is the way the first generation Dolby Surround worked.

“NORMAL” should be used if you are using a small center channel speaker (or speakers) with limited bass response. In NORMAL mode, the lower frequencies (below 100Hz) are removed from the center channel and redirected equally to the left and right speakers. Since bass frequencies are omnidirectional, this will not affect the imaging of the center channel. The dialog will still appear to come from the video screen.

“WIDE” should be used if you are using full-range center channel speakers that are capable of good bass response. In this mode, all the center channel information remains in the center channel output.

There are four delay times available in Dolby Surround: 15, 20, 25 and 30mS (milliseconds). This is the amount of time the surround information output to your rear speakers is delayed from the front and center channels. The reason for this delay is to allow the front channel information to reach your ears first. This is required because of a psychoacoustical phenomena known as the “Haas effect”, which states that our ears will tell us that sound is coming from the direction from which it arrives at our ears first. Delaying the rear channels 15 to 30mS assures that our ears will hear the front channels first, maintaining a correct directional image. Sound travels at the rate of about 1 foot per millisecond, so the minimum number of milliseconds of delay you should use can be calculated with the following formula:

$$D_F - D_S + 15 = \text{Delay in milliseconds}$$

Where:

$$D_F = \text{Distance from listening position to Front speakers}$$

$$D_S = \text{Distance from listening position to Surround speakers}$$

You can experiment with the delay settings to find the one that works best for your particular speaker and listening positions.

### MOVIE SURROUND

Movie Surround provides stereo left and right, center and rear channel outputs, but furnishes additional delay times for the SURROUND (rear) channel output. This mode allows you to select from 0mS to 90ms delay times, in 10 millisecond increments. This may be appropriate in some instances to simulate the spacious sound of a large “movie theater”. Again, you should experiment with these settings to find the one most appropriate for your listening room and the particular program you’re watching.

### 3 CHANNEL LOGIC

This mode of operation is available to provide a center channel image for stereo program sources that are not encoded with surround sound. This is useful for watching older movies or TV shows that are recorded in stereo, particularly if your speakers are located relatively far apart from each other. In this way, dialog will be correctly located at the video screen, while the stereo information will provide off-screen imaging. Only NORMAL and WIDE center channel modes are available in 3 CHANNEL LOGIC mode. Delay time is 0mS because the SURROUND channel is off.

### HALL 1 SURROUND

This mode simulates the sound field of a medium-sized concert hall with a circular shape. The DSP circuit takes a L+R mono signal (hall ambience is not perceived in stereo) and creates the rich and complex reverberation signals and sound reflections that would normally occur in a hall this size. The overall delay of the SURROUND channel can be varied from 0mS to 90mS. There is no center channel output in this mode.

### HALL 2 SURROUND

This mode simulates the sound of a live concert venue, recreating the feel of a stage performance and the expansiveness of audience seating. As in HALL 1 SURROUND mode, the SURROUND output can be delayed from 0mS to 90mS, and there is no center channel output.


### MATRIX SURROUND

This setting produces a natural, spacious sound. In this mode, a delayed stereo difference (L-R) signal is sent to the rear speakers. This setting might be appropriate for listening to sports broadcasts or outdoor concerts. As in the Hall Surround modes, the SURROUND output can be delayed from 0mS to 90mS, and there is no center channel output.

### STEREO

STEREO is not a surround mode. All surround sound circuitry is off in STEREO mode, and it allows you to listen to the stereo signal as it was recorded, without any processing.

# C-20v

DSP MODES	Delay Time Range
<p><b>DOLBY SURROUND</b></p> <p>DOLBY SURROUND was designed to be compatible with movies and programs encoded with . The C-20v employs a Dolby Pro Logic Surround decoder that functions in the same way as the decoding found at the heart of Dolby Stereo cinema processors used in movie theaters.</p> <p>The Dolby Pro Logic Surround decoder features a directivity enhancer, which naturally recreates the acoustic image and motions to provide a surround effect just like you would experience in a movie theater.</p>	<p>15 - 30ms Initial setting: 20ms</p>
<p><b>MOVIE SURROUND</b></p> <p>This mode allows you to extend the delay time in the rear channel up to 90mS. This enhances the feeling of a larger sound field in the surround channel.</p>	<p>0 - 90ms Initial setting: 20ms</p>
<p><b>3 CHANNEL LOGIC</b></p> <p>If the left and right speakers are located far apart, the sound field between the speakers is degraded. This mode is used to improve the sound field center by applying directivity enhancement provided by the Dolby Pro Logic Surround decoder.</p>	<p>No delay applicable.</p>
<p><b>HALL 1 SURROUND</b></p> <p>The rich tone you hear in actual concert halls are a complex combination of direct and reflected sounds. This mode provides a sound field effect of a medium sized circular hall with rich reverberations.</p>	<p>0 - 90ms Initial setting: 30ms</p>
<p><b>HALL 2 SURROUND</b></p> <p>This mode is suitable for reproduction of live concerts. It reproduces the feeling of a live stage performance and audience expanse.</p>	<p>0 - 90ms Initial setting: 30ms</p>
<p><b>MATRIX SURROUND</b></p> <p>This mode is effective for playing sports broadcasts or outdoor concerts. It provides a surround mode with a full feeling of presence.</p>	<p>0 - 90ms Initial setting: 30ms</p>
<p><b>STEREO</b></p> <p>The DSP mode is off in this position, and the sound is reproduced in normal stereo.</p>	<p>No delay applicable.</p>

**Notes on Delay Time:**

The "Initial Setting" is the default setting which comes up when the C-20v is turned on for the first time. These are the recommended settings to start with for each surround mode. A longer delay time creates a larger sound field,

and a shorter delay time creates a smaller sound field.

The delay time can be varied independently in each mode (except 3 CHANNEL LOGIC and STEREO).

## Speaker Selection and Placement

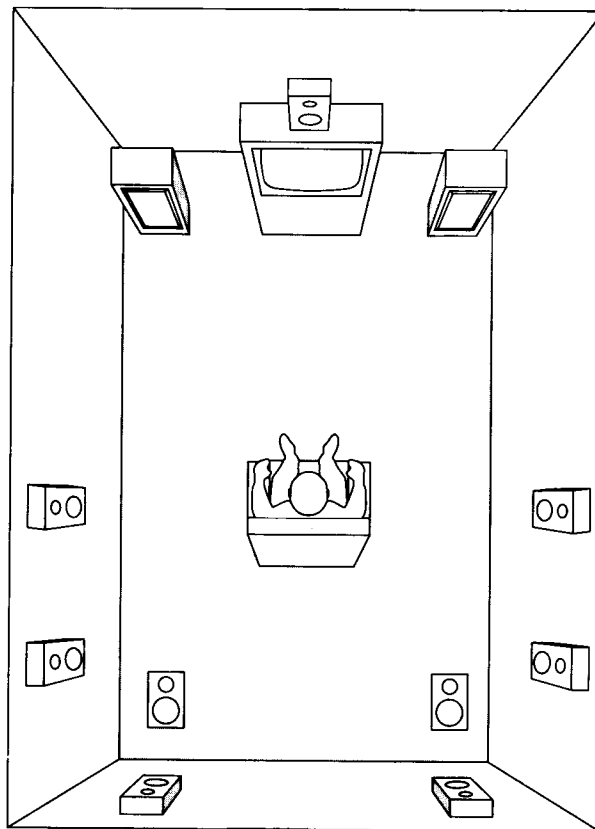
**Front Speakers** — These should be full-range, high quality speakers - the best speakers in your system. They should be located far enough from each side of your TV monitor to provide a well defined stereo image. The TV monitor should be located midway between the left and right front speakers.

**Rear Speakers** — The rear speakers in your surround sound system provide ambient sound for an open, “concert hall” effect when listening to music. They also spread the sound and provide special effects on video soundtracks when used in the Dolby Surround mode.

The demands made on your rear surround speakers are far less than on your main room speakers. Therefore, these speakers do not need to be as large (and as expensive) as your main room speakers. Deep bass response is not important at all. They should, however, have a smooth midrange and reasonably clean upper midrange. Extended high frequency performance is not critical either, because the very high frequencies

are rolled off above 7kHz. This is to minimize dialog sibilance crosstalk in the rear channel, and also to create a sense of increased distance between the speakers and the listener. The surround speakers should, however, have wide dispersion. Good 2-way bookshelf speakers will handle the job easily, and most full-range mini-monitors are also quite suitable for this application. Depending on how extensive you want to get with your installation, there are also several in-wall and wall-mount speakers that are suitable for use as surround sound speakers.

The rear channel speakers should be mounted so that the rear channel sound is dispersed throughout the viewing area. In a theater, Dolby Stereo is achieved with multiple rear channel speakers spaced along the side walls. To achieve the same effect with just two rear speakers requires a design which can disperse its sound evenly across the listening area. Another approach is to mount the speakers facing upward so that their sound is dispersed by the ceiling and rear wall (see the Figure below).



# C-20v

**Center Speaker(s)** — Again, the center speaker(s) can be of a smaller size and less expensive than your main speakers. However, the upper mid-range and treble response of the center speaker(s) should resemble that of the main speakers. If there are significant differences in frequency response in this range, the stereo image may shift toward the speaker with the higher output.

Although the C-20v has two output jacks for the center channel, it is a monophonic signal. If you choose to use two speakers (Figure A), the same signal will appear in both speakers. They should be located on each side of your TV monitor, as close as possible so that the dialog will seem to come from the center of the TV screen. If you choose to use one speaker (Figure B), it should be located immediately above or below your video screen.

In either case, since the center speaker(s) should be placed as close to your video screen as possible, it must be magnetically shielded. If it is not shielded, it could cause distortion of the TV picture. Special video-compatible monitor speakers are available for this application.

As another option, many TV monitors have a separate audio input jack (or jacks) that can be used to input an audio signal from an external source, like a VCR or your stereo system. If the speaker in your TV monitor is adequate, you can use these jacks to connect the CENTER AUDIO OUTPUT from the C-20v directly to your TV

monitor (Figure C). Just remember to select the external audio input (TV/VIDEO or whatever) on your TV monitor when using Dolby Surround, Movie Surround or 3 Channel Logic modes.

You might also consider using a Sat/Sub (Satellite/Subwoofer) system for the front and center speakers. Several manufacturers (including Carver) have speaker systems designed specifically for surround sound in home theater applications. This has the benefit of providing matched loudspeakers for the left, right and center channels as well as making use of a subwoofer to handle the bass frequencies.

## Amplifier Selection

The type of amplifier you choose to power the various speakers in your Surround Sound system will largely depend on the kind of speakers you are using.

For the front speakers, you will want to use a stereo amplifier with enough power to accommodate the maximum power rating of the speakers you have chosen for your main stereo reproduction. Avoid skimping on amplifier power for the front speakers. If you use an amplifier that is rated less than half of the maximum power rating of the speakers, then you will not benefit from the full potential of your speakers. You also run the danger of driving the amplifier to its maximum capacity in an attempt to try and reach the full potential of the speakers, which will produce

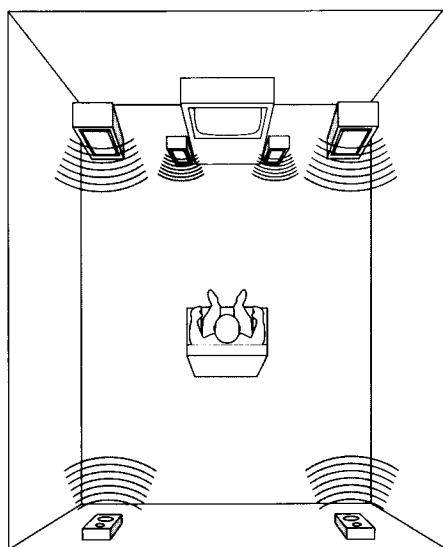


Figure A

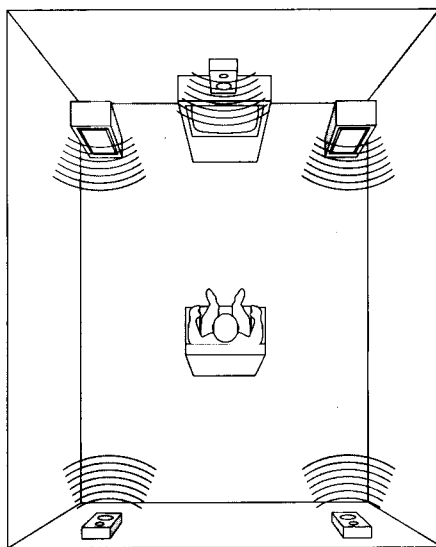


Figure B

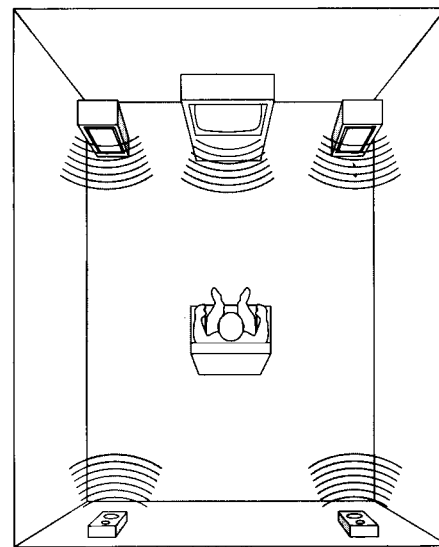


Figure C

“clipping” in the amplifier, a lethal condition for loudspeaker drivers.

The same formula holds true for the amplifier you use to drive your surround speakers. The amplifier should have enough power to reach the maximum power rating of all the surround speakers you are using. Although in DOLBY SURROUND the surround channel is in mono, you should use a stereo amplifier because, in HALL 1 and HALL 2 SURROUND modes, the Left and Right Surround outputs are different.

If you connect more than one speaker to each amplifier channel output, be sure you stay within the bounds of the manufacturer’s recommended minimum impedance for the amplifier (refer to the amplifier’s owner’s manual for this information).

Depending on how you choose to set up your system, you may not require a separate amplifier for the center channel output. If your TV monitor has audio input jacks, you can connect the center channel audio output from the C-20v directly to the TV, and use the combined audio amplifier and speaker(s) in the TV for the center channel.

You may choose not to use a center channel speaker at all, and simply use the PHANTOM mode for the center channel.

If you use a separate single center channel speaker, you might consider using a 3/4-channel amplifier like the Carver AV-634 (with channels 3 and 4 in bridged mono) to power both the surround speakers and the center speaker. Even if you use two center channel speakers, the AV-634 can be used in four-channel mode to power four separate speakers (see your Carver Dealer for details).

Finally, you may want to use a separate mono or stereo amplifier to drive your center channel speaker(s). Again, choose an amplifier that can supply enough power to meet the maximum recommended power of the loudspeakers you are using.

**Note:** If you are starting from scratch, we recommend that you choose your loudspeakers first, and then choose the amplifiers to match the speakers. If you already have the amplifiers and are choosing loudspeakers last, don’t be too concerned about selecting loudspeakers that fall slightly below the maximum power capability of your amplifiers. It is better for an amplifier to have more than enough power than not enough power.

## Surround Sound Level Adjustment

This procedure adjusts the relative levels of your front, center and rear speakers for the best balance in your listening environment. It need not be repeated before each use of Dolby Surround if you do not change the levels.

1. Turn your sound system on and turn the VOLUME control on the C-20v all the way down.
  2. Press DSP MODE button until DOLBY SURROUND appears in the display.
  3. Press C-MODE on the remote control to select the desired center channel mode of operation.
  4. Press T-TONE on the remote control. Slowly increase the VOLUME control and you will hear a test tone in the left, center, right and rear speakers in sequence. Adjust the VOLUME control for a comfortable listening level from the left and right speakers.
  5. Sit in the viewing area and, using the remote control’s CENTER and SURROUND VOLUME buttons, adjust the sound volume so that the sound appears to be the same level from all speakers. This presets the levels for average use conditions, so it is likely only small adjustments will be necessary after completing this procedure to fine tune the system for specific programs.
- If you have an asymmetrical loudspeaker arrangement, where one speaker is further from your listening position than another, you may adjust the C-20v L/R balance using the remote control to assist in arriving at a balanced sound. If your amplifiers have level controls, another option is to adjust the amplifier level controls to balance the sound at the listening position.
6. When adjustment is complete, press the T-TONE button again to stop the test signal.

**Note:** You may wish to use the ON-SCREEN DISPLAY function to note the Center and Surround volume levels when you complete your adjustment procedure. If you should change this adjustment when using other surround modes, you can reset it to optimum Dolby Surround level without repeating the test tone procedure.

## C-20v

### 8. In Case of Difficulty

If you're having trouble or suspect a problem with the C-20v, try some simple troubleshooting before contacting your Carver dealer or an Authorized Carver Service Center. Most likely, the problem lies elsewhere in the system or with a button or control inadvertently left in the wrong position.

#### No Sound, No Power

1. C-20v power is off.
2. C-20v is plugged into a switched convenience outlet. Verify outlet is live.
3. Linecord is disconnected.
4. Poor fit between the plug and wall receptacle.
5. Power off at wall receptacle (check with tester or lamp).
6. Fuse blown in C-20v.

#### No Sound, Power On

1. Inactive source is selected.
2. MUTING is activated.
3. VOLUME control is turned down on C-20v or on power amplifier.
4. Speaker cables not connected properly to amplifier.

#### No Display, Operates OK

1. Display OFF function has been activated. Push DISPLAY OFF button to turn back on.

#### Sound is very faint, even with volume control all the way up

1. Inactive input is selected.
2. CD player or other sound source with independent volume control is turned down.

#### No Sound in one Channel

1. Defective or loose connection cable. Swap with a known good cable to locate the bad one.
2. Speaker wire loose or disconnected.
3. Balance volume set fully left or right. Use On-Screen display to view Balance control position, or push VR RESET on the remote control for 2 seconds.
4. Speaker fuse blown.
5. Power amplifier malfunctioning.

#### No Sound from Rear Channels

1. Rear volume control on C-20v is turned down. Use On-Screen display to view Rear Channel Volume setting, or push VR RESET on the remote control for 2 seconds.
2. Videotape does not have surround sound effects. Try HALL 1, HALL 2 or MATRIX SURROUND mode to confirm that the rear channels are working.
3. VCR operating in mono. Check VCR instructions for stereo playback.

#### No Sound from Center Channel

1. DOLBY SURROUND (MOVIE SURROUND or 3 CH LOGIC) has not been selected.
2. Center Mode is set to PHANTOM.
3. Center volume control on C-20v is turned down. Use On-Screen display to view Center Channel Volume setting, or push VR RESET on the remote control for 2 seconds.

#### Hum and Constant Noise

1. Defective or loose signal cables.
2. Improper fit between signal cable plugs and sockets.
3. Signal cables have been routed too closely to AC cables, power transformers or motors.

### **Fluctuation of On-Screen Display characters.**

With some video components or programs, on-screen display characters may be unstable due to noise or tracking error.

1. Adjust the tracking control of the VCR or fine tuning of the TV for best results.

If the video signal being received is very noisy, or if the input level is low, the background of the On-Screen Display characters may turn to blue.

### **Remote Control Won't Work**

1. Batteries are dead or missing.
2. Remote is too far from or at too much of an angle from the remote sensor window on the C-20v.
3. Remote transmitter or the remote sensor window on the C-20v is dirty.

## **9. Care and Service Assistance**

### **Care**

You'll want to wipe off the C-20v'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. Do not use alcohol, ammonia, or other strong solvents.

### **Service Assistance**

We suggest that you read the LIMITED WARRANTY completely to fully understand your warranty/service coverage. Please promptly complete and return the WARRANTY REGISTRATION CARD. Also be sure to save the sales receipt in a safe place. It will be necessary for warranty service.

If your CARVER product should require service, we suggest you contact the Dealer from whom you purchased your unit. Should the Dealer be unable to take care of your needs, you may contact the CARVER Technical Service Department by phoning (206) 775-6245 or by writing to us at the Factory address shown at the right. 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.

If you should have questions or comments, please write to the Factory address given below. Please include the model and serial number of your Carver product, your complete address and a daytime phone number.

### **Factory Address**

Carver Corporation Service Department  
P.O. Box 1237  
Lynnwood, WA 98046-1237  
(206) 775-6245

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Pub. #920903-B  
Part #990-20163-00 Rev. B

Written and designed in  
the United States of America  
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