

# CARVER

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## CM-2002 Integrated Amplifier with Sonic Holography™

### Owner's Manual

# CARVER

# Safety Instructions

- 1. Read Instructions** — All the safety and operation instructions should be read before the CM-2002 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 on Page 7.
  - 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 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. All servicing should be referred to qualified service personnel.
  - 15. Power Lines** — An outdoor antenna should be located away from power lines.
  - 16. To prevent electric shock**, do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.  
**Pour prévenir les chocs 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.
  - 17. Grounding or Polarization** — Precautions should be taken so that the grounding or polarization means of the Component is not defeated.
  - 18. 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.
  - 19. 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.
- ATTENTION** --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.

|  |   |  |
|--|---|--|
|   | <b>CAUTION</b><br>RISK OF ELECTRIC SHOCK<br>DO NOT OPEN |  |
| <b>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK<br/>DO NOT REMOVE COVER (OR BACK)<br/>NO USER-SERVICEABLE PARTS INSIDE<br/>REFER SERVICING TO QUALIFIED SERVICE PERSONNEL</b> |   |  |



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.

**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.

|   |
|---|
| <b>WARNING - TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.</b>  |
| <b>CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.</b><br><b>ATTENTION: POUR ÉVITER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU'AU FOND.</b> |

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This shows you how to hook up all of your components.

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### Chapter 3: Front panel

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Please make sure that you read the Safety Instructions on page 2 and 3 and the unpacking and location details on page 6 and 7.

## Introduction

As an American electronics innovator for over fifteen years, Carver Corporation has contributed some of the industry's most impressive and remarkable audio technologies. In fact, many features that are now considered standard (surround sound and advanced signal processing) had their first successful consumer applications in Carver products. Today, many of our components are regarded as "Classics", still used by their original owners.

Our continuing goal is to provide affordable products of exceptional quality, aimed at reproducing sound with absolute accuracy. We are best known for our separate audio components (particularly high-performance power amplifiers), therefore, any integrated amplifier bearing the Carver name has extremely high standards to meet.

Combining the latest in signal path technology with the muscle of Carver amplification, the CM-2002 stands high above its class. The amplifier section has the performance and the clarity of some of the best separate designs. The preamplifier section includes essential "purist" features to impress both the CD and the Record collector. It has a separate digital input with integral D/A converter and the phono section accepts either Moving Magnet or Moving Coil cartridges.

The CM-2002 also features Carver's exclusive Sonic Hologram processing for lifelike sound field imaging. There are connections which allow the addition of an external processor or equalizer and another connection for adding an external amplifier. These features allow great flexibility when upgrading your system to higher power or surround sound.

Thank you for placing your confidence in us. We know that your integrated amplifier will provide you with many years of listening enjoyment.

## Features

- Sonic Holography enhances the three dimensional imaging
- Inputs for CD, Tuner, Auxillary and two Tape decks
- Phono input for turntables with Moving-Magnet or Moving-Coil cartridges
- One coaxial Digital input and internal D/A converter
- Two Tape record outputs
- External processor loop
- Preamplifier outputs allow the addition of an external amplifier
- Remote control
- Independent recording of any input, including dubbing between decks.
- Motorized volume control
- Bass and Treble controls
- Loudness
- Mute control
- Headphone jack
- Two illuminated power meters
- Solid mechanical construction with exceptional finish and styling
- The handles can be removed to make the CM-2002 17 inches wide
- AC outlets
- Available in 120 V or 240 V versions 50/60 Hz

## Specifications

**Power Output :** 105 watts per channel  
( continuous power into 8 ohms )

**THD :** < 0.08 % at full power

**Separation :** > 70 dB @ 1 KHz

**Frequency response :** 20 Hz - 20 kHz,  
( + 0 dB, - 1 dB )

**Signal to Noise ratio :** > 98 dB  
( relative to full power, A weighted )

**Input sensitivity :**

CD, Tuner, Aux, Tape : 160 mV

MC 210  $\mu$ V, MM 2.6 mV

( for 150 mV from Tape out )

**Tone control effect :**

Bass : + 8 dB / - 8 dB @ 100 Hz

Treble: + 8 dB / - 8 dB @ 10 kHz

Loudness: + 6 dB @ 100 Hz,

+ 2.5 dB @ 10 kHz

**Digital input format:** S/PDIF

**Digital/Analog converter**

THD : < 0.05 % @ 1 kHz

S/N : 100 dB

( A weighted, from Tape-out )

**Power consumption :**

62 watts at idle

190 watts at normal listening levels

457 watts at full power

**Dimensions** ( Depth x Height x Width ) :

13.8 x 6.7 x 19 inches, with handles  
( 350 x 170 x 483 mm )

13.5 x 6.7 x 17 inches, without handles  
( 343 x 170 x 432 mm )

**Net Weight:** 23 lbs. ( 10.4 kg )

**Shipping Weight:** 28 lbs. ( 12.7 kg )

The specifications are subject to change without notice.

" High current "

## Unpacking

Carefully unpack your CM-2002 and keep the original carton and packing materials for future moving, shipment or long-term storage. Make sure that you save the two end caps which come in the box. These are used if you do not want the handles fitted.

The CM-2002 and the accessories should reach you in perfect condition. If you notice any shipping damage, please contact your Carver Dealer immediately.

### Important Paperwork

You should save your sales receipt and keep it in a safe place. This is required if you ever need to obtain warranty service.

Write down the serial number which is located on the back of the CM-2002 and record it in the space provided below.

Please take a moment to fill out the customer response card and return it to Carver. This provides us with important information from our valued customers. There is also a section for you to note any comments you may have about our products.

Model: CM-2002

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

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

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

### Accessories

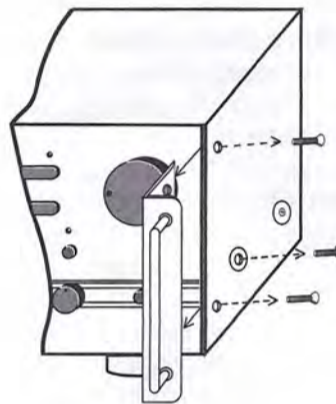
The following are supplied with the CM-2002 :

Remote control and batteries  
 This owners manual  
 Warranty description sheet  
 Consumer response card  
 Two end caps to use if the handles are removed.

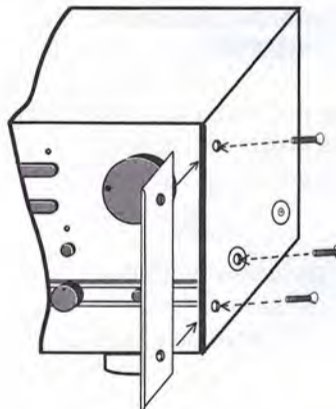
## Handle Removal

The CM-2002 comes with the handles installed. If you do not want them, they can be replaced with the two supplied end caps, as follows :

1. Unplug the power cord.
2. Remove the three Phillips screws on each side of the chassis as shown below.
3. Pull out the handle assembly and install the spacers provided.
4. Reinstall the three screws on each side of the chassis to secure the end caps in place.
5. Store the handles in a safe place for future use.



**Remove  
Handles**



**Install  
End caps**

## Location

Observe the following precautions when choosing a location for the CM-2002 :

- Do not expose the unit to rain or moisture.
- Protect from prolonged exposure to direct sunlight.
- Avoid exposure to extreme cold or dust.
- Protect from heat and allow adequate ventilation. Place away from any direct sources of heat such as heating vents and radiators. Make sure that air is allowed to circulate freely behind, beside and above the unit. Excessive heat is a common cause of component failure.
- Do not place heavy objects on top of the CM-2002.
- Do not place any audio or VCR tapes or computer disks near the CM-2002. They may be erased by the magnetic fields of the transformer.
- Avoid exposure to electrostatic discharge.
- If you ever accidentally spill anything on the CM-2002, unplug the power cord and contact your dealer for service information.

## Care

You can gently dust off the front panel and chassis with a soft dry cloth. Try to rub horizontally, following the grained finish of the front panel. Take extra care when cleaning the window, not to leave any scratch marks.

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.

## Connections

- No special tools are required to set up your system, just RCA patch cords and the speaker wires.
- Make sure that all of your components are OFF before making or undoing any connections.
- Connections labeled "out" on the source component connect to those on the CM-2002 that are labeled "in". For example, the output from a CD player connects to the CM-2002 CD input.
- The CM-2002 Tape 1 and Tape 2 outputs connect to the record inputs of your tape decks.
- Make sure that you connect left to left and right to right. For example, the left output from your CD player should connect to the left input of the CM-2002.
- It will help if you tag and identify each connection cord and speaker wire.
- Whenever possible, keep the power cords away from the patch cords and speaker wires. This will reduce the chance of picking up any electrical interference.
- The CM-2002 has some AC outlets on the rear panel. These should only be used for low power components such as CD players and tape decks.
- You might consider buying a good quality surge suppressor to protect your system from power spikes and surges.
- Always turn on the CM-2002 after all the other components are on.
- When turning off your system, always turn off the CM-2002 first. This precaution will reduce any turn-on or turn-off noises in the speakers.

## Chapter 2. Rear Panel connections

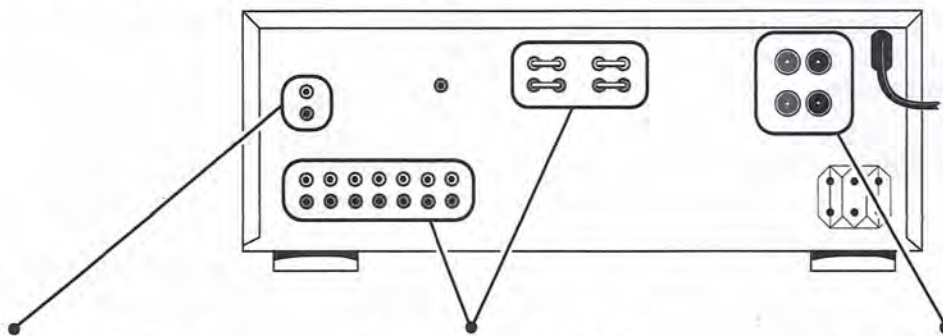
The following pages contain drawings of typical connections that you might make in your installation. These drawings demonstrate how each of the inputs and outputs on the rear panel of the CM-2002 are interconnected with other audio components and speakers.

Your particular installation may not use all of the connections shown, although, if you are using the CM-2002 as the center of a fully-fledged audio system you will use many or most of them.

The inputs and outputs on the CM-2002 are labeled to correspond to the most common audio and video components in use today. It is perfectly acceptable to connect other components to unused inputs or outputs, so long as they have line level signals. The phono input must only be used for a turntable.

### Input/output levels.

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



#### 1. Phono Level

This is a very low level signal that comes from the cartridge of your turntable. Because of its extremely low voltage, the CM-2002 has a special phono input designed *only* for turntables. The phono circuit provides extra gain to increase the signal, as well as RIAA re-equalization to restore the flat frequency response. This is altered by the equalization used in making phonograph recordings. A Moving-Coil cartridge has a much lower output than a Moving-Magnet type. The CM-2002 rear panel switch will increase the gain when using the Moving-Coil type.

#### 2. Line Level

This is the signal level that comes out of almost all audio components produced today, except for power amplifiers, turntables and microphones. 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 CM-2002. For example, if you have a DAT tape deck, but you don't have a second cassette deck, you can connect it to the TAPE 2 input. A VCR can also be connected to a Tape input for playback and recording. A LaserDisc player can be connected to the Auxillary input.

#### 3. Speaker level

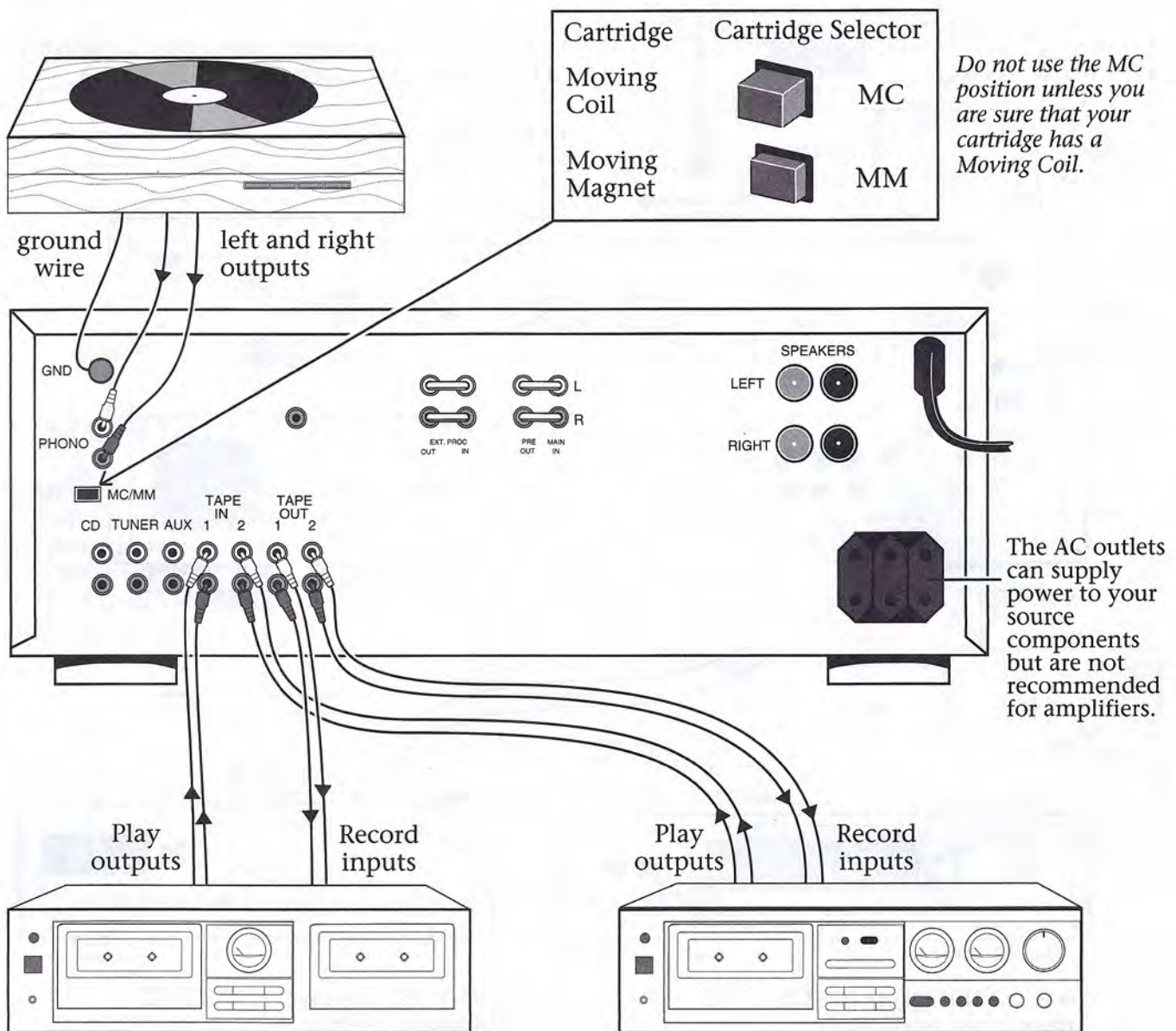
This is the signal level that comes out of the speaker output terminals on the CM-2002. It can range from a low level up to 30 volts (AC). Some high-powered amplifiers can reach voltage levels approaching that present on a household AC outlet! These connections should only be made to a speaker.



# Turntable and Tape decks

Any standard turntable with either a Moving-Magnet or Moving-Coil cartridge can be connected to the phono inputs of the CM-2002. The turntable must have a phono-level output, not line level. Make sure the CM-2002 is off before setting the cartridge selector switch.

Connect the ground wire of the turntable to the ground connector on the CM-2002 to reduce any hum heard in the speakers.



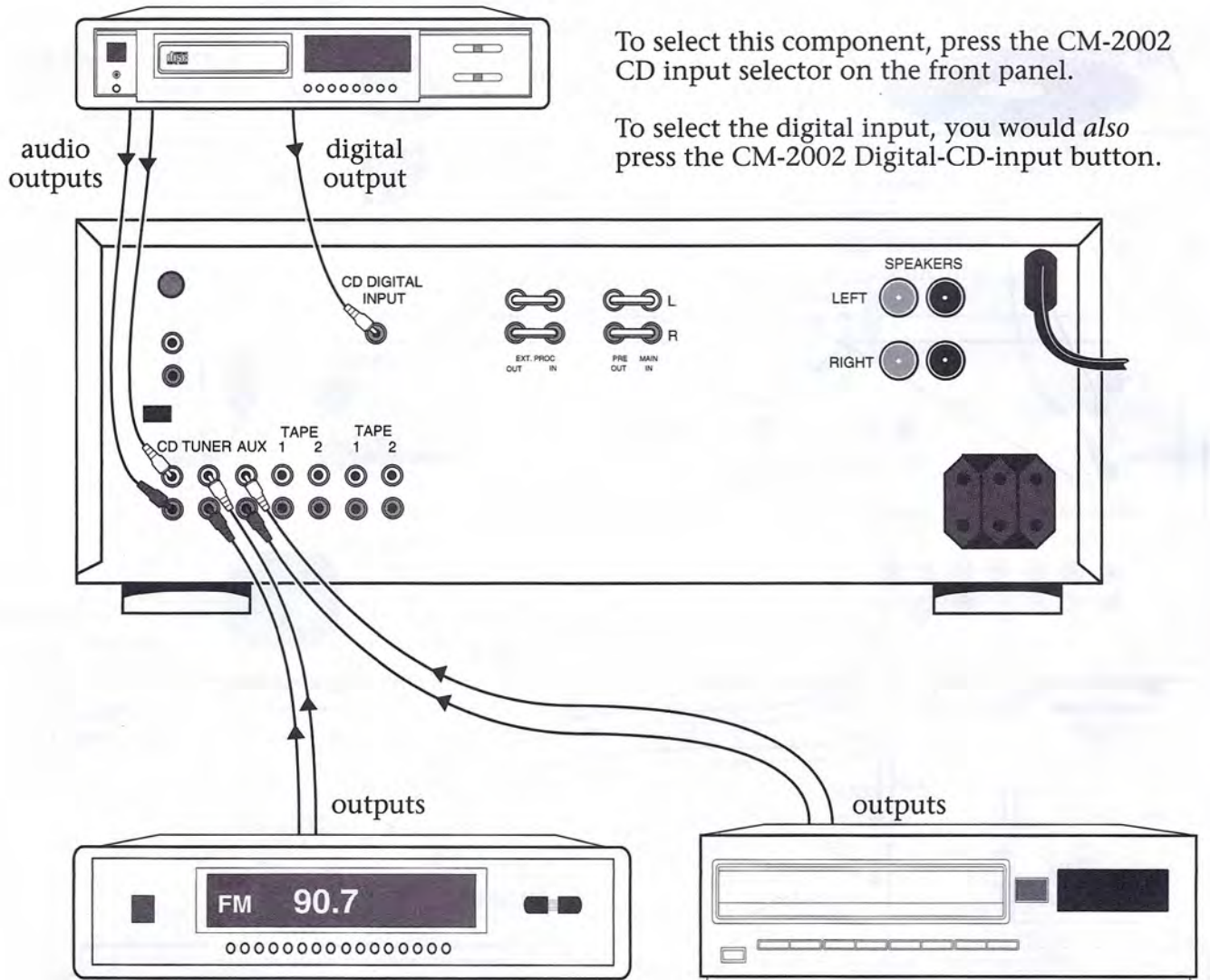
The Tape players can be any standard component with a line level output, such as a cassette deck, reel to reel or DAT. The connections allow the playback of the tape and recording.

You can also connect a VCR to listen to movie soundtracks or make good quality audio recordings. The VCR's audio inputs and outputs would connect in exactly the same way as the tape deck shown. The video or RF output connects to your TV set.

# CD, Tuner and Auxillary connections

These inputs can connect to any standard audio component as long as they have a line-level audio output. These include CD players, Tuners, TV, DAT, Video games, Laser Disc, VCR, DVD, DSS and computers.

If your component has a digital output, then you can connect it to the coaxial digital input.



To select this component, press the CM-2002 CD input selector on the front panel.

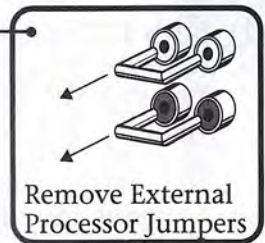
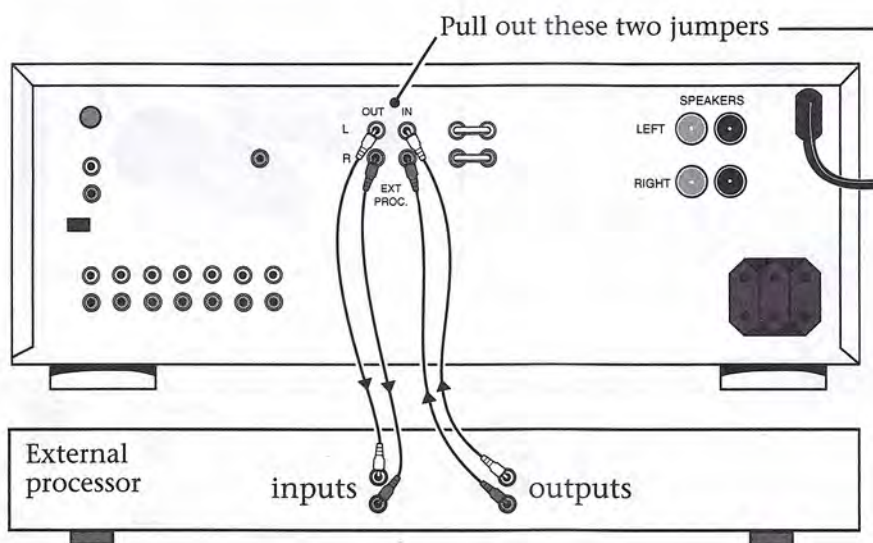
To select the digital input, you would *also* press the CM-2002 Digital-CD-input button.

To select this, press the CM-2002 Tuner input selector.

To select this, press the CM-2002 AUX input selector.

## External Processor connections

An external processor can be connected by first pulling out the two "U-shaped" jumpers in the external processor loop on the rear panel. Components which can be connected include surround processors, equalizers and electronic crossovers. The output from the CM-2002 goes into your processor and the processed or equalized output then goes back into the CM-2002.

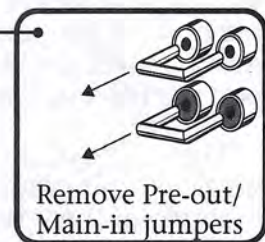
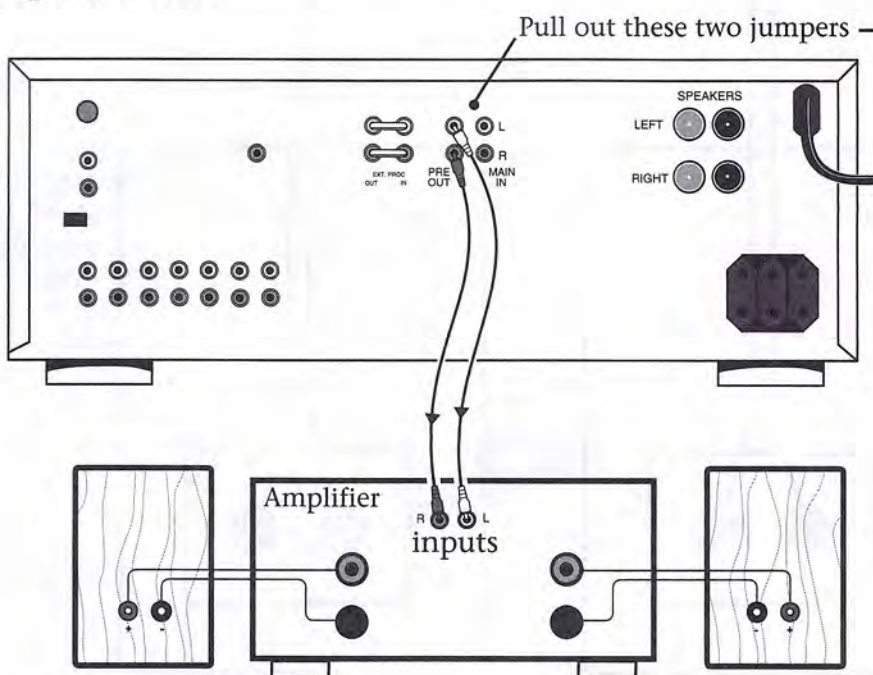


1. Turn off the CM-2002.
2. Pull out the two jumpers.
3. Connect the output to the input of your processor.
4. Connect the input to the output of your processor.

## External Amplifier connections

An external amplifier can be connected by pulling out the two Pre-out/Main-in jumpers. This will disconnect the internal amplifier section of the CM-2002. There will be no sound from the speakers or headphones, only the external amplifier and its speakers will receive a signal. The CM-2002 will just act as a preamplifier.

The Pre-out is the end of the preamplifier section and the Main-in is the start of the internal amplifier section.

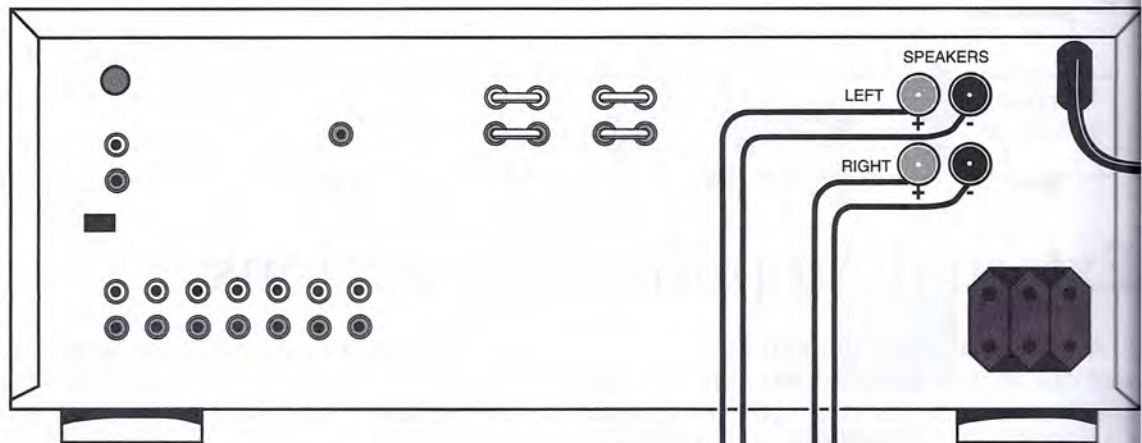
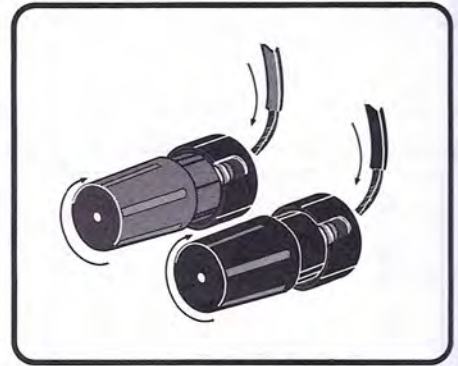


1. Turn off the CM-2002.
2. Pull out the two jumpers.
3. Connect the Pre-out to the input of your amplifier.
4. You can leave the Main-in disconnected.

# Speaker Connections

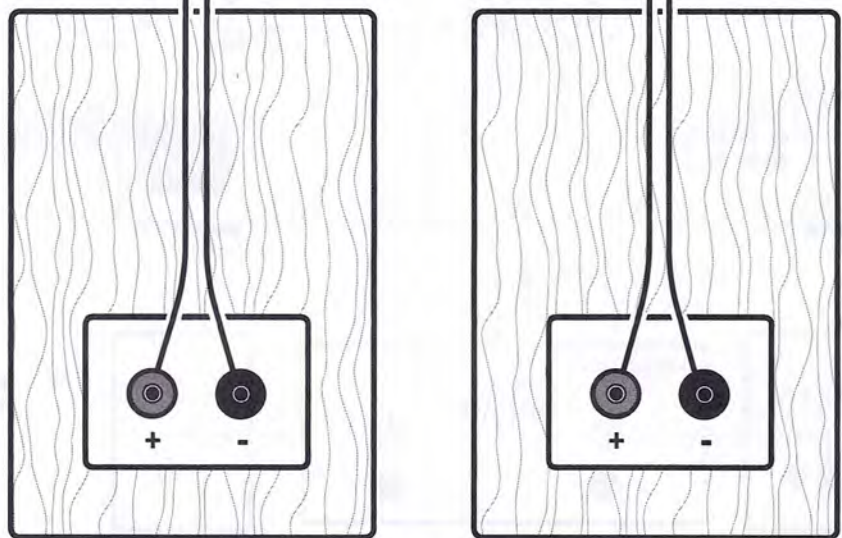
The CM-2002 output terminals are designed to accept bare speaker wires.

- 1) Strip 1/2" of insulation off each wire and make sure to carefully twist all the fine strands together. Even if one strand is loose and touches the opposite terminal, a short circuit will result.
- 2) Unscrew the CM-2002 terminals and insert the wire. Tighten the connection down onto the wire (finger tight only).

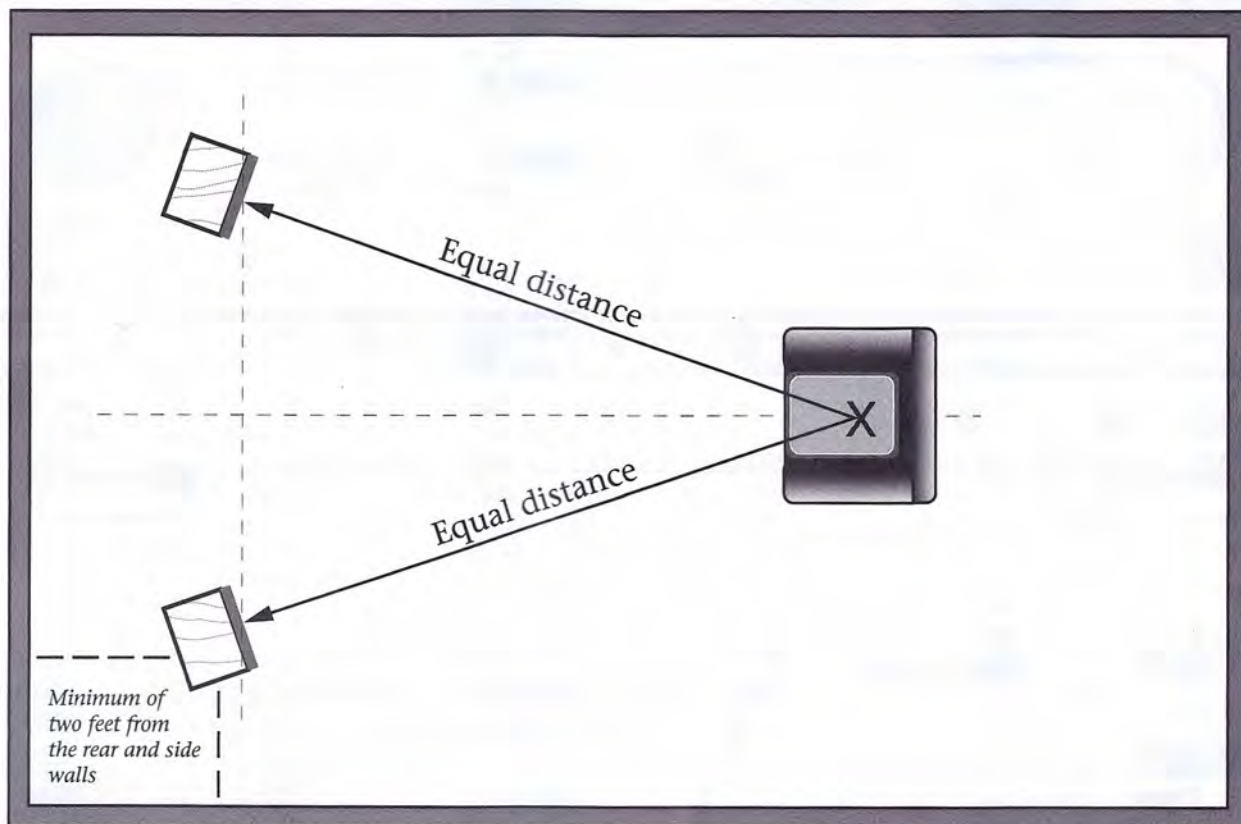


Take great care to connect the red output posts of the CM-2002 to the red posts of the speakers. Also connect the black CM-2002 posts to the black speaker posts.

This will keep all the speakers "in phase". For example, if there is a loud drum beat, all the speaker cones will be moving outwards at the same time. If one speaker is "out of phase" then its speaker cone will move inwards at this time. This causes a sound cancellation, resulting in a bass reduction.



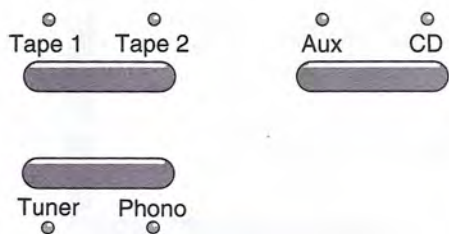
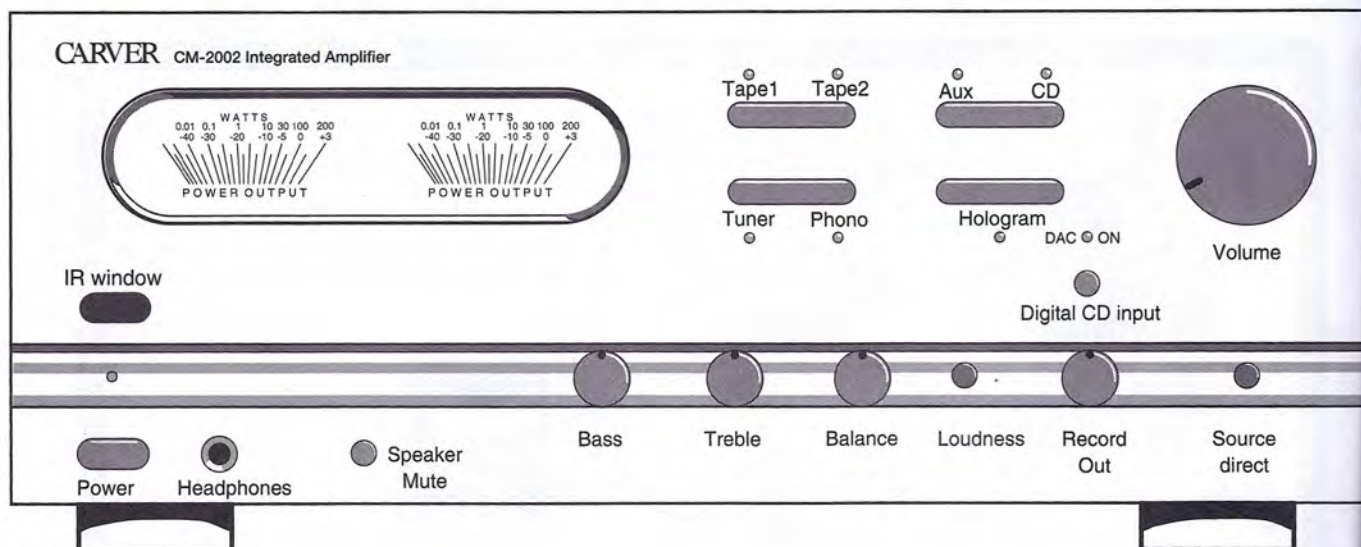
## Speaker Placement



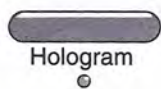
Since there are many different speaker designs available, you should closely follow the recommendations of your speaker manufacturer, with the addition of the following points.

1. Adjust the toe-in so that they both point in towards the listening chair.
2. To get the best results from the Sonic Hologram circuit, the left speaker should be set exactly the same distance away from your listening position as the right speaker. While this relationship is important in any stereo system, it is more important when using the Sonic Hologram. It might help to place a coin as a marker, on the center of the chair. Measure from this point to the center of each speaker and adjust until they are the same distance away.
3. Ideally, the speakers should be no closer than two feet from the rear and side walls, in order to reduce any reflections that might upset the Sonic Hologram imaging. If your speakers are closer than this, you can experiment by adding sound deadening material, such as curtains, on the walls to reduce any unwanted reflections. For more details of the Sonic Hologram, see page 19.

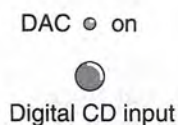
# Chapter 3. Front Panel features



These input selector buttons allow you to choose which source you would like to listen to. The indicator lights will show which source is currently selected.



This will engage the Hologram circuit to improve the three dimensional imaging, giving a more accurate sense of the position of the various musicians and special effects. See Page 19 for more details.



This will select the Digital Input as your listening source. The Digital signal from your CD, DVD or LaserDisc will be converted by the internal D/A converter. *Make sure that you also press the CM-2002 CD input selector or there will be no sound.*



The Volume can be adjusted manually or by using the remote control. It is motorized, so be careful not to hold it or impede its movement when using the remote. Make sure the volume is turned down before turning on the CM-2002.



This is the main power switch to turn the CM-2002 on or off. When this is pressed, the standby light above it, will turn on and your system will be ready to play after a few seconds. You may hear the relays click on during this start-up time.



This accepts a standard 1/4 inch stereo headphone plug. It does not shut of the main speakers when the headphones are plugged in. Use the Speaker-Mute control if you want headphone-only listening.



Use this to temporarily turn off the sound to your speakers. It does not affect the headphones, or your recordings.



This control will boost or reduce the output level in the Bass frequency range. Turning it fully clockwise will provide a boost of 8 dB @ 100 Hz. Turning it fully counterclockwise will produce a reduction of 8 dB @ 100 Hz.



This control will boost or reduce the output level in the Treble frequency range. Turning it fully clockwise will provide a boost of 8 dB @ 10 kHz. Turning it fully counterclockwise will produce a reduction of 8 dB @ 10 kHz.



This is used to balance the output of your speakers. It is useful if you are sitting closer to one speaker than the other. Turn it clockwise to make the left speaker play quieter. Turn it counterclockwise to make the right speaker quieter. If you are listening with the Sonic Hologram engaged, you should set the balance to the center position.



This will improve the performance when listening at lower volume levels by boosting both the Bass output and the Treble at the same time. It provides a 6 dB boost at 100 Hz and a 2.5 dB boost at 10 kHz.

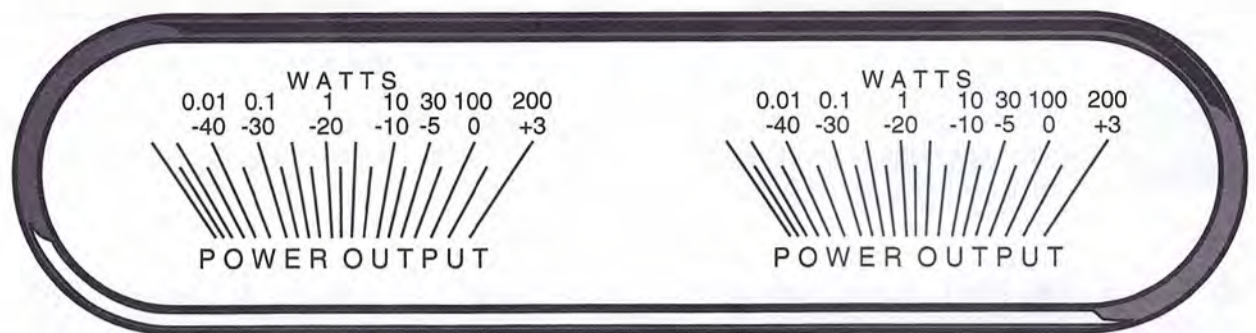


This allows you to select which sound source you would like to record onto your Tape decks. Rotate this control until the desired source is selected and then set your Tape decks to record. You can listen to something else at the same time. See page 18 for some recording examples.



This will bypass the Tone controls and the Balance. The signal path is shorter and this will improve the sound quality.

## Power Meters



The CM-2002 features ballistically-weighted power meters that are calibrated in decibels. The main dB scale has a top value of +3dB, with 0dB equal 100 watts per channel into 8 ohms.

The meter ballistics include a fixed amount of overshoot, the needles can move past the 0dB level when played loud.

On some musical material, the amplifier could be reaching its maximum power even though the meters aren't reaching full scale.

This is because the meters are indicating the *average* power output. Momentary musical peaks can drive the amplifier to its maximum output for brief periods, faster than the meter needles can respond.

The best way to tell whether the amplifier is overloading is to listen. If the sound becomes distorted on musical peaks at the same time the meter needles are "pegging", you have probably exhausted the CM-2002's power reserves. If this occurs, you should reduce the volume level.

## Operation

The front panel power button will turn the CM-2002 ON or OFF.



When this is pushed in, the standby light will flash for a few seconds until the CM-2002 is ready for use.



When it is pushed out, the CM-2002 is OFF, and it will not respond to the remote control. Then, the only way to turn it ON is by pushing the button in again.

If the CM-2002 is ON and you use the remote control power button to turn it OFF, it will go into the standby mode. There will be no power to the speakers and all the lights will go out except for the standby light. The CM-2002 will respond to the remote control power button to turn it back on again.

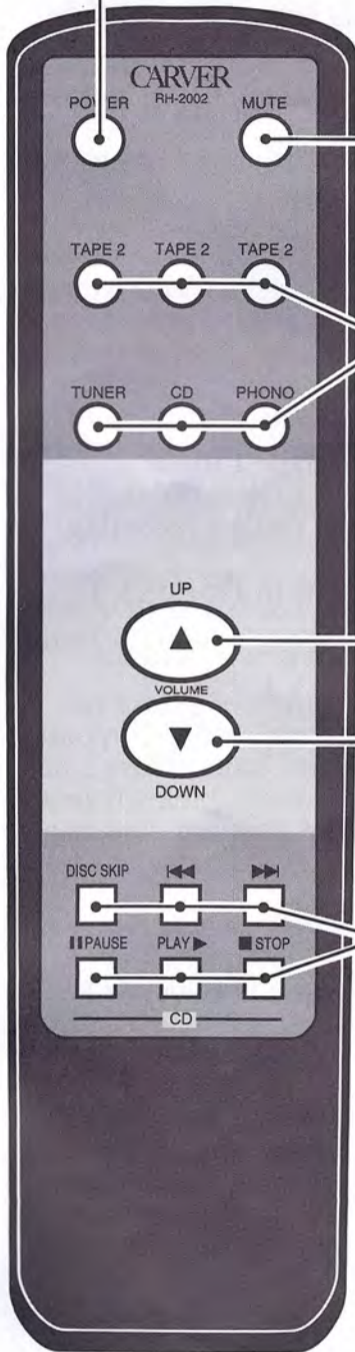
A typical listening session would be as follows:

1. Turn on your CD, Tape decks, etc.
2. Turn down the volume control and push the front panel power button in.
3. Play your CD, Tape, etc and adjust the volume as desired.
4. When finished, you can use the remote control to turn off the CM-2002, by putting it into standby.
5. The Standby light will stay on, indicating that it is ready to be turned on at any time.
6. If you have finished listening for the day, you should press the front panel power switch to turn it off. This is a precaution in case of power surges during the night.



# Remote Control

**POWER** This turns the CM-2002 ON or into its standby mode. If the CM-2002 is already on, it will go into standby when this button is pressed. It can be turned on by pressing this again.



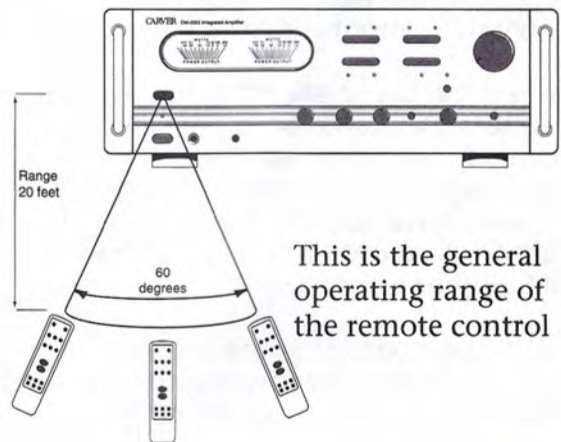
**MUTE** This turns off the audio output to the speakers and the headphones. The standby light will blink when this is engaged. It does not affect the record outputs.

**INPUT SELECTORS** These allow you to select the source you would like to hear. They do not affect the record selection

**Volume UP** These Volume controls will rotate the motorized volume knob on the front panel

**Volume DOWN**

**CD player controls** These will only work with players which follow the RC-5 remote control standard.



The remote is powered by two supplied "AAA" batteries.

## Recording

The Record-out selector on the front panel of the CM-2002 will allow you to select the source you would like to record on either tape deck. You can record something different from that playing in your speakers.

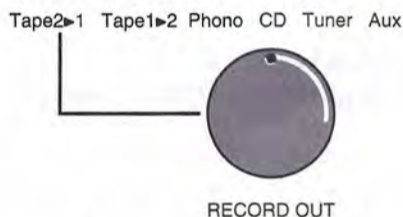
When you have selected a record source, there will be an output from the CM-2002 TAPE 1 out and TAPE 2 out on the rear panel. This is a straight copy of whichever source is selected and it is unaffected by the Tone control settings, the Sonic Hologram, Mute or the Volume controls.

### Recording audio components.

The Tape deck connections are shown on Page 9. The CM-2002 Tape outputs connect to the inputs of your Tape deck. These inputs are often labeled as "record" inputs.

For an example, if you would like to record a CD onto your Tape deck :

1. Rotate the CM-2002 Record-out selector until it is selecting the CD player.



2. Press the CM-2002 CD input selector and play the CD in your system.

3. If you wanted to record a CD using the digital input, make sure that the CM-2002 Digital CD input is also selected.

4. Follow the instructions in your Tape deck owner's manual to adjust the levels correctly and then make your recording. If your Tape deck also has microphone inputs, make sure the Tape deck is set to the line level record inputs, rather than the microphone inputs.

5. When your recording is complete, you can play it back by pressing the CM-2002 TAPE 1 or TAPE 2 input selector.

### Recording from one Tape deck to another (Tape dubbing).

The Record-out selector will allow you to record from Tape 1 to Tape 2 or from Tape 2 to Tape 1.

For example, if you want to record from Tape 1 to Tape 2 :

1. Rotate the Record-out selector to the position marked Tape1>2.



2. Press the CM-2002 Tape 1 input selector if you want to hear the tape in your speakers while you are recording.
3. Play your source tape in Tape deck 1.
4. The Tape deck 2 can now record the audio from Tape deck 1

## Appendix A : Sonic Holography™

Sonic Holography is a unique process which enhances the three-dimensional effects and realism of stereo sound.

To understand the benefits of this circuit, we must first understand a problem in obtaining accurate sound reproduction. In a stereo system, both ears hear the output from both speakers. The left ear hears sound from the left speaker and from the right speaker. To see the problem with this, compare what happens when listening to a live musical performance :

During a concert, each ear will receive one direct sound arrival. For example, a cymbal crashes, both ears will hear it and our brain tells us accurately the position of the musician.

In a stereo recording of the concert, this cymbal crash will be heard from both speakers. Our left ear will hear the left speaker, which is fine, but it will also hear the crash from the right speaker. The extra arrival tends to confuse our accurate sense of positioning, giving a general feeling that the musician might be over there "somewhere".

An example of this effect is if you use a good pair of headphones. The stereo effect is more pronounced because the left ear only hears the left headphone, and the right ear hears only the right headphone with no extra arrivals.

To summarize :

1. *A real musical event will create only two direct sound arrivals, one at the left ear and one at the right.*
2. *Stereo playback will give four arrivals, as both speakers are heard by each ear.*

These second sound arrivals reduce our naturally accurate sense of positioning, used for listening pleasure and self preservation.

The Sonic Hologram circuit was designed to cancel out the unwanted second arrivals. The left ear will mainly hear the left speaker and the right ear mainly hears the right speaker.

This is accomplished by sending a complex crosstalk signal from the left and right speakers, in addition to the normal program. These extra signals are virtually identical to the unwanted second sound arrivals but they are out-of-phase with them and they cancel each other out.

The result is a more three-dimensional and wider soundstage, where the positioning clues are restored. In a way, the musicians have been freed from the confines of the flat plane between the speakers. You will perceive them as playing forward or playing behind the speakers or to one side or the other, not just somewhere in between.

We recommend that you experiment with its effect, remember that you are listening for a more accurate sense of the location of the different musicians.

As the Hologram works by phase cancellation of the unwanted second sound arrivals, accurate speaker positioning is required to make sure that the left speaker is the same distance away from you as the right speaker. You must follow the speaker placement on Page 13 to get the best results. This is the same as any standard stereo system only with more care taken to position the speakers accurately.

## Appendix B : Connections

### Interconnects

- Choose reliable hook-up cables, also called patch cords or RCA cables. There are many different grades of cable available and you might want to ask your Carver dealer for advice. The main thing is that they should be fully shielded and as short as possible for the job. Try to layout the system so that most patch cords are less than six feet, perhaps most will be three or four feet long.
- Some patch cords can be a very tight fit and there is usually a preferred method of getting them off, some have to be removed with a twisting action. Be gentle or you may damage the jacks of the preamp or your other components.
- Some special patch cords can only be hooked up in one direction, these are usually marked with arrows.
- For video connections, use cords made especially for video signals, otherwise the picture quality may be degraded. Video cables are specially designed to match the video circuits electrical characteristics.
- It is usual for the right patch cord plugs to be red and the left connections to be white, grey or black. Video connections are usually yellow.

### Speaker cables

- The longer the distance from the amplifier to the speakers, the thicker the speaker wire should be.
- The thickness of speaker wire is specified as a "gauge". The thicker the wire, the smaller the gauge. For example, 16 gauge is thicker than 18 gauge. Most systems use 16, 14 or 12 gauge wire.
- The following table shows the minimum recommend gauge for different lengths.

| Length        | Gauge |
|---------------|-------|
| up to 25 feet | 16    |
| up to 40 feet | 14    |
| up to 60 feet | 12    |

- Use speaker cables which are marked in some way to help you connect them up correctly. Some have a black stripe or a ridge on one of the cables, other types have a silver strand or thread running through.
- You might start with standard speaker wires and connection cords and then upgrade them later when you want to fine tune your system. Your dealer can advise you on the different cables and cords available.

## Appendix C : Troubleshooting

If you're having trouble or suspect a problem with the CM-2002, try some of these points 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.

### **The CM-2002 does not turn on and there are no front panel lights or Standby light.**

1. The power is off at the wall receptacle or power strip.
2. The CM-2002 is plugged into a switched convenience outlet which has been turned off.
3. The power cord is disconnected.
4. There is a poor fit between the power cord plug and the wall receptacle.
5. The internal fuses have blown. Contact your dealer or Carver service. The CM-2002 must be checked and the fuses replaced by an authorized repair center.

### **The CM-2002 powers on and lights up as normal but there is no sound.**

1. An inactive source is selected, such as a CD player which is off or not playing.
2. CD player or other sound source with an independent volume control is turned down.
3. MUTE is activated on the remote control or the front panel.
4. The volume control is turned down on the CM-2002.
5. The speaker cables or patch cords are not connected properly.
6. Check that the CM-2002 Pre-out/ Main-in connections are still joined with the U-shaped jumpers.
7. Check that the CM-2002 External processor in/out connections are still joined with the U-shaped jumpers.

### **No Sound in one Channel**

1. Defective or loose patch cord.
2. Speaker wire loose or disconnected.
3. Check the Balance control is in the center position.
4. Speaker fuse blown.
5. Check that both the CM-2002 Pre-out/ Main-in connections are still joined with the U-shaped jumpers.
6. Check that both the CM-2002 External processor in/out connections are still joined with the U-shaped jumpers.

### **Loud howl, squeal or whistle**

1. TAPE 1 or 2 is engaged while there are microphones connected to tape deck for recording (feedback).

### **Solo voices or instruments sound thin, shrill or distorted**

1. Treble control set to maximum boost.
2. Speakers are connected out of phase.
3. The meter needles are pegging at maximum. Turn the volume down.
4. The phono cartridge is wired out of phase.

### **No recordings can be made.**

1. Check the connections of the CM-2002 Tape outputs to the record-inputs of your components (see page 9). They may be connected incorrectly or there is a bad patch cord.
2. Check your recording components are selecting the record inputs correctly and not the microphone or antenna inputs.
3. If you want to record the Digital input, make sure that the CM-2002 Digital input selector is pressed and it's record-out selector to CD.

## Troubleshooting, continued

### Hum and Constant Noise

1. Defective or loose patch cords.
2. Improper fit between patch cord plugs and sockets.
3. Patch cords or speaker wires have been routed too closely to AC cables, power transformers or motors. Check for lighting dimmer switches or Halogen lamps causing interference.
4. The CM-2002 is sitting directly on top of a large power amplifier.
5. The turntable ground wire has not been connected. If it is connected, then try disconnecting it and see if the hum goes away.
6. You have a ground loop in the system. As a test, try disconnecting cable TV or any component which is grounded, if the hum goes away please contact your dealer or our technical support department.

### Remote Control Won't Work

1. The batteries are weak or missing.
2. The remote is too far away or at too much of an angle to the front panel of the CM-2002.
3. Either the remote transmitter or the remote sensor window on the CM-2002 is dirty.
4. The CM-2002 is sitting in bright sunshine or very bright or flickering lighting.
5. If the CD functions do not operate, make sure that your CD player uses the RC-5 control standards. Carver CD players which use this are the SD/A-360 and the MV-5.

### Sound is weak when Phono is selected

1. The Phono cartridge is a Moving Coil type, check the position of the rear panel MM/MC switch, see page 9.

### Digital input does not work

1. Make sure that your CD player is connected correctly. The digital output should connect to the digital input of the CM-2002.
2. Your digital output of the CD player must follow the S/PDIF format. This is an industry standard format.
3. Check that both the CM-2002 CD input selector *and* the Digital CD input selector are engaged.
4. Try using another patch cord.

### Unusual operation

As the CM-2002 is a microprocessor controlled device, any severe power surges or spikes could put it into a strange operating mode or cause it to "lock up".

This may be cured by turning your CM-2002 **on and off**. If this does not work, try unplugging the power cord and leaving it unplugged overnight. This may be all that is required to return it to normal operation.

## Appendix D : Service Assistance

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

If your CM-2002 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, please contact us at the Factory.

Have the model number and serial number ready and we will then give you detailed instructions on how to obtain prompt repair service.

### Factory Address

Carver Corporation  
P.O. Box 137  
Woodinville, WA, USA  
98072-0137

*Main Telephone* (425) 482 3400

*Technical support* 1 800 521 4333  
(this is a toll-free number if you are calling from within the USA or Canada)

*Main Fax* (425) 482 3401

*Service fax* (425) 482 3442

If you have access to the Internet, you can check out the full line of Carver products and company announcements on our World Wide Web page (<http://www.carver.com>).

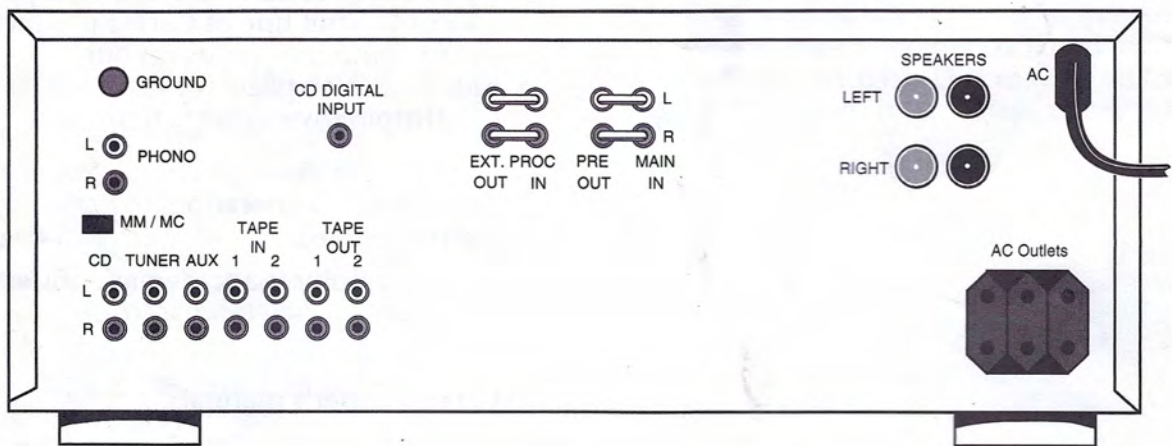
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CM-2002 Owner's manual  
Part #990-00785-00 Rev. A

# CARVER

CM-2002



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