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# Owner's Manual

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## Model CD2

### DIGITAL TRANSPORT-CD PLAYER

**audio research**  
HIGH DEFINITION®

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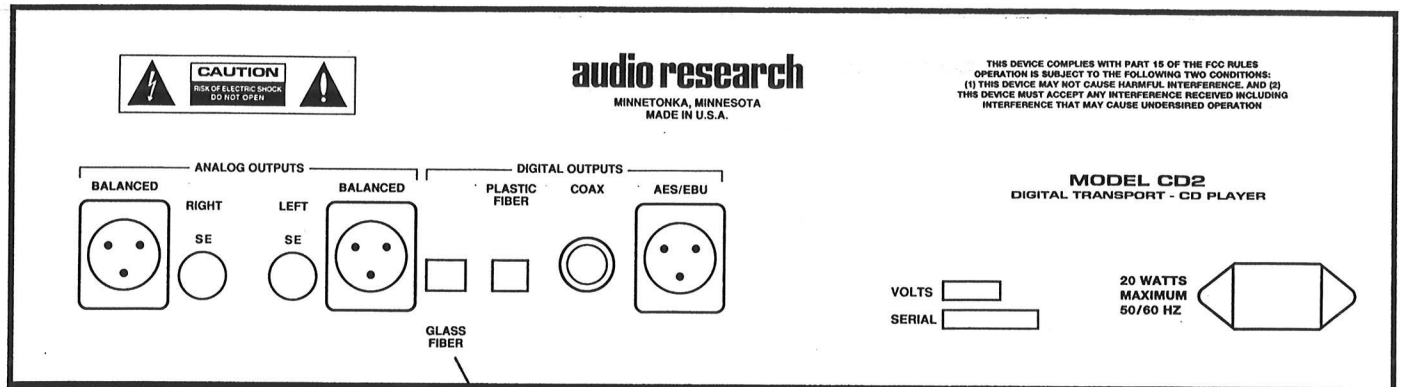
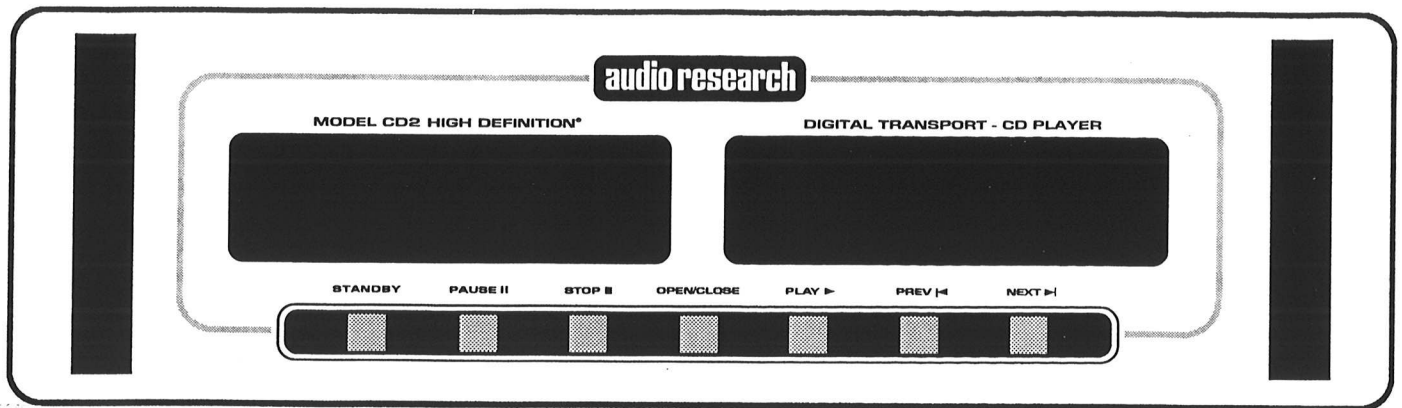
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Optional

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## Preface

Please take the time to carefully read this instruction manual prior to installation or use of your CD2 compact disc player. Because it is a highly advanced electronic instrument, there are several facts and procedures you should know before you place it in operation.

## Introduction

We believe the CD2 breaks new ground in the retrieval and transmission of digital data from the CD format. In fact, that's a large part of the fun: just as in the past, when a new cartridge and tonearm combination brought music to life with startlingly improved resolution, subtlety and dynamics, so too you will discover layers of musical information you never knew were there in the mirrored surface of the compact disc.

What's the reason for this superior performance? Well, a look inside the CD2 reveals a wealth of proven Audio Research design philosophy. Circuit boards are Audio Research engineered, with beefy construction, careful hand soldering and layouts optimized for lowest digital noise. Sophisticated electronic "jitter stripping" techniques help minimize jitter in the overall circuit. Advanced power supply design, with two transformers and extensive regulation, has proved crucial even in digital applications like the CD2. The BNC and XLR digital outputs are transformer coupled and are driven by a high-current balanced line driver. Mechanical damping theory has also been applied to internal mounting of key components and to critical aspects of the transport and chassis structures (including tuned polymer feet), to minimize vibration-induced noise.

A bitstream digital-to-analog converter and a high-current analog output stage allow the CD2 to be used directly with a line-level preamplifier or integrated amplifier for immediate music enjoyment. Both single-ended (RCA) and balanced (XLR) outputs are included. Alternatively, the owner may use the CD2 as a high-quality CD transport in conjunction with an external digital processor like the Audio Research DAC3.

The CD drive mechanism itself represents the latest thinking from digital engineers, and offers performance clearly superior to older drives. In part, this is because even the servos of the CD2 drive operate fully in the digital domain, whereas older transport models were actually hybrid designs using analog servos, which placed greater demands on power supply reserves. The CD2 drive also has a superior eye pattern for more effective resolution of CD data and, again, lower jitter.

In appearance, the CD2 is pure Audio Research: heavy bevelled front panel, with the new-style handles flanking the readout display on the right and the front-load drawer on the left. Both drawer and display readout are recessed within bevelled openings for a more sculptured appearance. Power and function switches are arrayed below in another bevelled opening; a convenient handheld remote control of front-panel functions and additional functions is also included.

On the rear chassis panel you will find all the digital output options you need: Toslink optical, BNC coaxial, XLR and ST-standard optical (optional). (An RCA/BNC adaptor is included with each unit.) Analog outputs include single-ended (RCA) and balanced (XLR). This gives the CD2 easy compatibility with any digital converter on the market, although you will experience the best sonic performance with an Audio Research converter like the DAC3.

## Warnings

1. To prevent fire, or shock hazard, do not expose your CD2 to rain or moisture.
2. This unit contains voltages which can cause serious injury or death. Do not operate with cover removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.
3. The detachable power cord on your CD2 is equipped with a heavy gauge, 3-conductor cable and a standard three-prong grounding plug. For absolute protection, **do not defeat the ground power plug**. This provides powerline grounding of the CD2 chassis to provide absolute protection from electrical shock.
4. For continued protection against fire hazard, replace the fuse only with the same type and rating as specified at the fuse holder.

## Packaging

Save all packaging in a dry place away from fire hazard. Your CD2 compact disc player is a precision electronic instrument and should be properly cartoned any time shipment is made. You may not have occasion to return your unit to the factory for service, but if that should prove necessary, or other occasion requiring shipment occurs, the original packaging will protect your CD2 from unnecessary damage or delay.

**NOTE:** The CD2 does not have a screw-type drawer locking mechanism for shipment. Instead, it has a flexible plastic retainer wedge in place across the drawer front. Remove this retainer by gentling pulling outward at either side before attempting operation.



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## Front Panel Control Functions

(Functions in [ ] indicate labeling on remote control unit.)

**STANDBY [STBY]:** Essentially an on/off switch, turns off display and controls when in STANDBY. Note: The CD2 has current flow to keep circuitry warm when in STANDBY mode. The CD2 is "on" when the display is lit.

**PAUSE:** Interrupts play. Release PAUSE by pressing it a second time to resume playing disc.

**STOP:** Stops play. (Number of tracks and total track time appear on display.)

**OPEN/CLOSE [DISC]:** Opens and closes CD drawer. Drawer also closes and disc begins to play when the front is pressed briefly and gently.

**PLAY:** Starts play. Closes drawer if it is open and begins to play first track unless another is selected. Restarts track if pressed during play. (Track number and elapsed track time appear on display.)

**PREV ◀ [◀]:** Selects the previous track to play. Continue pressing to cycle backward through previous tracks. (Track number will appear on display.)

**NEXT ▶ [▶]:** Selects the next track to play. Continue pressing to cycle forward through tracks. (Track number will appear on display.)

## Remote Control Functions

The remote control unit includes all of the above described CD2 front panel control functions plus the following additional functions.

**0-9 BUTTONS:** Pressing numbered button(s) corresponding to the disc track number will advance disc to desired track. Also used to select tracks when compiling a custom disc playback program (see PROGRAM [PROG] function description below).

**SCAN:** Pressing SCAN will close CD drawer if it is open, and the first 10 seconds of each track will be played in sequence. ("SCAN" will light up on display, then 10 seconds are counted out next to each track number.) To hear a track in full that player is presently scanning, press SCAN button again which will cancel SCAN function.

**PROGRAM [PROG]:** Allows compiling a custom track selection and playback order of up to 20 tracks on a disc. With the player in STOP mode, enter the desired first track number and then press the PROGRAM button. The word "PROGRAM" will light and the display will show total programmed time. If a second track selection is entered, the word "PROGRAM" flashes, indicating that other track(s) have already been stored in the program memory. Push the PROGRAM button to save the second track selection. Repeat procedure to program additional tracks as desired. This programming procedure, with readout of the cumulative total programming time, works for any of the first 14 numbered tracks on a disc. You may program track numbers higher than 14, but those track times will not be logged into the total programming time on the display. To preview a program before playing it, press PLAY and then use the NEXT ▶ and PREV ◀ buttons to cycle through track selections. Pressing PLAY will begin playing program. Pressing STOP once will stop program play. Pressing PLAY again will resume play from beginning of program. To cancel program, press STOP twice.

**TIME:** Pressing and releasing TIME repeatedly will cycle through the following information on the display: current track time elapsed (default setting initially seen on display), total disc time elapsed, and total disc time remaining.

**Note:** The FAST and A/B buttons on the remote control unit are not used.

◀◀: Pressing and holding this button down will fast search backward through the track that is playing until it is released. Rate of search accelerates as button is held down.

▶▶: Pressing and holding this button down will fast search forward through the track that is playing until it is released. Rate of search accelerates as button is held down.

**SHUFFLE [SHUF]:** Pressing SHUFFLE will close CD drawer if it is open. "SHUFFLE" lights up on display, and tracks will now play in random order. Press SHUFFLE again to return to normal play sequence.

**REPEAT [REP]:** Press REPEAT once to repeat the entire disc continuously. ("REPEAT" lights up on display.) Press REPEAT twice again to discontinue disc repeat mode.



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or:

Press REPEAT twice to repeat the track now playing continuously. ("REPEAT 1" lights up on display.) Press REPEAT once again to discontinue track repeat mode.

## Maintenance

### THE CDs

- Never write on the printed side of a CD.
- Do not attach any stickers to the CD.
- Keep the shiny surface of the disc clean. Use a soft lint-free cloth and always wipe the disc in a straight line from center to edge.
- Never use cleaning agents for conventional records.
- Detergents or abrasive cleaning agents should not be used either.

### PROBLEMS AND THEIR LIKELY CAUSES

If a problem occurs, run through the points listed below before taking your player in for repair.

Check whether:

- condensation has formed on the lens of the laser due to a dramatic change in temperature; this will disappear automatically after some time;
- the CD has been inserted correctly with the printed side up and that there is a CD in the compartment;
- the CD is dirty, badly scratched or warped;
- the player has been connected to the PHONO jack of the preamplifier.

If the problem remains, try to clear it by switching the player off and on again, or unplugging it and plugging it in again. If this also fails to help, consult your Audio Research dealer.

*Under no circumstances should you repair the player yourself as this will invalidate the warranty!*

## Connections

The CD2 offers several standard digital output options. Which option is best for your system will depend on your personal listening preference, the nature of your system installation requirements, and the options allowed by your digital processor.

**WARNING:** These outputs supply only a digital signal and can therefore only be connected to an input which is suitable for this signal. Never connect

any of these outputs to a non-digital input of a preamplifier or power amplifier (labeled CD, AUX, PHONO, TAPE, etc.). To do so is to risk damage to your system and may void any or all warranties involved.

## Digital Outputs

**TOSLINK OPTICAL:** For connection to digital processors with plastic fiber interconnect cable.

**BNC COAXIAL:** Uses 75-ohm impedance coaxial cable with locking BNC-type connectors. Audio Research DigitalLink Coaxial Cable is strongly recommended for best performance.

**BALANCED XLR:** For connection to digital processors having the AES/EBU-Standard interface. A high-quality XLR interconnect such as Audio Research DigitalLink XLR is strongly recommended for best performance.

**ST-STANDARD OPTICAL:** Allows connection to digital processors with an ST-Standard receiver with high-resolution glass fiber optical interconnect cable. (This is an optional, extra cost digital output connection on the CD2.)

## Analog Outputs

**SINGLE-ENDED (RCA):** For connections to the inputs of a line-level preamp or integrated amplifier, Audio Research brand LitzLink 2 interconnects are recommended.

**BALANCED (XLR):** For connection to the balanced inputs of a line-level preamp like the Audio Research LS15 or LS5MKIII, Audio Research brand LitzLink 2 balanced interconnects are recommended.

## Installation Instructions

While the CD2 does not dissipate an unusual amount of heat, it is important that it be provided with reasonable airflow to assure long, trouble-free operation. In addition, the following installation guidelines will help insure maximum sonic performance as well as reliable service.

1. Upright and level horizontal mounting is mandatory.
2. Do not "stack" the CD2 on top of another component; not only could this cause overheating, but "hum" may be introduced into the system.



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3. Do not place or operate your CD2 on a soft or irregular surface such as a rug. This will prevent proper levelling.
4. Do not operate your CD2 without the top and bottom covers installed. These are required both for safety as well as shielding from interference (except in service operations).
5. If rack mounting is employed, use Audio Research Rack Mount Ventilators (RMV-3) below and above your CD2.
6. If side-by-side mounting with other equipment is employed, place the CD2 to the left of the other chassis, so as to provide maximum spacing between the transformer of the CD2 and the other component.

## Operating Procedure

### Start-Up:

1. Secure all rear-panel connections between CD2 and digital converter or line level preamplifier.
2. Plug 3-prong powerline cord into rear of CD2, then plug into grounded AC wall receptacle.
3. Turn Standby switch to "On". Green LED readout display will glow.
4. Activate other system components.
5. See instructions for specific functions.

### Shut-Down

1. Set preamplifier "Mute" switch to "Mute" position.
2. Set CD2 Standby switch to "Off".

## Servicing

Because of its careful design and exacting standards of manufacture, your CD2 should normally require only minimal routine service to maintain its high level of performance.

**CAUTION:** Your CD2 contains sufficient levels of voltage and current to be lethal. Do not tamper with a component or part inside the unit. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

Should service be necessary, please contact your Audio Research dealer, or Audio Research Customer Service (612) 939-0600.

## Cleaning

To maintain the visual appearance of your CD2, occasionally wipe the front panel and top cover surfaces with a soft damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should **not** be used as they will damage the "brushed" grain of the front panel finish, as well as the LED display window. A dry 2-inch pure bristle paint brush works well to remove dust from bevels, reliefs and switches.

## Limited Warranty

Audio Research Corporation products are covered by a 3-Year Limited Warranty (all products except CD players, transports, and vacuum tubes), a 2-Year Limited Warranty (CD players and transports), or a 90-Day Limited Warranty (vacuum tubes). This Limited Warranty initiates from the date of purchase, and is limited to the original purchaser, or in the case of demonstration equipment, limited to the balance of warranty remaining after original shipment to the retailer or importer.

In the United States, the specific terms, conditions and remedies for fulfillment of this Limited Warranty are listed on the warranty card accompanying the product in its shipping carton, or may be obtained from the authorized retailer or from the Audio Research Customer Service Department. Outside the United States, the authorized importing retailer or distributor has accepted the responsibility for warranty of Audio Research products sold by them. The specific terms and remedies for fulfillment of the Limited Warranty may vary from country to country. Warranty service should normally be obtained from the importing retailer or distributor from whom the product was purchased.

In the unlikely event that technical service beyond the ability of the importer is required, Audio Research will fulfill the terms and conditions of the Limited Warranty. Such product must be returned at the purchaser's expense to the Audio Research factory, along with a photocopy of the dated purchase receipt for the product, a written description of the problem(s) encountered, and any information necessary for return shipment. The cost of return shipment is the responsibility of the purchaser.

**ADDENDUM TO CD2 OWNER'S MANUAL REGARDING  
ANALOG OUTPUT SIGNAL DELAY AND STANDBY  
SWITCH OPERATION AT INITIAL TURN ON OR  
IN THE EVENT OF LOSS OF POWER TO UNIT.**

NOTE: The CD2 has a timer circuit that mutes the analog output signal of the unit for the first 40 seconds after being plugged into a live outlet, or each time after it is powered up from an outlet that has been turned off by a switch controlling power to it, or when plugged into an outlet that has temporarily lost power to it. The delay is to allow the operating points of the CD2 to stabilize. The digital outputs of the CD2 will function immediately when the unit is connected to a live outlet. When the CD2 is left plugged into a continuously live power outlet, the Standby switch only turns on or off power to the transport and the front panel display and control functions, while the analog stages are always powered up for best sonics. To avoid analog output signal delay after initial turn on, the CD2 must be left plugged into a continuously live power outlet.

Also, on initial turn on or after power is restored to the CD2 after an interruption, the unit will default to the Standby setting (display, transport and front panel controls are deactivated). The Standby switch must be pushed once to bring the CD2 out of standby into the fully operational mode. Pushing the Standby switch again will return the CD2 to the standby mode. The CD2 may be continuously left on in the operate mode so it is ready for use at any time.



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## Specifications

### OUTPUTS, ANALOG: (Stereo)

1. Balanced XLR 4.2V RMS (+12.5dBv) max.
2. Single-Ended RCA 2.1V RMS (+6dBv) max.

### OUTPUT IMPEDANCE: (Analog)

350 ohms BAL, 175 ohms SE.

### FREQUENCY RESPONSE:

0.1–20,000Hz  $\pm$  0.2dB.

### SIGNAL TO NOISE RATIO: 96dBA

### DISTORTION: -90dB (.003%) 1kHz

### RESOLUTION: 20 BIT DELTA-SIGMA DAC.

### CHANNEL SEPARATION: 100dB 1kHz.

### PHASE LINEARITY: $\pm 0.5^\circ$ 20-20,000kHz.

### OUTPUTS, DIGITAL: (to external Digital-to-Analog Converter)

1. XLR Balanced AES/EBU 110-ohm 4V P-P.
2. BNC coax SPDIF 75-ohm 0.7V P-P.
3. TOSLINK fiber optical -19dBm, 660nm.
4. (Optional) ST-type glass fiber optical -12dBm, 875nm, 62.5/125 $\mu$ m fibers.

### SIGNAL FORMAT (disc):

Sampling frequency: 44.1kHz.  
Quantization Bit: 16bit linear per channel.  
Channel bit rate: 4.3218Mb/sec.  
Channel modulation code: EFM (8–14 modulation).  
Error correction: CIRC (cross interleave Reed Solomon Code).

### DRIVE MECHANISM:

Wow & Flutter: Unmeasurable (Quartz stability).  
Discs: Accepts 5" (12cm) and 3" (8cm) sizes.

### OPTICAL PICKUP:

Type: 3-beam LDGU (Laser Diode & Grating Unit), with holographic diffraction light pen.  
Laser: GaAlAs semiconductor, 780nm, 0.5mW maximum output.  
Servo: Digitally-controlled low-inertia linear positioning actuator.

JITTER REDUCTION: High-stability crystal-controlled re-clocking for all outputs.

DISPLAY: Six-digit vacuum fluorescent, with optical filter.

### POWER REQUIREMENTS (detachable power cord):

100-135VAC 60Hz (200-270VAC 50/60Hz), 20 watts maximum. (12 watts standby)

COMPLIANCE: RF Interference complies with FCC and CE MARK.

### FRONT PANEL CONTROL FUNCTIONS:

STANDBY operate/standby mode  
PAUSE II program  
STOP ■ disc  
OPEN/CLOSE drawer  
PLAY ► disc  
PREV ◀ selection  
NEXT ▶ selection

### INFRARED REMOTE CONTROL FUNCTIONS:

(Standard RC5 code, 30ft max distance)

0–9 digit entry keys  
SCAN ten seconds each track  
PAUSE program  
REP track/disc  
STOP program  
PLAY disc  
SHUF random sequence play  
◀◀ search, REV  
▶▶ search, FWD  
STBY operate/standby mode  
DISC opens/closes disc drawer  
PROG enters selection on program list  
TIME elapsed, remaining track; remaining disc  
FAST fast mode search  
◀ previous track  
▶ next track

DIMENSIONS (standard rack panel): 19" (48 cm) W x 5 1/4" (13.4 cm) H x 1 3/4" (29.8 cm) D. Handles extend 1 1/2" (3.8 cm) forward of the front panel. Rear connectors extend 3/4" (1.9 cm).

WEIGHT: 17 lbs. (7.7 kg) Net; 27 lbs. (12.3 kg) Shipping.

Specifications subject to change without notice.

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## FCC Rules

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Use interconnect cables of no more than one meter in length.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.