# CD-Audio Extensions for 64HDD

## Overview

Most CD-ROM drives are capable of playing Digital Audio CDs (CD-DA) or audio tracks from a Mixed-Mode CD. If you have a CD-ROM drive fitted to your 64HDD set-up, you can use your Commodore computer to control the CD-Audio functions. With the construction of the CD-Audio cable, you can have volume and mixing control of the audio stream, otherwise you can still use the features but listen with a headphone or external speaker.

## Introduction

The CD-Audio extensions are provided by an external MSDOS program called `CD-AUDIO.EXE`. The functions provided by this program are accessible from your Commodore computer via a single command through the 64HDD command channel:

An audio connection can be made by interfacing the audio-out signal from the CD-ROM (usually on the front panel) to the Commodore computer; for example to the Audio-In connection on the C64. If you are using 64HDD with a computer that does not have an audio input, you can still benefit from the CD-Audio extensions by connecting the audio-out to speakers, headphones, or the monitor directly.

There are several reasons why access to CD-Audio is useful:

- CD-Audio players such as those provided by “modern” operating systems can be written. These simply allow music to be played, allowing you to be entertained whilst you work.

- Multimedia applications can be written and distributed on CD-DA or Mixed-Mode CD. For example, using the upcoming A64 Video Creator AVI videos can be converted for playback on the C64. Handling streams of video data is a full-time job for a 1MHz computer, let alone having to handle audio. By using the CD-Audio extensions, audio tracks are played-back directly from the CD, leaving the C64 to 100% concentrate on the video.

## Installation and Configuration

CD-Audio extensions are very easy to install. All that is required is that the `CD-AUDIO.EXE` program is located on the MSDOS path. As with other 64HDD external programs, their operation will be faster if they are located on a RAMDisk and that this location is first on the PATH definition.

The 64HDD system needs to have a CD-ROM drive installed and the driver and `MSCDEX.EXE` file needs to be configured as required by MSDOS.

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**Command:** Send a CD-Audio Command
**Applicability:**

■ All ☐ MSDOS ☐ D64 ☐ D71 ☐ D81 ☐ H64 (Native) ☐ T64 ☐ LNX

**Syntax:** `CDA:command`
`CDA0:command`

**Examples:**
*Send a CD-Audio command and get return information*

```
OPEN 1,11,15,"CDA:command"
INPUT#1, EN,EM$,CT,MT
CLOSE 1
```

"command" may include the following:

| | |
|---|---|
| EJECT | ejects CD from drive (if supported by hardware) |
| FIRST | play first audio track |
| FWD | skip forward by 10seconds |
| LAST | start play of last audio track on CD |
| NEXT | skip to next audio track (or wrap to beginning of CD) |
| PAUSE | pause CD playback |
| PLAY | re-start current audio track, or first track if CD is stopped |
| PREVIOUS | skip to start of previous track (or wrap to last CD track) |
| RESUME | continue playback after a pause |
| REW | rewind by 10seconds |
| START | re-start current audio track, or first track if CD is stopped |
| STATUS | reports CD status, results:<br>"STATUS[mm:ss.uu][ mm:ss.uu][ppp]"<br>"PAUSED[mm:ss.uu][ mm:ss.uu][ppp]"<br>HALTED<br>First value is current track's play time<br>Second value is current track's total play time<br>Third value is % played<br>Note: quotes will not appear if using BASIC's `INPUT` command |
| STOP | stop playing of audio CD |
| TRACK# | start a specified track, where # is track number (relative to first audio track) |

**Errors:**

- If result is successful, EN=0, though EM$ will show status eg "playing", "resuming", "ejecting", "forwarding", "rewinding", "stopped"
- Error [200] if CD-Audio extensions cannot be found. This may also result if there was a problem with running the CD-Audio routines
- Error [101] for other errors, the message describes the reason why the command was unsuccessful
- CT is current audio track, and is valid if result of CD-Audio command was successful

- MT is maximum audio track, and is valid if result of CD-Audio command was successful
- CT and MT describe audio tracks not the absolute track on a Mixed-Mode CD

**Notes:**

- works regardless of disk image /directory selected
- volume is controlled by the knob on the from panel of the CD-ROM, as well as the setting of SID's volume register
- the track which is currently playing can be identified by sending a "status" command at any time and reading CT and MT
- CDs can have a maximum of 99 tracks, a mix-mode CD has a minimum of one data track and a maximum of 98 audio tracks, such that audio=99-data. The audio tracks are numbered in sequence, not by actual track number. Hence the first audio track, may be the second CD track, but is started with "track1"
- omitting the command will return copyright and version details

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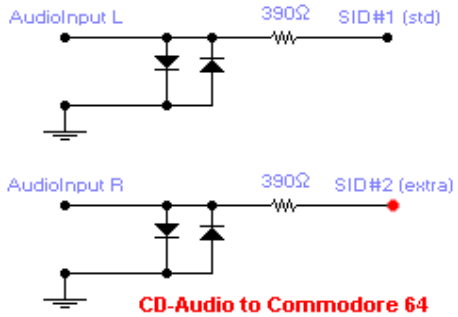
# CD-Audio Cable Specification:

If you intend to connect CD-Audio “through” your Commodore so that your software can control of the final volume and so that you can mix synthesised audio with the CD stream you will need to construct this cable. The cable is very simple, but has a couple of active components (the diodes) to help protect the SID chip from overload. The diode type is non-critical and any 1N4148 or 1N914 type signal diode should do. A resistor is also included to help reduce current draw; its value is not critical so anything in the 390-470ohm range will do. You could leave out these components altogether BUT YOU RISK DAMAGING the SID chip.




CD-Audio is stereo, but as we all know you can listen to the mono channel on the left speaker. The Commodore 64 by default has only one SID and as such this should be used as the *left* channel. If you have a second SID installed in the system then this can be used as you *right* channel.


Perhaps the easiest point in the computer to locate the necessary signals and do your soldering is at the A/V connector itself. A picture of the A/V connector is shown in the C64 User Manual Appendices. The view shown is from “outside” the computer, looking at the connector.

Please note: the data is provided for guidance. I have successfully built this circuit, but you take responsibility for the modifications you make to your computer. If you want to test CD-Audio without building this interface, remember that you can connect speakers or headphones to the CD-Audio out socket instead.