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# Data Stream Conversion to an Analog Signal by the Controller

**Ishaan Amar***

*Department of Electronic Engineering, Indian Institute of Technology Madras, Chennai, India*

***Corresponding author:** Dr. Ishaan Amar, Indian Institute of Technology Madras, Chennai, India, E-mail: deshaanamarjdbu@gmail.com

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## Introduction

An audio controller for use with laptop and notebook digital computers for reproducing compressed digital audio recordings. The controller includes a drive interface for traversing and accessing audio data files stored on a drive of a computer system. Function keys coupled to the controller permit users to access drives containing desired audio data. The selected audio data is read from the drive into the controller. Decoding circuitry decodes the audio data and generates a decoded audio data stream. The data stream can be converted to an analog signal by the controller, or sent to the audio subsystem of the computer system. Advantageously, the controller operates when the computer system is in an inactive state, for example in power saving mode or OFF, and operates in pass through mode when the computer system is ON or active.

## Field of the Invention

The present invention relates generally to portable devices for reproducing audio recordings and more particularly to a device for reproducing compressed digital audio recordings. Particular utility for the present application is in the reproduction of MP3 digital audio files, especially for use with portable computers, however other utilities are contemplated here in.

Presently there exist various portable devices for replaying digital audio recordings that have been compressed in accordance with a compressed audio digital recording format called MP3. These devices can be divided into two classes, those which store the MP3 compressed digital audio recordings in an electronic solid state memory, and those which record the compressed digital audio for subsequent reproduction using an electro-mechanical device such as a Compact Disk (CD) player or on a hard disk drive of a digital computer. Portable devices for replaying MP3 compressed digital audio recordings that use electronic solid state memory, i.e. flash-memory, are capable of storing about ten (10) music selections. With an add-in memory card, such devices can carry a total of about twenty (20) music selections. These MP3 players that store the MP3 compressed digital audio recordings in an electronic solid state memory consume comparatively little electrical power. Thus, such MP3 players provide an extended playing interval without battery replacement or recharging for the limited number of selections which they can store. In addition to having a capacity for only a limited number of music selections, another characteristic of portable MP3 players that store compressed digital audio recordings in an electronic solid state memory is the inconvenience associated with loading the music selections into that memory. In general, such MP3 players require first downloading or obtaining copies of MP3 compressed digital audio recordings on a hard disk drive of a personal computer, and then transferring the MP3 compressed digital audio recordings from the personal computer to the portable MP3 player. The preceding operations are to be contrasted with the simplicity of merely inserting a Compact Disk ("CD") into a CD player, or playing MP3 compressed digital audio recordings directly from a hard disk drive or CD drive of a digital computer. MP3 players which preserve compressed digital audio recordings for reproduction using an electromechanical device are capable of storing many more music selections than portable MP3 players that store compressed digital audio recordings in an electronic solid state memory, e.g. hundreds or even more than one-thousand. However, usually MP3 players that use electromechanical devices require significant amounts of electrical power. Thus, portable players that reproduce music selections using an electro-mechanical device exhibit comparatively short playing interval, e.g. less than one (1.0) hour before batteries must be replaced or recharged. Batteries used in laptop and notebook computers usually permit their operation for several hours before becoming discharged. As is readily apparent, a laptop or notebook computer can be to play MP3 compressed digital audio recordings using either the computer's CDROM or hard disk drive. Such excessive electrical energy consumption drains a laptop or notebook computer's battery of power that is more prudently applied in performing microprocessor intensive tasks such as word processing and spreadsheet analysis. The solution presented in the 207 application is a state machine that operates when main power to the portable device is OFF. The 207 invention couples a CD-ROM to the audio subsystem (when main power is OFF) so that CDs can be played, without excessive battery drain, or without having to boot up the portable computer. Accordingly, it is one object of the present invention to adapt laptop and notebook digital computers for reproducing compressed digital audio recordings when main power to the computer system is OFF. Another object of the present invention is to adapt laptop and notebook digital computers for storing MP3 compressed digital audio recordings into a conventional portable MP3 player using as little energy as is practicable. In one embodiment, the present invention provides a computer system adapted to play audio files which includes a computer subsystem comprising a system CPU and a drive for storing audio data. The computer system also includes an audio controller comprising a drive interface for selectively accessing the audio data from the drive and memory for storing the audio data. Advantageously, the controller is adapted to access, store and play the audio data when power is not being supplied to said computer subsystem. In another embodiment, the present invention provides a computer system adapted to play audio data when said computer system is inactive, the computer system including a computer subsystem comprising a system CPU and a drive for storing audio data. An audio controller is provided comprising a drive interface for selectively accessing the audio data from the drive and decoder circuitry for decoding the audio data and generating a decoded signal. The controller is adapted to access the drive to retrieve the audio data and decode the audio data when said computer subsystem is inactive. In method form, the present invention provides a method for playing audio files in a computer system when said computer system is in an inactive state includes the steps of activating an audio controller if a main CPU of a computer system is inactive; selecting desired audio data; and generating an audio data stream from said selected audio data. It will be appreciated by those skilled in the art that although the following detailed description will proceed with reference being made to preferred embodiments and methods of use,

the present invention is not intended to be limited to these preferred embodiments and methods of use. Rather, the present invention is of broad scope and is intended to be limited as only set forth in the accompanying claims.

Controller is provided comprising a drive interface for selectively accessing the audio data from the drive and decoder circuitry for decoding the audio data and generating a decoded signal. The controller is adapted to access the drive to retrieve the audio data and decode the audio data when said computer subsystem is inactive. In method form, the present invention provides a method for playing audio files in a computer system when said computer system is in an inactive state includes the steps of activating an audio controller if a main CPU of a computer system is inactive; selecting desired audio data; and generating an audio data stream from said selected audio data. It will be appreciated by those skilled in the art that although the following detailed description will proceed with reference being made to preferred embodiments and methods of use, the present invention is not intended to be limited to these preferred embodiments and methods of use. Rather, the present invention is of broad scope and is intended to be limited as only set forth in the accompanying claims.