

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN**

HUNTS POINT VENTURES, INC.,

Plaintiff,

v.

TONIUM AB,

Defendant.

CASE NO. 11-cv-847

DEMAND FOR JURY TRIAL

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Hunts Point Ventures, Inc. hereby alleges for its complaint against defendant Tonium AB (“Tonium”) on personal information as to Plaintiff’s own activities, and upon information and belief as to the activities of others, as follows:

NATURE OF THE ACTION

1. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code.

PARTIES

2. Plaintiff HUNTS POINT VENTURES is a Washington corporation with its principal place of business in Washington State.

3. Hunts Point Ventures is the owner of U.S. Patent No. 7,574,272 (“the ‘272 Patent”), entitled “System and Method for Data Transfer Optimization in a Portable Audio Device”, issued August 11, 2009 (copy attached as Exhibit A).

4. Hunts Point Ventures is the owner of the entire right, title, and interest in the ‘272 Patent and has standing to sue for all past, present, and future infringement of the ‘272 Patent.

5. Upon information and belief, Defendant TONIUM AB is a Swedish corporation with its principal business address in Finlandsgatan 60, Kista, Sweden SE-164 74. Upon information and belief, Tonium transacts business and has provided to customers in this judicial district and throughout the State of Wisconsin products that infringe and/or induce infringement of, and/or contribute to infringement of, one or more claims of the '272 Patent.

6. Upon information and belief, Tonium manufactures, imports into the United States, sells, offers for sale, and/or uses portable media player products that infringe one or more claims of the '272 Patent, including its portable media player called the "Pacemaker". Upon information and belief, such products are offered for sale to customers in this judicial district and throughout the State of Wisconsin.

JURISDICTION AND VENUE

7. This Court has exclusive subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

8. Personal jurisdiction over Defendant is proper in this court. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b), (c) and/or 1400(b).

DEFENDANT'S INFRINGEMENT OF THE '272 PATENT

9. Upon information and belief, Defendant Tonium has infringed and continues to infringe the '272 Patent under 35 U.S.C. § 271(a) by making, using, modifying, upgrading, performing quality control, and providing support for its Pacemakers.

10. Upon information and belief, Defendant Tonium has also been and is directly infringing the '272 Patent under 35 U.S.C. § 271(a) by selling, offering for sale,

and/or importing into the United States Pacemakers that infringe one or more claims of the '272 patent, including claims 1, 2, and 10.

11. Upon information and belief, Defendant Tonium's customers and other users of Defendant's Pacemakers and the services provided by means of those products, have been and are directly infringing one or more claims of the '272 Patent under 35 U.S.C. § 271(a).

12. Upon information and belief, Defendant Tonium has been and is actively inducing infringement of one or more claims of the '272 Patent under 35 U.S.C. § 271(b) by providing to customers, including customers in this judicial district, its Pacemakers, as well as services provided by means of its Pacemakers, along with instructions and directions that result in the use of the invention disclosed and claimed in the '272 Patent. On information and belief, Defendant knew, or should have known, that its customers and other users of its Pacemakers would use Defendant's portable media player products to infringe the '272 Patent and intended such infringement.

13. Upon information and belief, Defendant Tonium has been and is contributorily infringing one or more claims of the '272 Patent under 35 U.S.C. § 271(c) by making, selling, and/or offering for sale to customers, including customers in this judicial district, its Pacemakers, as well as services provided by means of its Pacemakers. Defendant's portable media player products are a material part of the invention claimed in the '272 patent, are not staple articles or commodities of commerce, and have no substantial non-infringing use. Upon information and belief, Defendant knew, or should have known, that its Pacemakers were especially made or adapted for an infringing use.

14. Defendant Tonium's infringement, contributory infringement, and inducement to infringe the '272 Patent has been willful and has deliberately injured and will continue to injure Hunts Point Ventures unless and until the Court enters a preliminary and permanent injunction prohibiting further infringement and, specifically, enjoining further manufacture, use, importation, sale, and/or offer for sale of products that infringe the '272 Patent.

**CAUSE OF ACTION
INFRINGEMENT OF U.S. PATENT NO. 7,574,272**

15. Defendant Tonium has infringed and is infringing the '272 Patent by making, using, offering for sale, and selling in the United States, without authority, products that infringe one or more claims of the '272 Patent.

16. Defendant's infringement of the '272 Patent is willful and deliberate, justifying an increase of damages of up to three times under 35 U.S.C. § 284.

17. Defendant's infringement of the '272 Patent is exceptional and entitles Hunts Point Ventures to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

18. Defendant's acts of infringement have caused damage to Hunts Point Ventures, and Hunts Point Ventures is entitled to recover from Defendant compensation as a result of Defendant's wrongful acts in an amount subject to proof at trial, injunctive relief, and such other relief as may be appropriate.

DEMAND FOR JURY TRIAL

19. Hunts Point Ventures demands a trial by jury under Federal Rule of Civil Procedure 38(b).

RELIEF REQUESTED

WHEREFORE, Hunts Point Ventures asks this Court to enter judgment against Tonium AB and its subsidiaries, affiliates, agents, servants, and employees and all persons in active concert or participation with them, granting the following relief:

- A. A judgment or order declaring that Defendant has infringed, induced others to infringe, and/or contributorily infringed the '272 Patent;
- B. A judgment, order, or award of damages adequate to compensate Hunts Point Ventures for Defendant's infringement of the '272 Patent, based on lost sales, lost profits, price erosion, loss of market share, or any other applicable theory, together with prejudgment interest from the date infringement of the '272 Patent began;
- C. Preliminary and permanent injunctions prohibiting further infringement, inducement, and contributory infringement of the '272 Patent;
- D. A finding that this case is exceptional and an award to Hunts Point Ventures of its attorneys' fees and costs as provided by 35 U.S.C. § 285;
- E. Increased damages as permitted by 35 U.S.C. § 284, together with prejudgment interest; and
- F. Such other and further relief as this Court or a jury may deem proper and just.

Dated December 22, 2011.

Respectfully Submitted,

NEWMAN DU WORS LLP

s/ Derek Linke

John Du Wors

Derek Linke

1201 Third Avenue, Suite 1600

Seattle, WA 98101

Telephone: (206) 274-2800

Facsimile: (206) 274-2801

john@newmanlaw.com

linke@newmanlaw.com

Attorneys for Plaintiff

Hunts Point Ventures, Inc.

(12) **United States Patent**
Gibbs et al.

(10) **Patent No.:** **US 7,574,272 B2**
(45) **Date of Patent:** **Aug. 11, 2009**

(54) **SYSTEM AND METHOD FOR DATA
TRANSFER OPTIMIZATION IN A PORTABLE
AUDIO DEVICE**

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(76) Inventors: **Eric Paul Gibbs**, 2918 NW. Esplanade
St., Seattle, WA (US) 98117; **Mark**
Edward Phillips, 3028 22nd Ave., West,
Seattle, WA (US) 98119

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 1333 days.

(21) Appl. No.: **09/975,749**

(22) Filed: **Oct. 10, 2001**

(65) **Prior Publication Data**

US 2002/0045961 A1 Apr. 18, 2002

Related U.S. Application Data

(60) Provisional application No. 60/240,776, filed on Oct.
13, 2000.

(51) **Int. Cl.**
G06F 17/00 (2006.01)

(52) **U.S. Cl.** **700/94**

(58) **Field of Classification Search** **700/94**
See application file for complete search history.

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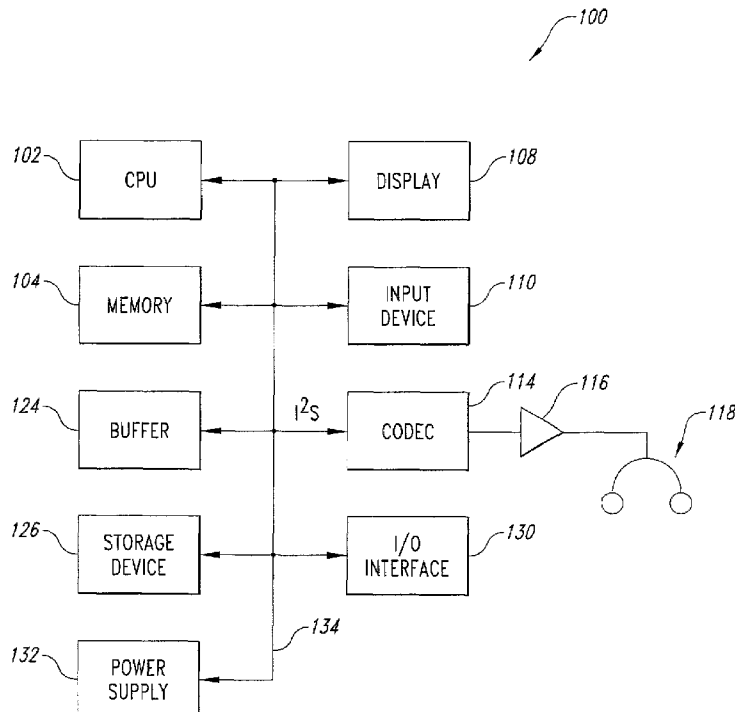
Primary Examiner—Daniel R. Sellers

(74) *Attorney, Agent, or Firm*—Bob Bergstrom; Mike
Donahue

(57) **ABSTRACT**

A system and method are disclosed wherein a battery-powered portable audio device utilizes a spinning media device for data storage. To conserve batter power, the motor in the media storage device is not powered unless an actual data transfer is required. A processor calculates the amount of data remaining in a data buffer and considers a number of factors, such as the type of spinning media storage device, amount of available buffer space, the type of CODEC used to implement the system, and the type of data to determine when it will be necessary to power up the spinning media storage device and transfer data to assure that a continuous stream of data is provided to the CODEC.

10 Claims, 7 Drawing Sheets



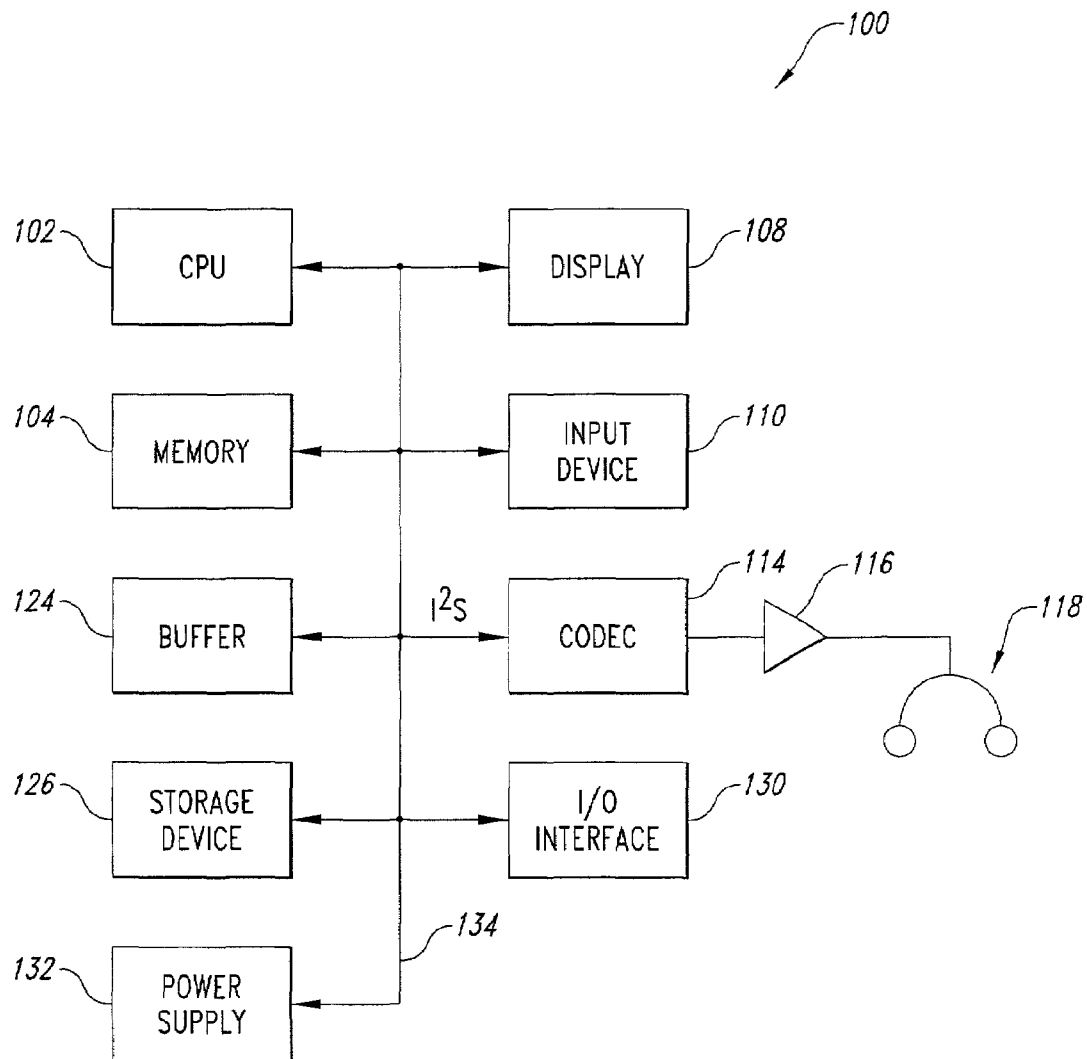


Fig. 1

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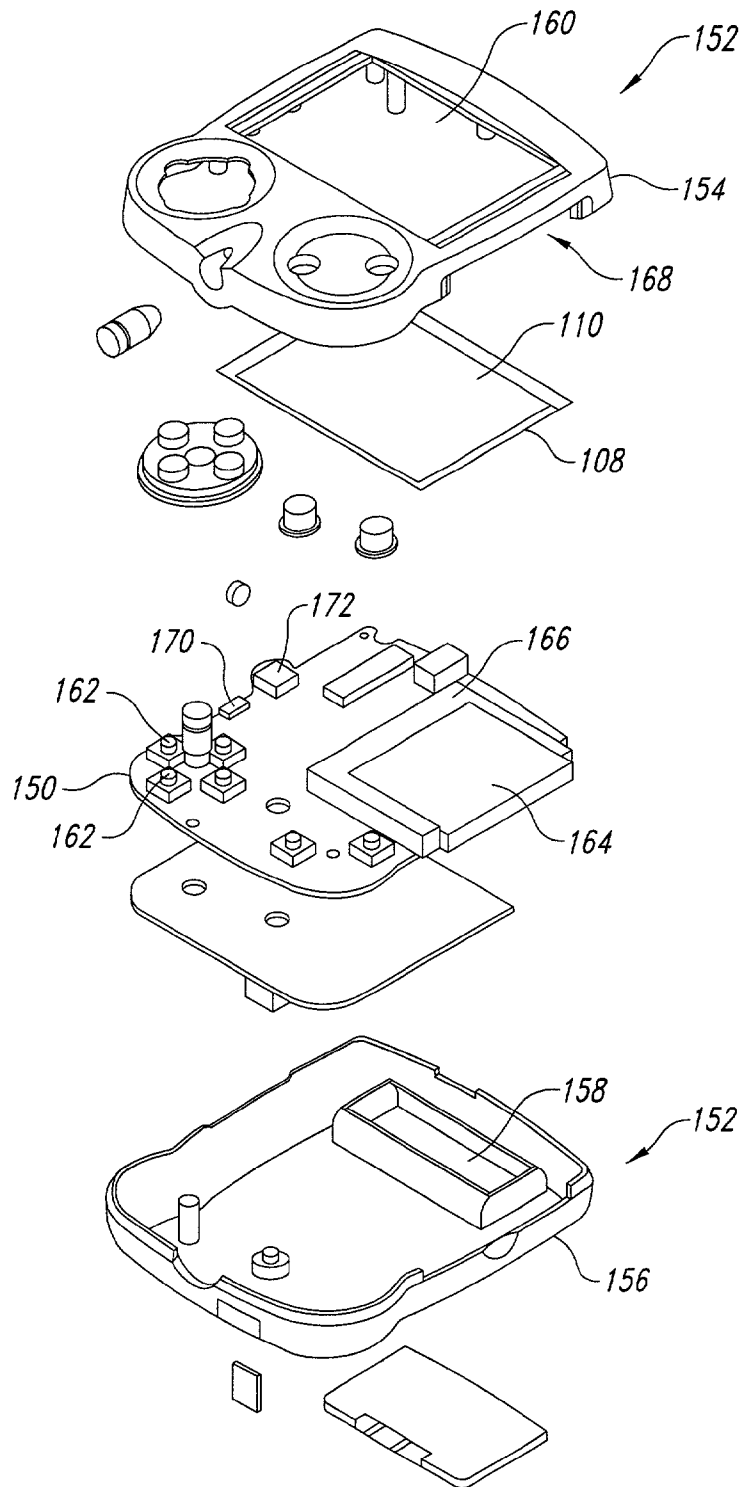


Fig. 2

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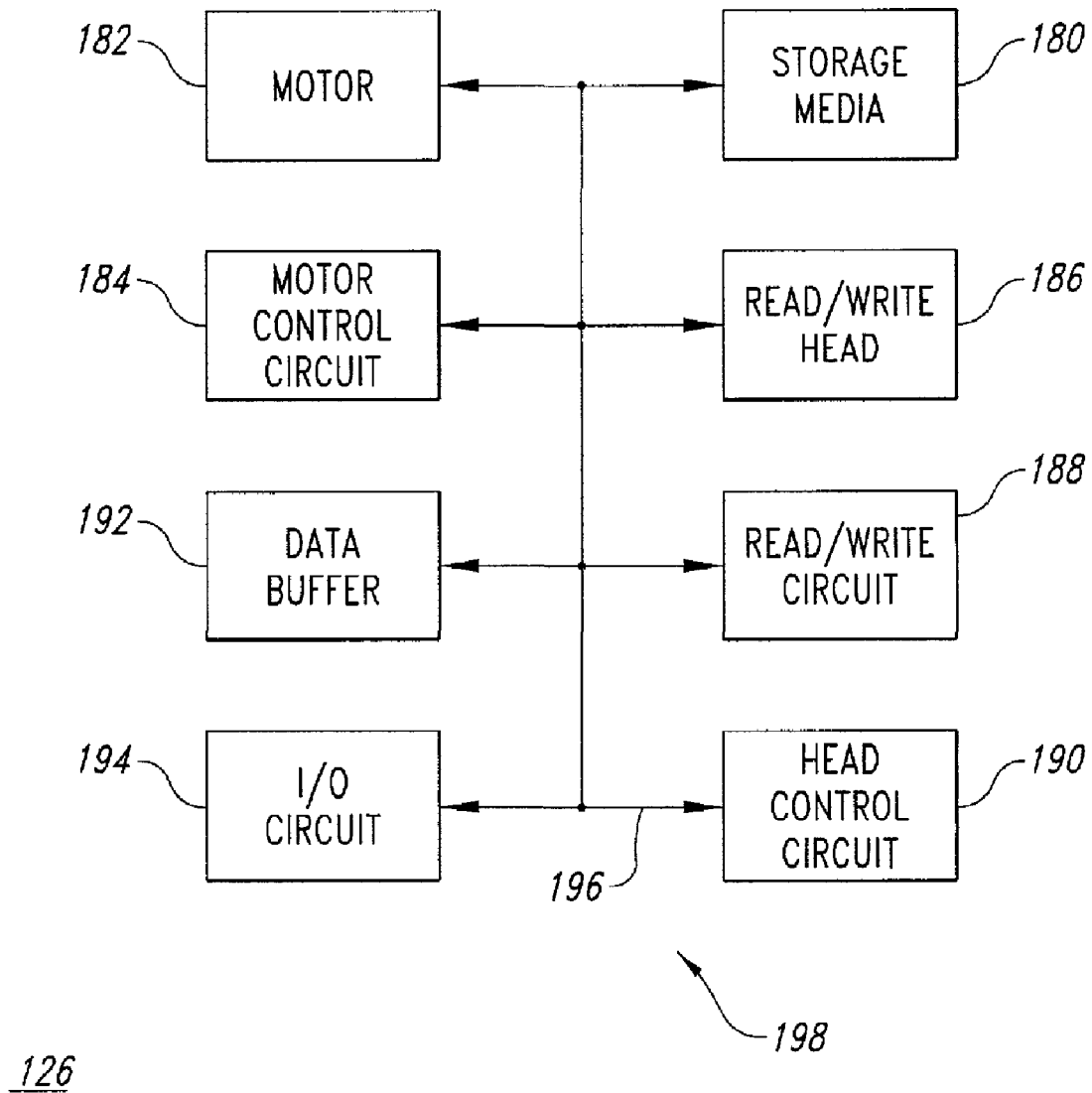


Fig. 3

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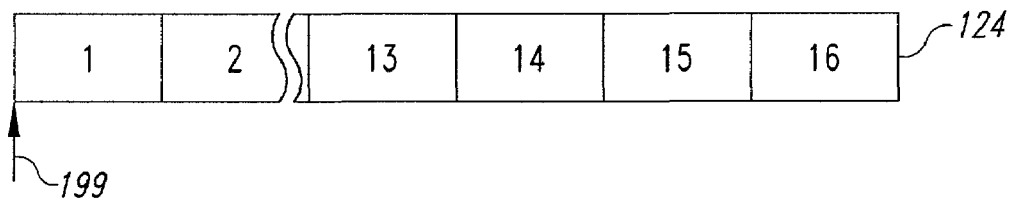


Fig. 4

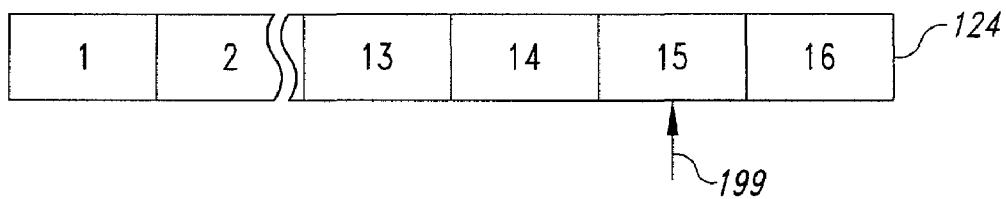


Fig. 5

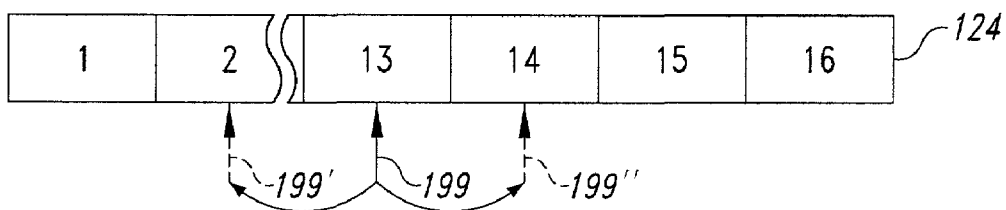


Fig. 6

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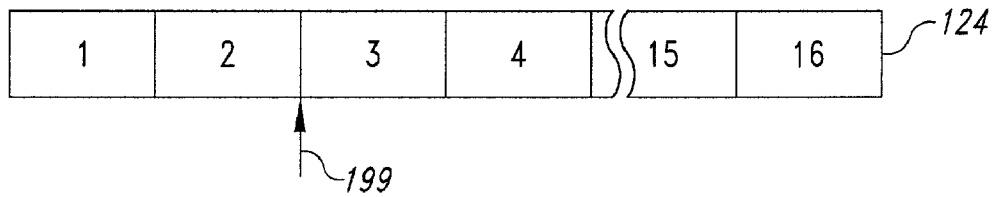


Fig. 7

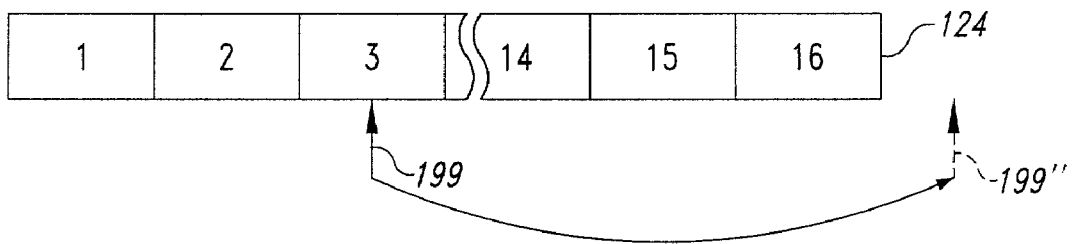


Fig. 8

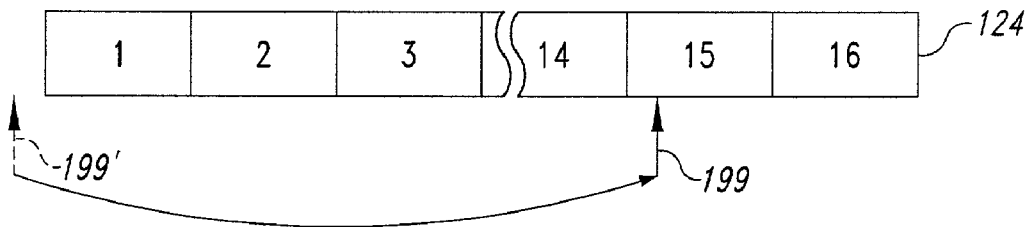
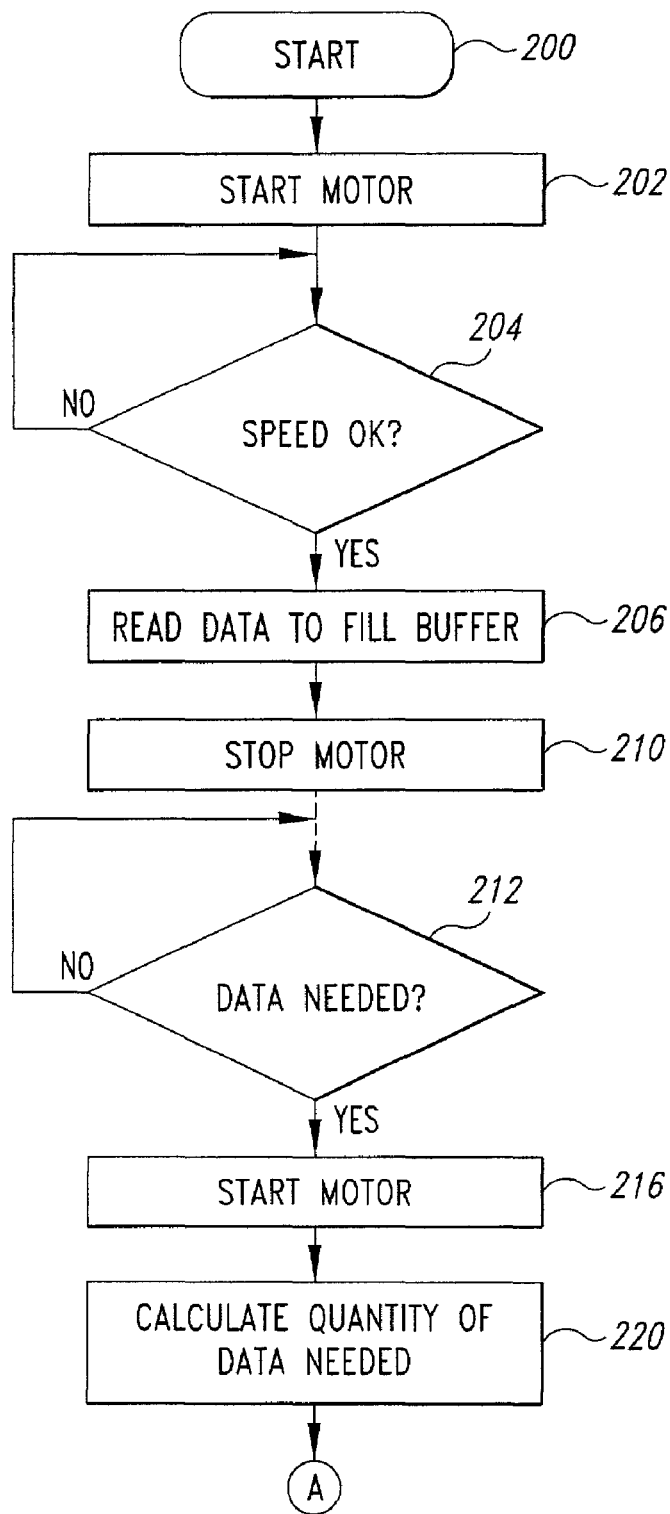


Fig. 9

*Fig. 10*

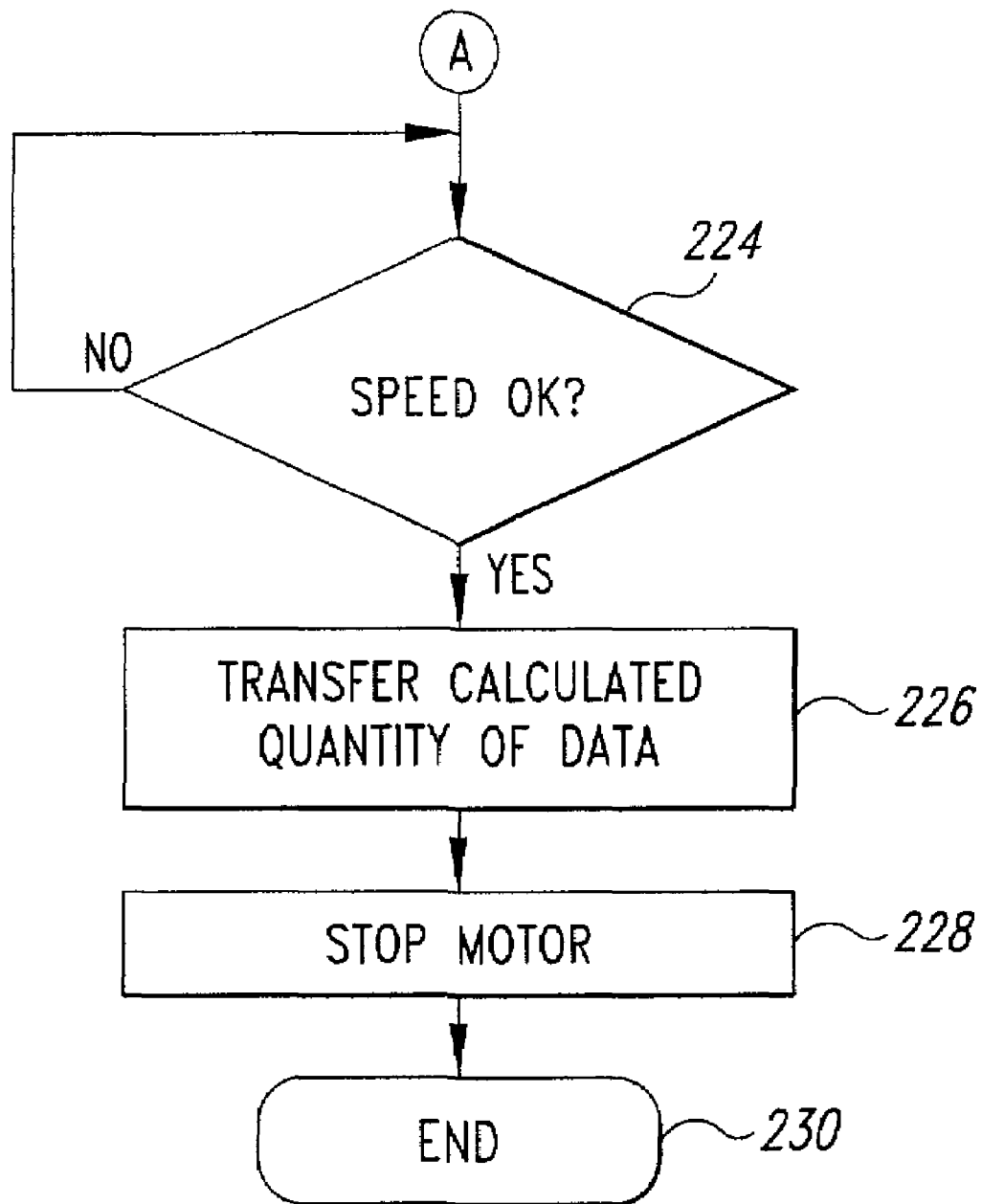


Fig. 11

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SYSTEM AND METHOD FOR DATA TRANSFER OPTIMIZATION IN A PORTABLE AUDIO DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application No. 60/240,776 filed Oct. 13, 2000, where this provisional application is incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present invention relates generally to portable audio devices and, more particularly, to a system and method for optimizing data transfer from a spinning media in a portable audio device.

BACKGROUND OF THE INVENTION

Portable devices have evolved from large cumbersome analog tape players to highly miniaturized digital storage devices. Early portable audio devices were typically in the form of analog tape players. Early tape players were large devices that required significant battery power for satisfactory operation. Analog tape players, such as the SONY Walkman™, provided a relatively compact device that played a standard audio cassette, required multiple batteries because of the power consumption required to drive the motor. Although these were popular devices, their large size and weight were a significant drawback. Similarly, portable disk players, capable of playing a compact disk (CD) were large and bulky. Portable CD players are also susceptible to vibration and require significant circuitry to avoid skipping.

More recently, portable digital devices have been designed to eliminate all moving parts. These devices incorporate solid state memory storage technology and utilize digital processing capabilities, such as data compression, to minimize the storage requirements. A popular music format, known as Motion Pictures Expert Group layer 3 (MPEG-1 layer 3) defines a digital music format that plays "near-CD quality" music from a relatively small digital file as compared to the original digital file stored on a CD. Indeed, a music data file using the data structure defined by MPEG-2 layer 3, sometimes abbreviated as MP3, is approximately one-tenth the size of a comparable data file on a CD. In addition, the solid state storage used in a typical MP3 player does not include a CD and thus is not susceptible to skipping. Furthermore, the solid state format of MP3 does not include a tape, such as required by a cassette player, and thus does not destroy the data storage device by "eating" the tape.

Despite these improvements, MP3 players have limited solid state storage capacity. Several different types of memory devices, such as flash memory, smart media, MMC, and the like, are used to provide storage. Other types of spinning media devices, such as hard disk drives and micro-drives, may be used to provide additional storage capacity for an MP3 player. However, the motor associated with such spinning media consumes a significant amount of power. This is a significant problem in a battery operated portable device. Accordingly, it can be appreciated that there is a significant need for a system and method for optimizing data transfer from a spinning media storage device. The present invention provides this and other advantages, as will be apparent from the following detailed description and accompanying figures.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a functional block diagram of an example embodiment of the present invention.

FIG. 2 is an exploded view of a device implementing the present invention.

FIG. 3 is a functional block diagram of a data storage device used in the implementation of the present invention.

FIGS. 4-9 are diagrams illustrating various buffering techniques used by an implementation of the present invention.

FIGS. 10 and 11 together form a flowchart illustrating the operation of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a technique for transferring data from a spinning storage media, such as a disk drive or micro-drive, in a portable audio device. As is known in the art, these portable devices are battery powered. The drive motors associated with spinning media storage devices consume significant amounts of electrical power from a limited capacity battery power supply. To conserve power, the present invention only periodically applies electrical power to the spinning media storage device. Because the storage device is only powered when a data transfer is required, the system must calculate when a transfer is required, activate the storage device motor, wait until the motor comes to the proper speed, and read an optimal amount of data from the spinning media into a storage buffer. As will be discussed in greater detail below, the quantity of data transferred each time the storage media motor is activated may vary from one disk transfer to the next so as to optimize the actual data transfer.

The present invention is embodied in a system 100, illustrated in the functional block diagram of FIG. 1. The system 100 includes a central processing unit (CPU) 102 and a memory 104. The CPU 102 may be implemented using a device, such as the ARM 7209 from Cirrus Logic or other processor designed for operation as an MP3 player. However, those skilled in the art will appreciate that the CPU 102 may be implemented using any convenient processor, such as a microprocessor, embedded controller, digital signal processor (DSP) or the like. The present invention is not limited by the specific form of the CPU 102. The memory 104 may typically include both random access memory (RAM) and read-only memory (ROM). In one embodiment, the ROM portion of the memory 104 may be implemented using a flash program memory or a NAND flash memory. In addition, the memory 104 includes a basic input output system (BIOS), which contains instructions that allow the CPU 102 to communicate with various peripheral devices.

In addition, the system 100 includes a display 108. In an exemplary embodiment, the display 108 is implemented as a liquid crystal display (LCD) to reduce overall power consumption. In one example, the display 108 may be a 240 by 160 pixel LCD subsystem, such as may be commercially purchased from a number of vendors. The display 108 may conveniently provide instructions to the user as well as programmable functions that may be context-sensitive. For example, when playing a music signal, the display 108 may provide commands associated with music playing, song information, and the like. For example, the display 108 may show the sampling rate and number of kilobytes in a particular data file. The display 108 may also include other information, such as power status, startup information, and the like.

The system 100 also includes an input device 110. The input device 110 may be implemented as a series of electro-mechanical switches using conventional techniques. Alterna-

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tively, the input device **110** may be implemented in conjunction with the display **108** to provide a touch-sensitive display. A touch-sensitive display advantageously minimizes the need for electromechanical switches and further provides labels on the display that may be readily altered to accommodate variations in the implementation of the system **100**. Alternatively, the input device **110** may comprise both electromechanical switches and a touch-sensitive display. Electromechanical switches and touch-sensitive displays are known in the art and need not be described in further detail herein. However, the present invention is not limited by the specific form of the input device **110**.

As those skilled in the art can appreciate, the data representing the audio signal is in the form of digital samples. The digital data must be converted to analog form to produce a useful signal for the user. The system **100** includes a coder/decoder (CODEC) **114**. The CODEC **114** is also sometimes referred to as a “compressor/decompressor” because the digital data samples are usually stored in a compressed form and are decompressed for playback. The CODEC **114** accepts a digital data stream and converts it to a representative analog signal. Different commercial CODECs are available for audio applications. Some CODECs, such as a code excited linear prediction (CELP) CODEC is designed for operations at relatively low frequencies and thus is particularly useful as a speech CODEC. Other forms of speech CODECs include adaptive delta modulation (ADM), pulse code modulation (PCM) and adaptive differential pulse code modulation (ADPCM). Other forms of CODECs are designed for operation at higher frequencies and thus are useful for music applications. These music CODECs include MPEG or MP3 CODECs, G2 format, developed by Real Networks, Enhanced Perception Audio Coder (ePAC), developed by Lucent, AC3 algorithm, which is a modified version of PCM, and Windows Media Audio (WMA), developed by the Microsoft Corporation. Some formats, such as the G2 format, may be used for both music and voice. Although the examples illustrated herein are directed to MP3 music format, those skilled in the art will recognize that the CODEC **114** illustrated in FIG. **1** may be satisfactorily implemented using any of the known CODEC technologies for either speech applications, music applications, or both. Thus, the present invention is not limited by the specific implementation of the CODEC **114**.

In an MP3 environment, the digital data is provided to the CODEC **114** using an I²S bus. The I²S bus is a high speed serial bus that is well known to those of ordinary skill in the art. As such, implementation details of the I²S bus need not be provided herein. The CODEC **114** receives the data on the I²S bus and converts it from digital data form to analog data. An analog amplifier **116** has an input terminal coupled to the output of the CODEC and receives the analog signal thereon. The amplifier **116** provides the necessary amplification and drive capability to power an audio output device **118**, such as a pair of headphones. It should be noted that in a typical implementation, the output of the amplifier **116** is coupled to a standard 1/8 inch phone jack **172** (see FIG. **2**). The headphones **118** plug into the phone jack **172**.

The system **100** also includes a buffer **124** that receives and temporarily stores digital data and provides the digital data to the CODEC **114**. As will be discussed below, the buffer **124** receives data from a storage device **126**. The buffer **124** may be a stand-alone device, or may be a portion of the memory **104**. The use of the buffer **124** in optimizing the response of the storage device **126** will be discussed below.

The storage device **126** is typically implemented as a spinning media device, such as a micro-drive, click drive, IDE drive, CD-ROMs, or the like. As will be discussed in detail

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below, the storage device **126** has a controllable motor that is only enabled when the system **100** requires a data transfer from the storage media. The optimization of the storage device **126** includes a determination of when to start the motor on the storage device to allow it to come up to full speed (i.e., start-up latency), and how long to maintain power to the motor so as to transfer the desired amount of data (i.e., a wake-up period). The length of a wake-up period may depend on a number of factors, including, but not limited to, the high speed transfer rate, the size of the buffer **124**, the type of CODEC **114**, power consumption to start and run the storage device **126**, error handling and data fragmentation.

The system **100** also may include an optional input/output (I/O) interface **130**. The system **100** may include any conventional form of I/O interface and may typically include a serial interface and/or a universal serial bus (USB) interface. The operation of a serial interface and USB interface are well-known in the art and need not be described in greater detail herein. Although illustrated as a single I/O interface **130**, those skilled in the art will recognize that the I/O interface **130** is intended to illustrate the function of one or more conventional interfaces.

A power supply **132** provides power to all of the components of the system **100**. In an exemplary embodiment, the power supply **132** comprises two or more AAA batteries. A voltage regulator (not shown) in the power supply **132** provides a regulated voltage of approximately 3.1 VDC. The power supply **132** may also include provisions, such as an external power supply jack **170** (see FIG. **2**), to permit the introduction of power from an external source, such as a cigarette lighter in an automobile, or the like.

The various components of the system **100** are coupled together by a bus system **134**. The bus system **134** may include a data bus, control bus, the I²S bus, a memory bus, and the like. However, for the sake of simplicity, these various buses are illustrated in FIG. **1** as the bus system **134**.

The system **100** is intended for portable operation. The various components described above are typically implemented as one or more integrated circuits on a printed circuit (PC) board **150**, as shown in FIG. **2**. The PC board **150**, power supply **132**, display **108**, input device **110**, and other components of the system **100** are enclosed in a case or housing **152**. The housing **152** is designed to be small enough to fit in a single hand of the user and thereby permit operation with the other hand of the user. The housing **152** may be readily manufactured in two pieces comprising an upper housing portion **154** and a lower housing portion **156**. The lower housing portion has a battery compartment **158** sized to receive and retain two AAA batteries. The upper housing portion **154** contains an aperture **160** sized to receive and retain the display **108**. In the embodiment illustrated in FIG. **2**, the display **108** is combined with a touch-sensitive screen as a portion of the input device **110**. In addition, the embodiment illustrated in FIG. **2** contains a plurality of electromechanical switches **162** that are also part of the functional block illustrated in FIG. **1** as the input device **110**. In the embodiment illustrated in FIG. **2**, four switches **162** may be positioned to form a “top hat” switch in which one or two of the four switches may be simultaneously activated to provide eight different switch combinations. FIG. **2** also illustrates a module **164** that may be inserted into a socket **166** mounted on the PC board **150**. The upper housing portion **154** contains a slot **168** in the side portion to permit the insertion and removal of the module **164**. In one embodiment, the module **164** may be a flash memory pack. Alternatively the module **164** may be a click-drive, such as manufactured by Iomega, that functions as the storage device **126**.

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In addition to the functional components illustrated in FIG. 1, the PC board 150 contains an external power supply jack 170 and an audio output jack 172. The external power supply jack 170 may be used to supplement the power provided by the AAA batteries. For example, the system may be used in an automobile or other vehicle by connecting a cigarette lighter adapter to the external power supply socket 170 to provide power directly from the vehicle. The audio output jack 172 is a conventional 1/8 inch stereo phone jack that is designed to receive a standard stereo mini-phone plug.

Returning again to FIG. 1, the storage device 126 is controlled by instructions stored in the memory 104 and executed by the CPU 102. The instructions serve to control the operation of the storage device 126. The storage device 126, which may be a CD-ROM, a micro-drive, a click drive, or the like, has a motor whose operation is controlled by the instructions from the CPU 102. FIG. 3 is a functional block diagram illustrating the components that comprise the storage device 126. The storage device 126 includes a storage media 180, such as a magnetic storage media or optical storage media. It should be noted that in some cases, the storage media 180 may be physically removed from the storage device 126, as in the case of a removable disk.

The storage device 126 comprises a motor 182 and motor controller 184. The motor 182 is a direct drive motor while the motor control circuit 184 controls the motor speed. Other conventional components, such as a read/write head 186, a read/write circuit 188, and a head control circuit 190, are also included in the storage device 126. The read/write head 186 contains a sensor, such as a magnetic sensor, to read and write data to and from the storage media 180. If the storage media 180 is an optical device, such as a CD-ROM, the read/write head 186 may be an optical device. If the storage media 180 is a read-only device, such as an optical CD-ROM, the read/write head 186 is replaced simply by a read head (not shown). The read/write circuit 188 contains conventional electronic circuitry to amplify the detected signal generated by the read/write head 186. The head control circuit 190 controls the position of the read/write head 186 and allows the read/write head to be positioned over the desired track on the storage media 180. The operation of the read/write head 186, read/write circuit 188 and head control circuit 190 are well-known in the art and need not be described in any greater detail herein.

In addition, the storage device 126 contains a data buffer 192 and an I/O circuit 194. The data buffer 192 temporarily stores data retrieved from the storage media 180 during a READ operation or stores data to be transferred to the storage media during a WRITE operation. The operation of the data buffer 192 is well-known and need not be described in any greater detail herein. The I/O circuit 194 is coupled to the bus system 134 (see FIG. 1) and controls the flow of data and command instructions between the storage device 126 and the CPU 102. The various portions of the storage device 126 may be coupled together by an internal bus system 196, which may comprise a power bus, data bus, control bus, or the like. For the sake of convenience, these busses are illustrated in FIG. 3 as the internal bus system 196. The storage device 126 is typically a commercial product, such as IDE hard drives or CD-ROMs from a number of different manufacturers, as well as microdrives and click-drives from companies, such as Microdrive, DataPlay, and Klik. The various components illustrated in FIG. 3, except for the storage media 180 itself, may be collectively referred to as a disk controller 198. As will be discussed in greater detail below, the disk controller receives data and commands from the CPU 102 to read and write data to the storage media 180. The BIOS portion of the

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memory 104 provides instructions to control access to a selected track and/or cylinder of the storage media 180.

The storage device 126 operates in a conventional manner to transfer data between the storage media 180 and the buffer 124. As those skilled in the art can appreciate, the motor 182 consumes a significant amount of power when active. Indeed, the motor 182 is the main source of power consumption in the system 100. Accordingly, the system 100 maintains the motor 182 in a deactivated state until a data transfer is required. As will be discussed below, the system 100 must determine when to start the motor 182 so as to read data at an appropriate time. This is particularly important in audio applications where it is undesirable to have a break in the audio output stream. The system 100 must determine ahead of time when data will be needed and start up the motor 182 in advance of the time when data will actually be needed so that data may be read from the storage media 180 and stored in the buffer 124 (see FIG. 1) for delivery to the CODEC 114.

In a conventional CD containing music, the digital data is uncompressed. The raw data file, sometimes referred to as a "Red Book Audio" file, consumes an extraordinary amount of storage space. In a conventional CD player, music is encoded at a sample rate of 44,100 Hertz per channel. A five minute sample of music would require more than 26 million samples (300 seconds times 44,100 samples per channel per second times 2 channels=26.46 million samples). A typical CODEC utilizes 16 bit stereo samples for a total of almost 53 million bytes of data (26.46 million samples times 2 bytes per sample) for a five minute selection of music. As can be appreciated, utilization of the Red Book Audio file requires significant storage capacity. However, many CODECs utilize a form of compression that greatly reduces the storage requirements. Although lossless compression may be possible, such compression is often limited in the overall reduction of storage requirements. For example, typical lossless compression may result in a 2:1 or 3:1 compression ratio. However, such lossless compression would still require 20-30 megabytes of storage for a five minute music sample. Other forms of compression do encounter some loss of information. However, such lossy compression has been satisfactorily implemented to eliminate portions of data samples that have little or no effect on the music heard by the user. MP3 compression is one such form of lossy compression. With MP3 format encoding, it is possible to achieve compression ratios of 10:1.

Although MP3 encoding is well-known in the art, the following brief description will assist in a better understanding of the present invention. MP3 systems process the Red Book Audio wave by dividing the acoustic signal into a series of wavelets or frames. Fourier transformation of the wavelets from the time domain to the frequency domain is applied and frequencies compared using predetermined masking rules to eliminate frequencies that humans cannot typically hear. In addition, frequencies whose energy levels fall below a certain decibel limit, such that they are inaudible to the typical human ear, are also removed. Furthermore, some CODECs check for redundant information between the two channels of a stereo signal to delete redundant information between the two channels. Following such a signal processing, MP3 uses Huffman encoding for each frame. Frame header information is prepended to the frame and the data stored in a file. This process is capable of achieving up to 10:1 compression ratio. The decoding process occurs in essentially the opposite order with Huffman decoding of the frequency data and an inverse Fourier transformation to return the frequency data to the time domain. Finally, specialized interpolations are performed between the data frames, in a process known as "windowing," to generate the desired output signal.

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As noted above, MP3 transforms data into a series of frames. For proper operation, MP3 requires fixed frame size of 384 bytes per frame with a frame equal to approximately 44 milliseconds. When the system 100 calculates a quantity of data needed in step 220, the CPU 102 takes into account that the CODEC 114 (see FIG. 1) requires complete frames. Accordingly, if the system 100 is implemented using MP3 format, the data will be transferred in complete frames. This requires the transfer of data in multiples of 384 bytes (plus the prepended header) such that only complete frames are transferred. In contrast, other data formats, such as windows media format (sometimes referred to as WMA) uses a variable bit rate and allows frames to be repeated if there is little change from the previous data frame. For example, during a slowly changing musical passage, data frames may change very little. The WMA format allows a variable bit rate and allows data frames to be repeated thus providing greater efficiencies in utilization of data. With such formatting, the system 100 can transfer a variable number of data bits from the storage media 180 (see FIG. 3) to the CPU 102.

The system 100 utilizes a number of different buffering strategies in order to optimize data transfer from the storage device 126. As previously discussed, the system 100 can dynamically allocate a number of different buffers when a particular application is instantiated. For example, the number of buffers, size of each buffer, and the number of full buffers to maintain are all variables that can be specified at the time an application is initially executed. This allows the behavior of the system to be tailored to the individual CODECs and the specific timing and efficiency requirements of each CODEC as well as the access time and data transfer rates of the storage device 126. In addition, as will be discussed in greater detail below, the system will maintain data in buffers for some period of time after the data has been transferred to the CODEC 114 to permit quick response to user requests to "Rewind" in the middle of a song.

In one example, illustrated in FIGS. 4-9, a number of buffers have been allocated for the storage of a music file. As those skilled in the art can appreciate, the data stored in the buffers can be of many different types of format. Accordingly, the following description will generically refer to data because the principles can be applied to any format. For simplicity, assume that a megabyte of storage is available for the buffer 124. Further, the buffer 124 may be readily broken down into a number of individual buffers. In the example, illustrated in FIGS. 4-9, the buffer 124 has been subdivided into sixteen separate buffers. For convenience in illustrating the principles of the present invention, the buffers 1-16 are illustrated as contiguous buffers within the buffer 124. However, those skilled in the art will recognize that the buffers 1-16 need not be contiguous. Furthermore, the buffers 1-16 are illustrated in FIGS. 4-9 as being of a single size, namely 64 Kbytes (64 Kbytes \times 16=1 megabyte). Having contiguous buffers of a convenient constant size, such as 64 Kbytes, may simplify the programming process for operation of the system 100. However, those skilled in the art will recognize that the buffers 1-16 need not be contiguous, nor need they be of uniform size.

When a particular music data file or track has been selected by the user, the system 100 will initially activate the storage device 126 to extract the data therefrom to fill the entire buffer 124. However, the system 100 need not wait until all 16 buffers are filled until music can be played via the CODEC 114 (see FIG. 1). For example, the system 100 can begin transferring data from the buffer 124 to the CODEC 114 as soon as buffer 1 is filled. Thus, buffers 2-16 will continue to receive data from the storage device while played out from the

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buffer 124 to the CODEC 114. As illustrated in FIG. 4, a pointer 199 indicates the current position within the buffer 124 where data is being read and transferred to the CODEC 114. The data pointer 199 is sometimes referred to as the "Read Point" for the buffer 124. As data is transferred from the buffer 124 to the CODEC 114, the read point 199 shifts to reflect the fact that data is being read out of the buffer 124.

In normal operation, the read point 199 will shift sequentially through buffers 1-16 as the music track is played out via the CODEC 114. At some point in time, the read point 199 will approach the end of the buffer 124, which will require the transfer of additional data from the storage device 126. As previously noted, the decision of when to activate the storage device 126 depends on factors such as the type of data file being played (e.g., music versus speech), the time for the motor 182 (see FIG. 3) to reach the proper speed, the data transfer rate of the storage device 126, and the like. FIG. 5 illustrates the activation of the storage device 126 when the read point 199 reaches a predetermined location in buffer 15. For example, at a sample rate of 48,000 samples per second (time two channels), the buffer 124 must supply data to the CODEC 114 at the rate of 96,000 bytes per second. Accordingly, in the example illustrated in FIGS. 4-9 where each of the buffers 1-16 is 64 Kbytes in length, a single one of the buffers 1-16 provides approximately 0.68 seconds of data for the CODEC 114. The time for the motor 182 to reach full speed when power is applied and the data transfer rate from the storage device 126 to the buffer 124 can be readily determined. Thus, a simple calculation will provide the system with the location of the read point 199 when the storage device 126 must be activated to provide more data to the buffer 124.

In a conventional application, the entire buffer would be refilled with data from the storage device 126. However, in many applications, the user may wish to backup or "Rewind" the device. If all the buffers 1-16 were refilled with new data, a rewind request from the user would require reactivation of the storage device 126 and the rebuffering of data for all of the buffers 1-16. To avoid such non-optimal utilization of the storage device 126, the system 100 can reserve a portion of the buffer preceding the read point 199. For example, FIG. 5 illustrates the position of the read point 199 in buffer 15 when the storage device 126 must be activated to replenish the data from buffers 1-14. However, rather than replenish all data from buffers 1-14, the system 100 may reserve, by way of example, two buffers of data preceding the read point 199. In the example illustrated in FIG. 5, the storage device 126 is activated when the read point 199 reaches a predetermined location in buffer 15. The system 100 may read sufficient data from the storage device 126 to fill buffers 1-12 of the buffer 124. Thus, buffers 13-14 contain approximately 1.25 seconds of data. Alternatively, the system 100 may extract data from the storage device 126 to fill buffers 1-14 on the presumption that the read point 199 will be almost at the end of buffer 16 by the time buffers 1-14 are filled with data from the storage device 126. Those skilled in the art will recognize that the number of buffers reserved for a rewind operation can be altered depending on the application. Accordingly, the present invention is not limited by the specific number of buffers utilized for a rewind operation.

In addition, the sixteen buffers illustrated in the examples of FIGS. 4-9 provide efficient buffered seek operations, such as, by way of example, rewind and fast forward operations. FIG. 6 illustrates an example of a fast forward and rewind operation in which the user is moving the read point 199 within the range of the buffered data. As illustrated in FIG. 6, the current read point is in buffer 13. In one example, the user

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activates the input device 110 (see FIG. 1) to "Rewind" the musical track to a point within buffer 2. In this example, the read point is moved to the desired location within buffer 2 as illustrated by the reference numeral 199'. Because the read point 199' is still within the range of the buffer 124, there is no need to rebuffer the entire contents of the buffer 124 since the CODEC 114 (see FIG. 1) will simply replay buffers 2-13 again. Thus, the system 100 realizes greater efficiency in data transfers and avoids the unnecessary activation of the motor 182 (see FIG. 3).

In the other example illustrated in FIG. 6, the user activates the input device 110 (see FIG. 1) in a "Fast Forward" operation. In the example illustrated in FIG. 6, the user has activated the input device 110 to fast forward to a location within buffer 14. The new read point, indicated by the reference numeral 199", is now at the user-selected location within buffer 14. Again, it is unnecessary to reload the entire contents of the buffer 124 simply to accommodate the fast forward operation. However, those skilled in the art will appreciate that the fast forward operation moves the read point 199" closer to the point in time where the contents of the buffer 124 must be refilled, as illustrated with respect to FIG. 5. Furthermore, the user may select a fast forward operation that moves the read point 199" past the location at which the storage device 126 must be activated in order to refill the contents of the buffer 124. In that case, it will be necessary to activate the storage device 126 immediately so as to refill the buffer. However, the system 100 has still realized greater efficiency in buffering by activating the storage device 126 only when necessary to fill large portions of the buffer 124. Fast forward and rewind operations to points within the buffer do not necessarily require activation of the storage device 126.

In other circumstances, the user may initially jump to a location in a musical track that is not at the beginning of the musical track. In that situation, the system 100 will activate the storage device 126 to fill the buffer 124 in the manner previously described. However, the system 100 may further allocate buffer space that precedes the user selected point in the musical track. This concept is illustrated in FIG. 7, where buffers 1-16 are filled with data but wherein the read point 199, which corresponds to the user-selected start point in the musical track, is set at the beginning of buffer 3. In this manner, buffers 1-2 contain data that will not be played unless the user activates the rewind operation, as discussed above. Rewind operations that move the read point to locations within buffers 1-2 are accomplished very quickly and do not require reactivation of the storage device 126. Fast forward operations are also accommodated in the manner described above. That is, fast forward operations that move the read point 199 to a location within the range of the buffer 124 are accomplished very quickly without activation of the storage device 126.

In other circumstances, the user may activate a fast forward operation to move the read point to a location beyond the range of the buffer 124. This is illustrated in FIG. 8 where the read point, indicated by the reference numeral 199", has been moved to a location beyond the range of buffer 16. If the new read point 199" is only slightly beyond the end of buffer 16, the system 100 can activate the storage device 126 to buffer ahead to the read point 199". This allows some of the already filled buffers to be maintained for possible use in a Rewind operation, as discussed above. However, the situation is limited by the latency of servicing the request (i.e., starting the motor 182, waiting for the motor 182 to reach operational speed, and transferring the data from the storage media 180).

If the new read point 199" is too far beyond the range of the buffer 124, none of the already filled buffers will be used in a

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Rewind operation. In this case, the system 100 will move the read pointer to the user selected location and fill the entire contents of the buffer in the manner illustrated in FIG. 7.

In other circumstances, the user may activate the input device 110 (see FIG. 1) to initiate a rewind operation that will move the read point 199 to a point prior in time to the range of the buffer 124. This is illustrated in FIG. 9 where the user-selected location of the read point, designated by the reference numeral 199', is earlier in time than the range of data contained in buffer 1. In this example, the system 100 activates the storage device 126 to "Backfill" data into the buffer 124. However, the system 100 need not load the entire contents of the buffer 124 to accommodate this request. FIG. 9 illustrates an example where the read point 199' is just before the range of buffer 1. In this example, the system 100 can backfill one or more buffers to provide data at least as far back as the new read point 199'. The system may provide additional buffering to accommodate future rewind requests by the user, as described above with respect to FIG. 7. However, the system 100 need not reload the entire contents of the buffer 124. In the example illustrated in FIG. 9, the read point 199 is moved from buffer 15 to a location just prior to the range of buffer 1. In one example, a single buffer of data (preceding buffer 1 in time) must be reloaded to accommodate the rewind requests from the user. However, the contents of buffers 1-15 (which may be relabeled as labels 2-16 for the sake of convenience) need not be reloaded since they will be transferred to the CODEC 114 (see FIG. 1) without having to reactivate the storage device 126.

In a further example to illustrate this concept, consider the total storage capacity of the buffer 124 as 1 megabyte and the user requests a location that is 600 Kbytes prior to the current range of the buffer 124. In this example, the storage device 126 (see FIG. 1) is activated to fill the 600 kilobytes of buffer space. However, the remaining 400 kilobytes of buffer space need not be reloaded since that data falls within the range of the buffer 124 and will be reused in the near future (barring possible additional rewind or fast forward operations).

Thus, the buffering techniques provided by the system 100 efficiently utilizes buffer space and minimizes operations that require the activation of the storage device 126.

Part of the efficiency provided by the buffering techniques of the system 100 is that only one buffer is "Locked" for a reading to the CODEC 114 while the other buffers are available for read/write operations. In the examples illustrated in FIGS. 4-9, sixteen buffers are allocated as part of the buffer 124. Thus, only $\frac{1}{16}$ of the total buffer space is locked for data transfer to the CODEC 114 and is thus unavailable for other read/write operations. However, the remaining $\frac{15}{16}$ of the total buffer space are available to be filled each time the storage device 126 is activated. Such operation is in sharp contrast to a typical buffering operation in which a buffer is allocated into two portions with only one-half of the buffer space available for read/write operations while the other half of the buffer space is locked for data transfer operations to the CODEC.

The process of reading data from the storage media is illustrated in flowchart of FIGS. 10 and 11 where, at a start 200, the system is already under power. For example, the user may have elected to play a music selection stored on the storage media 180. In step 202, the CPU 102 (see FIG. 1) sends commands to the storage device 126 to start the motor 182 (see FIG. 3). In decision 204, the motor control circuit 184 determines whether the motor speed is satisfactory. As those skilled in the art can appreciate, the motor takes a brief predetermined period of time to reach operating speed. This time can be readily determined and, as will be discussed

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below, is one factor used to determine when to start the motor to read additional data from the storage media **180**. If the motor speed is not satisfactory, the result of decision **204** is NO and the system **100** returns to decision **204** until the motor has reached its operational speed. When the motor has reached its correct operational speed, the result of decision **204** is YES and in step **206**, the disk controller **198** reads a sufficient amount of data to fill the buffer **124**.

After sufficient data has been read from the storage media **180** to fill the buffer **124**, the motor is stopped in step **210**. As noted above, this significantly reduces the power consumption of the system **100** thereby significantly extending the life of the AAA batteries that comprise the power supply **132** (see FIG. 1).

There are a number of factors considered by the system **100** in determining when to start the motor again and read additional data from the storage media **180**. Among these factors are the time it takes to start the motor and bring it up to normal operational speed, the size of the buffer **124** and the amount of available space in the buffer and the type of audio data being generated by the system. For example, music data is played at very high rates by the CODEC **114**. Thus, the data in the buffer **124** is rapidly transferred to the CODEC **114**. In contrast, speech data is provided to the CODEC **114** at a significantly lower data transfer rate. Accordingly, it is possible to wait until the buffer **124** is nearly empty before starting the motor **182** if the data being transferred to the CODEC is speech data. In contrast, the motor **182** must be started much earlier if the data being transferred to the CODEC **114** is music data.

In decision **212**, the system **100** determines whether additional data is needed. As noted above, the system **100** takes many factors into account to determine precisely when data is needed. While this includes normal data transfer from the buffer **124** to the CODEC **114** (see FIG. 1), as illustrated in FIGS. 4 and 5, the process illustrated in decision **212** includes the various buffering strategies described above with respect to FIGS. 4-9. If data is not presently needed, the result of decision **212** is NO and the system **100** returns to decision **212** until additional data is needed. At a time when additional data is needed, the result of decision **212** is YES. In step **216**, the CPU **102** (see FIG. 1) sends instructions to the disk controller **198** (see FIG. 3) to start the motor **182**.

In step **220**, the system **100** determines the quantity of data that will be required by the present disk transfer operation. It should be noted that step **220** may be executed after starting the motor **182** while waiting for the motor to reach proper operational speed. Alternatively, the calculation performed in step **220** may be done prior to starting the motor **182** or after the motor reaches operational speed. Those skilled in the art will appreciate that the quantity of data being transferred may vary depending on the point in time at which such calculation is made.

The quantity of data needed, which is calculated in step **220**, takes into account the amount of space available in the buffer **124** (see FIG. 1), the type of CODEC **114**, the type of drive (micro-drive versus click drive) and dynamically allocates buffers and buffer sizes. The system can allocate up to eight or more buffers to accommodate data transfers. For example, some drives are capable of transferring 512 K blocks of data. Under these circumstances, the system **100** will allocate sufficient number of buffers in the buffer **124** to accommodate the large block transfer size. Thus, the system **100** advantageously considers a number of variable factors in determining how much data to transfer and when such data transfers are required.

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When the system has calculated the quantity of data required and started the motor (see step **216**), the system moves to step **224**, illustrated in FIG. 11 to determine whether the motor **182** (see FIG. 3) has reached the proper speed. If the motor **182** has not reached the proper speed, the result of decision **224** is NO and the system returns to decision **224** until the motor achieves the proper speed. When the motor **182** has reached the appropriate speed, the result of decision **224** is YES and, in step **226**, the system **100** transfers the required amount of data from the storage media **180** to the buffer **124**. In step **228**, the CPU sends instructions to the disk controller **198** (see FIG. 3) to stop the motor **182**. The data retrieval process ends at **230**. At this point, the buffer **124** (see FIG. 1) has sufficient data such that the CODEC **114** receives a stream of data for conversion to analog form. The processing steps performed by the CODEC **114** to convert data stored in the buffer **124** is known in the art, and need not be described in greater detail herein. As noted above, different forms of CODECs are known in the industry and may be satisfactorily substituted into the system **100**. That is, the CODEC **114** may be selected for speech production, music production, or a combination of the two. The specific algorithms used by the CODEC are known in the art and need not be described herein.

From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

What is claimed is:

1. A portable media player comprising:

a processor that executes commands;

a random-access-memory component that stores compressed data in more than two different random-access-memory buffer areas, each random-access-memory buffer lockable and unlockable by the processor;

a codec component, controlled by the processor, that reads compressed data from a locked random-access-memory buffer, the locked random-access-memory buffer selected from among the more than two different random-access-memory buffer areas and locked by the processor to prevent writing of the locked random-access-memory buffer by another component, and that generates a decompressed signal from the read compressed data that is rendered by a data-rendering component;

a non-volatile, mass-storage component that stores compressed data and that writes compressed data, under control of the processor, to unlocked random-access-memory buffers; and

a battery power supply to provide electrical power to the processor, random-access memory component, codec component, data-rendering component, and non-volatile, mass-storage component.

2. The portable media player of claim 1 wherein the processor continuously monitors progress of the codec component in decompressing data in order to:

power up the non-volatile, mass-storage component;

direct the non-volatile, mass-storage component to write additional compressed data to multiple random-access-memory buffers and redirect the codec component to read the additional compressed data from the multiple random-access-memory buffers so that the codec component can continue to generate a decompressed signal without interruption; and

power-down the non-volatile, mass-storage component.

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3. The portable media player of claim 2 wherein the processor, following reception of a fast-forward command that redirects rendering, by the data-rendering component, of compressed data starting at a desired location within a compressed-data sequence not currently stored within the more than two different random-access-memory buffer areas, directs the non-volatile, mass-storage component to write compressed data, starting at a location prior to the desired location in the compressed-data stream and ending at a location following the desired location in the compressed-data stream, to multiple random-access-memory buffers.

4. The portable media player of claim 2 wherein the processor, following reception of a rewind command that redirects rendering, by the data-rendering component, of compressed data starting at a desired location within a compressed-data sequence not currently stored within the more than two different random-access-memory buffer areas, directs the non-volatile, mass-storage component to write compressed data, starting at a location prior to the desired location in the compressed-data stream and ending at a location following the desired location in the compressed-data stream, to multiple random-access-memory buffers.

5. The portable media player of claim 2 wherein the processor, following reception of a rewind command that redirects rendering, by the data-rendering component, of compressed data starting at a desired location within a compressed-data sequence not currently stored within the more than two different random-access-memory buffer areas,

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directs the non-volatile, mass-storage component to write compressed data, starting at a location prior to the desired location in the compressed-data stream and ending at a location at which subsequent compressed-data of the compressed-data sequence is already stored in the more than two different random-access-memory buffer areas, to multiple random-access-memory buffers.

6. The portable media player of claim 2 wherein the processor, following reception of a fast-forward command, predicts portions of a compressed-data sequence that are likely to be accessed by additional fast-forward commands and directs the non-volatile, mass-storage component to write predicted portions of the compressed data to multiple random-access-memory buffers.

7. The portable media player of claim 2 wherein the processor minimizes the number of times that the processor powers up the non-volatile, mass-storage component.

8. The portable media player of claim 2 wherein the processor minimizes the duration of time during which the non-volatile, mass-storage component is powered up.

9. The portable media player of claim 2 wherein the processor locks only a single random-access-memory buffer at any point in time.

10. The portable media player of claim 2 wherein the compressed data is a compressed audio signal; and the decompressed signal is a decompressed audio signal.

* * * * *

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
filed in the U.S. District Court _____ on the following

☐ Trademarks or ☐ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
PLAINTIFF		DEFENDANT
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

I. (a) PLAINTIFFS

(b) County of Residence of First Listed Plaintiff _____
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorney's (Firm Name, Address, and Telephone Number)

DEFENDANTS

County of Residence of First Listed Defendant _____
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE LAND INVOLVED.

Attorneys (If Known)

II. BASIS OF JURISDICTION (Place an "X" in One Box Only)

- ☐ 1 U.S. Government Plaintiff
- ☐ 2 U.S. Government Defendant
- ☐ 3 Federal Question
(U.S. Government Not a Party)
- ☐ 4 Diversity
(Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant)

- | | PTF | DEF | | PTF | DEF |
|---|----------------------------|----------------------------|--|----------------------------|----------------------------|
| Citizen of This State | <input type="checkbox"/> 1 | <input type="checkbox"/> 1 | Incorporated <i>or</i> Principal Place of Business In This State | <input type="checkbox"/> 4 | <input type="checkbox"/> 4 |
| Citizen of Another State | <input type="checkbox"/> 2 | <input type="checkbox"/> 2 | Incorporated <i>and</i> Principal Place of Business In Another State | <input type="checkbox"/> 5 | <input type="checkbox"/> 5 |
| Citizen or Subject of a Foreign Country | <input type="checkbox"/> 3 | <input type="checkbox"/> 3 | Foreign Nation | <input type="checkbox"/> 6 | <input type="checkbox"/> 6 |

IV. NATURE OF SUIT (Place an "X" in One Box Only)

CONTRACT	TORTS	FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES
<input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excl. Veterans) <input type="checkbox"/> 153 Recovery of Overpayment of Veteran's Benefits <input type="checkbox"/> 160 Stockholders' Suits <input type="checkbox"/> 190 Other Contract <input type="checkbox"/> 195 Contract Product Liability <input type="checkbox"/> 196 Franchise	PERSONAL INJURY <input type="checkbox"/> 310 Airplane <input type="checkbox"/> 315 Airplane Product Liability <input type="checkbox"/> 320 Assault, Libel & Slander <input type="checkbox"/> 330 Federal Employers' Liability <input type="checkbox"/> 340 Marine <input type="checkbox"/> 345 Marine Product Liability <input type="checkbox"/> 350 Motor Vehicle <input type="checkbox"/> 355 Motor Vehicle Product Liability <input type="checkbox"/> 360 Other Personal Injury	PERSONAL INJURY <input type="checkbox"/> 362 Personal Injury - Med. Malpractice <input type="checkbox"/> 365 Personal Injury - Product Liability <input type="checkbox"/> 368 Asbestos Personal Injury Product Liability PERSONAL PROPERTY <input type="checkbox"/> 370 Other Fraud <input type="checkbox"/> 371 Truth in Lending <input type="checkbox"/> 380 Other Personal Property Damage <input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 422 Appeal 28 USC 158 <input type="checkbox"/> 423 Withdrawal 28 USC 157 PROPERTY RIGHTS <input type="checkbox"/> 820 Copyrights <input type="checkbox"/> 830 Patent <input type="checkbox"/> 840 Trademark SOCIAL SECURITY <input type="checkbox"/> 861 HIA (1395ff) <input type="checkbox"/> 862 Black Lung (923) <input type="checkbox"/> 863 DIWC/DIWW (405(g)) <input type="checkbox"/> 864 SSID Title XVI <input type="checkbox"/> 865 RSI (405(g)) FEDERAL TAX SUITS <input type="checkbox"/> 870 Taxes (U.S. Plaintiff or Defendant) <input type="checkbox"/> 871 IRS—Third Party 26 USC 7609	<input type="checkbox"/> 400 State Reapportionment <input type="checkbox"/> 410 Antitrust <input type="checkbox"/> 430 Banks and Banking <input type="checkbox"/> 450 Commerce <input type="checkbox"/> 460 Deportation <input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations <input type="checkbox"/> 480 Consumer Credit <input type="checkbox"/> 490 Cable/Sat TV <input type="checkbox"/> 810 Selective Service <input type="checkbox"/> 850 Securities/Commodities/Exchange <input type="checkbox"/> 875 Customer Challenge 12 USC 3410 <input type="checkbox"/> 890 Other Statutory Actions <input type="checkbox"/> 891 Agricultural Acts <input type="checkbox"/> 892 Economic Stabilization Act <input type="checkbox"/> 893 Environmental Matters <input type="checkbox"/> 894 Energy Allocation Act <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 900 Appeal of Fee Determination Under Equal Access to Justice <input type="checkbox"/> 950 Constitutionality of State Statutes
REAL PROPERTY <input type="checkbox"/> 210 Land Condemnation <input type="checkbox"/> 220 Foreclosure <input type="checkbox"/> 230 Rent Lease & Ejectment <input type="checkbox"/> 240 Torts to Land <input type="checkbox"/> 245 Tort Product Liability <input type="checkbox"/> 290 All Other Real Property	CIVIL RIGHTS <input type="checkbox"/> 441 Voting <input type="checkbox"/> 442 Employment <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 444 Welfare <input type="checkbox"/> 445 Amer. w/Disabilities - Employment <input type="checkbox"/> 446 Amer. w/Disabilities - Other <input type="checkbox"/> 440 Other Civil Rights	PRISONER PETITIONS <input type="checkbox"/> 510 Motions to Vacate Sentence Habeas Corpus: <input type="checkbox"/> 530 General <input type="checkbox"/> 535 Death Penalty <input type="checkbox"/> 540 Mandamus & Other <input type="checkbox"/> 550 Civil Rights <input type="checkbox"/> 555 Prison Condition	LABOR <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Mgmt. Relations <input type="checkbox"/> 730 Labor/Mgmt. Reporting & Disclosure Act <input type="checkbox"/> 740 Railway Labor Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Empl. Ret. Inc. Security Act IMMIGRATION <input type="checkbox"/> 462 Naturalization Application <input type="checkbox"/> 463 Habeas Corpus - Alien Detainee <input type="checkbox"/> 465 Other Immigration Actions	

V. ORIGIN

(Place an "X" in One Box Only)

- ☐ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from another district (specify) ☐ 6 Multidistrict Litigation ☐ 7 Appeal to District Judge from Magistrate Judgment

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):

Brief description of cause:

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23

DEMAND \$

CHECK YES only if demanded in complaint:

JURY DEMAND: ☐ Yes ☐ No

VIII. RELATED CASE(S) IF ANY

(See instructions):

JUDGE

DOCKET NUMBER

DATE

SIGNATURE OF ATTORNEY OF RECORD

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44**Authority For Civil Cover Sheet**

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

I. (a) Plaintiffs-Defendants. Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.

(b) County of Residence. For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)

(c) Attorneys. Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".

II. Jurisdiction. The basis of jurisdiction is set forth under Rule 8(a), F.R.C.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.

United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.

United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.

Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.

Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below; federal question actions take precedence over diversity cases.)

III. Residence (citizenship) of Principal Parties. This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.

IV. Nature of Suit. Place an "X" in the appropriate box. If the nature of suit cannot be determined, be sure the cause of action, in Section VI below, is sufficient to enable the deputy clerk or the statistical clerks in the Administrative Office to determine the nature of suit. If the cause fits more than one nature of suit, select the most definitive.

V. Origin. Place an "X" in one of the seven boxes.

Original Proceedings. (1) Cases which originate in the United States district courts.

Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441. When the petition for removal is granted, check this box.

Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.

Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.

Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.

Multidistrict Litigation. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407. When this box is checked, do not check (5) above.

Appeal to District Judge from Magistrate Judgment. (7) Check this box for an appeal from a magistrate judge's decision.

VI. Cause of Action. Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553
Brief Description: Unauthorized reception of cable service

VII. Requested in Complaint. Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.

Demand. In this space enter the dollar amount (in thousands of dollars) being demanded or indicate other demand such as a preliminary injunction.

Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.

VIII. Related Cases. This section of the JS 44 is used to reference related pending cases if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.

AO 440 (Rev. 12/09) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

_____ District of _____

Plaintiff

v.

Defendant

)
)
)
)
)
)
)

Civil Action No. _____

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)*

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are:

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

CLERK OF COURT

Date: _____

Signature of Clerk or Deputy Clerk

Civil Action No. _____

PROOF OF SERVICE*(This section should not be filed with the court unless required by Fed. R. Civ. P. 4 (l))*

This summons for *(name of individual and title, if any)* _____
 was received by me on *(date)* _____.

☐ I personally served the summons on the individual at *(place)* _____
 _____ on *(date)* _____; or

☐ I left the summons at the individual's residence or usual place of abode with *(name)* _____
 _____, a person of suitable age and discretion who resides there,
 on *(date)* _____, and mailed a copy to the individual's last known address; or

☐ I served the summons on *(name of individual)* _____, who is
 designated by law to accept service of process on behalf of *(name of organization)* _____
 _____ on *(date)* _____; or

☐ I returned the summons unexecuted because _____; or

☐ Other *(specify)*: _____.

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ _____.

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc: