South Bridge and Codec to play the musical selections (or other stored audio) desired by the user. The mini-OS software of the present invention performs only those functions and enables those elements of the portable computer that are needed, when they are needed, to play the selected music, without performing all of the background functions performed by the full system operating system, e.g., Windows®, and without accessing the monitor circuitry and monitor screen of the portable computer. Additionally, the mini-OS of the present invention only accesses the HDD when compressed files are being transferred to RAM. Thus, it will be seen that the mini-OS software portion of the present invention performs both power saving and file management functions when playing audio.

[0030] **FIG. 1** is a block diagram representation of the operational flow of the exemplary software compressed audio player in one embodiment of the present invention.

[0031] The operational concept illustrated in **FIG. 1** is as follows:

[0032] 1st: A browser, running on a full system operating system, e.g., Windows®, of the portable computer is initially used to download compressed music files (for example 1000 songs) onto the PC hard disk drive (HDD) **(2)** (e.g., using 4 gigabytes of HDD space) at some time prior to the time at which the user desires to use the portable computer as an audio player and a playlist is created, comprising the songs the user desires to hear at a later time;

[0033] 2nd: When the user desires to use the portable computer as an audio player, once the desired music files are on the HDD, the user operates an audio player on-switch to turn the portable computer fully on, boot up the entire computer, load in the mini-OS of the present invention instead of the usual Microsoft Windows® OS (the full system operating system is not opened) with the power saving initialization subroutines and initializes only those portions of the portable computer as necessary, and the file management subroutines initialize the song play list or book generated in step 1, of a substantial number of songs, for desired music listening under direction of the user;

[0034] 3rd: The mini-OS software is then copied from the HDD **(2)** to RAM **(4)**, and then the first set of compressed files from the song play list is copied from the HDD **(2)** to the system RAM **(4)** also using the mini-OS software of the present invention. For example, in today's PC's 128 Mbytes is a typical system RAM size, with the mini-OS software of the present invention taking about 8 Mbytes of the RAM, leaving approximately 120 Mbytes for use as a compressed music memory (i.e., a cache or buffer, using system memory, dedicated memory, or other memory). That 120 Mbytes represents about 2 hours of continuous compressed music with a compression ration of 10:1, typical of MP3 files. Similarly, in the case when flash media is used for MP3 storage, all or most of the contents of the flash media card can be copied to the system RAM **(4)**, thus minimizing the access of the flash media reader and allowing for a more responsive control over the MP3 files;

[0035] 4th : The file management software of the present invention sequentially delivers portions of the first music file to the CPU **(6)** where the decode algorithm decompresses each file using the file management software of the present invention stored in RAM **(4)**. Once decoded, the PCM audio data is transferred in one of three ways: the CPU delivers the PCM audio data to the South Bridge (see **FIG. 3 (32)**) FIFO buffer; the DMA in the South Bridge transfers the data internally within the South Bridge to the FIFO buffer; or the special purpose circuit transfers the data to the FIFO buffer from the LPC interface. The FIFO buffer then sequentially feeds each piece of decoded music to Codec **(8)** (also see **FIG. 3 (42)**), through the special purpose circuit of the present invention, where the decoded signal is converted from digital to analog. Then the output signal from the Codec **(8)** is amplified **(10)** (also see **FIG. 3 (44)**) to drive the speakers and/or headset (see **FIG. 3 (46)**).

[0036] 5th: While the final song of the first set from the play list is playing from memory, the file management software of the present invention stored in the RAM **(4, 30)** returns control to the 4th step to retrieve the next set of compressed music files from the memory of the RAM, as determined by the earlier scripted song play list developed in the 1st step. Thus, the 4th and 5th steps are repeated for each set of compressed music files until the last music selection in the set plays. At that point in time control returns to the 3rd step to load another set from the play list, which is similarly played through the 4th and 5th steps. When the last song is played from the overall play list of the 2nd step, or when the user turns off the music player function, the operation of the player ceases.

[0037] The mini-OS power saving software of the present invention ensures that the CPU, Peripheral Chips, HDD and other controllable system elements will be in idle state for the highest percentage time possible. An interesting attribute of the solution offered by the present invention is that the higher the MIPS (Million Instructions Per Second) capacity of the CPU, the smaller percentage of time the CPU will spend performing the decode function. This means that higher performance CPU's will demonstrate even lower power usage when playing compressed music performances, thus saving even more battery power and further extending the length of time that the battery maintains sufficient charge to power the portable computer.

[0038] The mini-OS monitors the audio control buttons (e.g., play, fast forward, rewind, pause, scan, previous track, next track, first track, last track, fast forward/rewind while listening, audio source/media select (e.g., HDD or CD), etc.) (see **FIG. 3 (48)**) for user actuation through the special purpose circuit (see **FIG. 3 (40)**) of the present invention, and communicates user requests to the mini-OS file management software of the present invention. Optionally, a small LCD display (see **FIG. 3 (34)**) can be connected to the special purpose circuit to provide visual status indicators (e.g., Song #, Song titles, track #, Playtime & icons) under control of the mini-OS display management subroutines.

[0039] The mini-OS power saving software of the present invention primarily manages the usage of the CPU, and the MP3 storage devices such as CD, HDD, and flash media