players, video players, video recorders, cameras, and the like. In some cases, the media players contain single functionality (e.g., a media player dedicated to playing music) and in other cases the media players contain multiple functionality (e.g., a media player that plays music, displays video, stores pictures and the like). In either case, these devices are generally portable so as to allow a user to listen to music, play games or video, record video or take pictures wherever the user travels.

[0072] In one embodiment, the media player **100** is a handheld device that is sized for placement into a pocket of the user. By being pocket sized, the user does not have to directly carry the device and therefore the device can be taken almost anywhere the user travels (e.g., the user is not limited by carrying a large, bulky and often heavy device, as in a laptop or notebook computer). For example, in the case of a music player, a user may use the device while working out at the gym. In case of a camera, a user may use the device while mountain climbing. In the case of a game player, the user can use the device while traveling in a car. Furthermore, the device may be operated by the users hands, no reference surface such as a desktop is needed (this is shown in greater detail in **FIG. 6**). In the illustrated embodiment, the media player **100** is a pocket sized hand held MP3 music player that allows a user to store a large collection of music (e.g., in some cases up to 4,000 CD-quality songs). By way of example, the MP3 music player may correspond to the iPod MP3 player manufactured by Apple Computer of Cupertino, Calif. Although used primarily for storing and playing music, the MP3 music player shown herein may also include additional functionality such as storing a calendar and phone lists, storing and playing games, storing photos and the like. In fact, in some cases, it may act as a highly transportable storage device.

[0073] As shown in **FIG. 8**, the media player **100** includes a housing **102** that encloses internally various electrical components (including integrated circuit chips and other circuitry) to provide computing operations for the media player **100**. In addition, the housing may also define the shape or form of the media player. That is, the contour of the housing **102** may embody the outward physical appearance of the media player **100**. The integrated circuit chips and other circuitry contained within the housing may include a microprocessor (e.g., CPU), memory (e.g., ROM, RAM), a power supply (e.g., battery), a circuit board, a hard drive, other memory (e.g., flash) and/or various input/output (I/O) support circuitry. The electrical components may also include components for inputting or outputting music or sound such as a microphone, amplifier and a digital signal processor (DSP). The electrical components may also include components for capturing images such as image sensors (e.g., charge coupled device (CCD) or complimentary oxide semiconductor (CMOS)) or optics (e.g., lenses, splitters, filters).

[0074] In the illustrated embodiment, the media player **100** includes a hard drive thereby giving the media player **100** massive storage capacity. For example, a 20 GB hard drive can store up to 4000 songs or about 266 hours of music. In contrast, flash-based media players on average store up to 128 MB, or about two hours, of music. The hard drive capacity may be widely varied (e.g., 5, 10, 20 MB, etc.). In addition to the hard drive, the media player **100** shown herein also includes a battery such as a rechargeable lithium polymer battery. These type of batteries are capable of offering about 10 hours of continuous playtime to the media player **100**.

[0075] The media player **100** also includes a display screen **104** and related circuitry. The display screen **104** is used to display a graphical user interface as well as other information to the user (e.g., text, objects, graphics). By way of example, the display screen **104** may be a liquid crystal display (LCD). In one particular embodiment, the display screen **104** corresponds to a 160-by-128-pixel high-resolution display, with a white LED backlight to give clear visibility in daylight as well as low-light conditions. As shown, the display screen **104** is visible to a user of the media player **100** through an opening **105** in the housing **102**.

[0076] The media player **100** also includes a touch pad **110**. The touch pad is an intuitive interface that provides easy one-handed operation, i.e., lets a user interact with the media player **100** with one or more fingers. The touch pad **110** is configured to provide one or more control functions for controlling various applications associated with the media player **100**. For example, the touch initiated control function may be used to move an object on the display screen **104** or to make selections or issue commands associated with operating the media player **100**. In order to implement the touch initiated control function, the touch pad **110** may be arranged to receive input from a finger moving across the surface of the touch pad **110**, from a finger holding a particular position on the touch pad and/or by a finger tapping on a particular position of the touch pad.

[0077] The touch pad **110** generally consists of a touchable outer surface **111** for receiving a finger for manipulation on the touch pad **110**. Beneath the touchable outer surface **111** is a sensor arrangement **112**. The sensor arrangement **112** includes one or more sensors that are configured to activate as the finger sits on, taps on or passes over them. The sensor arrangement **112** may be based on a Cartesian coordinate system, a Polar coordinate system or some other coordinate system. In the simplest case, an electrical signal is produced each time the finger is positioned over a sensing coordinate of the sensor arrangement **112**. The number of signals in a given time frame may indicate location, direction, speed and acceleration of the finger on the touch pad, i.e., the more signals, the more the user moved his or her finger. In most cases, the signals are monitored by a control assembly that converts the number, combination and frequency of the signals into location, direction, speed and acceleration information and reports this information to the main system processor of the media player. This information may then be used by the media player **100** to perform the desired control function on the display screen **104**.

[0078] In one embodiment, the surface of the touch pad **110** is divided into several independent and spatially distinct actuation zones **113**A-D disposed around the periphery of the touch pad **110**. The actuation zones generally represent a more logical range of user inputs than the sensors themselves. Generally speaking, the touch pad **110** outputs a control signal associated with a particular actuation zone **113** when most of the signals are from sensing coordinates located within the particular actuation zone **113**. That is, when an object approaches a zone **113**, a position signal is generated at one or more sensing coordinates. The position