The display can be touch responsive. The display can provide touch signals to the processor and the processor perform responsive operations in response to receiving the touch signals. The display communications device can also include display memory for storing display data that corresponds to information currently being displayed. The display memory can be embedded into the display (e.g., in the pixels themselves), or contained in the housing.

The display can include a plurality of bistable pixels. For example, the display can include a plurality of organic light emitting devices (OLEDs). The OLEDs can be ordinary, side-by-side OLEDs, stacked OLEDs (SOLEDs), or transparent OLEDs (TOLEDs), for example. Additionally, the OLEDs can be integrated with organic photodetectors.

The display can include a plurality of self-configurable pixels. Each pixel can include a local processor and a memory that contains a pixel address associated with the pixel. The pixels can be adapted to configure themselves with respect to grayscale and resolution. The pixels can include groups of sub-pixels, where each sub-pixel includes a number of light emitting devices. The number of light emitting devices that form a sub-pixel can depend on grayscale and resolution of the pixel.

The processor can update the display by providing a data packet that includes a pixel address and a brightness that corresponds to a pixel located at the pixel address. The processor can be adapted to compare a current image with a previous image, and to identify one or more pixels having a pixel brightness that needs to be changed to convert the display from the previous image to the current image. The processor can provide the display with display data that causes the pixel brightness of the one or more identified pixels to change.

The display can be removably coupled to the housing, and adapted to be removably coupled to each of a plurality of external devices. The display can be adapted to automatically configure to the external device to which it is coupled.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Other features of the invention are further apparent from the following detailed description of the embodiments of the present invention taken in conjunction with the accompanying drawing.

FIGS. **1**A–**1**C depict typical prior art hand-held communications devices having relatively small displays that are integrated into their respective housings.

FIG. **2** depicts a preferred embodiment of an intelligent multi-media display communications system according to the invention.

FIGS. **3**A–**3**C depict a preferred embodiment of a display communications system according to the invention having a collapsible display.

FIG. **4** depicts a preferred embodiment of a display communications system according to the invention having a touch responsive display with a telephone keypad.

FIG. **5** depicts a preferred embodiment of a display communications system according to the invention a display having a touch responsive display with a keyboard.

FIG. **6** depicts a preferred embodiment of a display communications system according to the invention a full color display capable of displaying an entire Web page.

FIG. **7** depicts a preferred display communications system according to the invention having a display extension.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **2** depicts a preferred embodiment of an intelligent multi-media display communications device **100** according to the invention. As shown, the device **100** includes a housing **102** that contains a processor **103**, which includes the primary processing electronics for operating the device **100**. Preferably, the device **100** is a hand-held or pocket-sized device that has an overall shape similar to that of a pen or pointer, for example, as shown. In such an embodiment, the housing **102** is an elongated, narrow housing. The housing **102** can be made of plastic, for example.

The processor **103** can include, but is not limited to, a microprocessor. Preferably, the processor **103** is a thin film "digital radio on a chip." That is, the processor **103** provides the capability for processing of analog and digital radio signals. The processor can provide compound radio capabilities (i.e., multiple radio on a chip). For example, the device **100** can be adapted to transmit, process, and receive short range, infrared signals, or short, intermediate, or long range radio-frequency (RF) signals, depending on the particular characteristics of the environment, the application, and the external device with which the display communications device **100** is communicating.

Preferably, the processor **103** includes control means for selectively and/or simultaneously controlling the transmission and receipt of communications signals that contain audio, video, and/or control data. Additionally, the processor **103** preferably includes control means for selectively and/or simultaneously controlling the display or storage of audio, video, and/or control data that the device receives. A detailed description of the functions that the processor **103** can perform in a preferred embodiment of the invention is provided below.

The device **100** includes means **104**, such as an antenna, for example, for transmitting output radio signals and receiving input radio signals. The radio signals can be analog or digital radio signals. The device **100** can operate in one or more of simplex, half duplex, and full duplex transmission modes. The device **100** can accommodate access schemes such as time division multiple access (TDMA), frequency division multiple access (FDMA), code division multiple access (CDMA), narrowband CDMA (NCDMA), and broadband (or wideband) CDMA (BCDMA), for example, or any combination of such access schemes. The radio transceiver means **104** can be adapted to transmit and receive communications signals via any electromagnetic carrier, such as radio-frequency (RF), infrared, ultraviolet, or the like, or optically.

The device can communicate with (transmits signals to or receive signals from) a single base station, a plurality of base stations (i.e., a network), or any number of external devices. Thus, a communications device **100** according to the invention can be a node on a telecommunications network, such as a cellular network, for example. The device **100** can transmit communications signals to, and receive communications signals from, one or more base stations in the network. Similarly, the base stations can transmit communications signals to, and receive communications signals from, the device **100**. As the device moves from the proximity of a first base station into the proximity of a second base station, the first base station can automatically handoff the current communications link with the device (inbound or outbound communications; voice or data) to the second base station. Thus, the device **100** can remain in communication