DISPLAYS FOR PORTABLE ELECTRONIC APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from Provisional Application Serial No. 60/251,443 filed Dec. 5, 2000, the entire disclosure of which is herein incorporated by reference.

BACKGROUND OF INVENTION

[0002] The present invention relates to portable electronic apparatus, for example, a cellular telephone or a personal digital assistant (PDA) having an external screen for the display of information.

[0003] In another aspect, this invention relates a cellular telephone having a visual indicator arranged to indicate when a call is received.

[0004] The use of cellular telephones and other similar wireless telephones, for example direct satellite telephones (for convenience all such wireless telephones will hereinafter be referred to as "cell phones") is expanding rapidly throughout the world, and an increasing proportion of such phones are now equipped for wireless data access, either through the Internet or other data access systems, including E-mail systems. For example, traveling businesspeople require continuous access to their E-mail and often also need access to facsimiles and the resources available on the Internet or World Wide Web.

[0005] Unfortunately, because of the need for portability, the displays of most cell phones are inadequate for displaying anything more complicated than telephone numbers and brief textual E-mail messages. In particular, a typical cell phone display is wholly inadequate for displaying any reasonably complicated graphics, yet there are many occasions where field personnel urgently need access to corporate databases containing such graphics. For example, a technician encountering a faucet, refrigerator or television set of a type with which he is not familiar may require access to a database describing the type. At present, Internet access using cell phones is mainly confined to sites with special simple designs which can be viewed on a typical cell phone screen. Obviously, users would prefer the same Internet access which they have from their computers, and site owners would prefer to avoid the expense and inconvenience of maintaining separate sites for computer and cell phone use, especially in view of synchronizing such sites.

[0006] The problems with cell phone screens can only become worse as so-called "third generation" (3G) cell phones are developed. Such third generation phones, using special digital protocols, should provide data transfer at rates similar to those of broadband wired access, but will have no good way of displaying the large amounts of data they receive.

[0007] There is thus a clear need to equip cell phones with some type of auxiliary display which is substantially larger and has higher resolution than the display provided on the cell phone itself. One solution is to provide an interface between the cell phone and a portable computer, thus enabling text and graphics transmitted to the cell phone to be displayed on the computer screen, and such interfaces are well known in the art. However, the need for the portable computer greatly increases the traveling weight of the unit, and it may be inconvenient to connect the cell phone, the interface unit and the computer in the field. Furthermore, the liquid crystal display (LCD's) conventionally used portable computers are fragile and are likely to be damaged if they are thrown into a bag with a technician's tools or left where such tools might accidentally be dropped on them. Similar problems are encountered if one attempts to use an LCD monitor as the external display for a cell phone. Furthermore, the power requirements of personal computers or LCD monitors are so great that, unless a very large and heavy battery is used, the maximum time of operation on batteries of the external display will be substantially shorter than that of the cell phone.

[0008] Accordingly, there is a need for a cell phone to be equipped with an auxiliary display which is larger and has higher resolution than the display provided on the cell phone itself, but which is lighter, less complicated and less expensive than a personal computer or LCD monitor, and this invention seeks to provide a solution to this problem.

[0009] Essentially the same problems exists with PDA's, which have small screens inadequate for displaying web pages and other graphics, and, as more and more portable, hand-held electronic devices are developed, the problems of inadequate screens and/or excessive power consumption will be exacerbated.

[0010] Another problem with cell phones is that they often ring at embarrassing times. Users of cell phones have received considerable criticism because of the distraction and disruption which occurs when such phones ring in restaurants, cinemas, theaters or similar places of entertainment, public and business meetings, worship services and other types of meetings. Under such circumstances, the user of a cell phone needs some way to know when a call is received, without the inconvenience and embarrassment of an audible ring. In an attempt to avoid this problem, many cell phones are equipped with an indicator which vibrates when a call is received, and a switch to enable the user to select the ringing or vibrating indicator. However, such vibrating indicators give rise to other problems. They are usually satisfactory when the cell phone is carried on the user, for example on a belt or in a pocket. However, many women carry cell phones in a purse and may not notice the vibrating indicator. Furthermore, is the cell phone is removed from the purse and placed on a table, desk or similar hard surface, the surface may act as a sounding board, and when the vibrating indicator is activated, may generate a noise which is at least as distracting as a ringing indicator.

[0011] One approach to solving this problem is to provide a visual rather than audible warning of an incoming call. However, most conventional visual warning devices are ill-suited for use with cell phones. Conventional small incandescent bulbs, such as are use in flash lights, may prove too fragile when subjected to the handling to which cell phones are subjected, and may impose current demands larger than those conveniently supplied by cell phone batteries. A light emitting diode could be used as a visual indicator, but draws power continuously, thus reducing the operating time of the cell phone, and is only visible over a limited range of orientations. Also, a light emitting diode