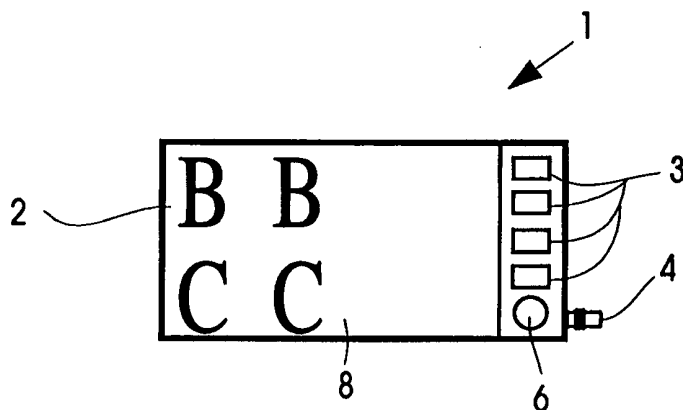


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(54) Title: A HAND-HELD DISPLAY DEVICE AND A METHOD OF DISPLAYING SCREEN IMAGES



## (57) Abstract

In a hand-held display device (1) for use with an electronic device (13) to display a complete or a determined part (8) of a screen image (7), there are included control circuits, a display screen (2) and control buttons (3) connected to said control circuits. Further, a gyroscope (6) is incorporated in said display device (1) and connected to said control circuits, whereby said display device (1) is responsive to movements in the space for displaying said screen image (7) in different magnifications, and/or in different parts (8).

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**TITLE:** **A HAND-HELD DISPLAY DEVICE AND A  
METHOD OF DISPLAYING SCREEN  
IMAGES**

5

**Field of the Invention**

The present invention relates to a hand-held display  
10 device and a method for its use with an electronic device  
to display a complete or a determined part of a screen  
image.

**Description of the Prior Art**

15 Several electronic devices, such as a mobile tele-  
phone, a PDA (Personal Digital Assistant), an organizer, or  
a PC (personal computer) etc. are provided with a display  
or a monitor for displaying different kind of information.  
A typical personal computer system, notebook, or hand-held  
20 computer consists of a system unit, storage means, a  
display, keyboard and a mouse or other interactive input  
devices such as a digitizing tablet, joystick, lightpen  
etc. to control the computer.

The primary attributes of a display is the size of  
25 the display screen; the resolution of the display; and  
whether the display is monochrome or in colour. The size of  
a display screen can vary from, for example, 5 to 25 inches  
in diagonal dimension. The quality of output or the resolu-  
tion of a common display or monitor is for example 640x480,  
30 800x600, or 1024x768 pixels.

There is a variety of displays available from differ-  
ent vendors. These displays are designed to accomplish par-  
ticular functions. An engineer needs a large high-resolu-  
tion monitor for CAD-applications and a smaller monochrome  
35 monitor for the display of text and graphic information. A  
full-page colour monitor can be utilized for both landscape  
and portrait presentations. Also, hand-held data entry de-  
vices or computers are provided with a small display. A

common hand-held data entry device has a limited keyboard and some kind of storage capability for the data. Another hand-held data entry device combines a hand-held optical wand with a keyboard. Stock clerks use such devices in  
5 stores to collect and enter reorder data.

For some purposes small flat-panels are required to save space. Flat-panels are used in conjunction with small size electronic devices such as notebooks, hand-held computers, mobile telephones etc.

10 Many vendors offer or are just about to offer hand-held computers. These computers are provided with flat-panels having for example a 640x240 resolution touchscreen, or 480x240 resolution touchscreen. Such panels or display screens cannot be too limited in size and resolution to be  
15 useful for their intended purpose, i.e. to present general software applications such as word processing, desktop publishing, spreadsheet, databases, internet applications etc. The limitations are set in view of the sight properties of a human being.

20 Consequently, a problem associated with prior art computer configurations is that access is needed to several types of computers provided with different displays suitable for different kinds of applications. As described above, a very small sized flat-panel of a hand-held data  
25 entry device, a mobile telephone, or a computer etc. is not at the same time capable of display full-screen documents in a proper and readable way.

JP-A-7 234 664 discloses a document image display, which reads out the contents of a document using a scanner  
30 and the image of the document is stored in a page memory. An area of the document specified by an operator is read from the memory and then magnified. The magnified area, stored in a working memory, is then displayed on an operation display.

35

### Summary of the Invention

The present invention is directed to an improved display device for use with an electronic device, which overcomes one or more of the limitations and disadvantages of the related art.

It is an object of the present invention to provide a hand-held display device for use with an electronic device, said display device being suitable for the purpose of a hand-held data entry device as well as for both landscape and portrait presentations of a full-page word processing document. Further, it can satisfy the needs of an engineer working with CAD-applications as well as for the display of text and graphic information. Also, hand-held computers can be provided with a display device of the present invention.

Consequently, another object of the present invention is to provide a hand-held display device for use with a computer to display a complete or a determined part of a screen image in a proper size with regard to the current needs or requirements of a user.

Still another object of the invention is to provide a display device incorporated in an electronic device such as a mobile telephone, a PDA (Personal Digital Assistant), an organizer, a data terminal to display a complete or a determined part of a screen image in a proper size with regard to the current needs or requirements of a user.

These objects are accomplished by a display device having movement sensitive means such as a micro gyroscope, strain gauge, piezo-electric, or equilibrium of force accelerometer etc incorporated in said display device, thereby being responsive to movements in the space for displaying the complete screen image in different magnifications, or in different parts.

Further, a method of displaying a complete or a determined part of a screen image in a proper size with regard to the current needs or requirements of a user is also

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