Electronic device, preferably an electronic book

The invention relates to an electronic device, preferably an electronic book according to the preamble of Claim 1.

A known document EP-A 0390611 describes a book with a floppy disc as the memory. The mechanical part of this memory is sensitive to impacts, requires a great deal of space and is much too expensive. Consequently these books become cumbersome and too bulky. In addition one requires additional buttons for controls in order to operate the floppy disc.

Frequently books of this type are based on the idea of a pocket calculator and have too many operating buttons. This is particularly apparent from the Patent Specification EP 0337401. In this case, a CD is proposed as the memory, which also requires mechanics and a laser for reading.

Also, the Patent Specification WO 87/01481 is based on an external card, in order to fill the memory with new information.

The Patent Specification US 4517660 is based on a book, which comprises a greater

number of buttons, in order to provide every conceivable operating variation, such as the selection of a certain word etc.. Experience shows that only simple and user-friendly devices have long-term success in use and as regards sales.

All these said Patent Specifications disclose an electronic book, such as one is accustomed to with a conventional book, namely with two pages. However, in practice it is such that only one page can be read at any one time.

In comparison therewith, the present invention was based on the object of providing an electronic device according to the aforementioned type, which operates with the fewest possible components and is as simple as possible to operate. The electronic book should be a universal communication device, which the user can use at any time and everywhere.

The object is achieved according to the invention by the characterising part of Claim 1.

The electronic device according to the invention provides the considerable advantage that it may have a very light and easily portable construction, can be used very universally and at the same time has a relatively large display.

This device is suitable for being designed in an advantageous construction as an electronic book with the representation of only one book page. Consequently it becomes easier to carry, more economical and when not in use and when being carried can be stored in a holder or a case.

It is easy to imagine that anyone, instead of purchasing a newspaper or magazine at a kiosk in the morning, inserts a coin or credit card into an automatic machine and then chooses whether he wishes to have the magazine, a town plan, tourist information and/or a newspaper etc. stored on his personal electronic book. Such an automatic distributor can be erected at any location and can be programmed for example by way of a telephone line (cable, light waves or radio) or a television cable at any time with the newest information. The transmission of data from the automatic distributor to the electronic book is simplest by way of a plug, a cable or by way of a modulated electromagnetic wave, for example by an infra-red light beam or the radio network for telephone transmission. It is also conceivable that an internal, integrated communication unit is present, with the assistance of which, by way of the existing GSM

radio network (Global System for Mobile Communications) or via GPRS (General Packet Radio Systems)/EDGE (Enhanced Data rates for GSM Evolution) or by other transmission devices - for example satellites - book data, magazines, newspapers, travel guides, train time-tables, stock exchange data etc. can be stored directly in the electronic book.

The same type of transmission may be possible in a book shop, where in the same manner as in a kiosk, one or more books can be transferred to the memory of the electronic book. In this case, any computer or a television set can be used as the data storage unit.

The electronic book consists of a housing, a display, an electronic circuit, a memory, a receiver for data from the system, input means and a power source, which can be charged for example by means of solar cells or thermo-electric generators. The solar cell may be provided on the back of the display and thus have a sufficiently large surface in order to supply the integrated storage battery as the power source of the electronic book, with sufficient current and thus to ensure that the electronic book has great operating autonomy. It is provided that the housing is made from synthetic material, thus it is light, stable and economical to produce. As the internal memory, a solid memory is provided, which works without mechanical parts and for each new selection of newspapers etc. can once again be reloaded.

As the display, an LCD, which is constructed as a liquid crystal display, is particularly suitable. A well distributed background illumination is advantageously provided, in order that one can read the document without outside light, for example when lying in bed. It is also conceivable that the display is mechanical, in order to represent braille letters for blind people.

In a very advantageous form the electronic device is equipped with a loudspeaker, a microphone and furthermore with a video camera. This makes it possible to hold video conferences with one or more participants by way of a telephone, television or radio connection. At the same time, the users can navigate on the internet and access and download data or information of any type.

The device can also be used with a speech control and a speech output. With this assistance, visually impaired people have the possibility of being able to move around in

the network of the data company without outside help.

This invention provides both ecological as well as economic and ergonomic advantages. The conventional reading medium such as books, magazines, newspapers documents etc. consists of printed paper. The resources used for this are limited, as is known. In addition, printed paper is ill-suited for the storage or archiving of data. On the road or on journeys, respectively only a limited number of books or documents can be carried. A further problem is the topicality of the data. A great deal of information in books, newspapers, travel guides and other documents is out of date and unusable after a relatively short time. All these drawbacks have the result that the newspaper and book publishers can only sell their products by way of intermediate sales points, so-called newspaper stands and book shops. Thus, at any location in the world, the most recent information is available in seconds and can be transferred to the electronic book. The ergonomics and price advantages of the present invention exceed those of conventional print media many times.

In commercial use, the relevant information and data will be charged to the customer or reader (clearing). The billing can take place by way of a GSM chip card, SIM card, SET, credit card, micropayment or other suitable payment systems.

The book data loaded and stored on the E-book can only be opened and read with the personal PIN code on the GSM chip card (SIM card). This concept offers high protection against copying. If the data are copied onto a foreign device, they can neither be opened nor read without the associated GSM chip card (SIM card).

Preferred embodiments of the invention are illustrated in the accompanying drawings and described in detail with reference to the following Description. In the drawings:

Figure 1 is a block diagram of the total solution with interfaces to the internet,
Figure 2 is a block diagram of the system for data transmission,
Figure 3 is a block diagram of the electronic book,
Figure 4 shows an electronic kiosk,
Figure 5 shows an electronic book store,
Figure 6 shows an electronic travel guide,
Figure 7 shows a computer or TV set for data transmission,

Figure 8 shows the electronic script for students,
Figure 9 shows an electronic shopping catalogue,
Figure 10 is a front view of an electronic device according to the invention,
Figure 11 is a side view of the device according to Figure 10, and
Figure 12 is a block diagram of the device according to Figure 10.

The block diagram in Figure 1 shows as an example an electronic book store, which is connected to the Internet by an online interface. The various books, magazines, newspapers, documents are stored electronically in a data bank. The electronic book store has an accounting system, which allows the data supplier to charge for the data retrieved. The electronic data can be selected by means of a system, which may for example be a computer or a TV set, by way of the network and loaded into a specific memory. The system transmits the electronic data to a reading device (electronic book). The system and the electronic book have an accounting system and an interface, by which the data are transmitted. The electronic book has an autonomous solid memory, which can store a plurality of selected data. The electronic book has its own power supply and can therefore be used at any desired location. The data can be managed in the memory and retrieved by way of the input control. The output control supplies the memorised data optically, acoustically or by way of braille script to the user.

Figure 2 is a block diagram of the system for data transmission, in which the various components are provided. The system consists of a screen with touch-screen sensor and driver for the visual output or control of an interface to the Internet and of an interface to the electronic book. The interfaces may consist of a plug, a cable or a modulated electromagnetic wave. The accounting can be controlled by way of a Pin code. The indication of time is controlled by a clock. The system may contain a money-introduction device or a credit card reader. The system can be connected by means of data selectors or by way of a microphone with speech recognition and controlled so that any data can be selected and transmitted. A microprocessor controls the entire data flow by way of the programme and data store. The power supply consists of a supply unit and an independent storage battery, which can be operated by a solar cell.

Figure 3 shows a block diagram of an electronic device with an LCD screen with background illumination. The background illumination can be switched on optionally. This function is particularly helpful in poor lighting. Other techniques for displaying information are also conceivable, which offer the same effect. These could operate for

example by means of different conductor layers applied one above the other to a glass plate. The layers can be controlled by means of target co-ordinates and illuminated.

The electronic device has an additionally incorporated touch-screen sensor for controlling operation. An interface for data transmission from the installation in Figure 2 to the electronic book of Figure 3 is incorporated. The interfaces may consist of a plug, a cable or a modulated electromagnetic wave. The accounting may be controlled by way of a Pin code. The indication of time is controlled by a clock. The electronic book can be connected by way of a microphone and controlled by speech recognition so that any data can be selected in the memory and displayed on the LCD screen. All reading functions may be activated by way of speech input. The reading functions may also be activated by way of a conventional keyboard. A control by means of brain waves, which are picked up by way of suitable electrodes or sensors from the user's brain, is also conceivable. A further possibility for information output may be a braille script module or a loudspeaker, which is controlled by means of a speech synthesiser. A microprocessor controls the entire data flow by way of the programme and data memory. The power supply consists of a supply unit and an autonomous storage battery, which can be operated by a solar cell. The electronic book can be adjusted or adapted individually to the requirements of the user. In order to achieve the greatest possible acceptance and user-friendliness for users, the electronic book is developed and constructed according to the newest ergonomic objectives.

As the input means, keys or a proximity switch may be provided, the latter advantageously operating inductively or capacitively, or operating by means of sound waves or infra-red scanning and which can be combined with the display, by a magnet which can be operated solely by the person who is in possession of the corresponding part and knows the functions. As the input means, an acoustic signal may also be provided, in which case the device can be tuned to a certain frequency, frequency spectrum or voice, or brain currents may also be used as the input means, in which case one attaches one or more detectors at defined points on the head and the input means can be controlled in accordance with the thoughts.

Figure 4 shows an electronic kiosk (E-News stand), in which the user acquires a choice of the newest newspapers and magazines from the entire world, transmitted to his electronic book. The accounting for the relevant information is facilitated by means of a money-introduction device, a credit card acceptance or a Pin code.

Figure 5 shows an electronic book store (E-book store), in which the user acquires a choice of books and documents, transmitted to his electronic book.

Figure 6 shows an electronic travel guide (E-travel guide), in which the user can read the desired travel information (town plan, map, attractions etc.) on his electronic book.

Figure 7 shows a computer, PC or a TV set with an interface to the Internet. All data, information and offers world-wide according to Figures 4 to 6 can be transmitted to the electronic book. The accounting for the relevant information takes place by way of credit cards or Pin codes.

Figure 8 shows diagrammatically a lecturer and his students. The students receive the script (E-script for students) for the lecture, transmitted to the electronic books. Thus the student has more time in order to follow the lecturer's exact comments.

Figure 9 shows an electronic shopping catalogue (E-shopping) which can be transmitted to the electronic books, targeted on the requirements and shopping habits of the user.

Figure 10 shows an electronic device 8 according to the invention in elevation, as a user may carry it with him. The latter appropriately has outside dimensions of between 12 x 18 cm and 24 x 32 cm. It consists of a frame or housing 9, a display 10, an antenna 4, a station 15 for receiving or sending via a radio network and an operating surface 5, 6, 7 constructed as a touch screen. The radio transmission takes place for example via Natel-C, Natel-D, via GSM (Global System for Mobile Communications), GRPS (General Packet Radio Services), EDGE (Enhanced Data rates for GSM Evolution), UMTS (Universal Mobile Telecommunication System), Blue-tooth and/or satellites etc.. The station 15 can also be constructed so that it can exchange signals via a telephone-radio network and furthermore via a local radio network, such as for example the Blue-tooth. With the latter, thus at any location, a connection to the Internet can be made and for example at a university, local data can be memorised. In addition to the on/off switch 1 provided in the housing, an additional control switch 5 may be located, in order to leaf forwards or backwards through the memorised book or magazine or to display a certain or predetermined page. In addition, an indicator 6 of the storage contents or composition of the library stored and a control button 7 for printing a certain page or a

plurality of pages is provided.

In order that conference conversations may be possible, in addition an indicated loudspeaker 2 and a video camera 3 are integrated in the frame-like housing 9. The operating surface may consist of a touch-screen LCD, on which the various functions are displayed as graphic objects. In order to start the functions, it is solely necessary to tap the corresponding symbol with the finger. Each user may design his own user surface, which is ergonomic for him. Both the symbols as well as the arrangement may be freely selected. With the control buttons, the user may introduce supplements and notes at individual passages. A passage is marked with the finger and notes of any length can be introduced with a virtual keyboard. These notes are then linked to the passage marked and stored as a hyperlink. The electronic book may communicate and exchange data by way of integrated interfaces with peripherals such as a PC, laptop, printer, scanner, headphones, mouse etc..

According to Figure 11, the device 8 having a flat construction illustrated in side view, has a height of approximately 1 to 3 cm. This produces the desired light-weight construction, due to which the device 8 is easily portable and nevertheless provides a large display surface.

Figure 12 shows the electronic device in a block diagram. A microprocessor unit 22 with a control 23 (CPU) as the central components are present in this device 8. Also contained therein are a solid memory 24, a power source 25 and one or more interfaces 26 for the data exchange with a peripheral device 27. This electronic data exchange serves in particular for receiving and storing data received from this peripheral device 27. The input means for controlling the device 8 are provided as touch-screens 5, 6, 7 in the display 10. The station 15 is responsible for receiving and sending signals by way of a radio network, by which electronic data, such as for example E-mails, faxes, data from the Internet or the like can be exchanged by way of the radio network and can be visualised on the display 10. Due to the peripheral device 27 or due to the radio network, electronic data can be loaded, for example electronic books, magazines, stock exchange rates, learning software, programmes etc. The data buses and communication paths are indicated by the arrows illustrated.

In addition, a telephone device with a loudspeaker 2 and a microphone 29 with an associated processor 30 or an interface for the connection to headphones are

integrated, which allows telephoning by way of the radio network. A video camera 3 and an evaluation unit 31 are furthermore integrated, which facilitate a visualisation of the user for video conferencing conversations or the like.

The receiving or sending station 15 is equipped with a SIM chip card 36 and it is designed as a multiband 37, which facilitates a data exchange from several local and supraregional areas of radio networks or by way of a satellite connection 38.

The power source 25 is advantageously formed by a storage battery, which can be charged by a solar cell 34 and by the current supply line via a connectable battery charger 35.

The invention is adequately explained with the above details. The device could also be equipped with additional options, such as for example with an electronic speaker with recognition of passages or with further input means, which operate by way of a speech control, acoustic signals, optical signals, brain currents, proximity switches or switches which can be activated mechanically.



Claims

1. Electronic device, preferably an electronic book, with a housing (9), a display (10), input means, a microprocessor (22), a control arrangement (23), a memory (24), a power source (25), one or more interfaces (26) for data exchange with at least one peripheral device (27), this electronic data exchange serving in particular for receiving and storing data received from this peripheral device, characterised in that

- the display (10) preferably provided as an LCD-display has dimensions such that with the latter approximately one page of a book can be displayed at normal size,
- that a flat, frame-like housing (9) is provided with the display (10) integrated therein,
- that the input means for controlling the device are preferably provided as a touch-screen in the display (10).
- that a station (15) for receiving and sending signals by way of a radio network is provided, by which electronic data, such as for example E-mails, faxes, data from the Internet or the like can be exchanged by way of the radio network and visualised on the display (10).

2. Device according to Claim 1, characterised in that integrated in the housing (9) is a telephone device with a loudspeaker and a microphone or an interface for the connection to headphones, which facilitates telephoning by way of the radio network.

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3. Device according to Claim 1 or 2, characterised in that integrated in the housing (9) is a video camera (3) and an evaluation unit (31) for the transmission of picture signals by the station (15), by means of which a visualisation of the user is facilitated for video conferencing conversations or the like.

4. Device according to one of the preceding Claims, characterised in that the housing (9) has external dimensions of between 12 x 18 cm and 24 x 32 cm and a height of approximately 1 to 3 cm.

5. Device according to one of the preceding Claims, characterised in that the station (15) can exchange signals by way of the Natel-C or Natel-D-telephone radio network, the GSM, the GPRS, the EDGE system, UMTS, Bluetooth and/or signals by way of any telephone cable radio network, also local radio network or satellite network.

6. Device according to one of the preceding Claims, characterised in that with a housing (9) made from synthetic material, only one on/off switch is preferably provided.

7. Device according to one of the preceding Claims, characterised in that as the memory, only one solid memory integrated in the housing (9) is provided.

8. Device according to one of the preceding Claims, characterised in that an electronic speaker is provided with recognition of text passages or the like.

9. Device according to one of the preceding Claims, characterised in that the power source is formed by a storage battery, which can be charged by a solar cell and/or by mains current via a connectable battery charger.

10. Device according to one of the preceding Claims, characterised in that provided in the receiving or sender station (15) is at least one interface for respectively one receiving module, for example a GSM or SIM chip card and/or at least one receiving module for the world-wide possible telephone radio networks.

11. Device according to one of the preceding Claims 1 to 10, characterised in that a station (15) designed as a multiband is provided, which facilitates a data exchange from several local and supraregional areas of radio networks.



12. Device according to one of the preceding Claims, characterised in that additional input means are contained, which operate by way of speech control, acoustic signals, optical signals, brain currents, proximity switches or switches which can be activated mechanically.

13. Device according to one of the preceding Claims, characterised in that electronic data can be loaded by the peripheral device (27) or by the radio network, for example electronic books, magazines, stock exchange rates, learning software, programmes etc..