

IMPROVEMENTS RELATING TO THE STORAGE, EXCHANGE AND MANIPULATION
OF ELECTRONIC INFORMATION

FIELD OF THE INVENTION

This invention relates to a system for facilitating the use and transferral of electronic information. More particularly the system is based on a portable apparatus and associated peripheral components which provide functionality for storing, retrieving, creating, manipulating and exchanging electronic information. The electronic information can be personal and/or business details typically printed on business cards, however the invention is not limited to utilising just this type of information and is in fact suited to using a wide range of other types of electronic information.

BACKGROUND TO THE INVENTION

Information cards, such as business cards, are commonly used to swap business and/or personal contact details and other relevant information with colleagues. Recent developments have now enabled systems in which this information is stored electronically in a multimedia format for subsequent transferral to colleagues using devices suitable for storing, reading and transmitting the information.

However such devices and systems are not always convenient to use. Further these devices and systems merely implement the function of business cards in an electronic form rather than offering further functionality over and above there mere transferral of information.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a portable electronic device which may interact with other electronic devices to facilitate information transferral and provide other functions.

In one aspect the present invention may be said to consist in a portable electronic device for exchange of personal information, comprising: a data store for storing information relating to a personal user of the device and also information relating to users of other compatible devices, an electromagnetic transceiver system which transmits and receives the information to and from other compatible devices as required by the personal user, a user interface by which the personal user is able to control operation of the device, a processor

which receives user commands from the user interface and controls operation of the data store and the transceiver, and a device interface for interchangeable secondary devices which operate in conjunction with the processor to provide additional information and/or enable the device to carry out other functions.

The invention may further be said to consist in any alternative combination of parts or features here mentioned or shown in the accompanying drawings. Known equivalents of these parts or features which are not expressly set out are nevertheless deemed to be included.

BRIEF LIST OF FIGURES

Preferred embodiments of the invention will be described with reference to the drawings of which:

Figure 1 is a block diagram of a control unit, interchangeable card and peripheral apparatus,

Figure 2 is a block diagram showing further detail of the control unit,

Figure 3 is a schematic diagram of a control unit with an embedded smart card chip, communication port and contacts,

Figure 4 is an end elevation of the control unit showing a connection port for interfacing with a host computer and a power charging unit,

Figures 5a and 5b are end elevation views of the control unit showing two possible embodiments of a means for retaining an interchangeable card,

Figure 6 is a schematic diagram of the control unit showing an installed card with a window and integrated circuit,

Figures 7a and 7b are end elevation views of two possible embodiments of the control unit showing an installed card,

Figure 8 is a schematic diagram of an alternative control unit with an embedded smart card chip, a communication port and contacts,

Figures 9a and 9b are end elevation views of the control unit showing two possible embodiments of a means for retaining an interchangeable integrated circuit,

Figure 10 is a schematic diagram of the control unit showing an installed integrated circuit,

Figures 11a and 11b are end elevation views of two possible embodiments of the control unit showing an installed integrated circuit,

Figure 12 is a schematic diagram of the rear of the control unit showing a display and control pad,

Figure 13 is a flow diagram showing a preferred method of gaining access to the control unit,

Figures 14a and 14b show operation of selected control unit functions,

Figure 15 is a flow diagram showing a preferred method of transferring data between control units,

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings it will be appreciated that an apparatus to facilitate electronic information storage, manipulation, and exchange may be implemented in various forms. The following embodiments are given by way of example only.

Figure 1 shows in block diagram form a preferred embodiment of a system which provides a range of functions for the use and transferral of electronic information. The system is based around a portable electronic device or control unit 10 which can be carried by a user. The control unit 10 can store a range of information types including personal information and multimedia content, and provide a user with access to the information by way of a visual display and retrieval/edit facilities. The control unit 10 is also adapted to facilitate information transfer between itself and a range of other compatible devices or apparatus, including card acceptance devices (CAD) 14, other control units 13, and host devices 11, for example a PC. A preferred embodiment of the control unit 10 is also adapted for use with interchangeable secondary electronic devices 12 which provide stored information and/or functionality in addition to that provided by the control unit 10. A selected secondary device 12 can be installed in the control unit 10 to alter/upgrade the information and functionality provided by the control unit 10. Interchangeable secondary devices can also be swapped between users of control units as an alternative means of transferring information. An installed secondary device 12 can also be adapted to communicate directly with a CAD 14, rather than indirectly through the control unit 10. It will be appreciated however that it is not essential for the control unit 10 to utilise secondary electronic devices 12.

Components comprising the control unit 10 will be described with reference to Figure 2. Where required these components and their function will be described in further detail with reference to relevant Figures as indicated. The control unit's 10 primary functionality is implemented by way of a CPU 20 in conjunction with user input via user interface, a ROM 21 which stores an operating system and the application software and a RAM 22 for temporary storage of data relating to CPU 20 operations. The CPU 20 also controls the remaining components of the control unit 10. The control unit 10 includes an integrated processor and memory IC 24 commonly known in the art as a "smart card chip". The smart chip 24 is based on smart card technology known to somebody skilled in this field and details need not be described. The smart chip 24 stores the personal details, business details or other information relating to the user. Where required the control unit 10 may include multiple smart card chips to provide additional functionality and stored information. Further personal information may also be stored on an EEPROM 23 along with security information which facilitates the control of user access to the information and functionality provided by the control unit 10.

The smart chip 24 includes physical contacts 30 (visible in Figure 3) for connection with corresponding contacts on a CAD 14 or other similar device to facilitate data transfer between the smart chip 24 and a CAD 14. In an alternative embodiment the smart chip 24 is adapted to include an antenna coil or other transmission means for non contact data transfer with a CAD 14. A communication module 25 enables data transfer between the control unit 10 with other control units 13 or similar compatible devices. Preferably the communication module 25 will implement an existing electromagnetic transceiver system typically used for transferring information between portable electronic devices. For example data could be transmitted using infrared signals conforming to the IrDA data protocols. However it will be appreciated that data communication could be implemented using RF or microwave frequencies, or even by physically connecting multiple units using a connection port. Details of the communication module 25 will be known to those skilled in the art and need not be described in further detail.

In one embodiment of the invention, the control unit 10 includes a first set of connectors 26 for enabling connection of the optional secondary electronic device 12. The secondary electronic device 12 and its interconnection with the control unit 10 will be described in detail with reference to Figures 3-11b. A second set of connectors 27 enable the control

unit 10 to dock with a host device 11 such as a PC or other suitable computer. The control unit 10 may also communicate with the host device 11 by way of the communication module 25.

5 The user accesses the functionality and information provided by the control unit 10 and any installed secondary device 12 by way of a visual display 29b and input means 29a such as a keyboard, both of which will be described in detail with reference to Figures 11 and 14. The control unit 10 has a power supply which can comprise either rechargeable or non chargeable power units, for example Li-ion or Li-polymer batteries/cells. The power supply 10 28 also includes contacts (visible in Figure 4) for connection with a power supply charging means. Preferably power supply charging will be undertaken by the host device although a separate portable power charging unit could be used.

15 Figure 3 is a schematic diagram showing a first embodiment of a control unit 10 adapted to utilise secondary electronic devices 12 which are in the form of a smart card. The smart card includes one or more embedded integrated circuits or smart chips 60 (partially visible in Figure 6) . Preferably the control unit 10 is about the size of a standard credit card/ business card to enable easy storage and portability although it will be appreciated the dimensions of the device 10 are not critical. The components of the control unit 10 are 20 housed in the main body 32 which can be made from any suitable material, for example plastic. The smart card chip 24 is embedded in the same manner as for standard smart cards. Its contacts 30, for connection to an installed secondary device 12, are exposed on an outside face 31 of the control unit 10. The connectors 26 for contact with corresponding connectors on an installed secondary device 12 are also exposed on the outside face 31 25 along with an infrared communication port 33. It will be appreciated that the control unit will have multiple sets of connectors 26 where secondary devices 12 with multiple smart chips are to be used. It will also be appreciated that it is not essential for these components to be located as shown in Figure 2. The location of the components will depend on various factors such as ease of design, convenience of use and the position of corresponding 30 contacts on the secondary devices 12 to be used. A further port or slot 40 is positioned on one edge of the control unit 10 as shown in Figure 4. This port contains connectors 27, 28 and enables connection of the control unit 10 to a host device 11 and/or charging means.

To enable installation of a secondary device 12, the control unit 10 further includes slotted

rails or grooves 34a, 34b which extend along two edges of the control unit 10, the profile of which are visible in Figure 5a. A secondary device 12 can be installed by locating its edges in the slots 34a, 34b and sliding the card 12 into position as shown in Figures 6 and 7a. In an alternative embodiment shown in Figure 5b, the far ends of the rails 34a, 34b are connected by a lateral cross piece 50 to assist in retaining the secondary device 12 in place. Figures 6 and 7a show an installed secondary device 12 according to the first rail embodiment and Figure 7b shows an installed secondary device 12 according to the second rail embodiment. Once in position the smart chip or chips 60 embedded on the underside of the secondary device 12 (visible as a dotted line in Figure 6) contact directly with the connectors 26 on the control unit 10 to facilitate data transfer between the two devices 10, 12. The secondary device 12 also includes an optional cutout or transparent window 61 which corresponds with the infrared port 33 to enable infrared light to pass through to enable data transfer. The secondary device 12 may also include printed information and graphics as required.

Figure 8 is a schematic diagram showing a second embodiment of a control unit 10 adapted to utilise secondary electronic devices 12 in the form of a smart chip 60 embedded in a minimal amount of housing rather than an entire plastic card as in the previously described embodiment. The control unit 10 is substantially the same as that for the embodiment described with reference to Figure 3. However, instead of rails extending along the edge of the control unit 10, a small slot 80 is formed on the control unit 10 surface in proximity to the connectors 26. The slot 80 includes grooves 91a, 91b (visible in Figure 9a) in the slot's side walls for retaining a secondary device 12 in place. A secondary device 12 can be installed by locating its edges in the slots and sliding the device 12 into position as shown in Figures 10 and 11a. In an alternative embodiment shown in Figure 9b, a lateral cross piece 90 extends across the slot 80 to assist in retaining the secondary device 12 in place. The control unit 10 may also include printed information and graphics on the top face 101 as required. If required, a control unit 10 can be adapted to include multiple connectors and multiple slots for installing multiple secondary devices 12.

Figures 10 and 11a show an installed secondary device 12 according to the first slot embodiment and Figure 11b shows an installed secondary device 12 according to the second slot embodiment. The contacts 26 are exposed on the bottom surface of the slot 80 such that when a secondary device 12 is in position it contacts directly with the connectors

26 on the control unit 10 to facilitate data transfer between the two devices 10, 12. It will be appreciated that the means described for installing a secondary device 12 are by way of example only and various other means could be implemented by a skilled person.

5 Figure 12 is a schematic diagram showing the control unit's 10 user interface which enables a user to operate the control unit 10 and any installed secondary device 12. Preferably the interface includes a visual display 29b and user input means 29a located on the back of the control unit 10. The interface may also include a speaker (not shown) to provide an audio
10 output. The visual display 29b is preferably an LCD screen although any other suitable display screen technology could be used. The input means 29a can include any suitable user input controls, for example buttons, jog dial, joystick, keyboard or the like. The LCD screen may also be touch sensitive to enable the use of touch screen keys.

15 The various functions and information provided by the system, and in particular the control unit 10 and/or any installed secondary device 12 will be described with reference to Figures 13-15. It will be appreciated that not all of the described variations are essential and a particular embodiment of the system might only provide a selection of the various functions and/or forms of information.

20 Figures 13 and 14a illustrate operation of the control unit's 10 security functionality which reduces the chances of unauthorised access to the functions and information provided by the control unit 10 and/or an installed secondary device 12. Upon power up the control unit 10 is placed in a standby mode 130 in which the user can only access the security functions of the unit 10. To access the full functionality the user selects an unlock mode 131 by
25 pressing unlock button 141 shown in Figure 14a. The user is prompted 132 for a password by way of a message on the display 29b. The user can then enter a password or security code by way of the keypad 29a on the unit 10. If a time out occurs 133 before a password is entered the control unit 10 is placed back in standby mode 120. If a password is entered the CPU 20 determines 134 if the password is correct based on security information stored in the EEPROM 23. If not, an incorrect password counter is incremented and the CPU 20
30 determines 135 if the user has exceeded the permissible number of incorrect attempts to enter the correct password. If the user has exceeded the permissible number of attempts, the control unit 10 is locked 136 and an unlock code must be obtained from the control unit's 10 manufacturer or vendor before the unit 10 can be used again. Otherwise the user

is prompted 132 to enter the password again. Once the correct password is entered the user has full access to the functionality and information provided by the control unit 10. The user also has the option of relocking the unit in which case the procedure must be carried out again to gain full control of the control unit 10.

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Alternatively, as shown in Figure 13, if a secondary device 12 with one or more smart chips 60 is installed, the user gets the opportunity to select 137 which smart chips 60 are made operational. The control unit 10 then indicates 138 which smart chips 60 are operational and which are non operational by way of the display 29b. At this point the functionality and information provided by the installed secondary device 12 is accessible to the user. In a possible embodiment only a specified number of operations 139 will be permitted before the unit 10 is returned to the standby mode and the password must be reentered. Alternatively a time out could be specified after which point the unit 10 is returned to the standby mode. This is to prevent the unit 10 remaining in the operational mode indefinitely which could compromise security if the device is left unattended.

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Once the control unit 10 is placed in the operational state a user can access the information stored on the smart chip 24 and/or EEPROM 23. This information could convey details which are typically printed on a traditional business card, for example personal or workplace details. The smart chip 24 and/or EEPROM 23 can also store information which has been transferred from another compatible device. Further, due to the multimedia capabilities of the control unit 10, a range of other information could also be stored in the control unit 10 for later retrieval such as advertising/promotional material, or even entertainment material. By using the input means 29a a user can retrieve the desired stored information and have it displayed on the screen 29b and/or played through a speaker on the control unit 10.

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The control unit 10 also enables editing of the information using the screen 29b and input means 29a as shown in Figure 14b. For example, the unit could contain contact details 140 relating to the user and/or a number of other colleagues. This information could be deleted, added to, or updated as required by pressing the edit button 142, using the cursor key 143 to navigate through the information and then using the keypad 130 to edit the information. The ROM 21 of the control unit 10 could also provide small applications for creating multimedia type information content for storage and later transferral.

Editing and creation tools could also be provide by a host device or system 11 such as a PC connected to a network. For example a database of personal details, or a multimedia file could be created using the system 11 and the information downloaded to the control unit 10 and stored in the EEPROM 23. Alternatively, information stored in the control unit 10 could be transferred to the PC, edited using the PC and the transferred back to the control unit 10 for storage and subsequent use. The control unit 10 could be interfaced with the host system 11 by way of the connectors 27, communication module 25 or any other suitable data transferral means.

The control unit 10 can also provide control over an installed secondary device 12. In this way the information provided by the smart chip/s 60 of an installed secondary device 12 can be retrieved, displayed, created and edited in the same manner as that described for the information stored on the control unit 10 itself. Further a secondary device 12 could provide additional functionality not provided by the control unit 10, for example information creation tools or additional editing tools. The information and functionality provided by an installed secondary device 12 could also enable the control unit 10 to function as a security pass for entering secure premises, a cash card for purchasing goods, a fare card for travelling on public transport, a telephone card, or any other application where the features of a smart card would be suitable. It is envisage that a range of secondary devices 12 would be available all providing different information and/or functionality.

The information and functionality provided by the control unit 10 and any installed secondary device 12 can be transferred to another compatible device 13 as illustrated in Figure 15. When the control unit 10 is not in use, it can be turned off or switched to a standby mode 150. To initiate an information or data exchange the user places the control unit 10 in an active mode by selecting an appropriate transceiver mode 151. The user has a choice of either an "Auto" mode or a "Trigger" mode. The Auto mode will enable automatic initiation of information exchange between two compatible control units when they come withing transmission range of each other. For example where an infrared communication module 25 is used this will be when the infrared lenses of both devices are facing each other and the devices are within a suitable range of each other. When in this mode the infrared communication modules 25 of both devices will send test signals to determine if the corresponding device is within transmission range. In contrast, the Trigger

mode will require the user of the transmitting device to initiate data transfer by pressing an appropriate control button on the transmitting control unit 10. Selecting the transceiver mode 151 also involves selecting a transfer status, either a "ready for transmit" status, "ready to receive" status or a "ready to transmit and receive" status.

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Once the transceiver mode has been selected 151 the control unit 10 is placed in a data transfer ready state 152 and displays a data transfer ready message on the screen 29b. At this point data transfer can take place 153. The transfer is initiated either automatically by the transmitting control unit 10 or by the user of the transmitting control unit 10. If no transfer takes place within a specified time 154 the control unit 10 is automatically placed back in a standby mode 150. Once data transfer has been successfully completed the screen 29b on the receiving control unit 10 displays the received data or information 155. The user of the receiving control unit 10 then has the option of storing the data in memory 156. If the user declines, the control unit 10 is returned to a data the transfer ready state 152. Otherwise the user selects where the information is to be stored 157, either in the EEPROM 23 or a smart card chip (either on the control unit 10 itself or an installed secondary device 12).

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The control unit 10 is also adapted for interoperation with CAD 14 which enables the control unit 10 and any installed secondary device 12 to function as a traditional smart card. For example a CAD 14 may be stationed at a retailer, the entrance way to a secure premises, a vending machine or telephone. The exposed contacts on a smart chip embedded on the control unit 10 or secondary device 12 can directly connect with corresponding contacts on a CAD 14. This enables transfer of, for example, security information or cash balance information to the CAD 14. Alternatively if the control unit 10 has a smart chip 24 with an integrated antenna coil, a wireless transmission of data between a CAD 14 and the control unit 10 can take place. The CAD would send a signal via the antenna to the smart chip 24 which would in turn active the CPU 20. The control unit 10 would then send the required information to the CAD via the antenna.

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CLAIMS



1. A portable electronic device for exchange of personal information, comprising:
a data store for storing information relating to a personal user of the device and also
5 information relating to users of other compatible devices,
an electromagnetic transceiver system which transmits and receives the information
to and from other compatible devices as required by the personal user,
a user interface by which the personal user is able to control operation of the device,
a processor which receives user commands from the user interface and controls
10 operation of the data store and the transceiver, and
a device interface for interchangeable secondary devices which operate in
conjunction with the processor to provide additional information and/or enable the device
to carry out other functions.
- 15 2. An electronic device according to claim 1 wherein:
the electronic device enables the personal user to control the information and/or
functionality provided by an installed secondary device.
- 20 3. An electronic device according to claim 2 wherein:
the user interface includes a display which presents information to the personal user.
4. An electronic device according to claim 2 wherein:
the user interface includes a control pad by which the personal user operates the
25 device.
5. An electronic device according to claim 2 wherein:
the personal user can use the electronic device to view and edit information
provided by an installed secondary device.
- 30 6. An electronic device according to claim 2 wherein:
the personal user can use the electronic device to activate one or more functions
provided by an installed secondary device.
7. An electronic device according to claim 2 wherein:



the personal user is prevented from controlling the information and/or functionality provided by an installed secondary device until a code is entered by way of the user interface.

- 5 8. An electronic device according to claim 2 wherein:
 an installed secondary device provides additional personal information relating to
 the personal user or another person.
- 10 9. An electronic device according to claim 2 wherein:
 an installed secondary device provides information and functionality to enable
 purchase of goods or services.
- 15 10. An electronic device according to claim 2 wherein:
 an installed secondary device provides information and functionality to enable
 access to a secure premises.
- 20 11. An electronic device according to claim 2 wherein:
 an installed secondary device includes one or more integrated circuits and the
 device interface includes one or more slots for retaining the secondary device.
- 25 12. An electronic device according to claim 11 wherein:
 the device interface further includes one or more contacts for data transfer between
 the one or more integrated circuits and the electronic device.
- 30 13. An electronic device according to claim 11 wherein the one or more integrated
 circuits are embedded on a card.
14. An electronic device according to claim 13 wherein:
 the electromagnetic transceiver includes an infrared transmitter/receiver and the card
 includes a window to facilitate passage of light from/to the transmitter/receiver
15. An electronic device according to claim 2 wherein:
 the electromagnetic transceiver transmits and receives information directly to and
 from other compatible devices.



16. A device according to claim 2 further comprising:

a contact transceiver system which transmits and receives information to and from
other devices as required.