(54) Title: ENCODED INFORMATION READING TERMINAL USING EXTERNAL TOKEN

(57) Abstract: An encoded information reading (EIR) terminal can comprise a microprocessor, a memory, a communication interface, and an EIR device, all communicatively coupled to a system bus. The EIR device can be provided by a bar code reading device, an RFID reading device, and/or a card reading device. The EIR device can be configured to output raw message data containing an encoded message and/or output decoded message data corresponding to an encoded message. The EIR terminal can be configured, responsive to receiving an identifier from an external token, to ascertain whether said identifier identifies a user allowed to operate said EIR terminal.

Published:
— with international search report (Art. 21(3))
ENCODED INFORMATION READING TERMINAL
USING EXTERNAL TOKEN

FIELD OF THE INVENTION

[0001] The present invention relates generally to encoded information reading terminals, and in particular to encoded information reading terminals adapted to authenticate the terminal's user.

BACKGROUND OF THE INVENTION

[0002] Encoded information reading (EIR) terminals are widely used in retail stores, shipping facilities, etc. A terminal user authentication can be required to prevent an authorized use of the terminal.

SUMMARY OF THE INVENTION

[0003] There is provided an encoded information reading (EIR) terminal. The EIR terminal can comprise a microprocessor, a memory, a communication interface, and an EIR device, all communicatively coupled to a system bus. The EIR device can be provided by a bar code reading device, an RFID reading device, and/or a card reading device. The EIR device can be configured to output raw message data containing an encoded message and/or output decoded message data corresponding to an encoded message. The EIR terminal can be configured, responsive to receiving an identifier from an external token, to ascertain whether said identifier identifies a user allowed to operate said EIR terminal.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The objects and features of the invention can be better understood with reference to the claims and drawings described below. The drawings are not necessarily to scale, the emphasis is instead generally being placed upon illustrating the principles of the invention. Within the drawings, like reference numbers are used to indicate like parts throughout the various views.
DETAILED DESCRIPTION OF THE INVENTION

In one embodiment, there is provided an encoded information reading (EIR) terminal comprising one or more EIR devices, including a bar code reading device, an RFID reading device, and/or a card reading device. The EIR terminal can be capable of reading bar codes, RFID tags and/or other encoded message carriers. Encoded messages, for example, UPC bar codes comprising twelve encoded characters representing numerical digits, can be used to convey identification of the source and the model of a product. The EIR terminal can be configured, responsive to reading an encoded message by the EIR device, to produce a decoded message string by decoding the encoded message. The EIR terminal can comprise a communication interface, which can be provided, e.g., by an Ethernet interface or by IEEE-802.1 lx-compliant wireless interface. Using the communication interface, one or more software modules being executed by the EIR terminal can communicate with external clients and/or servers.

For some applications, it can be necessary to authenticate the user of EIR terminal and prevent unauthorized users from operating the EIR terminal. In one embodiment, a user can be authenticated via a graphical user interface by being required to enter a user identifier and a password. The EIR terminal can compute a hash of the password provided by the user, and then compare the computed hash value with a stored value of the user's hashed password.

In another embodiment, a user can be authenticated by an authentication token which the user must have in order to operate the EIR terminal. In one embodiment, the authentication
token can be provided by a contactless token (e.g., RFID token or NFC token). In another embodiment, the authentication token can be configured to communicate to the EIR terminal via a wired interface (e.g., a USB interface, or a parallel interface).

[00012] In a yet another embodiment, a user can be required to have an authentication token and to enter a valid user identifier and a password in order to be authenticated.

[00013] In a further aspect, an authentication token can have a read-only memory configured to store a unique identifier. In another embodiment, an authentication token can have a user-programmable memory which can be used for storing encrypted data (e.g., a user identifier), thus preventing a malicious party from cloning the authentication token. The EIR terminal can store a key for decrypting the data stored by the authentication token. In one embodiment, asymmetric key cryptography can be used to encrypt the data stored by the authentication token, so that two different keys would be used to decrypt and to encrypt the data, and only one key will need to be stored by the EIR terminal, thus preventing a malicious party having a possession of both an authentication token and an EIR terminal from cloning the authentication token.

[00014] In a further aspect, the data stored by an authentication token can comprise a user identifier. In one embodiment, the data stored by an authentication token can comprise one or more authorization levels authorizing the EIR terminal user to perform various tasks, e.g., scanning, decoding, data transfer to host, terminal maintenance, etc.

[00015] The EIR terminal described herein can be used, for example, for bar code reading and decoding in point-of-sale (POS) and other applications. In one embodiment, EIR terminal 100 can be incorporated into a retail store data collection system 1000 schematically illustrated in Fig. 1, and can be employed at a checkout register for scanning identification tags (e.g., bar code tags) of retail items being purchased by retail customers. Data collection system 1000 can include a plurality of EIR terminals 100a-100z in communication with a plurality of interconnected networks HOa-10Oz. EIR terminal 100 can connect to one or more networks 110a-HOz, e.g., via a wireless access point 135. In one embodiment, at least one of networks HOa-110Oz can be provided by an IEEE 802.11x-compliant wireless network. In another embodiment, at least one of networks HOa-l 1Oz can be provided by an Ethernet network. In
another embodiment, at least one of networks 110a-110z can be provided by a local area network (LAN). In another embodiment, at least one of networks 110a-110z can be provided by a wide area network (WAN). While different networks are designated herein, it is recognized that a single network as seen from the network layer of the OSI model can comprise a plurality of lower layer networks, i.e., what can be regarded as a single Internet Protocol (IP) network, can include a plurality of different physical networks.

[00016] In one embodiment, EIR terminal 100 can exchange messages with one or more external computers, including, for example, checkout register 131, retail store server 133, and/or remote server 171. A "computer" herein shall refer to a programmable device for data processing, including a central processing unit (CPU) 310, a memory 320, and at least one communication interface. A computer can be provided, e.g., by a personal computer (PC) running Windows™ operating system. A skilled artisan would appreciate the fact that other hardware platforms and operating systems are within the spirit and the scope of the invention.

[00017] In a further aspect, EIR terminal 100 can be communicatively coupled via wired or wireless interface to checkout register 131. EIR terminal 100 can further be in communication with retail store server 133 via wireless access point 135 and network 110a. EIR terminal 100 can further be in communication with remote server 171 via wireless access point 135 and networks 110a, 110b, 110z. A skilled artisan would appreciate the fact that other methods of EIR terminal communicatively coupling to checkout register 131, store server 133, and remote server 171 are within the scope of this disclosure.

[00018] At least one of the messages transmitted by EIR terminal 100 to one or more external computers 131, 133, and/or 171 can include decoded message data corresponding to, e.g., a bar code label or an RFID label attached to a retail item. For example, EIR terminal 100 can transmit to the checkout register 131 a product identifier encoded by a bar code label attached to the product. In another example, EIR terminal 100 can transmit a request to retail store server 133 to retrieve product information corresponding to a product identifier encoded by a bar code label attached to the product.
As noted herein supra, the EIR terminal can ascertain whether an identifier received from an external token identifies a user allowed to operate said EIR terminal. In one embodiment, the identifier can uniquely identify a user. In another embodiment, the identifier can identify a group of users, and thus two or more tokens can store and transmit the same identifier.

In one embodiment, the EIR terminal can comprise an RFID reading device, and the authentication token can be provided by an RFID token. In a further aspect, the RFID reading device of the EIR terminal can be compliant with EPC™ Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz - 960 MHz by EPCglobal, commonly known as the "Gen 2" standard, which defines physical and logical requirements for a passive-backscatter, Interrogator-talks-first (ITF) RFID system operating in the 860 MHz - 960 MHz frequency range.

The EIR terminal can be configured to receive information from an RFID tag by transmitting an unmodulated RF carrier and listening for a backscatter reply. An RFID token can transmit information by backscatter-modulating the amplitude and/or phase of the RFID carrier. The RFID token can encode the backscattered data using, e.g., FM0 baseband or Miller modulation of a subcarrier at the data rate.

Responsive to receiving an interrogation signal transmitted by the EIR terminal 100, an RFID token can transmit a response signal back to the EIR terminal. The response signal can contain useful data, e.g., a token identifier (TID), a user identifier, a group identifier, and/or one or more authorization levels.

In another embodiment, the EIR terminal can comprise an NFC reading device, and the authentication token can be provided by an NFC token. In a further aspect, the NFC reading device of the EIR terminal can be compliant with NFC Digital Protocol Technical Specification DIGITAL 1.0 NFCForum-TS-DigitalProtocol-1.0 of 2010-1 1-17 by NFC Forum™. The EIR terminal can be configured to transmit a poll command (e.g., ALL_REQ or SENS_REC) to probe the operating field for NFC devices in Listen Mode. Responsive to receiving a poll command transmitted by the EIR terminal 100, an NFC token can transmit a response signal
back to the EIR terminal. The response signal can contain useful data, e.g., a token identifier (TID), a user identifier, a group identifier, and/or one or more authorization levels.

[00024] In another embodiment, the EIR terminal can comprise a USB interface, and the authentication token can be provided by a USB token. In another embodiment, the EIR terminal can comprise a parallel interface, and the authentication token can be provided by a parallel interface token.

[00025] In a further aspect, the EIR terminal can be configured to receive a token identifier, user identifier, and/or a group identifier from an authentication token. In one embodiment, the identifier can be provided by an ASCII string comprising one or more ASCII characters. In another embodiment, the identifier can be provided by a binary string comprising one or more binary bytes. Responsive to receiving a user identifier from the authentication token, the EIR terminal can be configured to ascertain whether the received identifier identifies a user allowed to operate the EIR terminal. In one embodiment, the EIR terminal can have a data structure stored in the terminal’s memory that can contain one or more user identifiers allowed to operate the terminal. In another embodiment, the EIR terminal can have a data structure stored in the terminal's memory that can contain one or more user identifiers and their associated authorization levels to perform various tasks (e.g., scanning, decoding, data transfer, terminal maintenance). Hence, the EIR terminal can ascertain whether the received identifier identifies a user allowed to operate the EIR terminal by looking up the identifier in the data structure stored in the terminal's memory. The data structure can be provided, e.g., by a one-dimensional or multi-dimensional array, a linked list, or a more complex data structure.

[00026] In another embodiment, the list of users allowed to operate the EIR terminal and their associated authorization levels can be centrally stored by an external computer accessible over a network by one or more EIR terminals. Responsive to receiving a user identifier from the authentication token, an EIR terminal can be configured to ascertain whether the received identifier identifies a user allowed to operate the EIR terminal by transmitting an authorization request to the external computer. The external computer can respond with an authorization response comprising a flag indicating the user's authorization to operate the EIR terminal and/or a list of authorization levels to perform various tasks corresponding to the user identifier. In a
further aspect, the external computer can support, e.g., Light-weight Directory Access Protocol (LDAP) for authorization requests and responses.

[00027] In another aspect, the EIR terminal can be configured to communicate with an external token in accordance to a state machine schematically shown in Fig. 2. Responsive to be powered on, the EIR terminal can transition from Powered Off state into Unauthorized state and initiate communications with the external token in order to receive a user identifier, a group identifier, and/or one or more authorization levels. In one embodiment, the EIR terminal can transmit a Select command to initiate communication to an RFID token. Responsive to receiving a response from an RFID token, the EIR terminal can transmit Access and Read commands to read the token's Reserved, EPC, TID and/or User memory. In another embodiment, the EIR terminal can transmit a poll command (e.g., ALL_REQ or SENS_REC) to probe the operating field for NFC devices in Listen Mode. Responsive to receiving a response from an NFC token, the EIR terminal can transmit Read command to read the token's memory. In another embodiment, the EIR terminal can, responsive to detecting an external token attached via a wired interface (e.g., a USB or parallel interface) to communicate with the external token via the wired interface.

[00028] Responsive to successfully detecting an external token, the EIR terminal can transition to Token Detected state and to request and/or receive a user identifier, a group identifier, and/or one or more authorization levels from the external token.

[00029] Responsive to failing to receive a user identifier, a group identifier, and/or one or more authorization levels from an external token, the EIR terminal can be configured to transition from Unauthorized state or Token Detected state to Locked state. The EIR terminal can be further configured to transition to Unauthorized state upon expiration of a pre-defined timeout since the terminal's transition to Locked state.

[00030] Responsive to receiving a user identifier, a group identifier, and/or one or more authorization levels, the EIR terminal can transition from Token Detected state to Identifier Received state and to ascertain the authorization of the user or group identified by the identifier to operate the EIR terminal as described herein supra. The EIR terminal can be further
configured, responsive to failing to receive a confirmation of the user or group authorization to operate the EIR terminal or to execute a requested operation, to transition to Locked state.

[00031] Responsive to receiving a confirmation of the user or group authorization to operate the EIR terminal or to execute a requested operation, the EIR terminal can transition to Authorized state and to execute one or more operations requested by the terminal's user. While in Authorized state, the EIR terminal can be configured to periodically ascertain the presence of the previously detected external token.

[00032] In one embodiment, the EIR terminal can be further configured to transition to Unauthorized state responsive to expiration of a pre-defined timeout. In another embodiment, the EIR terminal can be further configured to transition to Unauthorized state responsive to detecting a disconnection of an external token connected via a wired interface. In a yet another embodiment, the EIR terminal can be further configured to transition to Unauthorized state responsive to failing to ascertain a presence of a previously detected wireless token. In a yet another embodiment, the EIR terminal can be further configured to transition to Unauthorized state responsive to receiving a user interface command (e.g., a scanning command, a decoding command, a data transfer to host command, or a terminal maintenance command) for which a current authorization level is not sufficient. In a yet another embodiment, the EIR terminal can be further configured to transition to Unauthorized state responsive to reading an encoded information item encoding a command (e.g., a data transfer to host command, or a terminal maintenance command) for which a current authorization level is not sufficient.

[00033] In another aspect, the EIR terminal can be configured to track the terminal usage by user/group authenticated by an external token. In one embodiment, for each scanning operation the EIR terminal can be configured to store in the terminal's memory and/or to transfer to an external computer the identifier received from the external token and/or data derived from the identifier (e.g., a user's full name corresponding to a user identifier). For each scanning operation, the EIR terminal can be further configured to store in the terminal's memory and/or to transfer to an external computer the scanned image. For each decoding operation, the EIR terminal can be further configured to store in the terminal's memory and/or to transfer to an external computer the decoded message corresponding to an encoded information item.
One embodiment of EIR terminal 100 is shown in Figs. 3a (front panel view), 3b (side panel view), and 3c (bottom panel view). EIR terminal 100 can comprise housing 52 within which other components of EIR terminal 100 can be disposed. LCD screen display with touch screen sensor 54 can be disposed on the front panel 56. Also disposed on front panel 56 can be decode LED 58, scan led 62, and keyboard 64 including scan key 68 and navigation keys 72. Imaging window 74 can be disposed on the top panel of housing 52. Disposed on the side panel (best viewed in Fig. 3b) can be infra-red communication port 76, access door to a secure digital (SD) memory interface 78, audio jack 80, and hand strap 82. Disposed on the bottom panel (best viewed in Fig. 3c) can be multi-pin mechanical connector 84 and hand strap clip 86.

While Figs. 3a-3c illustrate a hand held housing, a skilled artisan would appreciate the fact that other types and form factors of terminal housings are within the scope of this disclosure. For example, in one embodiment schematically shown in Fig. 4, an EIR terminal can be incorporated into a POS workstation with a presentation housing. The workstation 1010 can include a horizontal countertop 1012 for placement of products to be scanned. A bioptic scanner 1014 mounted within the countertop 1012 can include a first housing portion 1016 and a second housing portion 1018 which can project from one end of the first housing portion in a substantially orthogonal manner. In one embodiment, the first housing portion 1016 can comprise a laser-based indicia scanning terminal and the second housing portion 1018 can comprise an imager-based terminal. The countertop 1012 can include an optically transparent (e.g., glass) horizontal-scanning window 1020 mounted flush with the checkout counter, covered by an imaging window protection plate 1022 which can be provided with a pattern of apertures 1024a. The second housing portion 1018 can further include a vertical-scanning window 1026 behind which an imager-based indicia reading terminal 1028 can be housed. A skilled artisan would appreciate the fact that other ways of disposing the scanners and scanning windows are within the scope of this disclosure.

In another illustrative embodiment, shown in Fig. 5, there is provided an EIR terminal 100 including a housing 52 comprising a head portion 54 and a handle portion 56, the latter further comprising a hand grip 58 and a trigger 60. The trigger 60 can be used to initiate signals for activating frame readout and/or certain decoding processes. Other components of EIR terminal 100 can be disposed within the housing 52. For example, an image sensor 62 can be
disposed in the head portion 54 behind a housing window 63. The image sensor 62 can be configured to output an electrical signal representative of light incident on the image sensor. EIR terminal 100 can further comprise an I/O interface which in the illustrative embodiment of Fig. 5 can be communicatively coupled to a wired connection 66. The I/O interface can be used to communicatively couple EIR terminal 100 to a companion device 68 such as a register and/or peripheral data capture devices in a POS application. Other configurations of the I/O interface may utilize wireless communication technology and/or contact-type features that do not require wires and/or wired connection 66. In certain applications of EIR terminal 100 for example, the companion device 68 may be provided by a docking station with corresponding mating contacts and/or connectors that are useful to exchange power and data, including image data captured by the imaging module 62. Although not incorporated in the illustrative embodiment of Fig. 5, EIR terminal 100 can also comprise a number of peripheral devices, including a display for displaying such information as image frames captured by the terminal, a keyboard, and a pointing device.

[00037] Component-level diagram of one embodiment of an EIR terminal is now being described with references to Fig. 6. EIR terminal 100 can comprise at least one microprocessor 310 and a memory 320, both coupled to the system bus 370. The microprocessor 310 can be provided by a general purpose microprocessor or by a specialized microprocessor (e.g., an ASIC). In one embodiment, EIR terminal 100 can comprise a single microprocessor which can be referred to as a central processing unit (CPU). In another embodiment, EIR terminal 100 can comprise two or more microprocessors, for example, a CPU providing some or most of the EIR terminal functionality and a specialized microprocessor performing some specific functionality. A skilled artisan would appreciate the fact that other schemes of processing tasks distribution among two or more microprocessors are within the scope of this disclosure.

[00038] EIR terminal 100 can further comprise a communication interface 340 communicatively coupled to the system bus 370. In one embodiment, the communication interface can be provided by a wireless communication interface. The wireless communication interface can be configured to support, for example, but not limited to, the following protocols: at least one protocol of the IEEE 802.11/802.15/802.16 protocol family, at least one protocol of the
HSPA/GSM/GPRS/EDGE protocol family, TDMA protocol, UMTS protocol, LTE protocol, and/or at least one protocol of the CDMA/1xEV-DO protocol family.

[00039] EIR terminal 100 can further comprise a keyboard interface 354 and a display adapter 355, both also coupled to the system bus 370. EIR terminal 100 can further comprise a battery 356. In one embodiment, the battery 356 can be provided by a replaceable rechargeable battery pack.

[00040] EIR terminal 100 can further comprise a GPS receiver 380. EIR terminal 100 can further comprise at least one connector 390 configured to receive a subscriber identity module (SIM) card.

[00041] EIR terminal 100 can further comprise one or more EIR devices 330, provided, for example, but not limited to, by an RFID reading device, a bar code reading device, or a card reading device. In one embodiment, the RFID terminal can be configured to read an encoded message using EIR device 330, and to output raw message data containing the encoded message. In another embodiment, the RFID terminal can be configured to read an encoded message using EIR device 330, and to output decoded message data corresponding to the encoded message. As used herein, "message" is intended to denote a character string comprising alphanumeric and/or non-alphanumeric characters. An encoded message can be used to convey information, such as identification of the source and the model of a product, for example, in a UPC code.

[00042] Of course, devices that read bar codes, read RFID, or read cards bearing encoded information may read more than one of these categories while remaining within the scope of this disclosure. For example, a device that reads bar codes may include a card reader, and/or RFID reader; a device that reads RFID may also be able to read bar codes and/or cards; and a device that reads cards may be able to also read bar codes and/or RFID. For further clarity, it is not necessary that a device's primary function involve any of these functions in order to be considered such a device; for example, a cellular telephone, smartphone, or PDA that is capable of reading bar codes is a device that read bar codes for purposes of this disclosure.

[00043] While the present invention has been particularly shown and described with references to certain exemplary embodiments, it will be understood by one skilled in the art that
various changes in detail may be affected therein without departing from the spirit and scope of the invention as defined by claims that can be supported by the written description and drawings. Further, where exemplary embodiments are described with reference to a certain number of elements it will be understood that the exemplary embodiments can be practiced utilizing less than the certain number of elements.

[00044] A small sample of systems methods and apparatus that are described herein is as follows:

Al. An encoded information reading (EIR) terminal comprising:
- a microprocessor communicatively coupled to a system bus;
- a memory communicatively coupled to said system bus;
- a communication interface coupled to said system bus;
- an EIR device communicatively coupled to said system bus, the EIR device selected from the group consisting of: a bar code reading device, an RFID reading device, and a card reading device;

wherein said EIR device is configured to perform one of: outputting raw message data containing an encoded message, outputting decoded message data corresponding to an encoded message;

wherein said EIR terminal is configured, responsive to receiving an identifier from an external token, to ascertain whether said identifier identifies a user allowed to operate said EIR terminal.

A2. The EIR terminal of Al, wherein said external token is provided by one of: an RFID token, a wired interface token.

A3. The EIR terminal of Al, wherein said EIR terminal is configured to ascertain whether said identifier identifies a user allowed to operate said EIR terminal by looking up said identifier in a data structure stored in said memory.
A4. The EIR terminal of Al, wherein said EIR terminal is configured to ascertain whether said identifier identifies a user allowed to operate said EIR terminal by querying an external computer via said communication interface.

A5. The EIR terminal of Al, wherein said EIR terminal is configured to request said identifier responsive to one of: said EIR terminal being powered up, said EIR terminal receiving a user interface command, said EIR terminal detecting a presence of said external token, said EIR terminal reading an encoded information item, and an expiration of a pre-defined timeout.

A6. The EIR terminal of Al, wherein said EIR terminal is configured to request said identifier responsive to receiving a user interface command; and wherein said user interface command is provided by one of: a data transfer command, a terminal maintenance command.

A7. The EIR terminal of Al, wherein said EIR terminal is configured to request said identifier responsive to said EIR terminal reading an encoded information item; and wherein a decoded message corresponding to said encoded information item comprises one of: a data transfer command, a terminal maintenance command.

A8. The EIR terminal of Al, wherein said EIR terminal is configured to store in said memory a decoded message corresponding to an encoded information item and one of: said identifier, data derived from said identifier.

A9. The EIR terminal of Al, wherein said EIR terminal is configured to transmit to an external computer a decoded message corresponding to an encoded information item and one of: said identifier, data derived from said identifier.

A10. The EIR terminal of Al, wherein said EIR terminal is configured, responsive to receiving a identifier from an external token, to ascertain whether said identifier identifies a user
authorized to perform an action requested via one of: said user interface, said communication interface.
1. An encoded information reading (EIR) terminal comprising:
   a microprocessor communicatively coupled to a system bus;
   a memory communicatively coupled to said system bus;
   a communication interface coupled to said system bus;
   an EIR device communicatively coupled to said system bus, the EIR device selected from the group consisting of: a bar code reading device, an RFID reading device, and a card reading device;
   wherein said EIR device is configured to perform one of: outputting raw message data containing an encoded message, outputting decoded message data corresponding to an encoded message;
   wherein said EIR terminal is configured, responsive to receiving an identifier from an external token, to ascertain whether said identifier identifies a user allowed to operate said EIR terminal.

2. The EIR terminal of claim 1, wherein said external token is provided by one of: an RFID token, a wired interface token.

3. The EIR terminal of claim 1, wherein said EIR terminal is configured to ascertain whether said identifier identifies a user allowed to operate said EIR terminal by looking up said identifier in a data structure stored in said memory.

4. The EIR terminal of claim 1, wherein said EIR terminal is configured to ascertain whether said identifier identifies a user allowed to operate said EIR terminal by querying an external computer via said communication interface.

5. The EIR terminal of claim 1, wherein said EIR terminal is configured to request said identifier responsive to one of: said EIR terminal being powered up, said EIR terminal receiving
a user interface command, said EIR terminal detecting a presence of said external token, said EIR terminal reading an encoded information item, and an expiration of a pre-defined timeout.

6. The EIR terminal of claim 1, wherein said EIR terminal is configured to request said identifier responsive to receiving a user interface command; and
   wherein said user interface command is provided by one of: a data transfer command, a terminal maintenance command.

7. The EIR terminal of claim 1, wherein said EIR terminal is configured to request said identifier responsive to said EIR terminal reading an encoded information item; and
   wherein a decoded message corresponding to said encoded information item comprises one of: a data transfer command, a terminal maintenance command.

8. The EIR terminal of claim 1, wherein said EIR terminal is configured to store in said memory a decoded message corresponding to an encoded information item and one of: said identifier, data derived from said identifier.

9. The EIR terminal of claim 1, wherein said EIR terminal is configured to transmit to an external computer a decoded message corresponding to an encoded information item and one of: said identifier, data derived from said identifier.

10. The EIR terminal of claim 1, wherein said EIR terminal is configured, responsive to receiving a identifier from an external token, to ascertain whether said identifier identifies a user authorized to perform an action requested via one of: said user interface, said communication interface.
FIG. 2
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

G06K 7/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G06K; H04J; H04L; H04B; H04W; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, CNPAT: encoded information reading, EIR, read, identifier, RFID, radio frequency identification, tag, label, token, external, authenticate, user, operator, allow

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US2011/01 16424A1 (HAND HELD PRODUCTS, INC.) 19 May 2011 (19.05.2011) paragraphs [0035]-[0040] of the description, figure 3</td>
<td>1-10</td>
</tr>
<tr>
<td>Y</td>
<td>CN200972678Y (XUDE DIGITAL CO., LTD. ET AL.) 07 Nov. 2007(07.11.2007) pages 4-5 of the description</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>CN101924570A (HAND HELD PRODUCTS, INC.) 22 Dec. 2010(22.12.2010) the whole document</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>CN101593330A (EHS CO., LTD.) 02 Dec. 2009(02.12.2009) the whole document</td>
<td>1-10</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"I" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
31 August 2012 (31.08.2012)

Date of mailing of the international search report

Name and mailing address of the ISA/CN
The State Intellectual Property Office, the P.R.China
6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088
facsimile No. 86-10-62019451

Authorized officer
YAN,Yan
Telephone No. (86-10) 624 13507

Form PCT/ISA/210 (second sheet) (July 2009)
<table>
<thead>
<tr>
<th>Patent Documents referred in the Report</th>
<th>Publication Date</th>
<th>Patent Family</th>
<th>Publication Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CN102184376A</td>
<td>14.09.2011</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2011124993A</td>
<td>23.06.2011</td>
</tr>
<tr>
<td>CN200972678Y</td>
<td>07.11.2007</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP2261834A1</td>
<td>15.12.2010</td>
</tr>
<tr>
<td>CN101593330A</td>
<td>02.12.2009</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>US2011/0259963A1</td>
<td>27.10.2011</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>