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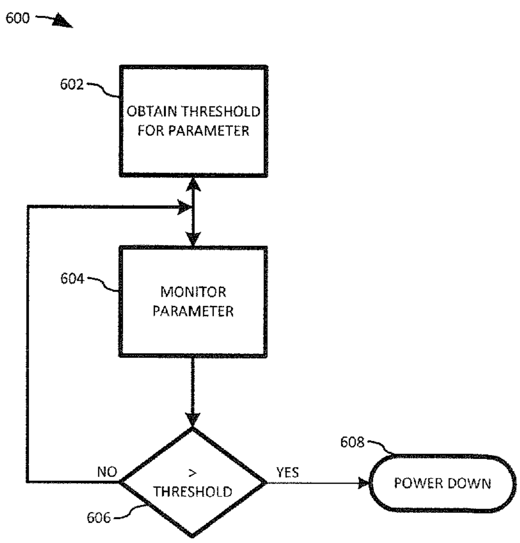

FIG. 6

(57) **Abstract**: In an example embodiment, a power controller is operable to monitor a parameter with a selectively set threshold associated with a powered device. If the device exceeds the threshold, the powered device can be shut down. Examples of parameters that may be monitored include but are not limited to current, under voltage, or a combination of current and under voltage. In particular embodiments, the ambient temperature of an area may be monitored. The ambient temperature may be employed with the monitored parameter to determine whether to shut down one or more powered devices.

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POWER CONTROL HUB

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to US Patent Application No.62/063,130 filed on October 13, 2014, which is hereby incorporated by referenced herein.

TECHNICAL FIELD

[0002] The present disclosure relates generally to controlling power of an automated banking machine.

BACKGROUND

[0003] Automated banking machines may include a card reader that operates to read data from a bearer record such as a user card. Automated banking machines may operate to cause the data read from the card to be compared with other computer stored data related to the bearer or their financial accounts. The machine operates in response to the comparison determining that the bearer record corresponds to an authorized user, to carry out at least one transaction which may be operative to transfer value to or from at least one account. A record of the transaction is often printed through operation of the automated banking machine and provided to the user. Automated banking machines may be used to carry out transactions such as dispensing cash, the making of deposits, the transfer of funds between accounts and account balance inquiries. The types of banking transactions that may be carried out are determined by the capabilities of the particular banking machine and system, as well as the programming of the institution operating the machine.

[0004] Other types of automated banking machines may be operated by merchants to carry out commercial transactions. These transactions may include, for example, the acceptance of deposit bags, the receipt of checks or other financial instruments, the dispensing of rolled coin, or other transactions required by merchants. Still other types of automated banking machines may be used by service providers in a transaction environment such as at a bank to carry out financial transactions. Such transactions may include for example, the counting and storage of currency notes or other financial instrument sheets, and other types of transactions. For purposes of this disclosure an automated banking machine, automated transaction machine or an automated teller machine (ATM) shall be deemed to include any machine that may be used to automatically carry out transactions involving transfers of value.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The accompanying drawings incorporated herein and forming a part of the specification illustrate the example embodiments.

[0006] FIG. 1 illustrates an example of an automated banking machine upon which an example embodiment can be implemented.

[0007] FIG. 2 is a side view of the automated banking machine illustrated in FIG. 1.

[0008] FIG. 3 illustrates an example of a power control hub that can operate in accordance with an example embodiment.

[0009] FIG. 4 is a block diagram illustrating an example of a power controller with multiple power control hubs coupled with multiple powered devices associated with an automated banking machine.

[0010] FIG. 5 is a block diagram that illustrates a computer system upon which an example embodiment may be implemented

[0011] FIG. 6 illustrates an example of a methodology for controlling power devices.

OVERVIEW OF EXAMPLE EMBODIMENTS

[0012] The following presents a simplified overview of the example embodiments in order to provide a basic understanding of some aspects of the example embodiments. This overview is not an extensive overview of the example embodiments. It is intended to neither identify key or critical elements of the example embodiments nor delineate the scope of the appended claims. Its sole purpose is to present some concepts of the example embodiments in a simplified form as a prelude to the more detailed description that is presented later.

[0013] In accordance with an example embodiment, there is disclosed herein a power controller having power controller logic and a port. The power controller logic is operable to obtain data representative of a selectively variable threshold for a parameter associated with a powered device coupled with the port. The power controller logic is operable to obtain data representative of a measurement of the parameter at the port. The power controller logic is operable to shut off power to the port responsive to determining the measurement of the parameter exceeds the threshold for the parameter. Other example embodiments include corresponding methods and computer readable medium of instructions that when executed implement the functionality of the power controller logic.

[0014] In accordance with an example embodiment, there is disclosed herein a tangible, non-transitory computer readable medium of execution having instructions encoded thereon for execution by a processor and when executed operable to obtain data representative of a selectively variable threshold for a parameter associated with a powered device coupled with a port. The instructions are also operable to obtain data representative of a measurement of the parameter at the port. The instructions are operable to determine whether the measurement of the parameter exceeds the selectively variable threshold. The instructions are further operable to shut off power to the port responsive to determining the measurement of the parameter exceeds the selectively variable threshold for the parameter.

[0015] In accordance with an example embodiment, there is disclosed herein an apparatus, such as, for example, an automated banking machine, that comprises a housing and a fascia coupled with the housing. A DIP reader, a cardless card reader, an encrypting personal identification number (PIN) pad, and a first power control hub comprising first power control logic and a plurality of first power control hub ports operatively coupled with the power control logic are coupled to the fascia. The DIP reader is coupled to a first of the plurality of first power control hub ports, the cardless card reader is coupled to a second of the plurality of first power control hub ports, and the encrypting PIN pad is coupled to a third of the plurality of first power control hub ports. The first power controller logic is operable to obtain data representative of a selectively variable thresholds for the plurality of first power control hub ports. The first power controller logic is operable to obtain data representative of measurements from the plurality of first power control ports, and to shut off power to a selected port from the plurality of first power control ports responsive to determining the measurement exceeds the threshold for the selected port. A printer, a card reader, and a second power control hub a second power control hub comprising second power control logic and a plurality of second power control hub ports operatively coupled with the power control logic are coupled to the housing. The printer is coupled to a first of the plurality of second power control hub ports and the card reader is coupled to a second of the plurality of second power control hub ports. The second power controller logic is operable to obtain data representative of selectively variable thresholds for the plurality of second power control hub ports. The second power controller logic is operable to obtain data representative of measurements from the plurality of second power control ports to shut off power to a selected port from the plurality of second power control ports responsive to determining the measurement exceeds the threshold for the selected port.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0016] This description provides examples not intended to limit the scope of the appended claims. The figures generally indicate the features of the examples, where it is understood and appreciated that like reference numerals are used to refer to like elements. Reference in the specification to "one embodiment" or "an embodiment" or “an example embodiment” means that a particular feature, structure, or characteristic described is included in at least one embodiment described herein and does not imply that the feature, structure, or characteristic is present in all embodiments described herein.

[0017] FIG. 1 illustrates an example of an automated banking machine 10 upon which an example embodiment can be implemented. In an example embodiment, the automated banking machine 10 operates to cause financial transfers using information read from data bearing records such as user cards. Those skilled in the art should readily appreciate that the illustrated example (an automated teller machine or “ATM”) was selected merely for ease of illustration and that the example embodiments described herein are not limited to any particular type of automated banking machine. The example automated banking machine 10 includes a housing 12. In the illustrated embodiment, the housing 12 includes an upper housing area 14 and a lower housing area 16. The lower housing area 16 includes a secure chest portion 18. Access to an interior area of the chest portion 18 is controlled by a chest door 20 (see FIG. 2), which when unlocked allows access to the interior area 22 of the chest area. In an example embodiment, access to the upper housing area 14 may be made through an appropriate opening in the housing 12. The opening to the interior area of the upper housing portion 14 may also be controlled by a movable door 150 that may be in a front, rear or side of the upper housing area 14. In other embodiments, the housing may include several openings to the interior area. In an exemplary embodiment, the chest door 20 may be situated at the front of the housing, for so called "front-load" ATMs or at the rear of the housing for "rear-load" ATMs. Examples of ATM housing structures are shown in U.S. Pat. Nos. 7,156,296; 7,156,297; 7,165,767; and 7,004,384, the disclosures of which are herby incorporated herein by reference.

[0018] In an example embodiment, the ATM 10 includes a number of transaction function devices. These transaction function devices include, but are not limited to, a card reader 24 and a keypad 26. The card reader 24 and the keypad 26 serve as input devices through which users can input instructions and information. It should be understood that as referred to herein the keypad may include function keys or touch screen areas which may be used in embodiments to input data into the machine. ATM 10 further includes a visual display 28 generally operative as an output device to provide information to users of the machine. The information provided may include information concerning cash dispensing transactions. The card reader 24 is used to read data from user cards that can be used to identify customer financial accounts to the machine. In some embodiments the card reader may be a magnetic stripe type reader. In other embodiments the card reader may be a smart card reader, or a contactless reader such as a radio frequency identification (RFID) reader or near-field communication (NFC) reader. Particular embodiments may include camera 52.

[0019] In an example embodiment, as will be described in more detail herein *infra*, ATM 10 comprises a power controller (PC) hub. The PC Hub may monitor power consumption of a plurality of ports, ambient temperature, or both. The PC hub may remove power if the power consumption or ambient temperature exceeds a selectively variable threshold.

[0020] FIG. 2 shows a schematic view of an example hardware configuration of ATM 10. The ATM 10 includes additional transaction function devices. Such transaction function devices may include a document dispensing mechanism, including a dispenser, schematically indicated 30, which operates to cause sheets such as currency bills or other documents of value stored within the machine to be delivered from the machine to a machine user. Such mechanisms are referred to herein as a cash dispenser. Examples of such cash dispensers are shown in U.S. Pat. Nos. 7,121,461; 7,131,576; 7,140,537; 7,140,607; 7,144,006; and 7,000,832 the disclosures of which are incorporated herein by reference.

[0021] The exemplary ATM 10 further includes a depository 32. The depository 32 accepts deposits such as cash or other instruments such as checks from customers. It should be understood that in other embodiments other types of depositories which accept various types of items representative of value may be used. Examples of depository devices are shown in U.S. Pat. Nos. 7,156,295; 7,137,551; 7,150,394; and 7,021,529 the disclosures of which are incorporated hereby by reference. Exemplary

ATMs may also include a note acceptor of the types described in the incorporated disclosures. The exemplary embodiment may include a printer 34 operative to print customer receipts related to the transaction. The exemplary embodiment may include other transaction function devices, such as a coin dispenser, coin acceptor, currency stacker, ticket accepting devices, stamp accepting devices, card dispensing devices, money order dispensing devices, and other types of devices which are operative to carry out transaction functions. Some of these devices may be located in the upper or lower housing areas, all generally schematically represented as 36. It should be understood that the embodiment shown is merely illustrative and automated banking machines of various embodiments may include a variety of transaction function devices and component combinations.

[0022] In an example embodiment, the automated banking machine includes a camera 52. The images captured by the camera 52 may be used, for example, to verify identity and/or provide security for the ATM 10 or users thereof. In an example embodiment, the ATM 10 may further include a data store 50 containing data corresponding to images of unauthorized users of the ATM 10. In an example embodiment10, a controller 48 is able to compare data corresponding to the images captured by camera 52 with data in the data store 50 corresponding to unauthorized users. If the data generated by camera(s) 52 corresponds to unauthorized user, the controller 48 is operative to carry out instructions, such as to activate an indicator which indicates the presence of the unauthorized user. The indicator may be an audible alarm, a message to a remote entity, a machine shut-down operation, or any other action able to indicate attempted use of or access to the machine by an unauthorized user. Alternatively, in some embodiments the data store 50 may be located remotely. In other embodiments the data stored in data store 50 may correspond to authorized users. Determining through operation of one or more controllers 48 that image data corresponds to an authorized user may permit such authorized users to carry out certain operations.

[0023] In the example embodiment, ATM 10 also includes a movable image capture device 58 such as a camera, in operative connection with interface bus 42. When the ATM 10 is in an operational mode, the movable image capture device 58 may be housed within the upper housing area 14. Alternately, a movable device may be housed within the lower housing area 12. Alternatively, in some embodiments, the movable image capture device 58 may be brought to the ATM 10 by a servicer and operatively connected to at least one controller 48, such as by plugging in a cable connected to a camera to a USB (Universal Serial Bus) port. After a servicer attains access to the interior of the ATM housing, the movable image capture device 58 may be utilized to aid servicing of the ATM 10.

[0024] Those skilled in the art should readily appreciate that the components and layout used in FIGs 1 and 2 were selected for ease of illustration. Therefore, the example embodiments should not be construed as limited to the illustrated architectures.

[0025] FIG. 3 illustrates an example of a power control 300 hub suitable for use with ATM 10 described in FIGs 1 and 2. For example, power control hub 300 may be employed to provide power to transaction function devices associated with ATM 10, such as card reader 24, keypad 26, visual display 28, camera 52, dispenser 30, printer 34, controller 48, movable image capture device 58, or any combination of the aforementioned devices. The power control hub 300 illustrated in FIG. 3 has one port 304, however, those skilled in the art should readily appreciate that in other embodiments, the power control hub 300 may have any physically realizable number of ports (*see e.g.*,. FIG. 4).

[0026] The power control hub 300 comprises power controller logic (PC Logic) 302 and a port 304 that is coupled with a powered device 306. “Logic”, as used herein, includes but is not limited to hardware, firmware, software and/or combinations of each to perform a function(s) or an action(s), and/or to cause a function or action from another component. For example, based on a desired application or need, logic may include a software controlled microprocessor, discrete logic such as an application specific integrated circuit (ASIC), a programmable/programmed logic device, memory device containing instructions, or the like, or combinational logic embodied in hardware. Logic may also be fully implemented in software embodied on a tangible, non-transitory computer-readable medium that performs the described functionality when executed by processor.

[0027] In an example embodiment, the port 304 may be a USB (Universal Serial Bus) port, such as USB 1.0, USB 2.0, or USB 3.0. In embodiments with multiple ports, (see e.g., FIG. 4), different ports may employ different protocols (for example in FIG. 4 the ports associated with PC Hub 404 may employ USB 3.0 and the ports associated with the second PC Hub may employ USB 2.0, or visa versa).

[0028] In an example embodiment, the power controller logic 302 is operable to obtain data representative of a selectively variable (e.g., programmable) threshold for a parameter associated with a powered device coupled with the port. The selectively variable threshold may be input by a user. in particular embodiments, the selectively variable threshold may be input by a user from a remote location. In an example embodiment, the powered controller may obtain the selectively variable threshold from a request sent by the powered device 306. The parameter may be any suitable parameter such as current used by the powered device (or current passing though the port 304), an under voltage value for the voltage at the port 304, the ambient temperature of a predefined area, for example the ambient temperature of the circuit card assembly (CCA) 308 for the power controller logic 302. In particular embodiments, a plurality of selectively variable thresholds corresponding to a plurality of parameters (e.g., current and ambient temperature, under voltage and ambient temperature, or current and under voltage) may be obtained.

[0029] The power controller logic 302 is operable to obtain data representative of a measurement of the parameter from the port 304. The power controller logic is operable to shut off power to the port responsive to determining the measurement of the parameter exceeds the threshold for the parameter.

[0030] In an example embodiment, the power controller further comprises a temperature sensor 310. The power controller logic 302 is further operable to shut off power to the port 304 responsive to the temperature sensor sensing a temperature above a predetermined threshold. In particular embodiments, where a plurality of ports 304 are associated with the power controller logic 302 (*see e.g.*, FIG. 4), the power controller logic 302 may be operable to shut off power to all or a selected set of ports. In an example embodiment, the temperature sensor 310 senses an ambient temperature at a circuit board 308 associated with the power control hub 300.

[0031] In an example embodiment, the power controller logic 302 is operable to shut off power to the port 304 responsive to determining the measurement of the parameter exceeds the threshold for the parameter for longer than a predetermined time period. Thus, spikes of short duration will not result in power to the port 304 being shut off. Similarly, the power controller logic 302 may not shut off power until the ambient temperature sensed by temperature sensor 310 exceeds a predetermined threshold for longer than a predetermined time period.

[0032] In an example embodiment, the power controller logic 302 is coupled with a plurality of ports (*see e.g.*, FIG. 4). The selectively variable threshold can vary by individual port (*e.g.*, 5 mA at a first port, 500 mA at a second port, etc.) or different ports may employ different parameters (*e.g.*, 500 mA at a first port, or less than 2.5V at a second port). The power controller logic 302 is operable to obtain data representative of a measurement for the plurality of ports. The power controller logic 302 is operable to shut off power to a selected one of the plurality of ports responsive to determining the measurement of the parameter at the selected one of the plurality of ports exceeds the threshold for the parameter.

[0033] In an example embodiment, the powered device 306 may by any suitable device employed in an automated backing machine. For example the powered device 306 may be a primary display, a motorized card reader, a secure card reader, a media accepter, a cash dispenser, a receipt printer, a journal printer, a statement/passbook printer, a contactless card reader, a dip reader, encrypted pin pad, biometric reading device, barcode scanner, a secondary display, or any combination of the aforementioned devices (see, for example, FIG. 4).

[0034] FIG. 4 is a block diagram illustrating an example of a power controller 400 with multiple power control (PC) hubs 404 , 406 with power controller logic 302 that are coupled with multiple powered devices 410, 411, 412, 413, 414, 415, 420, 421, 422, 423, 424, 425, 426, 427 associated with an automated banking machine 10. In the illustrated example, the PC hubs 404, 406 are coupled with a power source 402.

The Power source 402 may be any suitable power source such as utility power, battery power, or solar power.

[0035] The PC 404, 406 Hubs may be co-located or remotely located from each other. For example, in an automated teller machine (such as ATM 10 in FIG. 1), the first hub 404 may be located on the fascia 38 of the ATM while the second PC Hub may be located inside a housing (e.g. upper housing 14 or lower housing 12) of an ATM.

[0036] In the illustrated example, the first PC hub 404 is coupled with a contactless card reader 410, a DIP reader 411, an Encrypting Pin Pad (EPP) 412, a biometric reading device 413, a barcode reader 414, and a secondary display 415. The second PC Hub 406 is coupled with a primary display 420, motorized card reader 411, secure card reader 422, media accepter (such as a cash accepter, check accepter or mixed media accepter "MMA") 423, a dispenser (such as a cash dispenser) 424, a receipt printer 425, journal printer 426, and a statement/passbook printer 427. Those skilled in the art should readily appreciate that the example embodiments described herein do not require all of the powered devices listed herein and that the principles of the example embodiments described herein apply to automated banking machines or ATMs with different combinations of powered devices than those described herein.

[0037] As described herein *supra*, different selectively variable thresholds may be set for different ports, or different ports may have different parameters. For example, the selectively variable threshold parameter for the port coupled with the contact card reader 410 may be a first current value, while the selectively variable threshold parameter for the port coupled with DIP reader 411 may be a second current value, and a different selectively variable threshold parameter (e.g., an under voltage value) may be set for the port coupled with the EPP 412. The PC logic 302 on PC Hub 404 obtains measurements for the powered devices 410, 411, 412, 413, 414, 415 coupled with the first PC Hub 404 and can shut off power to a port to any individual, or combination of devices, e.g., any one, or combination of the contactless card reader 410, a DIP reader 411, an Encrypting Pin Pad (EPP) 412, a biometric reading device 413, a barcode reader 414, and a secondary display 415 upon detecting the measurement for the parameter (e.g., under voltage or current) exceeds the selectively variable threshold. This can enable the PC logic 302 to protect the PC Hub 404, the powered device that is exceeding the threshold, or both. Similarly, in an example embodiment, if the PC log 302 of the first hub 404 detects an ambient temperature of a predetermined threshold, the PC logic 302 can shut off power to any one or combination of the powered devices (*e.g.*, contactless card reader 410, a DIP reader 411, an Encrypting Pin Pad (EPP) 412, a biometric reading device 413, a barcode reader 414, and a secondary display 415), or the PC Hub 404 to protect the PC Hub 404 and the powered devices. As those skilled in the art can readily appreciate, the PC logic 302 associated with the second PC Hub 406 can function similarly.

[0038] FIG. 5 is a block diagram that illustrates a computer system 500 upon which an example embodiment may be implemented. Computer system 500 is suitable for implementing the functionality of PC logic 302 described in FIGs 3 and 4.

[0039] Computer system 500 includes a bus 502 or other communication mechanism for communicating information and a processor 504 coupled with bus 502 for processing information. Computer system 500 also includes a main memory 506, such as random access memory (RAM) or other dynamic storage device coupled to bus 502 for storing information and instructions to be executed by processor 504. Main memory 506 also may be used for storing a temporary variable or other intermediate information during execution of instructions to be executed by processor 504. Computer system 500 further includes a read only memory (ROM) 508 or other static storage device coupled to bus 502 for storing static information and instructions for processor 504. A storage device 510, such as a magnetic disk or optical disk, is provided and coupled to bus 502 for storing information and instructions.

[0040] Computer system 500 may be coupled via bus 502 to a display 512 such as a cathode ray tube (CRT) or liquid crystal display (LCD), for displaying information to a computer user. An input device 514, such as a keyboard including alphanumeric and other keys is coupled to bus 502 for communicating information and command selections to processor 504. Another type of user input device is cursor control 516, such as a mouse, a trackball, or cursor direction keys for communicating direction information and command selections to processor 504 and for controlling cursor movement on display 512. This input device typically has two degrees of freedom in two axes, a first axis (*e.g.* x) and a second axis (*e.g.* y) that allows the device to specify positions in a plane. Those skilled in the art should readily appreciate that display 512, input device 514, and cursor control 516 may be coupled to bus 502 of computer system 502 from a remote location or may be coupled via a removable connections such as a plug in device. In other embodiments, display 512, input device 514, and cursor control 516 may be combined, for example a touch screen.

[0041] An aspect of an example embodiment is related to the use of computer system 500 for a power control hub. According to one embodiment, the functionality of the power control hub is provided by computer system 500 in response to processor 504 executing one or more sequences of one or more instructions contained in main memory 506. Such instructions may be read into main memory 506 from another computer-readable medium, such as storage device 510. Execution of the sequence of instructions contained in main memory 506 causes processor 504 to perform the process steps described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 506. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions to implement an example embodiment. Thus, embodiments described herein are not limited to any specific combination of hardware circuitry and software.

[0042] The term "computer-readable medium" as used herein refers to any medium that participates in providing instructions to processor 504 for execution. Such a medium may take many forms, including but not limited to non-volatile media. Non-volatile media include for example optical or magnetic disks, such as storage device 510. Common forms of computer-readable media include for example floppy disk, a flexible disk, hard disk, magnetic cards, paper tape, any other physical medium with patterns of holes, a RAM, a PROM, an EPROM, a FLASHPROM, CD, DVD or any other memory chip or cartridge, or any other medium from which a computer can read.

[0043] Computer system 500 also includes a communication interfaces, or ports, 518, 520 coupled to bus 502. In the illustrated example n ports are illustrated where n is any integer greater than one. However, those skilled in the art should readily appreciate that computer system 500 may have as few as one port or any physicially realizable number of ports. Communication interfaces 518, 520 provides a power, and in some embodiments two-way data communication, to power devices 522 and 524 respectively.

[0044] For example, the processor 504 may obtain data representative of a selectively variable threshold parameter via input device 514 of powered device 522 coupled with port 518 (port 1). Alternatively, the processor 504 may obtain the data representative of the selectively variable threshold parameter from the powered device (for example from powered device 524 coupled with port 520). Processor 504 monitors the appropriate parameter for the ports 518, 520 (for example ports 518, 520 may provide processor 504 with measurements for the parameter) and can selectively shut off power to ports 522, 524 individually or in combination if a parameter exceeds its selectively variable threshold value.

[0045] In view of the foregoing structural and functional features described above, a methodology 600 in accordance with an example embodiment will be better appreciated with reference to FIG. 6. While, for purposes of simplicity of explanation, the methodology 600 of FIG. 6 is shown and described as executing serially, it is to be understood and appreciated that the example embodiment is not limited by the illustrated order, as some actions could occur in different orders and/or concurrently with other actions from that shown and described herein. Moreover, not all illustrated features may be required to implement a methodology in accordance with an example embodiment. The methodology 600 described herein is suitably adapted to be implemented in hardware, software, software when executed by a processor (such as computer system 500 in FIG. 5), or a combination thereof. For example, methodology 600 may be implemented by PC logic 302 described in FIGs 3 and 4.

[0046] At 602, the selectively variable threshold for a parameter to be monitored is obtained. The parameter may be any suitable parameter such as current, voltage, under voltage, ambient, temperature. The parameter may be obtained by any suitable technique. For example, the threshold may be manually input, input by a remote device (for example a device programming processor 504 in FIG. 5), or from a powered device itself (for example the device may request a certain amount of power and as needed request changes to the amount of power).

[0047] At 604, the parameter is monitored. For example, measurements taken at the port for a powered device, such as current, voltage and/or ambient temperature may be obtained.

[0048] At 606, a determination is made whether the measurement for the parameter exceeds the selectively variable threshold. If the measurement of the parameter exceeds the threshold (YES), then the port is powered down as illustrated at 608. In particular embodiments, the port will not be powered down unless the measurement has exceeded the threshold for longer than a predetermined time period.

[0049] If, however, at 606 a determination is made that the measurement does not exceed the threshold value, or has exceeded for less than a predetermined time period (NO), the mythology 600 continues. For example, another measurement for the port may be obtained at 604, or a new value for the threshold may be obtained at 602.

[0050] The actions described in 602, 604, 606 may be repeated as often as desired. For example, the parameter may be monitored continuously, periodically, or aperiodically. Similarly, the threshold for the parameter may be changed at any time.

[0051] Described above are example embodiments. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the example embodiments, but one of ordinary skill in the art will recognize that many further combinations and permutations of the example embodiments are possible. Accordingly, it is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of any claims filed in applications claiming priority hereto interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled.

CLAIM(S)

1. An apparatus, comprising:
a power control hub having power controller logic and a port;
the power controller logic is operable to obtain data representative of a selectively variable threshold for a parameter associated with a powered device coupled with the port;
the power controller logic is operable to obtain data representative of a measurement of the parameter from the port; and
the power controller logic is operable to shut off power to the port responsive to determining the measurement of the parameter exceeds the threshold for the parameter.

2. The apparatus set forth in claim 1, wherein the parameter is current passing through the port.

3. The apparatus set forth in claim 1, wherein the parameter is an under voltage value for the port.

4. The apparatus set forth in claim 1, wherein power controller logic obtains the data representative of the selectively variable threshold is obtained from the powered device via the port.

5. The apparatus set forth in claim 1, further comprising a temperature sensor coupled with the power controller logic, wherein the power controller logic is further operable to shut off power to the port responsive to the temperature sensor sensing a temperature above a predetermined threshold.

6. The apparatus set forth in claim 6, wherein the temperature sensor senses an ambient temperature at a circuit board associated with the power controller.

7. The apparatus set forth in claim 1, wherein the power controller logic is operable to shut off power to the port responsive to determining the measurement of the parameter exceeds the threshold for the parameter for longer than a predetermined time period.

8. The apparatus set forth in claim 1, wherein the power controller logic is coupled with a plurality of ports.

9. The apparatus set forth in claim 9, wherein the selectively variable threshold varies by individual port.

10. The apparatus set forth in claim 9, wherein the power controller logic is operable to obtain data representative of a measurement for the plurality of ports; and

the power controller logic is operable to shut off power to a selected one of the plurality of ports responsive to determining the measurement of the parameter at the selected one of the plurality of ports exceeds the threshold for the parameter.

11. The apparatus set forth in claim 1, wherein the powered device is selected from a group consisting of a primary display, a motorized card reader, a secure card reader, a media accepter, a cash dispenser, a receipt printer, a journal printer, and a statement printer.

12. The apparatus set forth in claim 1, wherein the powered device is selected from a group consisting of a contactless card reader, a dip reader, encrypted pin pad,

biometric reading device, barcode scanner, and a secondary display.

13. The apparatus set forth in claim 1, further comprising a temperature sensor; and wherein the power controller logic is operable to to shut off power to the port responsive to determining the measurement of the parameter exceeds the threshold for the parameter for longer than a predetermined time, and the temperature sensor sensing a temperature above a predetermined threshold.

14. A tangible, non-transitory computer readable medium of execution having instructions encoded thereon for execution by a processor and when executed operable to:

obtain data representative of a selectively variable threshold for a parameter associated with a powered device coupled with a port;

obtain data representative of a measurement of the parameter at the port;

determine whether the measurement of the parameter exceeds the selectively variable threshold; and

shut off power to the port responsive to determining the measurement of the parameter exceeds the selectively variable threshold for the parameter.

15. The tangible, non-transitory computer readable medium set forth in claim 14, wherein the parameter is selected for a group consisting of current passing through the port and an undervoltage value.

16. The tangible, non-transitory computer readable medium set forth in claim 14, the instructions are further operable to:

obtain data representative of an ambient temperature;

determine whether the ambient temperature exceeds a predetermined threshold; and shut off power to the device responsive to one of a group consisting of determining the measurement of the parameter exceeds the threshold for the parameter and the temperature exceeds the predetermined threshold.

17. The tangible, non-transitory computer readable medium set forth in claim 14, the instructions are further operable to:

determine a time period that the measurement of the parameter exceeded the selectively variable threshold; and

shut off power to the port responsive to determining the measurement of the parameter exceeded the selectively variable threshold for longer than a predetermined time period.

18. The tangible, non-transitory computer readable medium set forth in claim 14, wherein

obtain data representative of a selectively variable threshold for a parameter associated with a powered device coupled for a plurality of ports;

wherein the selectively variable threshold varies by individual port.

19. The tangible, non-transitory computer readable medium set forth in claim 18, the instructions are further operable to:

obtain data representative of a measurement for individual ports of the plurality of ports; and

power off a selected one of the plurality of ports responsive to determining the measurement of the parameter at the selected one of the plurality of ports exceeds the threshold for the parameter.

20. An apparatus, comprising, comprising:

a housing:

a fascia coupled with the housing;

a DIP reader mounted on the fascia;

a cardless card reader coupled with the fascia;

an encrypting personal identification number (PIN) pad mounted on the fascia;

a first power control hub comprising first power control logic and a plurality of first power control hub ports operatively coupled with the power control logic, wherein the DIP reader is coupled to a first of the plurality of first power control hub ports, the cardless card reader is coupled to a second of the plurality of first power control hub ports, and the encrypting PIN pad is coupled to a third of the plurality of first power control hub ports;

wherein the first power controller logic is operable to obtain data representative of a selectively variable thresholds for the plurality of first power control hub ports;

wherein the first power controller logic is operable to obtain data representative of measurements from the plurality of first power control ports; and

the power controller logic is operable to shut off power to a selected port from the plurality of first power control ports responsive to determining the measurement exceeds the threshold for the selected port;

a printer coupled with the housing;

a card reader coupled with the housing: and

a second power control hub comprising second power control logic and a plurality of second power control hub ports operatively coupled with the power control logic, wherein the printer is coupled to a first of the plurality of second power control hub ports, the card reader is coupled to a second of the plurality of second power control hub ports;

wherein the second power controller logic is operable to obtain data representative of a selectively variable thresholds for the plurality of second power control ports; and

wherein the second power controller logic is operable to obtain data representative of measurements from the plurality of second power control ports; and

the power controller logic is operable to shut off power to a selected port from the plurality of second power control ports responsive to determining the measurement exceeds the threshold for the selected port.

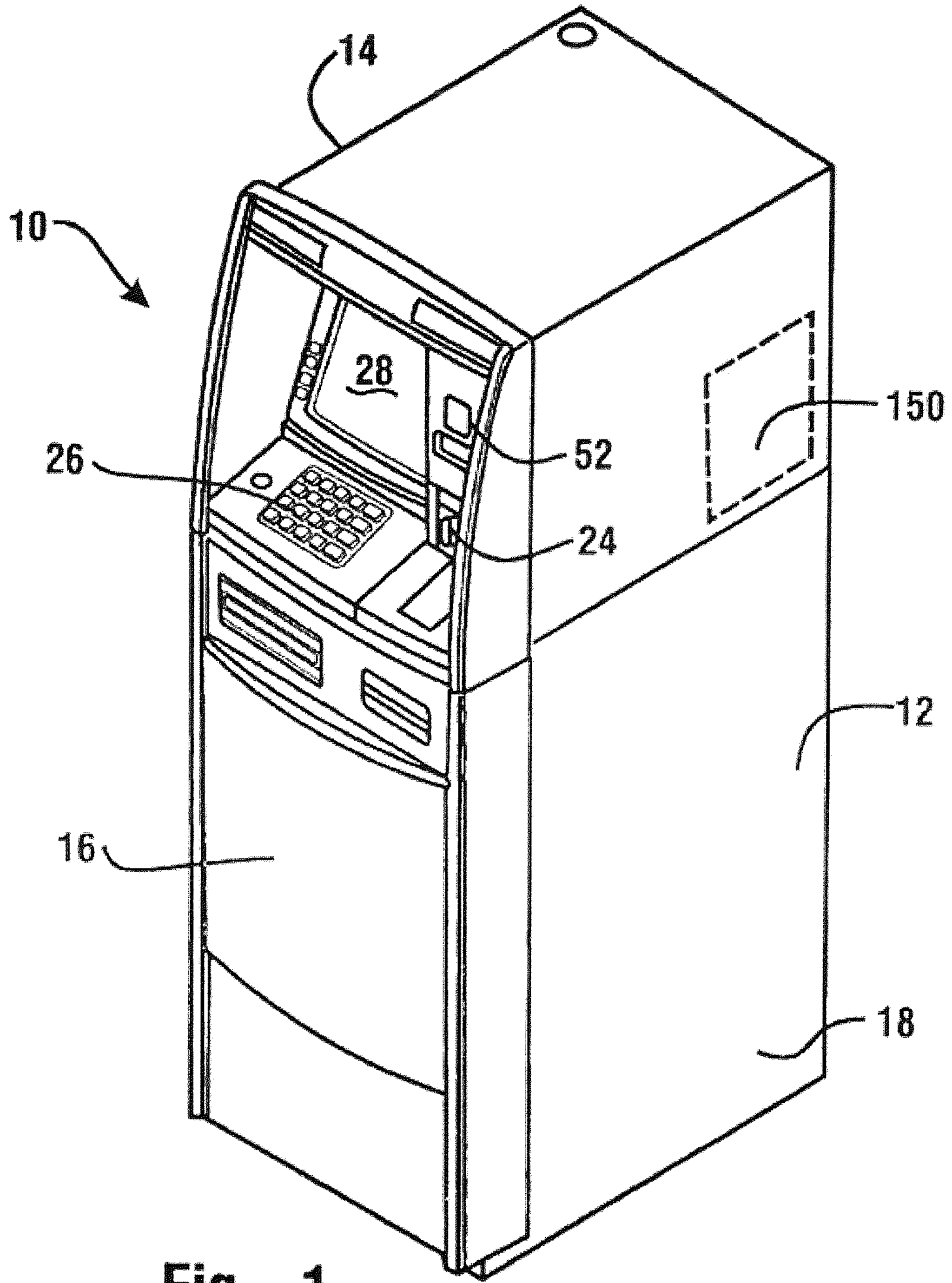

Fig. 1

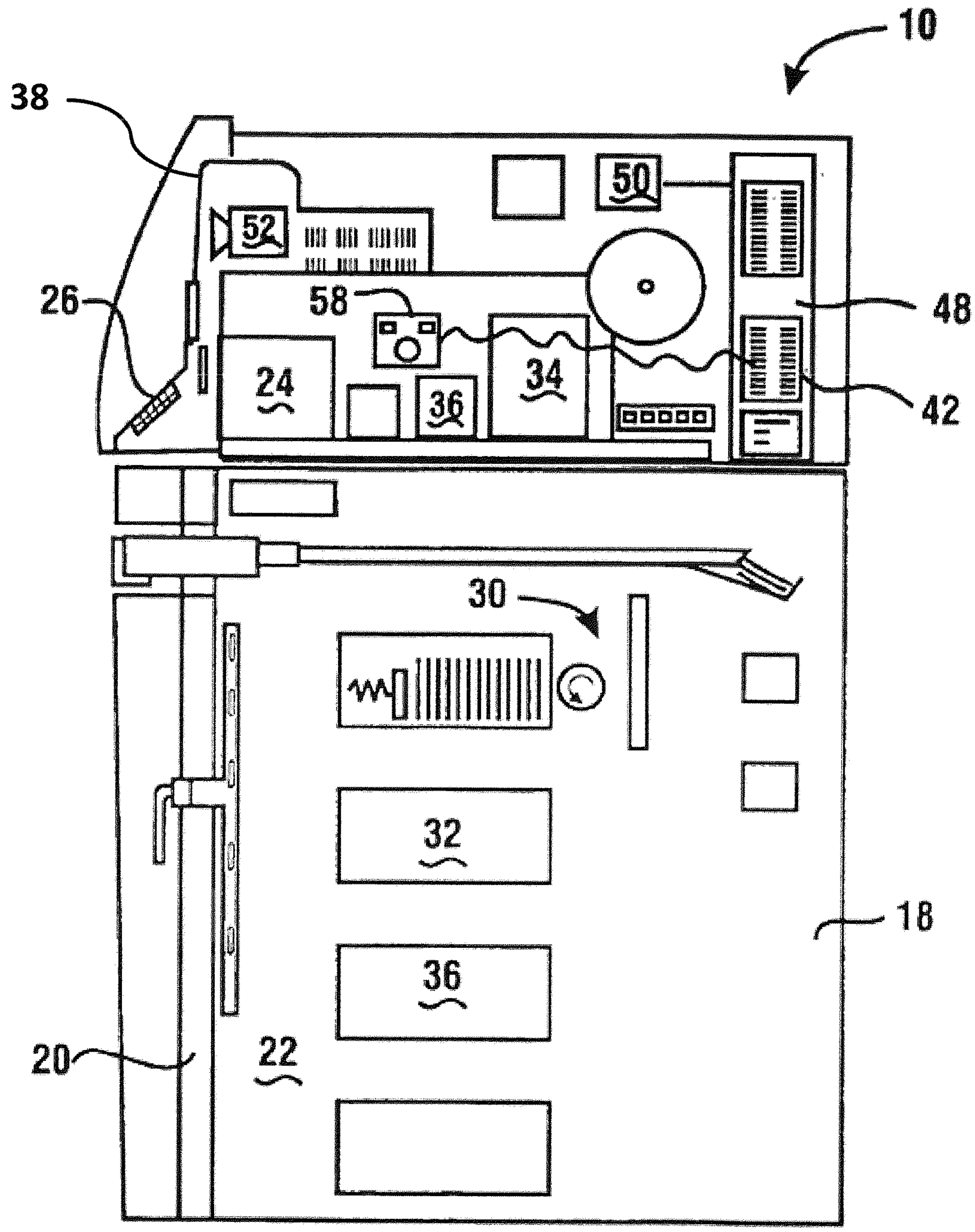

Fig. 2

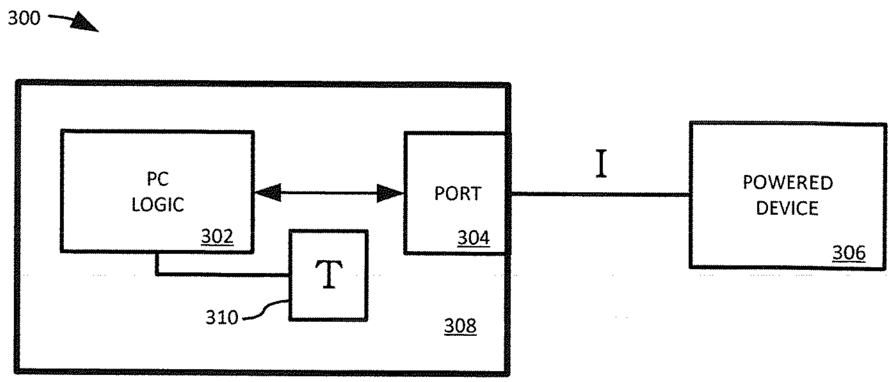
300
PC
LOGIC
302
PORT
304
I
POWERED
DEVICE
306
T
310
308

FIG. 3

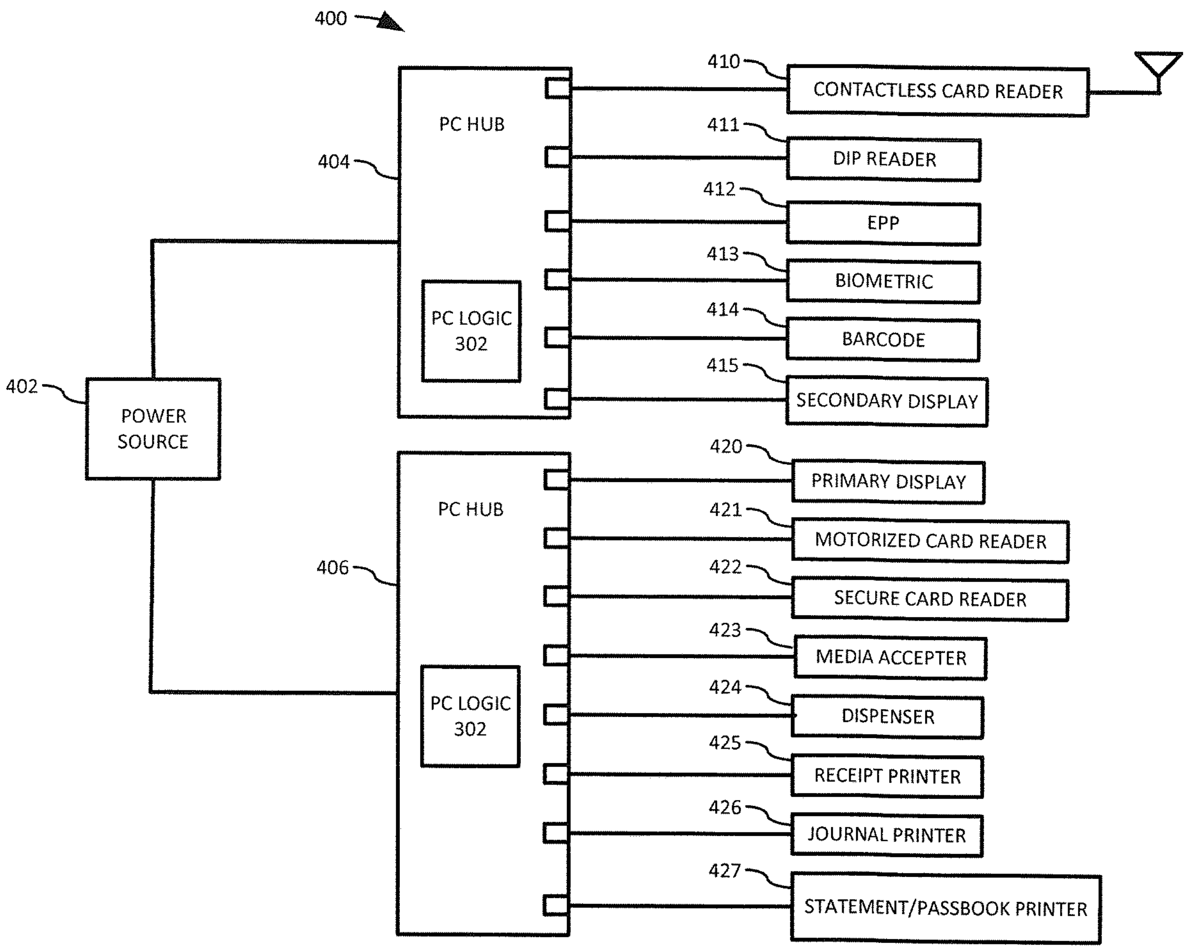
400
PC HUB
404
PC LOGIC
302
410
CONTACTLESS CARD READER
411
DIP READER
412
EPP
413
BIOMETRIC
414
BARCODE
415
SECONDARY DISPLAY
402
POWER
SOURCE
PC HUB
406
PC LOGIC
302
420
PRIMARY DISPLAY
421
MOTORIZED CARD READER
422
SECURE CARD READER
423
MEDIA ACCEPTER
424
DISPENSER
425
RECEIPT PRINTER
426
JOURNAL PRINTER
427
STATEMENT/PASSBOOK PRINTER

FIG. 4

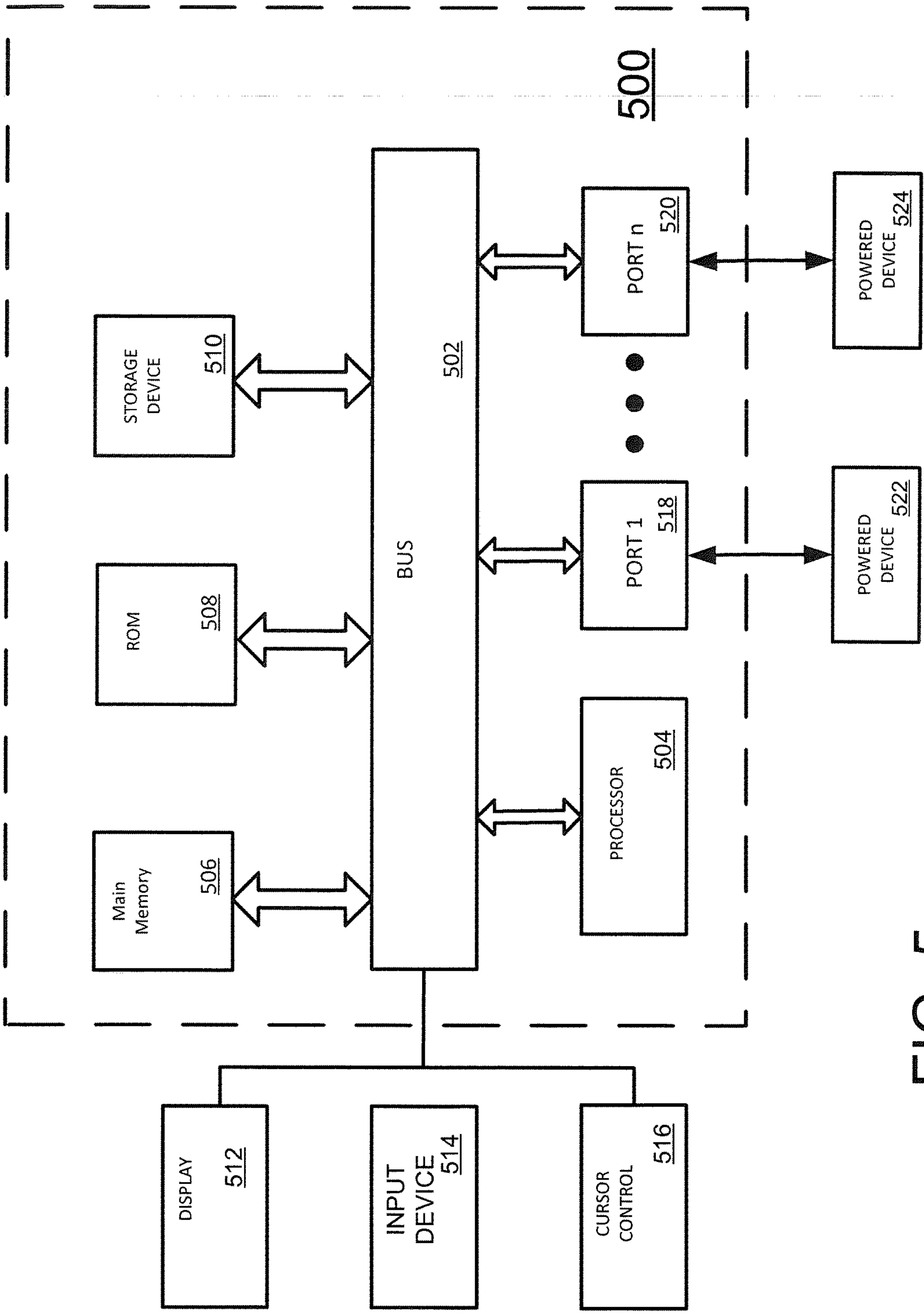
500
STORAGE DEVICE 510
ROM 508
Main Memory 506
BUS 502
PORT n 520
PORT 1 518
PROCESSOR 504
POWERED DEVICE 524
POWERED DEVICE 522
DISPLAY 512
INPUT DEVICE 514
CURSOR CONTROL 516

FIG. 5

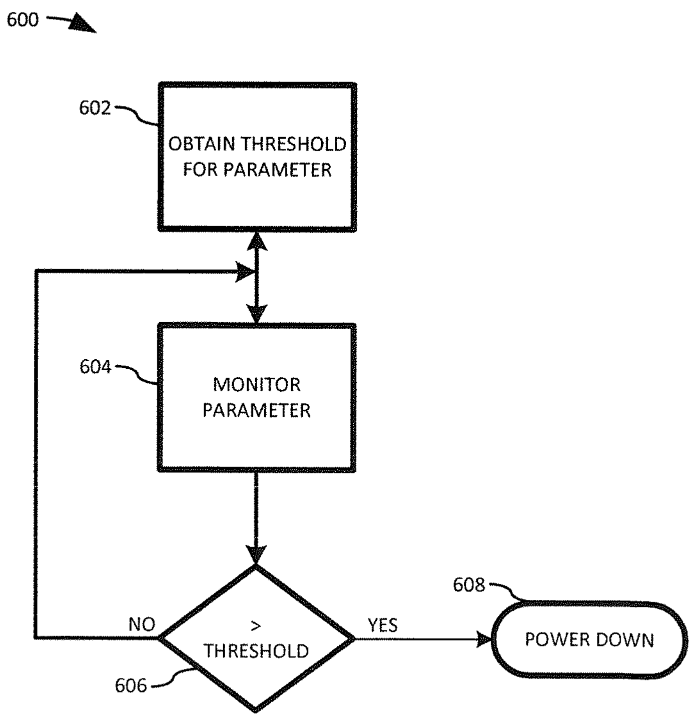
600
602
OBTAIN THRESHOLD FOR PARAMETER
604
MONITOR PARAMETER
NO
> THRESHOLD
YES
606
608
POWER DOWN

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/055304

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F19/00
ADD.

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)
G07F

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/138677 A1 (MA SONGTAO [US] ET AL) 7 June 2012 (2012-06-07) paragraph [0018]; figures 1-3,10,13 paragraph [0116] - paragraph [0173] paragraph [0246] paragraph [0259] -----	1-20
X	WO 2007/106479 A2 (WMS GAMING INC [US]; CANTERBURY STEPHEN A [US]; MERCADO VICTOR [US]; S) 20 September 2007 (2007-09-20) page 3 - page 9; figure 4 -----	1-20
X	WO 2007/081402 A1 (WMS GAMING INC [US]; FITZSIMONS MATTHEW [US]; RYAN ERIC; BUCHHOLZ DALE) 19 July 2007 (2007-07-19) page 3 - page 14; claims 1-20 -----	1-20
	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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

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"L" 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	Date of mailing of the international search report
7 January 2016	14/01/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Lavin Liermo, Jesus

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International application No
PCT/US2015/055304

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/073232 A1 (BILLINGSLEY RICHARD J [CA] ET AL) 21 March 2013 (2013-03-21) paragraph [0016] - paragraph [0049]	1-20
X	US 7 959 072 B1 (JENKINS RANDALL W [US] ET AL) 14 June 2011 (2011-06-14) column 3, line 39 - line 54; figures 1-3,10-13 column 21 - column 34	1-20
X	US 2014/256450 A1 (BLEICH CHARLES R [US] ET AL) 11 September 2014 (2014-09-11) paragraph [0017] - paragraph [0060]	1-20
X	US 2010/056278 A1 (MATTICE HAROLD E [US] ET AL) 4 March 2010 (2010-03-04) paragraph [0007] - paragraph [0035]	1-20
X	US 2006/143488 A1 (PELEG AMIR [IL] ET AL) 29 June 2006 (2006-06-29) paragraph [0028] - paragraph [0050]	1-20
A	FR 2 728 712 A1 (SCHNEIDER ELECTRIC SA [FR]) 28 June 1996 (1996-06-28) claims 1-4	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2015/055304

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
US 2012138677	A1	07-06-2012	US	2012138677	A1	07-06-2012
			US	2012312870	A1	13-12-2012
			US	2014138434	A1	22-05-2014
			US	2014166746	A1	19-06-2014
			US	2015076222	A1	19-03-2015
WO 2007106479	A2	20-09-2007	US	2009061987	A1	05-03-2009
			WO	2007106479	A2	20-09-2007
WO 2007081402	A1	19-07-2007	US	2009138133	A1	28-05-2009
			WO	2007081402	A1	19-07-2007
US 2013073232	A1	21-03-2013	EP	2758842	A1	30-07-2014
			US	2013073232	A1	21-03-2013
			WO	2013040571	A1	21-03-2013
US 7959072	B1	14-06-2011	US	7959072	B1	14-06-2011
			US	8251281	B1	28-08-2012
			US	8281986	B1	09-10-2012
			US	8448849	B1	28-05-2013
			US	8534548	B1	17-09-2013
			US	8794512	B1	05-08-2014
			US	2014339758	A1	20-11-2014
US 2014256450	A1	11-09-2014	NONE			
US 2010056278	A1	04-03-2010	NONE			
US 2006143488	A1	29-06-2006	NONE			
FR 2728712	A1	28-06-1996	NONE			