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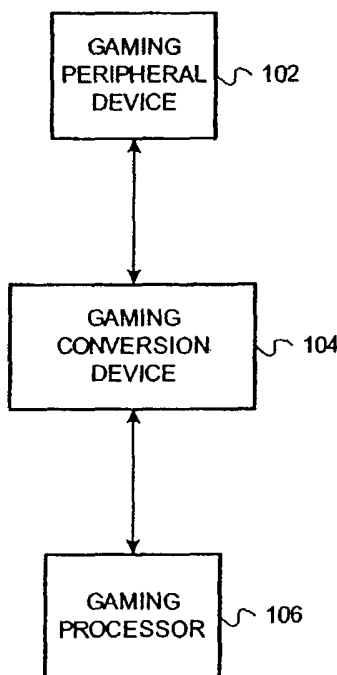
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(54) Title: SYSTEM AND METHOD FOR CONVERTING GAMING PERIPHERAL COMMUNICATION

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(57) Abstract: Methods and systems for converting gaming peripheral communications are described herein. In one embodiment the method includes receiving gaming peripheral data of a first format from a gaming peripheral, wherein a gaming processor does not understand gaming peripheral data of the first format. In the embodiment, the method also includes converting the gaming peripheral data into a second format, wherein the gaming processor understands gaming peripheral data of the second format, wherein the gaming peripheral is of a type, and wherein the second format is defined for gaming peripherals of the type. In the embodiment, the method also includes transmitting the gaming peripheral data of the second format to the gaming processor.

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SYSTEM AND METHOD FOR CONVERTING GAMING PERIPHERAL COMMUNICATION

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RELATED APPLICATION

This application claims the priority benefit of U.S. Provisional Application Serial No. 60/615,218 filed October 1, 2004, the contents of which are incorporated herein by reference.

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FIELD

This invention relates generally to the field of wagering game machines and more particularly to communications between wagering game machines and gaming peripheral devices.

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BACKGROUND

There are a wide variety of peripheral devices that can be connected to gaming machines. These peripheral devices provide features that define or augment games presented on the gaming machines. Peripheral devices used in conjunction with gaming machines include coin mechanisms, lights, printers, card readers, speakers, bill validators, display panels, keypads, button pads, etc.

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Communication interfaces between gaming devices and gaming peripherals have not been standardized across the gaming industry. Consequently, almost every gaming peripheral vendor offers a different communication interface. For example, company X may offer bill validators that have a gaming machine communication

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interface which is completely different from company Y's interface. More specifically, company X's bill validator may transmit data to a gaming machine over a four wire interface, which conducts high and low signals to the gaming machine. In contrast, company Y's bill validator may transmit data to a gaming machine over an RS-232 interface. To complicate matters, neither of the bill validators uses a standard communication protocol. As a result, gaming machines typically include a vendor specific communication interface and logic for enabling the gaming machine to understand communications received from the gaming peripheral. Although standardizing communication interfaces and protocols can overcome many of the problems discussed above, one impediment to standardization is that replacing already existing non-standard units could be extremely costly.

SUMMARY

Systems and methods for converting gaming peripheral communications are described herein. In one embodiment the method includes receiving gaming peripheral data of a first format from a gaming peripheral, wherein a gaming processor does not understand gaming peripheral data of the first format. The method also includes converting the gaming peripheral data into a second format, wherein the gaming processor understands gaming peripheral data of the second format, wherein the gaming peripheral is of a type, and wherein the second format is defined for gaming peripherals of the type. The method also includes transmitting the gaming peripheral data of the second format to the gaming processor.

In one embodiment the system includes a gaming peripheral device to create original gaming peripheral device data, wherein the gaming peripheral device is of a type. In the embodiment, the system also includes a gaming conversion device to receive the original gaming peripheral device data from the gaming peripheral device, the gaming conversion device to convert the original gaming peripheral device data into converted gaming peripheral device data. In the embodiment, the system also includes a gaming processor to receive the converted gaming peripheral device data from the gaming conversion device, the gaming processor to perform a

gaming operation based on the converted gaming peripheral device data, wherein the gaming processor does not understand the original gaming peripheral device data, but does understand the converted gaming peripheral device data, and wherein the converted gaming peripheral device data is of a format specifying
5 communications between the processor and gaming device peripherals of the type.

BRIEF DESCRIPTION OF THE FIGURES

The present invention is illustrated by way of example and not limitation in the Figures of the accompanying drawings in which:

10 **Figure 1** is a block diagram illustrating a system for facilitating communications between a gaming peripheral device and a gaming processor, according to exemplary embodiments of the invention;

Figure 2 is a flow diagram illustrating operations for converting gaming peripheral data, according to exemplary embodiments of the invention;

15 **Figure 3** is a block diagram illustrating a system for converting communications from a particular bill validator into USB communications understandable by any gaming processor, according to exemplary embodiments of the invention; and

Figure 4 is a perspective view of a gaming machine, according to exemplary
20 embodiments of the invention.

DESCRIPTION OF THE EMBODIMENTS

Methods and systems for converting gaming peripheral communication are described herein. In the following description, numerous specific details are set
25 forth. However, it is understood that embodiments of the invention may be practiced without these specific details. In other instances, well-known circuits, structures and techniques have not been shown in detail in order not to obscure the understanding of this description. Note that in this description, references to “one embodiment” or “an embodiment” mean that the feature being referred to is
30 included in at least one embodiment of the invention. Further, separate references to “one embodiment” in this description do not necessarily refer to the same

embodiment; however, neither are such embodiments mutually exclusive, unless so stated and except as will be readily apparent to those of ordinary skill in the art. Thus, the present invention can include any variety of combinations and/or integrations of the embodiments described herein. Moreover, in this description, the phrase “exemplary embodiment” means that the embodiment being referred to serves as an example or illustration.

Herein, block diagrams illustrate exemplary embodiments of the invention. Also herein, flow diagrams illustrate operations of the exemplary embodiments of the invention. The operations of the flow diagrams will be described with reference to the exemplary embodiments shown in the block diagrams. However, it should be understood that the operations of the flow diagrams could be performed by embodiments of the invention other than those discussed with reference to the block diagrams, and embodiments discussed with references to the block diagrams could perform operations different than those discussed with reference to the flow diagrams. Moreover, it should be understood that although the flow diagrams depict serial operations, certain embodiments could perform certain of those operations in parallel.

System Architecture

This section describes a system architecture for facilitating communications between a gaming peripheral device and a gaming processor.

Figure 1 is a block diagram illustrating a system for facilitating communications between a gaming peripheral device and a gaming processor, according to exemplary embodiments of the invention. As shown in Figure 1, the system 100 includes a gaming peripheral device 102 connected to a gaming conversion device 104. The gaming conversion device 104 is connected to a gaming processor 106.

According to embodiments, the gaming peripheral device 102 can be of any type suitable for use with a gaming machine. For example, the gaming peripheral device 102 can be of any of the following types of gaming peripheral devices: coin mechanisms, lights, printers, card readers, speakers, bill validators, display panels,

keypads, button pads, etc. In one embodiment, the gaming peripheral device 102 creates original gaming peripheral data based on input and/or transactions conducted within a casino environment. The gaming peripheral device 102 transmits the original gaming peripheral data to the gaming conversion device 104, according to
5 embodiments.

The gaming conversion device 104 can include hardware and/or software for converting gaming peripheral data of a first format into data of the second format. The gaming conversion device 104, as well as any component of system 100, can include machine-readable media including instructions for performing operations
10 described herein. Machine-readable media includes any mechanism that provides (i.e., stores and/or transmits) information in a form readable by a machine (e.g., a computer). For example, a machine-readable medium includes read only memory (ROM), random access memory (RAM), magnetic disk storage media, optical storage media, flash memory devices, electrical, optical, acoustical or other forms of
15 propagated signals (e.g., carrier waves, infrared signals, digital signals, etc.), etc. According to embodiments of the invention, the gaming conversion device 104 and other components of the system 100 can include other types of logic (e.g., digital logic) for executing the operations described herein.

In one embodiment, the gaming processor 106 includes any hardware and/or
20 software necessary for conducting a casino style wagering game. For example, the gaming processor 106 can include a microprocessor, memory, I/O channels (e.g., buses), network connection, and any other necessary hardware components. The gaming processor 106 can include software for receiving and processing player input, conducting the wagering game (e.g., slots, video poker, video roulette, etc.),
25 and paying players based on game results. Additionally, the gaming processor 106 can include software (e.g., device drivers) for processing communications with gaming peripheral devices. In one embodiment, the gaming processor 106 includes a universal serial bus (USB) port. The gaming processor 106 can also include an RS-232 port, RS-435 port, parallel port, Ethernet port, Wi-Fi port, infrared port,
30 and/or any other suitable communication port.

In one embodiment, the gaming processor 106 can be disposed within a gaming machine cabinet, while the other system components are disposed outside the gaming machine cabinet. In another embodiment, the gaming peripheral device 102, gaming conversion device 104, and gaming processor 106 are all disposed
5 within a gaming machine cabinet. The operations for the system 100 are described below, in the next section.

System Operations

This section describes operations performed by embodiments of the gaming
10 system described above.

Figure 2 is a flow diagram illustrating operations for converting gaming peripheral data, according to exemplary embodiments of the invention. The operations of the flow diagram 200 will be described with reference to the gaming system of Figure 1. The flow diagram 200 begins at block 202.

15 At block 202, gaming peripheral data is received, where that gaming peripheral data is of a first format that is not understood by a gaming processor. For example, the gaming conversion device 104 receives original gaming peripheral data from the gaming peripheral device 102. In one embodiment, the original gaming peripheral data is in a first format that cannot be understood by the gaming
20 processor 106. The first format can include a sequence of high and low signals received over a set of one or more wires, where the signals are formatted according to a proprietary protocol defined by the gaming peripheral device manufacturer. Alternatively, the first format can include signals transmitted over an RS-232 connection or other standard connection, where the signals are formatted according
25 to a proprietary protocol. Because embodiments of the gaming processor 106 cannot understand certain proprietary protocols, the gaming conversion device 104 can convert the original gaming peripheral data into a format understandable by the gaming processor 106. The flow continues at block 204.

30 At block 204, the gaming peripheral data is converted into a second format that is understood by a gaming processor. For example, the gaming conversion device 104 converts the original gaming peripheral data of the first format into

converted gaming peripheral data of the second format. In one embodiment, the converted gaming peripheral data of the second format can be understood by the gaming processor 106. In one embodiment, the second format defines communications for all peripherals of a type. For example, the gaming conversion device 104 can convert the original gaming peripheral data from a particular bill validator into a standard format, which defines communications between any bill validator and a gaming processor. In one embodiment, converting the original gaming peripheral data into a second format includes creating a USB packet including information representing the original gaming peripheral data. The flow continues at block 206.

At block 206, the converted gaming peripheral data is transmitted to the gaming processor. For example, the gaming conversion device 104 transmits to the gaming processor 106 the converted peripheral data of the second format. In one embodiment, the gaming conversion device 104 transmits the converted peripheral data to a port (e.g., a USB port, RS-232 port, RS-435 port, parallel port, Ethernet port, Wi-Fi port, infrared port, etc.) of the gaming processor 106. From block 206, the flow ends.

In one embodiment, the gaming processor 106 receives the converted peripheral data and performs gaming operations based on the converted peripheral data. For example, the gaming processor 106 can receive converted peripheral data indicating that \$5 was received by a bill validator. The gaming processor can then issue a \$5 player credit.

Exemplary Implementation

This section describes an exemplary implementation of the system described above. **Figure 3** is a block diagram illustrating a system for converting communications from a particular bill validator into USB communications understandable by any gaming processor, according to exemplary embodiments of the invention. As shown in Figure 3, a system 300 includes a bill validator 302 connected to a USB conversion board 304 via an RS-232 connection. The USB

conversion board 304 is connected to the gaming processor 306 via a USB connection.

In one embodiment, the bill validator 302 transmits signals to the USB conversion board 304 over the RS-232 connection. The signals, which are in a format that is not natively understandable to the gaming processor 306, represent bill validation transactions performed by the bill validator 302.

The USB conversion board 304 receives the signals from the bill validator 302 and converts them into packets of a standard bill validation protocol, which defines communications between a bill validator and a gaming processor. As part of the conversion, the USB conversion board 304 encapsulates the standard bill validation protocol packets within USB packets. The USB conversion board 304 transmits the USB packets over the USB connection to the gaming processor 306.

The gaming processor 306 receives the USB packets from the USB conversion board 304. The gaming processor decapsulates the bill validator packets and performs gaming operations based thereon.

Exemplary Gaming Machine

Figure 4 is a perspective view of a gaming machine, according to exemplary embodiments of the invention. As shown in Figure 4, the gaming machine 400 can be a slot machine having the controls, displays, and features of a conventional slot machine. The gaming machine 400 can be operated while players are standing or seated. Additionally, the gaming machine 400 is preferably mounted on a console. However, it should be appreciated that the gaming machine 400 can be constructed as a pub-style tabletop game (not shown), which a player can operate while sitting. Furthermore, the gaming machine 400 can be constructed with varying cabinet and display designs. The gaming machine 400 can incorporate any primary game such as slot, poker, or keno, and additional bonus round games. The symbols and indicia used on and in the gaming machine 400 can take mechanical, electrical or video form.

As illustrated in Figure 4, the gaming machine 400 includes a coin slot 402 and bill validator 424. Players can place coins in the coin slot 402 and paper money

or ticket vouchers in the bill validator 424. Other devices can be used for accepting payment. For example, credit/debit card readers/validators can be used for accepting payment. Additionally, the gaming machine 400 can perform electronic funds transfers and financial transfers to procure monies from house financial accounts.

5 When a player inserts money in the gaming machine 400, a number of credits corresponding to the amount deposited are shown in a credit display. After depositing the appropriate amount of money, a player can begin playing the game by pushing play button 408. The play button 408 can be any play activator used by the player to start a game or sequence of events in the gaming machine 400.

10 As shown in Figure 4, the gaming machine 400 also includes a bet display 412 and a "bet one" button 416. The player places a bet by pushing the bet one button 416. The player can increase the bet by one credit each time the player pushes the bet one button 416. When the player pushes the bet one button 416, the number of credits shown in the credit display 406 decreases by one, and the number
15 of credits shown in the bet display 412 increases by one.

A player may "cash out" by pressing a cash out button. When a player
cashes out, the gaming machine 600 dispenses a number of coins, corresponding to the number of remaining credits, into the coin tray 618. The gaming machine 600 may employ other payout mechanisms such as credit slips, which are redeemable by
20 a cashier, or electronically recordable cards, which track player credits.

The gaming machine 400 also includes one or more display devices. The embodiment shown in Figure 4 includes a primary display unit 404 and a secondary display unit 406. In one embodiment, the primary display unit 404 displays a plurality of reels 420. In one embodiment, the gaming machine displays three reels,
25 while an alternative embodiment displays five reels. In one embodiment, the reels are in video form. According to embodiments of the invention, the display units can display any visual representation or exhibition, including moving physical objects (e.g., mechanical reels and wheels), dynamic lighting, and video images. In one embodiment, each reel 420 includes a plurality of symbols such as bells, hearts,
30 fruits, numbers, letters, bars or other images, which correspond to a theme associated with the gaming machine 600. Furthermore, as shown in Figure 4, the

gaming machine 400 includes a primary sound unit 428 and a secondary sound unit 430. In one embodiment, the primary and secondary sound units include speakers or other suitable sound projection devices. The gaming machine 400 can be adapted to include the system 400. Additionally, the gaming machine 400 is capable of

5 performing the operations for processing game settings described herein. . .

CLAIMS

1. A method comprising:
receiving gaming peripheral data of a first format from a gaming peripheral,
wherein a gaming processor does not understand gaming peripheral
5 data of the first format;
converting the gaming peripheral data into a second format, wherein the
gaming processor understands gaming peripheral data of the second
format, wherein the gaming peripheral is of a type, and wherein the
second format is defined for gaming peripherals of the type; and
10 transmitting the gaming peripheral data of the second format to the gaming
processor.
2. The method of claim 1, wherein the peripheral data of the second type is
transmitted to a Universal Serial Bus port of the gaming processor.
- 15 3. The method of claim 1, wherein the peripheral data of the second type is
transmitted to a port of the gaming processor, and wherein the port is selected from
the set consisting of an RS-232 port, RS-435 port, parallel port, Ethernet port, Wi-Fi
port, and an infrared port.
- 20 4. The method of claim 1, wherein the gaming peripheral device is selected
from the set consisting of a bill validator, coin hopper, coin mechanisms, printer,
bill dispenser, bill hopper, display device, and camera.
- 25 5. A method comprising:
receiving, in a gaming processor, converted gaming peripheral data from a
gaming conversion device, wherein the gaming conversion device
converted original gaming peripheral device data into the converted
gaming peripheral device data, wherein the gaming device does not
30 understand the original gaming peripheral device data, and wherein

the gaming processor understands the converted gaming peripheral device data; and
performing a gaming operation based on the converted gaming peripheral device data.

5

6. The method of claim 5, wherein the converted gaming peripheral device data is included in a Universal Serial Bus (USB) packet.

7. The method of claim 6 further comprising:
10 extracting the converted gaming peripheral device data from the USB packet.

8. The method of claim 5, wherein the converted gaming peripheral device data is of a format defining communications for gaming peripheral devices of a type.

15

9. The method of claim 8, wherein the original gaming peripheral device data is created by a gaming peripheral device of the type.

10. A method comprising:
20 creating, in a gaming peripheral device of a type, gaming peripheral device data of a first format that is not understandable to a gaming processor; and
transmitting the gaming peripheral device data to a gaming conversion device, wherein the gaming conversion device is adapted to convert
25 the gaming peripheral device data of the first format into a second format, wherein the second format defines communications between the gaming processor and gaming peripheral devices of the type, and wherein the second format is understandable to the gaming processor.

30

11. The method of claim 10, wherein the type is selected from the set consisting of a bill validator, coin hopper, coin mechanism, printer, bill dispenser, bill hopper, display device, and camera.
- 5 12. A gaming system comprising:
a gaming peripheral device to create original gaming peripheral device data,
wherein the gaming peripheral device is of a type;
a gaming conversion device to receive the original gaming peripheral device
10 data from the gaming peripheral device, the gaming conversion
device to convert the original gaming peripheral device data into
converted gaming peripheral device data; and
a gaming processor to receive the converted gaming peripheral device data
from the gaming conversion device, the gaming processor to perform
a gaming operation based on the converted gaming peripheral device
15 data, wherein the gaming processor does not understand the original
gaming peripheral device data, but does understand the converted
gaming peripheral device data, and wherein the converted gaming
peripheral device data is of a format specifying communications
between the processor and gaming device peripherals of the type.
20
13. The gaming system of claim 12, wherein the converted gaming peripheral
device data is encapsulated in a Universal Serial Bus (USB) packet.
14. The gaming system of claim 13, wherein the gaming processor receives the
25 converted gaming peripheral device data through a port selected from the set
consisting of an RS-232 port, RS-435 port, parallel port, Ethernet port, Wi-Fi port,
and an infrared port.
15. The gaming system of claim 12, wherein the type is selected from the set
30 consisting of a bill validator, coin hopper, coin mechanisms, printer, bill dispenser,
bill hopper, display device, and camera.

16. A machine-readable medium including instructions which when executed perform operations comprising:
- 5 receiving gaming peripheral data of a first format from a gaming peripheral, and wherein a gaming processor does not understand gaming peripheral data of the first format;
- converting the gaming peripheral data into a second format, wherein the gaming processor understands gaming peripheral data of the second format, wherein the gaming peripheral is of a type, and wherein the
- 10 second format is defined for gaming peripherals of the type; and transmitting the gaming peripheral data of the second format to the gaming processor.
17. The machine-readable medium of claim 16, wherein the peripheral data of
- 15 the second type is transmitted to a Universal Serial Bus port of the gaming processor.
18. The machine-readable medium of claim 16, wherein the peripheral data of the second type is transmitted to a port of the gaming processor, and wherein the
- 20 port is selected from the set consisting of an RS-232 port, RS-435 port, parallel port, Ethernet port, Wi-Fi port, and an infrared port.
19. The machine-readable medium of claim 16, wherein the gaming peripheral device is selected from the set consisting of a bill validator, coin hopper, coin
- 25 mechanisms, printer, bill dispenser, bill hopper, display device, and camera.
20. A machine-readable medium including instructions which when executed perform operations comprising:
- 30 receiving, in a gaming processor, converted gaming peripheral device data from a gaming conversion device, wherein the gaming conversion device converted original gaming peripheral device data into the

- converted gaming peripheral device data, wherein the gaming device does not understand the original gaming peripheral device data, and wherein the gaming processor understands the converted gaming peripheral device data; and
- 5 performing a gaming operation based on the converted gaming peripheral device data.
21. The machine-readable medium of claim 20, wherein the converted gaming peripheral device data is included in a Universal Serial Bus (USB) packet.
- 10 22. The machine-readable medium of claim 21 further comprising:
extracting the converted gaming peripheral device data from the USB packet.
- 15 23. The machine-readable medium of claim 20, wherein the converted gaming peripheral device data is of a format defining communications for gaming peripheral devices of a type.
24. The machine-readable medium of claim 23, wherein the original gaming peripheral device data is created by a gaming peripheral device of the type.
- 20 25. A machine-readable medium including instructions which when executed perform operations comprising:
creating, in a gaming peripheral device of a type, gaming peripheral device
25 data of a first format that is not understandable to a gaming processor; and
transmitting the gaming peripheral device data to a gaming conversion device, wherein the gaming conversion device is adapted to convert the gaming peripheral device data of the first format into a second
30 format, wherein the second format defines communications between the gaming processor and gaming peripheral devices of the type, and

wherein the second format is understandable to the gaming processor.

26. The machine-readable medium of claim 25, wherein the type is selected
5 from the set consisting of a bill validator, coin hopper, coin mechanism, printer, bill dispenser, bill hopper, display device, and camera.

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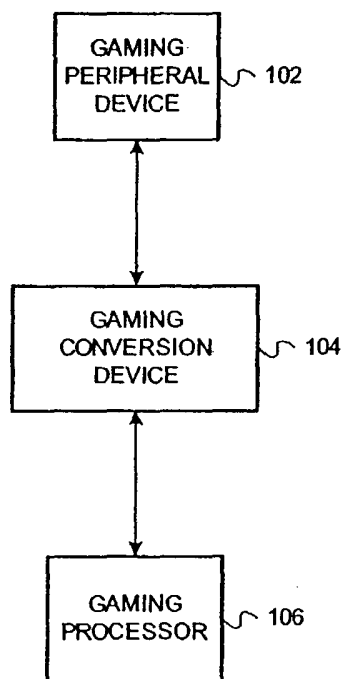


FIG. 1

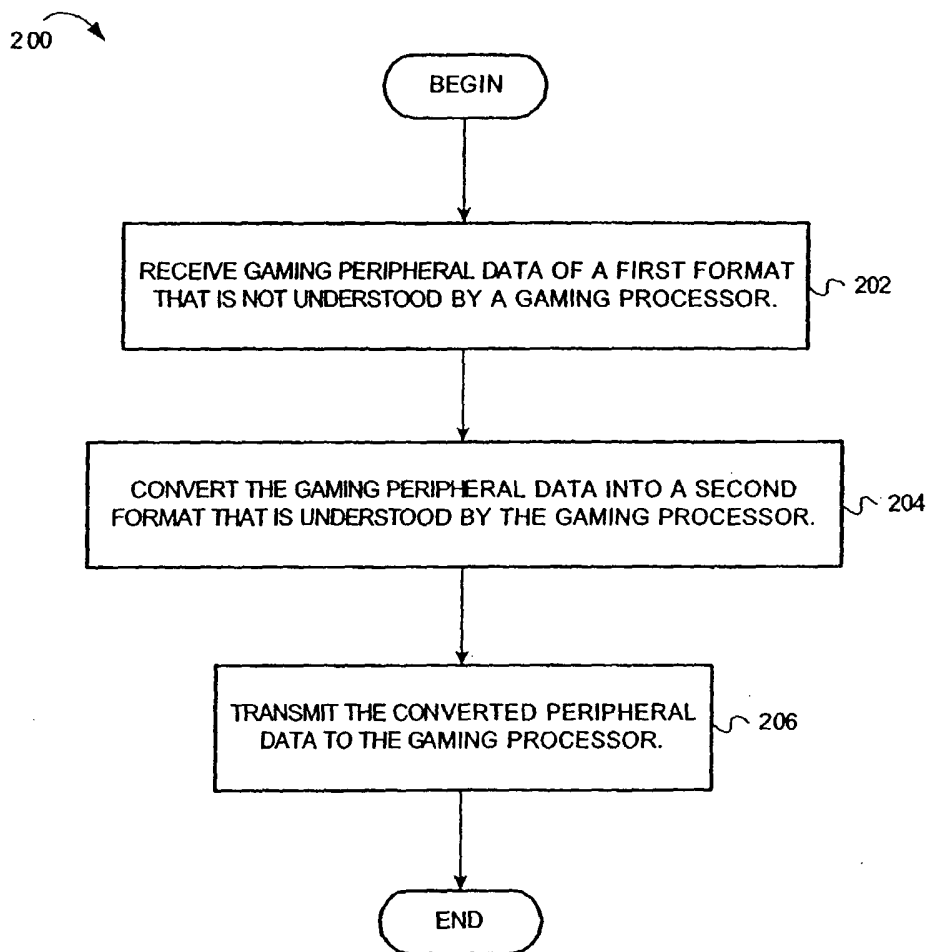


FIG. 2

300 ↗

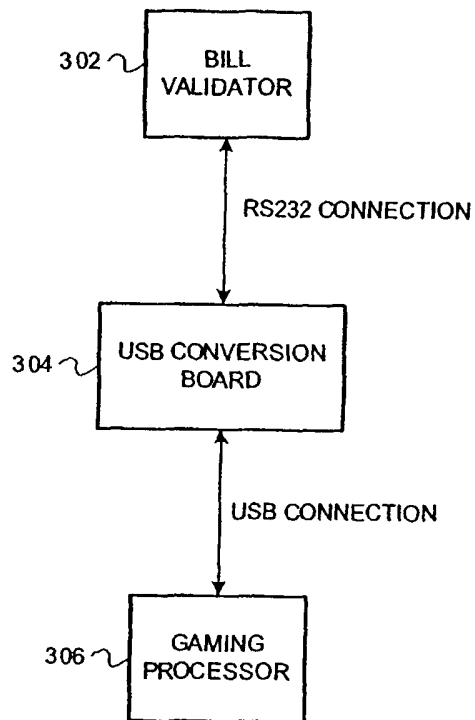


FIG. 3

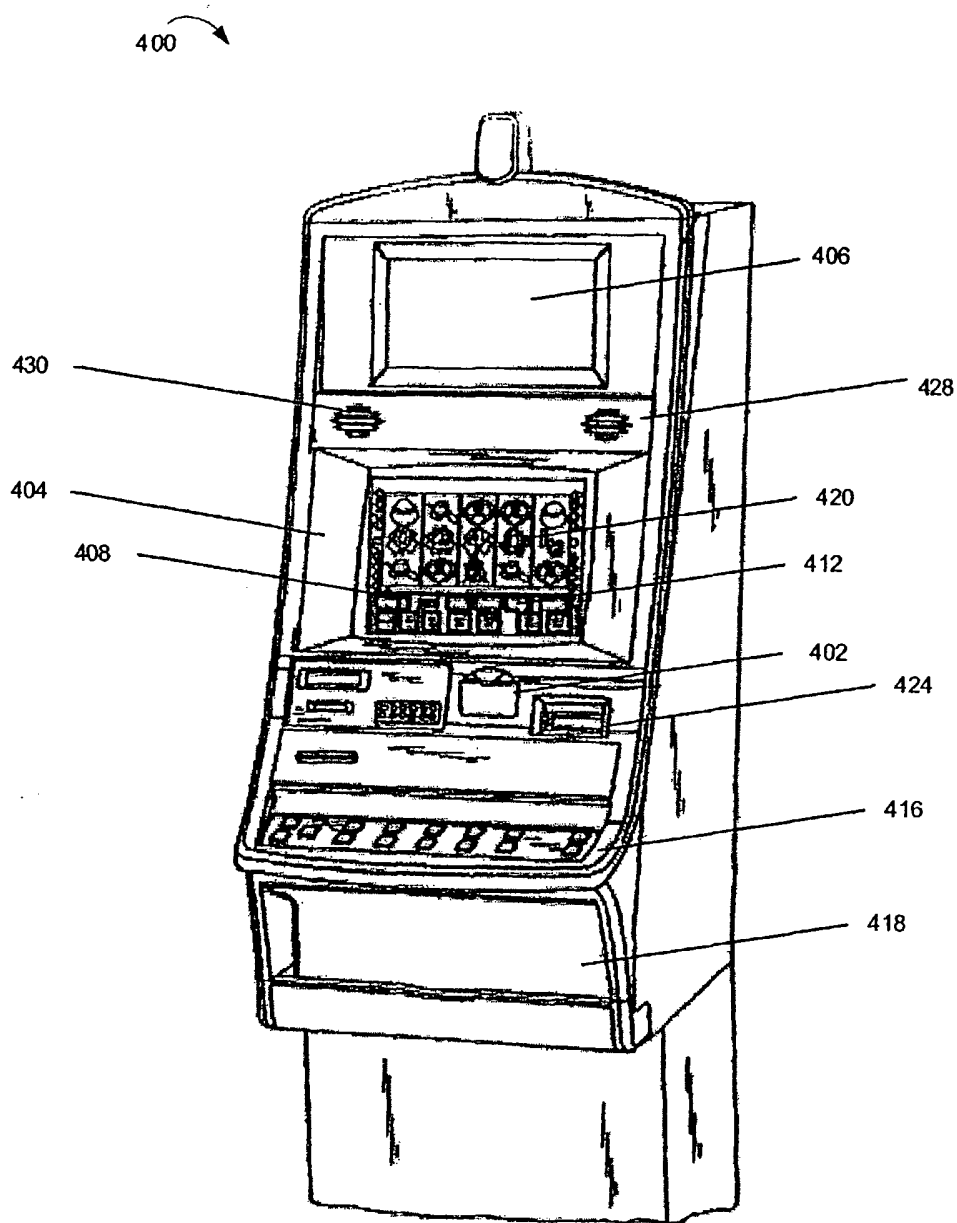


FIG. 4