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(71) Applicant and
(72) Inventor: SMIT, Francois, Vermeulen [ZA/ZA]; 130 Trafalgar Street, Sandhurst, 2146 Johannesburg (ZA).

(74) Agent: RADEMEYER, Montague, Ampie, John; Mc Callum Rademeyer & Freimond, P.O. Box 1130, 7 Maclyn House, Bordeaux, 2125 Randburg (ZA).

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(54) Title: METHOD OF AND APPARATUS FOR OPERATING A VIDEO LOTTERY TERMINAL
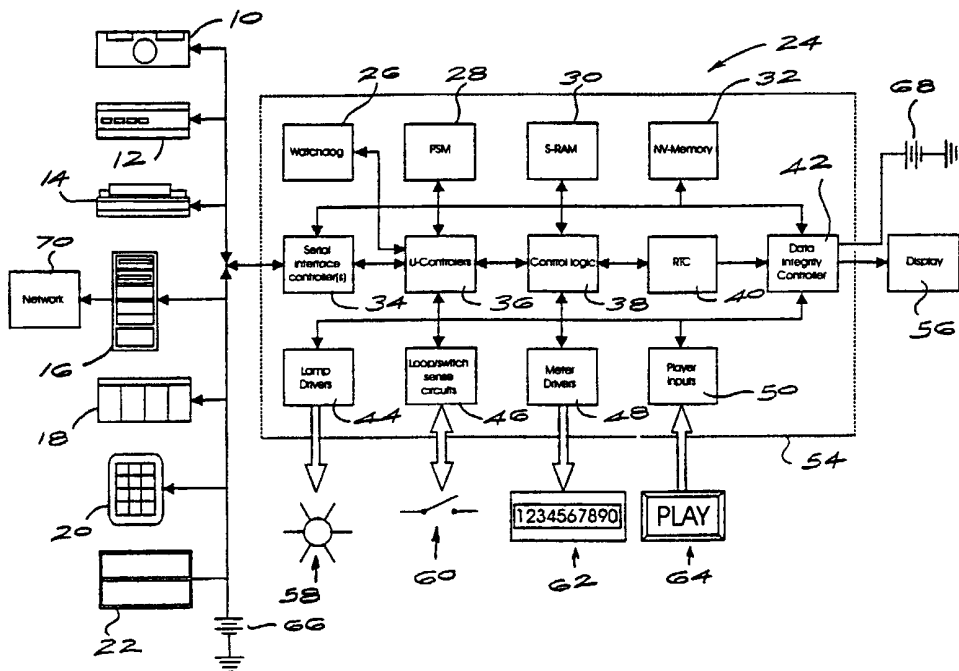
(57) Abstract: A video lottery terminal which is monitored using means which is powered independently of the terminal to detect the occurrence, at least, of security events which may compromise the integrity of operation of the terminal. The time and date of occurrence of each detected event are stored and can be accessed via a network connected to a host computer associated with the terminal.

METHOD OF AND APPARATUS FOR OPERATING A VIDEO LOTTERY TERMINAL

BACKGROUND OF THE INVENTION

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This invention relates to the operation of a video lottery terminal used for playing a game, or for gaming purposes.

The video lottery terminal may be intended for use by a single player, i.e. for single player
10   games or gaming, or it may be part of a multiplayer arrangement which allows a plurality of players to participate in a game or games.

As used herein the words "game" and "gaming" are interchangeable and are intended to relate to activities in which one or more players participate irrespective of whether or not
15   there is a monetary reward at stake. Notwithstanding the broad possible scope of application of the principles of the invention it is appreciated that, generally, the invention is concerned with gaming activities for monetary awards such as computer-controlled blackjack or similar games, played for monetary gain, by one or more players.

20   Computer-based video gaming machines are subject to strict regulations which inter alia have resulted in the use of electromechanical meters to log certain game events. Such meters have to be read on the spot and do not necessarily provide a complete game recovery system in the event of a power failure.

25   Another aspect with existing computer-based gaming systems is that security events such as the opening of a cabinet door may be detected and logged by the computer. It is possible though to manipulate the stored data for ulterior purposes.

5 <u>SUMMARY OF THE INVENTION</u>

The invention provides a method of operating a video lottery terminal which includes the steps of monitoring the terminal to detect the occurrence of each of a plurality of events and storing data relating to events which are detected.

10

The method may include the step of recording information relating to the time and date of the occurrence of each detected event.

The data is preferably stored in a permanent manner i.e. the storage of the data is not

15 dependent on the existence of a continuous power supply or, otherwise put, the non-interruption of a power supply, to a memory device. Thus, for example, the data may be stored in non-volatile memory.

The terminal may include computing means and the method may include the step of

20 accessing the stored data from the computing means.

Alternatively or additionally the data may be accessed from a remote site via the computing means.

25 The data may be displayed at a local site.

The method may include the step of categorising the event. Events may for example be categorised as security events, status events and game events.

30 Security events may relate to events which when they occur may compromise the integrity of the terminal, such as events which are forbidden or which are permitted only under

defined conditions or with authorised personnel. Merely by way of example security events may include printer malfunction, a low back-up battery voltage, a data storage error, communication difficulties or problems between the terminal and a local controller, movement of a door or closure to a cash holding area, movement of a closure to the aforementioned computing means, and the like.

Status events may reflect the status of each of a number of specified components in or associated with the video lottery terminal and by way of example only may indicate the functionality of a keypad module, a player credit display or a bill acceptor, or indicate that a player button has been pressed, or that communication with a local controller is taking place.

Game events may be used primarily to provide a summary of game activities which are electronically metered with validation of information being effected before each fresh game. The game events may include one or more of the following:

total number of games played;

total of all credits played;

total of all credits won;

total of all credits paid;

total of all cash in;

last and current game credits played;

last and current game credits won;

last and current game credits paid;

last and current game cash in;

number of wins.

According to a different aspect of the invention there is provided a method of operating a

5   video lottery terminal which is powered by a first power source which includes the step of

using control means independently powered by a second power source to monitor the

terminal to detect the occurrence of each of a plurality of events irrespective of whether

or not power is applied to the terminal.

10   Thus the control means may be powered by a power source which is independent of the

power source used to power the terminal.

Data may be stored, relating to detected events, and may be displayed on site or

transferred to computing means embodied in or associated with the terminal.

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The stored data may be accessed, for example through the said computing means, from

a network of any appropriate kind such as a local area network or the Internet.

The time and date of occurrence of each event may be detected and stored.

20

The invention also extends to a method of operating a video lottery terminal which includes

the steps of electronically metering information relating to the occurrence of each of a

plurality of events and accessing the metered information from a remote location.

25   The metered information may relate at least to security and status events.

The time and date of occurrence of each security event, at least, may also be metered or

recorded.

30   According to a different aspect of the invention there is provided a method of operating a

video lottery terminal which includes the steps of detecting the occurrence of each of a

5   plurality of security events, storing data on each detected security event and on the time

and date of occurrence of each security event in non-volatile memory, and permitting such

stored data to be accessed from one or more remote points.

The invention also extends to apparatus for operating a video lottery terminal which

10   includes means for monitoring the terminal to detect the occurrence of each of a plurality

of events and means for storing data relating to events which are detected.

The data may be stored in non-volatile memory.

15   The time and date of occurrence of each detected event may also be stored.

The apparatus may include means for displaying data which is retrieved from the data

storing means.

20   The apparatus may include means for transferring the said stored data to computing

means which is incorporated in the terminal thereby to allow the stored data to be

accessed from one or more remote locations.

BRIEF DESCRIPTION OF THE DRAWINGS

25

The invention is further described by way of example with reference to the accompanying

drawings in which:

Figure 1 illustrates in block diagram form a video lottery terminal which includes apparatus

according to the invention, and

30   Figure 2 is a representation of a display incorporated in the apparatus of Figure 1.

DESCRIPTION OF PREFERRED EMBODIMENT

Figure 1 of the accompanying drawings illustrates components included in a video lottery terminal which embodies apparatus according to the invention.

Figure 1 illustrates a bill acceptor 10, a player station 12 which may be one of a plurality of similar stations, a printer 14, an industrial or host computer 16 eg. a pc which is directly associated with the terminal, a location controller 18, a keypad module 20, a player credit display device 22 and apparatus 24 according to the invention.

The apparatus 24 is illustrated in block diagram form and each block is labelled and has the function set out in Table 1:

Block	Reference	Purpose
Watchdog	26	Restarting the μ-Controller if the system hangs.
Program storage Memory (PSM)	28	Memory hosting application code. This can be FLASH, EPROM or E^{2}PROM.
S-RAM	30	Scratch memory used during normal operation for temporary parameter storage and manipulation.
NV-Memory	32	Non-Volatile Memory for storage of recovery information.
Serial Interface Controller	34	Controller that handles/provides all of the serial communication interfaces of the system.
μ-Controller	36	Embedded processor that executes the application code.
Control Logic	38	Logic implemented in a programmable device that enables the μC to access and control all functional blocks of the system.
Real-Time Clock (RTC)	40	Device used for date and time keeping and used for time-stamping specified events.
Data Integrity Controller	42	Battery backed-up device (from a source 68) that allows the retrieval of recovery information in case of a complete power failure.
Lamp Drivers	44	Driver circuitry required for driving display lamps.

Tally meters & switch sense circuits	46	Circuitry sensing the presence of tally meters and sensing switch statuses to the secure and logic areas of the lottery terminal.
Meter Drivers	48	Circuitry required to drive the tally meters.
Player Inputs/buttons	50	Circuitry required to sense the player's inputs/responses.

The apparatus 24 is an embedded computer-controlled entity packaged into a single enclosure 54 that provides a plurality of operational capabilities. Via the serial interface controller 34 the apparatus provides serial communication interfaces to communicate with the industrial computer 16, the location controller 18, the player credit display 22, the bill acceptor 10, the printer 14 and the keypad module 20. The apparatus further facilitates some aspects of the metering, monitoring and control aspects required by gaming legislation. Thus the apparatus provides the ability to detect the occurrence of each of a plurality of events, to time and date stamp each event which occurs and to store data relating thereto. The apparatus 24 may operate in a plurality of modes which may include initialise, maintenance and operational or player modes but the present invention is concerned particularly with the last mentioned mode.

The micro controller 36 in the apparatus 24 is supported by the watchdog 26 which enables operation to be recovered in case the micro controller hangs. A display 56 in the data integrity controller 42 is used to indicate the occurrence of a watchdog reset.

The real-time clock 40 is used to time and date stamp events.

The lamp driver 44 is used to drive incandescent lamps 58 which are located in the player buttons.

5   The sense circuits 46 detect the activation of sensors such as a plurality of security

switches 60 (only one of which is shown) in order to monitor events of the following kind:

movement (open or close) of a door of a cabinet which houses or provides access to the

industrial computer 16;

movement (open or close) of a door of a cabinet which houses or provides access to the

10   player station 12;

opening or closing of a service door to the terminal; and

opening or closing of a cage which holds a card in the industrial computer 16.

These events are vital to the integrity of the operation of the terminal;   for example if

15   non-monitored physical access is possible to the computer then its operation can be

manipulated in a non-detectable way.

The meter drivers 48 drive a plurality of externally connected electro-mechanical tally

meters 62 which are required by legislation. The electro-mechanical meters normally are

20   used to tally the following events on the terminal:

total number of games played;

total of all credits played;

total of all credits won;

total of all credits paid (value of the pay-outs on the printed receipt);

25   total of all cash in (total value of money in the cash box of the bill acceptor); and

total number of jackpots won.

Apart from driving the electro-mechanical tally meters the apparatus 24 provides an

electronic metering capability in that meter information relating to the following events or

5   activities is stored in the non-volatile memory 32:

       total number of games played;

       total of all credits played;

       total of all credits won;

       total of all credits paid (value of the pay-outs on the printed receipt);

10   total of all cash in (total value of money in the cash-box of the bill acceptor);

       last and current game credits played;

       last and current game credits won;

       last and current game credits paid;

       last and current game cash in; and

15   jackpot wins (number of wins).

       The circuitry 50 senses a player's inputs or responses as reflected in switches 64, key

       pads or the like.

20   The data integrity controller 42 provides a data recovery function for the apparatus and

       hence for the terminal. To this end status and security events are monitored and

       information relating thereto is time and date stamped and recorded in the non-volatile

       memory 32. Without being limiting security events may include the following:

       printer malfunction, low back-up battery, storage device error, communication error to local

25   controller or industrial computer, removal or installation of bill acceptor stacker, opening

       or closing of cash door, opening or closing of access door to terminal, and the like.

       Without being limiting status events may include a communication error to the keypad

       module or the player credit display; failure of the keypad module or the player credit

5   display; failure of the real-time clock; a communication error to the local controller; a

service request from the bill acceptor; data that the watchdog reset circuit was triggered;

player button pressed; and the like.

Bill acceptor events which may be detected and reported, i.e. data thereon is stored in the

10   non-volatile memory 32, may include the following:

a bill was rejected; a bill has been jammed; the stacker is full and the bill acceptor cannot

accept more bills; the bill acceptor has failed; the bill acceptor has been enabled; indicated

currency has been accepted by the bill acceptor; a bill has been returned to a player; and

the like.

15

All significant events, generally of the aforegoing type, which are required for full data

recovery of the terminal, may be detected and stored in the non-volatile memory. This is

under the supervision of the micro controller 36. It is to be noted that the data integrity

controller is battery backed up from an independent power source 68 which is continuously

20   recharged. so that, if necessary, data can be retrieved at any stage, even in the event of

a complete external power failure.

The data stored in the non-volatile memory may be displayed in any appropriate form and

for example is displayed in the manner shown in Figure 2 on the display 56. Figure 2

25   illustrates a liquid crystal display 56 which is under the control of a set of index scroll keys

that allow relevant event information to be retrieved from the non-volatile memory. In this

example electronic metering information is displayed as follows: in an uppermost display

A, a total number of games played and total of all credits played; in a second display B the

total of all credits won and total of all credits paid; and in a third display C the total of

5   credits paid and total of all cash in.

Although the apparatus 24 permits a local display of all critical information for data recovery, all or part of the information may be transferable or transferred to the industrial computer 16 for review. The industrial computer may in turn be connected to a local or

10   remote network 70 so that the data may be accessed via the computer 16 from a suitable communications device, eg. a computer, at a remote site.

The components 10 to 22 of the terminal are powered by an external power supply 66, which may have a standby generator or backup battery (not shown). This however is

15   independent of the power supply to the controller 42 for, as indicated, the data integrity controller is powered from a rechargeable battery 68 which provides the data integrity controller with the capability of performing the function of monitoring and logging specified game and security events when power to the terminal fails or when a primary external power supply to the apparatus 24 fails.

20

The apparatus 24 thus provides full integrity of data relating to critical events which may occur during the playing of a game. As indicated electro-mechanical metering systems have been used in the past and although this aspect is not dispensed with in the present invention the apparatus 24 in addition provides an electronic metering capability with non-

25   volatile memory storage. Thus the apparatus 24 has the capability of receiving event data which is time and date stamped and of down-loading that data to the industrial computer 16 which can be accessed from any appropriate network. Management and control functions are thereby facilitated. Another important aspect is that the data integrity controller 42 is directly connected to the security switches 60 employed in the terminal.

5   Thus the data integrity controller itself directly detects the actuation of a security switch. This situation must be contrasted with the detection of the actuation of a switch via the industrial computer, a technique which lends itself to manipulation. It follows that the detection of security events is more reliable and less likely to be manipulated.

5   <u>CLAIMS</u>

1.   A method of operating a video lottery terminal which includes the steps of

monitoring the terminal to detect the occurrence of each of a plurality of events and

storing data relating to events which are detected.

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2.   A method according to claim 1 which includes the step of recording information

relating to the time and date of the occurrence of each detected event.

3.   A method according to claim 1 or 2 which includes the step of storing the data in

15   non-volatile memory.

4.   A method according to any one of claims 1 to 3 wherein the video lottery terminal

includes computing means and which includes the step of accessing the stored

data by at least one of the following:

20   (a)   directly from the computing means;

(b)   from a remote site via the computing means.

5.   A method according to any one of claims 1 to 4 wherein the said events are

classified as security events which may compromise the integrity of operation of the

25   terminal; status events which relate to the status of specified components of the

terminal; and game events which provide a summary of game activities on the

terminal.

6.   A method of operating a video lottery terminal using a first power source and which

5   includes the step of using control means, which is independently powered by

means of a second power source, to monitor the terminal to detect the occurrence

of each of a plurality of events irrespective of whether or not power is applied to the

terminal.

10   7.   A method according to claim 6 wherein data is stored relating to the said events

and which includes at least one of the following steps:

(a)   displaying the data at the terminal;

(b)   transferring the data to computing means associated with the terminal; and

(c)   accessing the stored data through computing means associated with the

15   terminal from a network connected to the computing means.

8.   A method according to claim 6 or 7 wherein the time and date of occurrence of each

event are detected and stored.

20   9.   A method of operating a video lottery terminal which includes the steps of

electronically metering information relating to the occurrence of each of a plurality

of events and accessing the metered information from a remote location.

10.   A method according to claim 9 wherein the metered information relates at least to

25   security events which may compromise the integrity of operation of the terminal and

which includes the step of recording the time and date of occurrence of each

security event.

11.   A method of operating a video lottery terminal which includes the steps of detecting

5   the occurrence of each of a plurality of security events, storing data on each

detected security event and on the time and date of occurrence of each security

event in non-volatile memory, and permitting such stored data to be accessed from

one or more remote points.

10   12.   Apparatus for operating a video lottery terminal which includes means for

monitoring the terminal to detect the occurrence of each of a plurality of events and

means for storing data relating to events which are detected.

13.   Apparatus according to claim 12 wherein the said data storing means is non-volatile

15   memory.

14.   Apparatus according to claim 12 or 13 which includes means for displaying data

which is retrieved from the data storing means.

20   15.   Apparatus according to claim 12, 13 or 14 which includes means for transferring the

said stored data to computing means which is incorporated in the terminal thereby

to allow the stored data to be accessed from one or more remote locations.
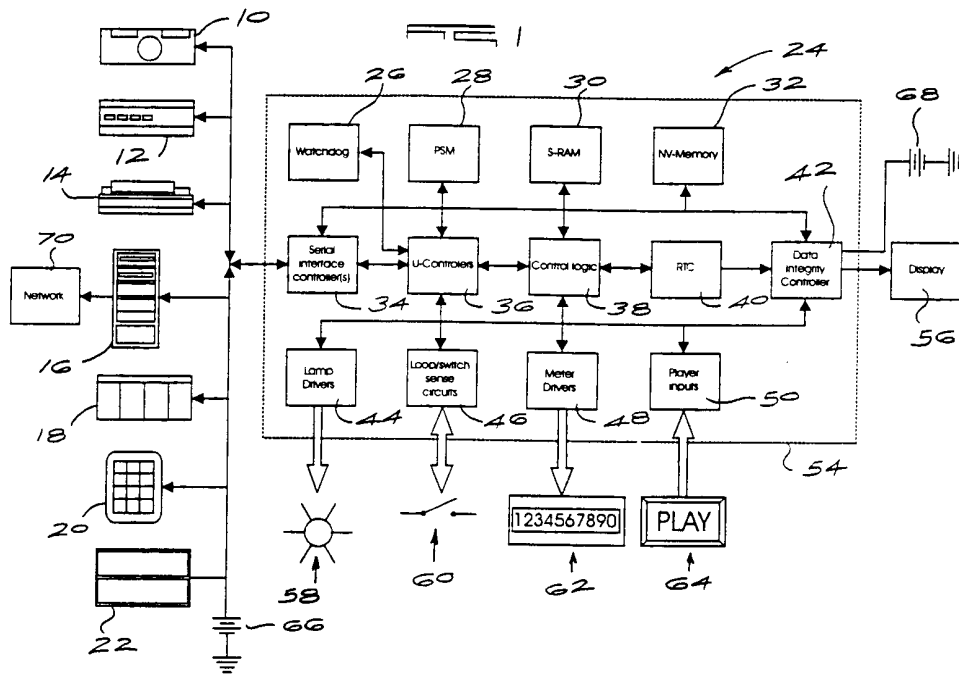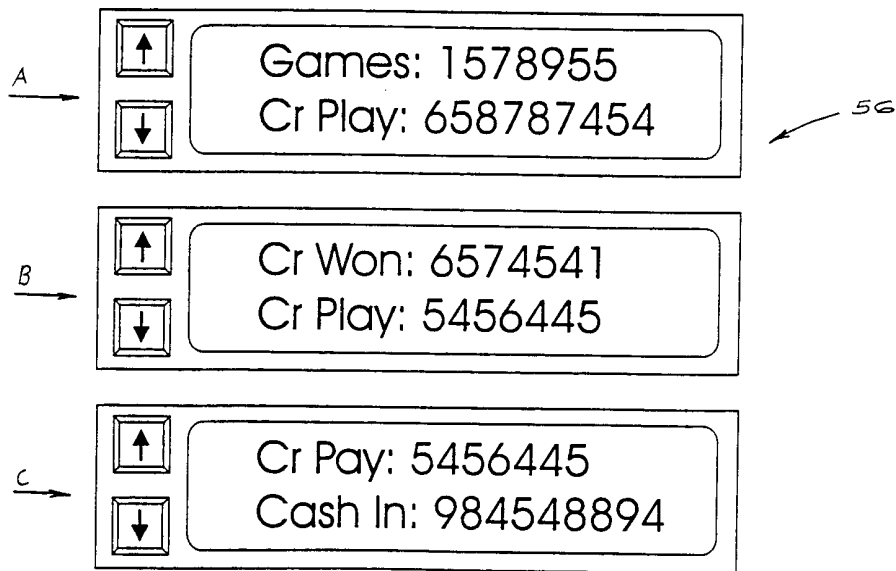
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   A63F3/06   A63F13/12   G07F17/32

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 7   A63F   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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 5 286 023 A (WOOD) 15 February 1994 (1994-02-15) the whole document -----	1,12

☐ Further documents are listed in the continuation of box C.   ☒ Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Raybould, B

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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