

(19) AUSTRALIAN PATENT OFFICE

(54) Title
Gaming machine, gaming information authenticating and loading device, and gaming
information loading device

(51)⁶ International Patent Classification(s)
A63F 13/10 (2006.01) 20060101AFI2006042
A63F 13/10 7BHAU

(21) Application No: 2006201615 (22) Application Date: 2006 .04 .19

(30) Priority Data

(31) Number (32) Date (33) Country
P2005-121397 2005 .04 .19 **JP**

(43) Publication Date : 2006 .11 .02
(43) Publication Journal Date : 2006 .11 .02

(71) Applicant(s)
Universal Entertainment Corporation

(72) Inventor(s)
Tanimura, Tatsuhiko

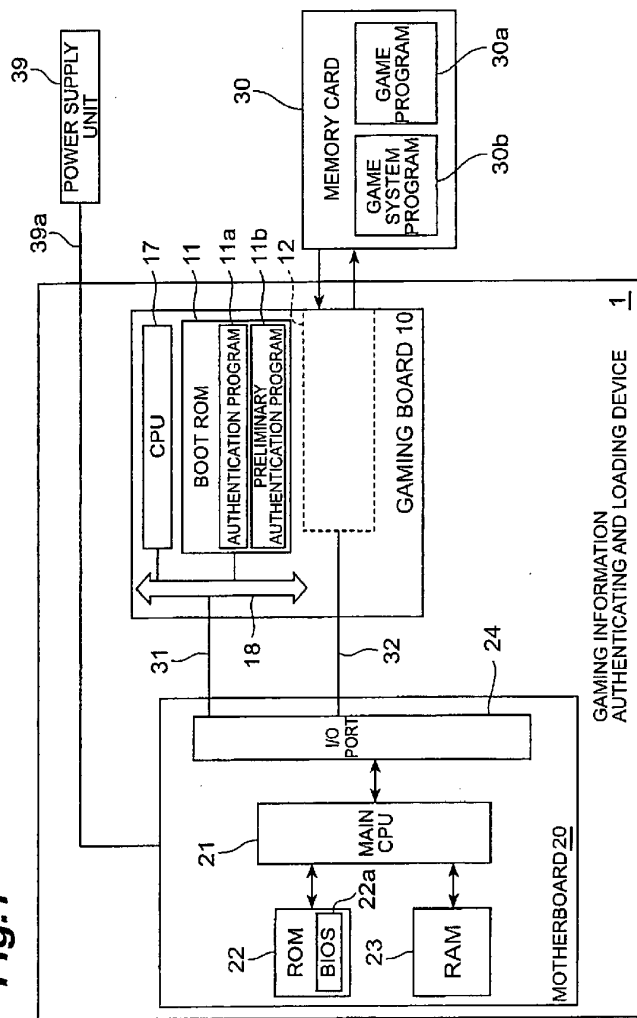
(74) Agent/Attorney
Callinans, 1193 Toorak Road, Camberwell, VIC, 3124

(56) Related Art
EP 1352677 B1 (WMS GAMING INC) 15 October 2003
US 2003/0195033 A1 (GAZDIC et al.) 16 October 2003
US 6149522 A (ALCORN et al.) 21 November 2000

ABSTRACT OF THE DISCLOSURE

5 A gaming machine includes a gaming operation execution device,
a loading device and a processing device. The gaming operation
execution device executes gaming operations. The loading device
includes connection means for connecting a storage medium, first
program storage means for storing a first authentication program,
second program storage means for storing a second authentication
program, and first authentication means for authenticating the first
authentication program with the second authentication program. The
10 processing device includes readable and writable storage means, reading
means for reading out the gaming information from the storage medium
and for reading out the first authentication program authenticated by the
first authentication means, second authentication means for
authenticating the gaming information with the authenticated first
15 authentication program, writing means for writing the authenticated
gaming information to the storage means, and operation control means
for controlling the gaming operation execution device.

Fig.1



GAMING INFORMATION
AUTHENTICATING AND LOADING DEVICE 1

2006201615 19 Apr 2006

P/00/011
Regulation 3.2

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

TO BE COMPLETED BY APPLICANT

Name of Applicant: ARUZE CORP.

Actual Inventor: Tatsuhiko Tanimura

Address for Service: CALLINAN LAWRIE, 711 High Street,
Kew, Victoria 3101, Australia

Invention Title: GAMING MACHINE, GAMING INFORMATION
AUTHENTICATING AND LOADING DEVICE, AND GAMING
INFORMATION LOADING DEVICE

The following statement is a full description of this invention, including the best method of performing it known to us:-

18/04/06, ck15638/front, 1

TITLE OF THE INVENTION

GAMING MACHINE, GAMING INFORMATION
AUTHENTICATING AND LOADING DEVICE, AND GAMING
INFORMATION LOADING DEVICE

5 BACKGROUND OF THE INVENTIONField of the Invention

[0001] The present invention relates to a gaming machine, a
gaming information authenticating and loading device, and a loading
device for loading gaming information, whereby gaming information
10 recorded on a portable storage medium can be authenticated.

Related Background of the Invention

[0002] In the prior art, various types of gaming machines are
known, such as gaming machines known as video game machines, slot
machines, Pachislo machines, Pachinko machines, or the like, which
15 provide image-based gaming by using images displayed on image
display means. In recent years, in this type of gaming machine, it has
become possible to supply a program (hereinafter, called a "gaming
program") used to control the operations required for playing the game,
such as controlling the progress of the game, controlling the display of
20 images, and judging whether or not a prize has been won (a hit or miss
judgment), and various types of game used for playing the game
(hereinafter, collectively referred to as "gaming information"), by
means of a storage medium. For example, gaming information is
stored in a small, portable storage medium, such as a compact flash
25 memory (registered trademark; also called "CF card"), and the gaming
machine has a component which allows attachment and detachment of

the storage medium, gaming information being supplied to the gaming machine by means of this storage medium.

[0003] Nevertheless, since the storage medium which stores the gaming information is detachable with respect to the gaming machine, then there is a risk that the medium could be removed from the gaming machine and used to perform illegal actions, such as duplicating or manipulating the gaming information stored on the medium. Therefore, in cases where gaming information is supplied by means of a storage medium, it is necessary to prevent illegal actions relating to the storage medium which stores the gaming information.

[0004] With regard to this point, for example, Japanese Patent Application Publication No. 2001-344096 discloses a method in which, when a storage medium is attached to a game device, storing identification information that is unique to the game device is stored on the storage medium from the game device, and identification information that is unique to the gaming information is also stored on the game device from the storage medium. Then, according to the method, the software stored on the storage medium is executed if the two sets of the identification information are the same in the game device and the storage medium.

[0005] Moreover, Japanese Patent Application Publication No. 2002-341957 discloses technology relating to the startup of a computer when a removable unit is attached to a computer main body, whereby the content of a user code stored in the removable unit is compared with the content of a unit code stored in the computer main body, and permission to start up the system is decided according to whether or not

the respective contents are matching.

[0006] Furthermore, Japanese Patent Application Publication No. Hei. 8-241194 discloses a video game system in which a security check is performed repeatedly during the progress of a game, in order to compare a security code set in an information processing device, with an accumulation device (storage medium) which stores a game program and a security code.

SUMMARY OF THE INVENTION

[0007] However, in the conventional examples described in the aforementioned publications, there is a problem in that only the storage medium itself is authenticated, whereas authentication of the actual gaming information is not performed, in other words, it is not checked and verified that the gaming information stored on the storage medium has not been manipulated in some way.

[0008] In other words, the technology described in Japanese Patent Application Publication No. 2001-344096 simply makes it possible to prevent illegal actions of duplicating the gaming information stored on the storage medium, but it does not make it possible to prevent manipulation of the actual gaming information. Furthermore, in the technology described in Japanese Patent Application Publication No. 2002-341957, although authentication is carried out in respect of the removable unit itself, the data stored in the unit is not authenticated, and therefore, this technology does not make it possible to prevent manipulation of the data stored in the unit. Moreover, in the video game system described in Japanese Patent Application Publication No. Hei. 8-241194, although transfer to and execution of illegal software

after the security check is prevented, it is not possible to prevent manipulation of the data stored on the recording medium.

[0009] Therefore, the present invention is devised in order to resolve the aforementioned problems, an object thereof being to provide a gaming machine, a gaming information authenticating and loading device, and a loading device for loading gaming information, whereby the gaming information stored on a storage medium can be authenticated.

[0009A] According to the present invention there is provided a gaming machine including (i) a connector for connecting a memory card which stores gaming information for execution of a game, (ii) a first memory for storing an authentication program for authenticating the gaming information stored in the memory card and an auxiliary authentication program for authenticating the authentication program, (iii) a first board including the connector, the first memory, and a first CPU for authenticating the authentication program by executing the auxiliary authentication program in the first memory, (iv) a second CPU, (v) a second board including a second memory and the second CPU, the second memory for reading and storing from the first memory of the first board, the authentication program authenticated by execution of the auxiliary authentication program by the first CPU, the second memory for reading and storing from the memory card, the gaming information authenticated as a result of execution of the authentication program under control of the second CPU, and (vi) a bus for connecting the second board to the first board and the connector, wherein (a) the first CPU of the first board executes the auxiliary authentication program stored in the first memory of the first board, and executes based on the auxiliary authentication program, a first authentication process for authenticating the authentication program stored in the first memory, (b) the second CPU of the second board writes, in a case where the authentication program is authenticated on the first board as a result of the first authentication process in (a), the authentication program authenticated and stored in the first memory of the first board, in the second memory of the second board, (c) the second CPU of the second board executes the authentication program authenticated and stored in the second memory of the second board, and executes based on the authentication program, a second authentication process for authenticating the gaming information in the

memory card connected to the second board and the connector through the bus, (d) the second CPU of the second board writes, in a case where the gaming information in the memory card is authenticated as a result of the second authentication process in (c), the gaming information stored in the memory card, in the second memory of the second board, and (e) the second CPU of the second board executes the game based on the gaming information stored in the second memory of the second board.

[0010] According to the present invention, a gaming machine comprising: a gaming operation execution device executing gaming operations for playing a game; a loading device including connection means for connecting a storage medium which stores gaming information to be used in playing the game, first program storage means for storing a first authentication program for authenticating the gaming information stored in the storage medium connected to the connection means, second program storage means for storing a second authentication program for authenticating the first authentication program stored in the first program storage means, and first authentication means for authenticating the first authentication program with the second authentication program stored in the second program storage means; and a processing device connected to the loading device, including readable and writable storage means, reading means for reading out the gaming information from the storage medium connected to the connection means of the loading device and for reading out the first authentication program authenticated by the first authentication means from the first program storage means, second authentication

5 means for authenticating the gaming information read out by the reading means with the first authentication program read out by the reading means, writing means for writing the gaming information authenticated by the second authentication means to the storage means, and operation control means for controlling the gaming operation execution device in accordance with the gaming information written to the storage means by the writing means.

10 [0011] In this gaming machine, since the loading device is connected to the processing device, by connecting a storage medium storing gaming information to the connection means of the loading device, it is possible to load the gaming information stored in the storage medium and to store the information in the storage means of the processing device. Furthermore, since the first authentication program for authenticating the gaming information is stored in the program
15 storage means of the loading device, this loading process is carried out after the second authentication means has performed authentication processing with the first authentication program. Moreover, since the first authentication program can be authenticated by the first authentication means with the second authentication program, it is
20 possible to authenticate the gaming information stored on the storage medium to a higher degree of reliability.

[0012] Moreover, the first authentication means of the loading device may send an authentication completion signal to the reading means of the processing device when completing authentication of the
25 first authentication program, and the reading means may suspend readout of the first authentication program until receiving the

authentication completion signal from the first authentication means.
 In this case, it is possible reliably to avoid a situation where the reading
 means reads out the first authentication program before the
 authentication processing of the first authentication program by the first
 authentication means has been completed.

5 [0013] Furthermore, the reading means may perform readout of
 the first authentication program after detecting completion of
 authentication of the first authentication program by the first
 authentication means. In this case, it is possible reliably to avoid
 10 situations in which the reading means reads out the first authentication
 program before the authentication processing of the first authentication
 program by the first authentication means has been completed.

[0014] According to the present invention, a gaming information
 authenticating and loading device comprising: a loading device
 15 including connection means for connecting a storage medium which
 stores gaming information to be used in playing a game, first program
 storage means for storing a first authentication program for
 authenticating the gaming information stored on the storage medium
 connected to the connection means, second program storage means for
 20 storing a second authentication program for authenticating the first
 authentication program stored in the first program storage means, and
 first authentication means for authenticating the first authentication
 program with the second authentication program stored in the second
 program storage means; and a processing device connected to the
 25 loading device, including readable and writable storage means, reading
 means for reading out the gaming information from the storage medium

5 connected to the connection means of the loading device and for reading out the first authentication program authenticated by the first authentication means from the first program storage means, second authentication means for authenticating the gaming information read out by the reading means with the first authentication program read out by the reading means, and writing means for writing the gaming information authenticated by the second authentication means to the storage means.

10 [0015] In this gaming machine, since the loading device is connected to the processing device, by connecting a storage medium storing gaming information to the connection means of the loading device, it is possible to load the gaming information stored in the storage medium and to store the information in the storage means of the processing device. Furthermore, since the first authentication program
15 for authenticating the gaming information is stored in the program storage means of the loading device, this loading process is carried out after the second authentication means has performed authentication processing with the first authentication program. Moreover, since the first authentication program can be authenticated by the first
20 authentication means with the second authentication program, it is possible to authenticate the gaming information stored on the storage medium to a higher degree of reliability.

[0016] Moreover, the first processor of the loading device may
25 send an authentication completion signal to the reading unit of the processing device when completing authentication of the first authentication program, and the reading unit may suspend readout of the

first authentication program until receiving the authentication completion signal from the first processor. In this case, it is possible reliably to avoid a situation where the reading means reads out the first authentication program before the authentication processing of the first authentication program by the first authentication means has been completed.

[0017] Furthermore, the reading unit may perform readout of the first authentication program after detecting completion of authentication of the first authentication program by the first processor. In this case, it is possible reliably to avoid situations in which the reading means reads out the first authentication program before the authentication processing of the first authentication program by the first authentication means has been completed.

[0018] According to the present invention, a gaming information loading device for loading stored gaming information to be used in playing a game from a storage medium and for sending the gaming information into a connected motherboard, said gaming information loading device comprising: connection means for connecting a storage medium which stores the gaming information to be used in playing the game; first program storage means for storing a first authentication program for authenticating the gaming information stored on the storage medium connected to the connection means; second program storage means for storing a second authentication program for authenticating the first authentication program stored in the first program storage means; and first authentication means for authenticating the first authentication program with the second authentication program stored

in the second program storage means.

[0019] When this gaming information loading device is connected to the motherboard, if the gaming information stored in a storage medium connected to the connection means is read out by the motherboard, it is possible to carry out authentication processing for the gaming information with the first authentication program. Moreover, since authentication processing can be carried for the first authentication program by the first authentication means with the second authentication program, it is possible to authenticate the gaming information stored on the storage medium, with a higher degree of reliability.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Fig. 1 is a block diagram showing the general constitution of a gaming information authenticating and loading device according to an embodiment of the present invention;

[0021] Fig. 2 is a perspective diagram showing the general constitution of a slot machine, which is a gaming machine relating to an embodiment of the invention;

[0022] Fig. 3 is a block diagram of the slot machine shown in Fig. 2, describing the internal constitution of same;

[0023] Fig. 4 is a block diagram showing the procedure of an authenticating and loading process for gaming information relating to the gaming information authenticating and loading device shown in Fig. 1;

[0024] Fig. 5 is a chart showing the procedure of an authenticating and loading process for gaming information performed by the gaming

board and motherboard shown in Fig. 1;

[0025] Fig. 6 is a block diagram showing the procedure of an authenticating and loading process for gaming information according to an embodiment different from the procedure shown in Fig. 4; and

[0026] Fig. 7 is a chart showing the procedure of an authenticating and loading process for gaming information performed by the gaming board and motherboard, which is different from the procedure shown in Fig. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] Below, an embodiment of the present invention will be described. The same reference numeral is used for the same constituent elements, and duplicated description thereof is omitted.

[0028] (General constitution of gaming information authenticating and loading device)

[0029] Fig. 1 is a block diagram showing the general constitution of a gaming information authenticating and loading device 1. The gaming information authenticating and loading device 1 has a gaming board 10 constituting a loading device according to the present invention, and a motherboard 20 constituting a processing device according to the present invention. The gaming information authenticating and loading device 1 is constituted by connecting the gaming board 10 with the motherboard 20 by means of a PCI bus 31 and an IDE bus 32 constituting a signal transmission unit. This gaming information authenticating and loading device 1 carries out an authenticating and loading process for authenticating and loading a game program 30a and game system program 30b, which form the

gaming information of the present invention and are stored on the memory card 30.

[0030] The gaming board 10 comprises a CPU 17 and boot ROM 11 which are mutually connected by means of an internal bus 18, and a card slot 12 corresponding to the memory 30. The gaming board 10 is a device which loads a game program 30a and a game system program 30b, described hereinafter, in the motherboard 20 from a memory card 30 constituting a storage medium according to the present invention.

[0031] The CPU 17 and the boot ROM 11 which are mutually connected by the internal bus 18 are connected to the motherboard 20 by means of a PCI bus 31. The PCI bus 31 transmits signals between the motherboard 20 and the gaming board 10, and the PCI bus 31 also supplies power from the motherboard 20 to the gaming board 10. The boot ROM 11 stores an authentication program (first authentication program) 11a, a preliminary authentication program (second authentication program) 11b, which are described below, and a program (boot code), or the like, (not illustrated) for booting (starting up) the CPU 17 and the preliminary authentication program 11b. This boot ROM 11 has the function of the first program storage means and the second program storage means of the present invention.

[0032] The authentication program 11a states a procedure (authentication procedure) for authenticating the gaming information, in other words, checking and verifying that the gaming information, which is the object of the authenticating and loading process, has not been manipulated. This authentication program 11a forms a program for authenticating the game program 30a and the game system program 30b

supplied to a slot machine 41 via the memory card 30. This authentication program 11a may also be called a "manipulation checking program", since the authentication program 11a checks whether the game program 30a and the game system program 30b have not been manipulated.

[0033] On the other hand, the object of the authentication processing performed by the preliminary authentication program 11b is the authentication program 11a itself. This preliminary authentication program 11b states a procedure (authentication procedure) for authenticating the authentication program 11a. In other words, the preliminary authentication program 11b checks and verifies that the authentication program 11a has not been manipulated. Accordingly, the preliminary authentication program 11b is a program for authenticating the authentication program 11a, which performs authentication of the game program 30a and the game system program 30b.

[0034] The card slot 12 is connected to the motherboard 20 by means of an IDE bus 32. This card slot 12 is a slot (physical connection section) which allows the memory card 30 to be connected in such a manner that the game program 30a and the game system program 30b stored thereon can be read out. The card slot 12 constitutes the connection means of the present invention, into which the memory card 30 can be inserted.

[0035] The motherboard 20 is constituted by means of a commercially available, generic motherboard (a printed circuit board mounted with the basic components of a personal computer). The

motherboard 20 has, at least, a CPU (Central Processing Unit) 21, a ROM (Read Only Memory) 22, a RAM (Random Access Memory) 23, and an I/O port 24, as shown in Fig. 1. The PCI bus 31 and IDE bus 32 described above are connected to this I/O port 24.

[0036] The ROM 22 stores programs, such as the BIOS (Basic Input/Output System) 22a (standard BIOS on the motherboard 20) which is executed by the main CPU 21, and permanent data. When this BIOS 22a is executed by the main CPU 21, then prescribed initialization processing of the peripheral device is carried out, and a process for reading the game program 30a and the game system program 30b stored in the memory card 30 via the gaming board 10 is started. A memory device, such as a flash memory, is used for this ROM 22, and it is possible to use a memory whose contents are either rewritable or non-rewritable.

[0037] The data and the program used when the main CPU 21 is operating are stored in the RAM 23. The RAM 23 can store, at the least, an authentication program 11a read out via the gaming board 10, and the game program 30a and the game system program 30b. Thus, the RAM 23 constitutes the readable and writable storage means of the present invention.

[0038] The memory card 30 is the storage medium according to the present invention which stores gaming information used in playing a game, and in the present embodiment, a CF card is used. The game program 30a and the game system program 30b forming the gaming information according to the present invention are stored in this memory card 30 (see Fig. 4). The game program 30a and the game system

program 30b respectively form slot game programs in the present embodiment.

[0039] A power supply unit 39 is connected via a power supply cable 39a to the motherboard 20 of the gaming information authenticating and loading device 1. When this power supply unit 39 supplies power to the motherboard 20, then the main CPU 21 of the motherboard 20 is started up, and substantially simultaneously with this, power is supplied to the gaming board 10 via the PCI bus 31, and the CPU 17 is started up.

[0040] (General constitution of slot machine)

[0041] Fig. 2 is an oblique diagram showing the general constitution of the slot machine 41. The slot machine 41 is a gaming machine relating to the present embodiment of the invention. This slot machine 41 incorporates the gaming information authenticating and loading device 1 having the aforementioned constitution, and executes a gaming operation for playing a game, on the basis of a game program 30a and a game system program 30b incorporated into this authenticating and loading device 1.

[0042] This slot machine 41 has display which displays gaming images used for gaming. The display shows a state where a plurality of (five) reels having a plurality of pictures are aligned, and the display shows a variable display image (reel image) exactly as if the respective reels are scrolling. This slot machine 41 is a video slot machine that executes a slot game in which pay-out is decided in accordance with the combination of pictures at the time that the respective reels shown by the display come to a halt (the reels shown by the image may also be

called "game reels").

[0043] The slot machine 41 has a frame 42, and an upper side image display panel 43 and a lower side image display panel 44 are provided on the front side of this frame 42. The upper side image display panel 43 is constituted by a liquid crystal display device, and displays an image which does not relate directly to the game (a description of the game, for example), in such a manner that the image displayed thereon changes in accordance with the operational contents. The lower side image display panel 44 is located in a substantially central position in the vertical direction of the frame 42, and is constituted by a liquid crystal display device (not illustrated), in such a manner that a game image comprising reel images is displayed.

[0044] The slot machine 41 also comprises a control panel 45 comprising an arrangement of a plurality of operating buttons whereby the player can perform prescribed operations, on the lower part of the lower side image display panel 44, and a coin inlet 47 for introducing gaming media (hereinafter, called "coins") used in playing a game, such as medals, money coins, or the like, and a banknote inlet 48 having a banknote input sensor 48a (see Fig. 3) which outputs a signal indicating input of a banknote, provided in order that a player can introduce banknotes, are disposed on the right-hand side of the control panel 45. Furthermore, the slot machine 41 has at the base of the frame 42 a coin pay-out opening 50, and a coin receiving section 51 which collects coins that have been paid out, and furthermore, speakers 49L and 49R are provided respectively on the left and right-hand sides of the pay-out opening 50.

[0045] Fig. 3 is a block diagram of a slot machine 41 focusing on the internal constitution of same. The slot machine 41 incorporates the motherboard 20 and the gaming board 10 constituting the gaming information authenticating and loading device 1 described above. The slot machine 41 also has a plurality of constituent elements constituting the gaming operation execution device of the present invention which executes gaming operations. The motherboard 20 comprises, in addition to the main CPU 21, ROM 22, RAM 23 and I/O port 24 described above, a random number generator 35, a sampling circuit 36, a clock pulse generator circuit 37, and a frequency divider 38. The random number generator 35 operates in accordance with instructions from the main CPU 21, and generates a random number within a prescribed range. The sampling circuit 36 samples a random number from the group of random numbers generated by the random number generator 35, in accordance with an instruction from the main CPU 21, and the random number generator 35 inputs the sampled random number to the main CPU 21. The clock pulse generator circuit 37 generates a reference clock for operating the main CPU 21, and the frequency divider 38 inputs a signal obtained by dividing the reference clock at a prescribed frequency, to the main CPU 21.

[0046] Moreover, the slot machine 41 comprises, as the aforementioned gaming operation execution devices, a lamp drive circuit 59, a lamp 60, an LED drive circuit 61, an LED 62, a hopper drive circuit 63, a hopper 64, a pay-out completion signal circuit 65, a coin detector unit 66, an image control circuit 71 and an audio control circuit 72. The elements from the lamp drive circuit 59 until the audio

control circuit 72 constitute a group of gaming operation execution devices.

[0047] The lamp drive circuit 59 outputs a signal to the lamp 60 for causing the lamp 60 to light up and switching the lamp 60 on and off during the game. By means of this switching on and off, a game performance is created. The LED drive circuit 61 controls the on and off display of the LED 62. The LED 62 creates a number of credits display, a winning display, and the like. The hopper drive circuit 63 drives the hopper 64 in accordance with control implemented by the main CPU 21. The hopper 64 performs an operation for paying out coins that have been won as a prize, and pays out coins from the pay-out opening 50 into the coin receiving section 51. The coin detector unit 66 counts up the number of coins that have been paid out by the hopper 64, and data on the number thus counted is sent to the pay-out completion signal circuit 65. The pay-out completion signal circuit 65 inputs the number-of-coins data from the coin detector unit 66, and when this number of coins reaches a specified number of coins data, then the circuit 65 inputs a signal reporting the completion of coin pay-out to the main CPU 21.

[0048] The image control circuit 71 controls the respective image displays on the upper side image display panel 43 and the lower side image display panel 44. The image control circuit 71 displays various images, such as variable display images of a plurality of pictures, or the like.

[0049] The audio control circuit 72 inputs a sound signal from a sound source IC, amplifies the input sound signal and outputs sound

from the speakers 49L and 49R. Thereby, sounds for raising the atmosphere of the game at suitable moments after the start of the game, for example, are output from the speakers 49L and 49R.

[0050] The image control circuit 71 and the audio control circuit 72 store an image control program and an audio control program in the ROM 22, and they can be incorporated into the motherboard 20 by executing the processing according to the respective programs, by means of the CPU 21.

[0051] Furthermore, the power supply unit 39 is connected to the other constituent elements, as well as the motherboard 20, but in Fig. 3, in order to simplify the diagram, the connections between the power source unit 39 and the constituent elements other than the motherboard 20 are omitted.

[0052] (Operation of gaming information authenticating and loading device and slot machine)

[0053] Next, the details of the operation of the gaming information authenticating and loading device 1, and the slot machine 41, having the constitution described above, are explained with reference to Fig. 1, and Fig. 4 and Fig. 5.

[0054] Here, Fig. 4 is a block diagram showing the procedure of a gaming information authenticating and loading process in the gaming information authenticating and loading device 1. Fig. 5 is a chart showing the procedure of an authenticating and loading process for gaming information performed by the gaming board 10 and the motherboard 20. In Fig. 5, "step" is abbreviated to "S".

[0055] In the gaming information authenticating and loading

device 1 and the slot machine 41, during the authenticating and loading processing for gaming information, firstly, the power supply switch in the power source unit 39 is switched on (the power source is switched on), as shown in Fig. 5, and the motherboard 20 and the gaming board 10 are started up (Step 1-1, Step 2-1). In a substantially simultaneous fashion with the switching on of the power supply switch, the memory card 30 is inserted into the card slot 12 in the gaming board 10.

[0056] When the motherboard 20 and the gaming board 10 are started up, their independent processes are carried out respectively, in parallel fashion. Specifically, in the gaming board 10, the CPU 17 reads out the preliminary authentication program 11b stored in the boot ROM 11. In accordance with the preliminary authentication program 11b thus read out, the CPU 17 operates as the first authentication means, and performs preliminary authentication f4 (see Fig. 4) for checking and verifying in advance that the authentication program 11a has not been manipulated, before the authentication program 11a is read into the motherboard 20 (Step 2-2).

[0057] On the other hand, in the motherboard 20, the main CPU 21 executes the BIOS 22a and develops the compressed data included in the BIOS 22a into the RAM 23 (Step 1-2). When the main CPU 21 advances to Step 1-3, the main CPU 21 executes the BIOS 22a developed into the RAM 23 and then carries out diagnosis and initialization of the various peripheral devices. In this case, the main CPU 21 carries out a check to see what devices are connected to the PCI bus 31. Here, since the boot ROM 11 of the gaming board 10 is connected to the PCI bus 31, the main CPU 21 advances to step S1-4

and operates as the reading means of the present invention, by reading out the authentication program 11a stored in the boot ROM 11.

[0058] Furthermore, when the authentication program 11a is read out, the main CPU 21 carries out a loading process r1 for storing the authentication program 11a into the RAM 23. In this loading process r1, in accordance with the functions of the standard BIOS in the BIOS 22a, the main CPU 21 takes the check sum acquired by an ADDSUM method (standard check function), and the main CPU 21 stores the authentication program 11a in the RAM 23, while carrying out a confirmation process f1 (see Fig. 4) to see whether or not storage has been completed without any errors.

[0059] Next, the main CPU 21 advances to Step 1-5, where the main CPU 21 confirms what devices are connected to the IDE bus 32, and then accesses the memory card 30 inserted into the card slot 12, by means of the IDE bus 32. The main CPU 21 then operates as the reading unit of the present invention, and reads out gaming information (in other words, a game program 30a and a game system program 30b) from the memory card 30. In this case, the main CPU 21 reads out 4 bytes of data constituting the gaming information at a time. Continuously, the main CPU 21 operates as the second authentication means of the present invention, in accordance with the authentication program 11a stored in the RAM 23. Then, the main CPU 21 performs an authentication process f2 with respect to the read-out game system program 30b, and an authentication process f3 with respect to the game program 30a. Thereby, the CPU 21 checks and verifies that the game program 30a and the game system program 30b have not been

manipulated. When these authentication processes f2 and f3 complete normally, the main CPU 21 advances to Step 1-6, where the main CPU 21 operates as the writing means of the present invention, and carries out a loading process r2 for the game system program 30b which was the object of the authentication process (namely, which has been authenticated), and a loading process r3 for the game program 30a. Thereby, the game program 30a and the game system program 30b are written to and stored on the RAM 23.

[0060] Although not shown in the drawings, if an abnormality occurs during the authentication process for some reasons, for instance, if the game system program 30b has been manipulated, and the authentication process has not been completed normally, then the main CPU 21 reports the occurrence of an abnormality, for instance, by issuing an error display on the upper-side image display panel 43, whereupon the authentication process is halted. In this case, the loading process is not carried out. In other words, the game program 30a and the game system program 30b are introduced into the motherboard 20 only when they have been authenticated.

[0061] In this way, the authenticating and loading process is completed by the processing in Steps 2-1 to 2-2 performed by the CPU 17, and Steps 1-1 to 1-6 performed by the main CPU 21, and the processing by the gaming information authenticating and loading device 1 is also completed.

[0062] Continuously, in the slot machine 41, the main CPU 21 advances to Step 1-7, where the main CPU 21 operates as the operation control means and implements control in such a manner that the

5 respective gaming operation execution devices carry out gaming operations, in accordance with the game program 30a and the game system program 30b stored in the RAM 23. Thereby, the plurality of constituent elements for gaming operation execution devices which

10 constitute a group of gaming operation execution devices perform respective gaming operations. For example, the image control circuit 71 displays gaming information used in playing a game, such as simulated reels, on the lower-side image display panel 44, and furthermore, the lamp drive circuit 59 lights up the lamp 60, or the like,

15 principally in order to create a game effect, in accordance with the progress of the game. Moreover, the hopper drive circuit 63 operates the hopper 64 in accordance with the game winnings result, and thus pays out coins. The player is able to play a slot game by observing the simulated reels.

20 [0063] In this way, in a slot machine 41, the gaming operation execution devices carry out gaming operations in accordance with the game program 30a and the game system program 30b supplied by means of the memory card 30 and stored in the RAM 23 after the programs 30a and 30b are authenticated. Thereby, the player is able to

25 play a slot game.

 [0064] As described above, in the gaming information authenticating and loading device 1 and the slot machine 41, since the gaming board 10 is connected to a generic motherboard 20, then by inserting the memory card 30 storing gaming information into the card

 slot 12 of the gaming board 10, the stored gaming information can be read out and stored in the RAM 23 of the motherboard 20.

[0065] Moreover, since the authentication program 11a which states a procedure for authenticating the gaming information is stored in the boot ROM 11 of the gaming board 10, then when the gaming information is loaded, an authentication process is performed in accordance with the authentication program 11a, and it is checked and verified that the gaming information has not been manipulated. Consequently, in the authenticating and loading device 1 and the slot machine 41, even if gaming information 30a and 30b is supplied from a source that is external to the slot machine 41, it is certain that the gaming information 30a and 30b thus loaded is legitimate gaming information which has not been manipulated. Therefore, illegal actions relating to the actual gaming information are reliably prevented.

[0066] Moreover, preliminary authentication f4 is carried out with respect to the authentication program 11a used to perform authentication of the game program 30a and the game system program 30b, before it is read in to the motherboard 20. That is, before the motherboard 20 loads the authentication program 11a, the preliminary authentication f4 is carried out in addition to a check sum by means of a standard BIOS. Therefore, it is confirmed that the authentication program 11a is a legitimate program which has not been manipulated, and the reliability of this authentication program 11a is improved. As a result, it is possible to authenticate the gaming information 30a and 30b stored on the memory card 30 with a greater degree of reliability. Furthermore, the preliminary authentication program 11b, which carries out preliminary authentication f4, is stored in a non-rewritable fashion, in the boot ROM 11.

[0067] Moreover, in the gaming information authenticating and loading device 1 and the slot machine 41, since the motherboard 20 is constituted by a commercially available generic motherboard, the motherboard 20 has highly generic characteristics and, consequently, it is possible to reduce manufacturing costs.

[0068] In the foregoing description, a game program 30a and a game system program 30b for a slot game are loaded, but instead of this, it is also possible to load a separate game program 30a and a game system program 30b for another game. In this case, the slot machine 41 becomes a game machine (for instance, a card game machine) which implements another game (for example, a card game which displays card images of trump cards).

[0069] Instead of the procedure of the gaming information authenticating and loading process performed by the gaming board 10 and the motherboard 20 described above, it is also possible to adopt a procedure such as that shown in Fig. 6 and Fig. 7. Specifically, the procedure of the gaming information authenticating and loading process shown in Fig. 6 and Fig. 7 is different from the aforementioned procedure in that reset control of the main CPU 21 is carried out, when the CPU 17 performs authentication of the authentication program 11a.

[0070] More specifically, similarly to the procedure of the authenticating and loading process for gaming information described above, the power supply switch on the power source unit 39 is switched on (the power supply is switched on), and the motherboard 20 and the gaming board 10 are started up (Step 1-1, Step 2-1). Thereby, in the gaming board 10, the CPU 17 advances to Step 2-10, and a reset signal

output process P1 (see Fig. 6) is performed by the main CPU 21, via the PCI bus 31. By carrying out the reset control output process P1, the main CPU 21 is held in a reset state and the readout process of the authentication program 11a and the gaming information 30a and 30b is not executed, until there is an output process P2 of the reset release signal (authentication completion signal) at the subsequent step, Step 2-11. Thereupon, the CPU 17 advances to Step 2-2 to perform readout of the preliminary authentication program 11b stored in the boot ROM 11, and carries out preliminary authentication f4 in accordance with the preliminary authentication program 11b. When the preliminary authentication f4 is completed normally, the procedure advances to Step 2-11, and the CPU 17 performs a reset release signal output process P2 (see Fig. 6), thereby releasing the reset state of the main CPU 21.

[0071] As described above, by adopting reset control using a reset signal and a reset release signal, the readout of the authentication program 11a by the main CPU 21 in the motherboard 20 is suspended, until the preliminary authentication f4 by the CPU 17 on the gaming board 10 has been completed. Therefore, it is possible reliably to avoid a situation where the main CPU 21 reads out the authentication program 11a before the preliminary authentication f4 by the CPU 17 has been completed. Furthermore, by adopting reset control of this kind, it is possible to avoid a situation in which the CPU 17 and the main CPU 21 access the PCI bus 31 at the same timing, thus causing a conflict of signals, without using separate means, such as a bus switching device.

[0072] However, in general, the execution time of the BIOS 22a by the main CPU 21 (the sequence of processing from Step 1-2 to Step

1-3) is significantly longer than the processing time of the preliminary authentication f4 (Step 2-2) by the CPU 17. Therefore, it is desirable that the CPU 17 and the main CPU 21 should be carried out in parallel without adopting reset control, as shown in Fig. 5, from the viewpoint of being able to shorten the time period until the gaming information is executed at Step 1-7.

[0073] In an embodiment where the CPU 17 and the main CPU 21 carry out processing in parallel, it is also possible to avoid situations where the main CPU 21 reads out an authentication program 11a before the preliminary authentication f4 by the CPU 17 has been completed, by a method other than reset control. Specifically, a prescribed storage region (for example, a register or memory) for confirming the completion of the preliminary authentication f4 is provided previously in either the gaming board 10 or the motherboard 20. When the preliminary authentication f4 has completed, the CPU 17 rewrites the contents of the prescribed storage region, and by means of the main CPU 21 monitoring this rewriting process, the main CPU 21 is able to determine the completion of the preliminary authentication f4 by the CPU 17. After determining that the preliminary authentication f4 has been completed, the main CPU 21 performs readout of the authentication program 11a, thereby preventing situations in which the main CPU 21 reads out the authentication program 11a before the preliminary authentication f4 by the CPU 17 has been completed. At the same time, it is also possible to avoid situations in which the CPU 17 and the main CPU 21 access the PCI bus 31 simultaneously, thus producing signal conflicts, without having to use separate means, such

as a bus switching device.

[0074] In the aforementioned embodiments, a slot machine 41 which performs a slot game is described as an example of a gaming machine, but the present invention may also be applied to gaming machines which implement other types of games. For example, the present invention may also be applied to a card game machine which implements a card game using card images showing trump cards, a Mahjong game machine which implements a Mahjong game, or a Pachinko game machine which uses game balls. Furthermore, in the case of a slot machine, the machine is not limited to being a video slot machine such as the slot machine 41, but may also be a rotating cylinder type of slot machine which has mechanical reels. In this case, the mechanical reels constitute the gaming operation execution device of the present invention.

[0075] In the embodiments described above, the gaming information is constituted by two types of programs, namely, a game program and a game system program, but the gaming information may also be modified appropriately to gaming information constituted by one type of program, or three or more types of program. Furthermore, a state is shown in which both the authentication program 11a and the preliminary authentication program 11b are stored in the boot ROM 11; however, it is also possible to provide a plurality of ROMs and RAMs in the gaming board 10, and to store the authentication program 11a and the preliminary authentication program 11b in separate ROMs and RAMs.

Where the terms "comprise", "comprises", "comprised" or "comprising" are used in this specification, they are to be interpreted as specifying the presence of the stated features, integers, steps or components referred to, but not to preclude the presence or addition of one or more other feature, integer, step, component or group thereof.

The claim defining the invention is as follows:

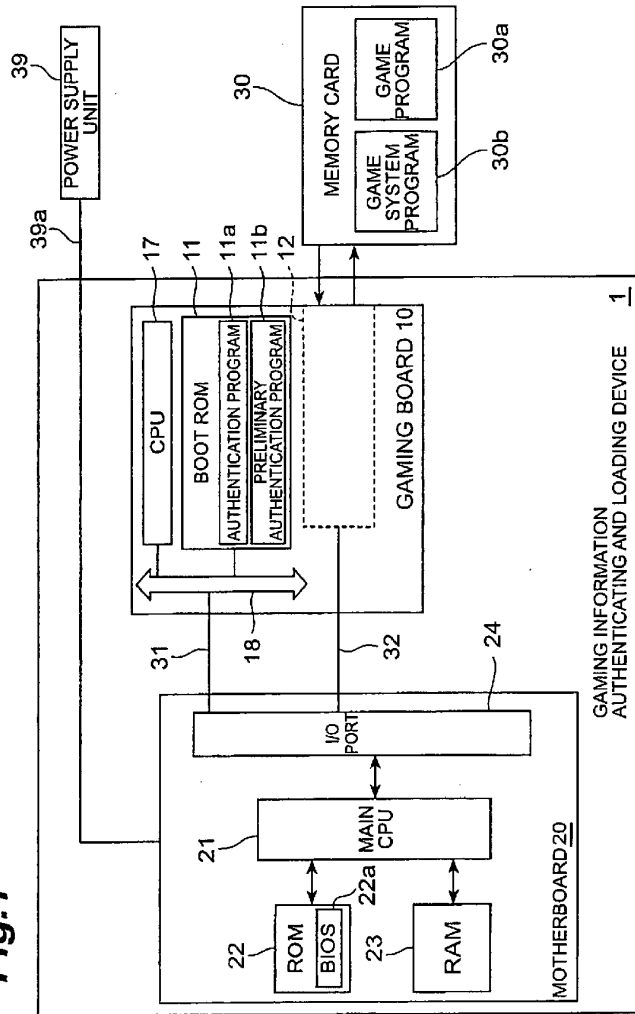
1. A gaming machine including:
 - (i) a connector for connecting a memory card which stores gaming
 - 5 information for execution of a game;
 - (ii) a first memory for storing an authentication program for authenticating the gaming information stored in the memory card and an auxiliary authentication program for authenticating the authentication program;
 - (iii) a first board including the connector, the first memory, and a first CPU
 - 10 for authenticating the authentication program by executing the auxiliary authentication program in the first memory;
 - (iv) a second CPU;
 - (v) a second board including a second memory and the second CPU, the second memory for reading and storing from the first memory of the first board, the
 - 15 authentication program authenticated by execution of the auxiliary authentication program by the first CPU, the second memory for reading and storing from the memory card, the gaming information authenticated as a result of execution of the authentication program under control of the second CPU, and
 - (vi) a bus for connecting the second board to the first board and the
 - 20 connector; wherein:
 - (a) the first CPU of the first board executes the auxiliary authentication program stored in the first memory of the first board, and executes based on the auxiliary authentication program, a first authentication process for authenticating the authentication program stored in the first memory;
 - 25 (b) the second CPU of the second board writes, in a case where the authentication program is authenticated on the first board as a result of the first authentication process in (a), the authentication program authenticated and stored in the first memory of the first board, in the second memory of the second board;
 - (c) the second CPU of the second board executes the authentication program
 - 30 authenticated and stored in the second memory of the second board, and executes based on the authentication program, a second authentication process for

authenticating the gaming information in the memory card connected to the second board and the connector through the bus;

5 (d) the second CPU of the second board writes, in a case where the gaming information in the memory card is authenticated as a result of the second authentication process in (c), the gaming information stored in the memory card, in the second memory of the second board; and

10 (e) the second CPU of the second board executes the game based on the gaming information stored in the second memory of the second board.

Fig.1



GAMING INFORMATION
AUTHENTICATING AND LOADING DEVICE 1

Fig.2

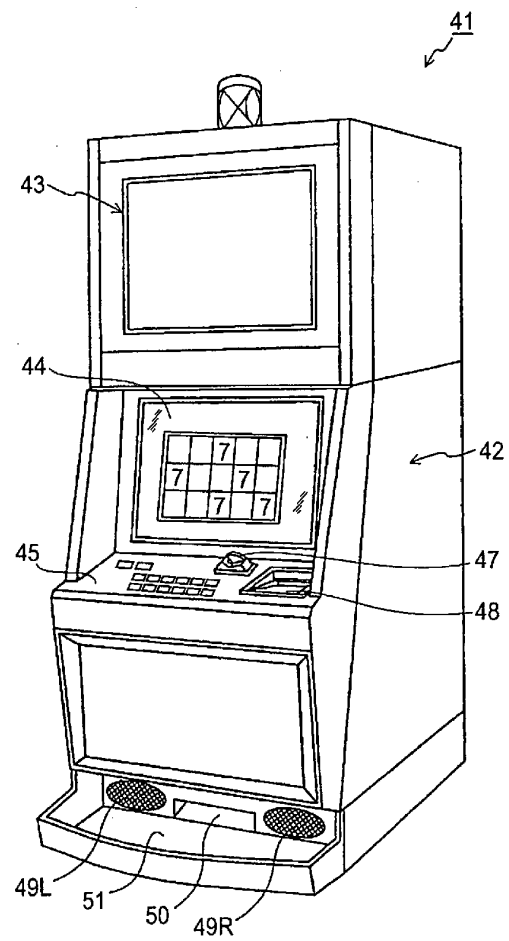


Fig.3

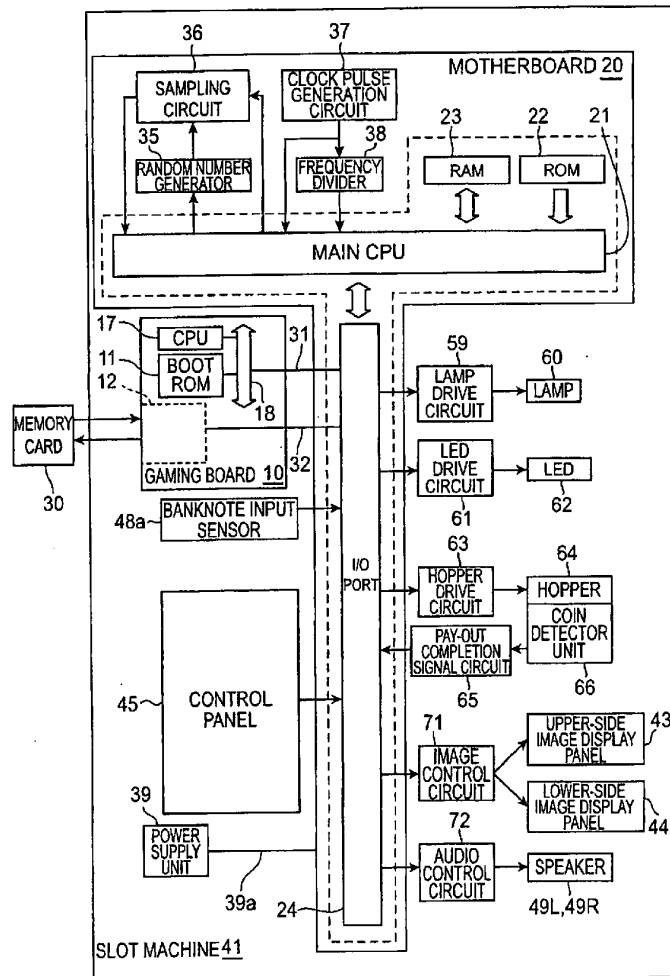


Fig.4

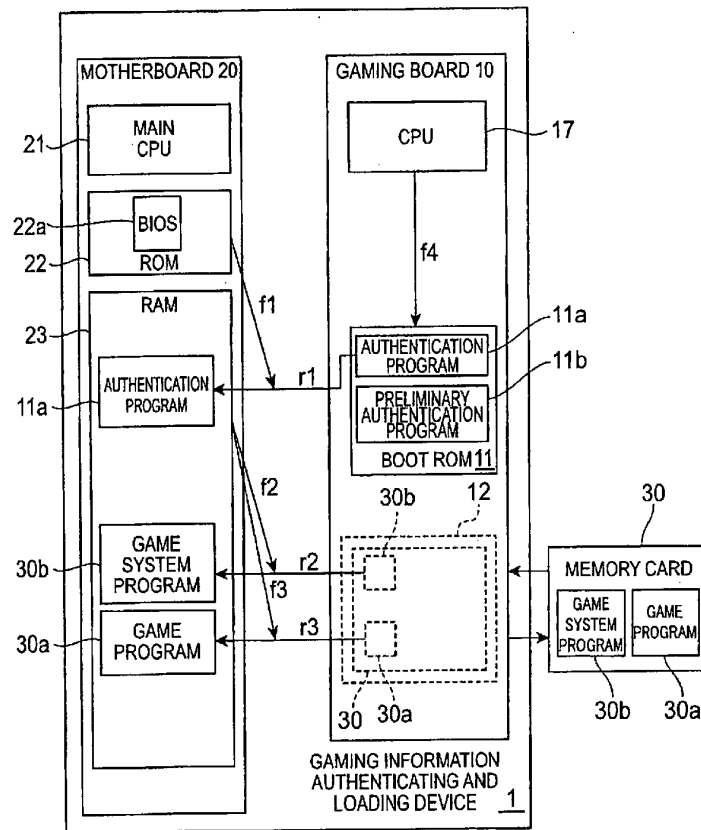


Fig.5

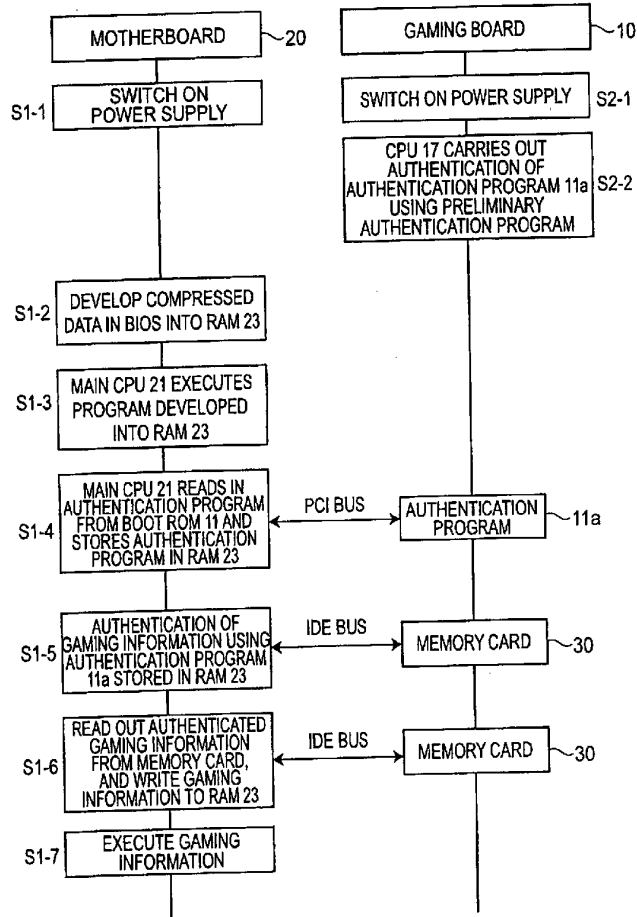


Fig.6

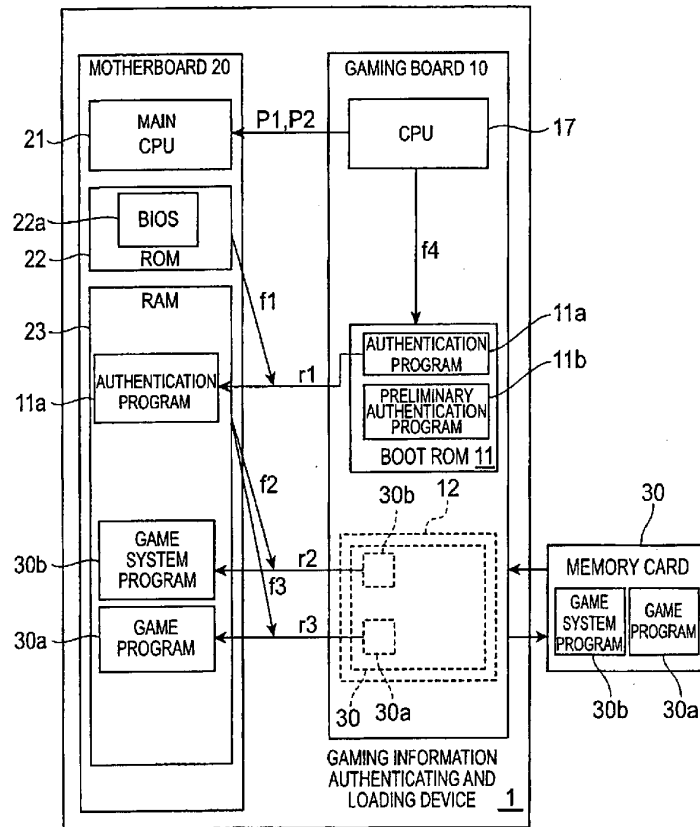


Fig.7

