(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 529 658 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
22.05.1996 Bulletin 1996/21

(51) Int. Cl.[6]: **A63F 9/22**

(21) Application number: **92114759.1**

(22) Date of filing: **28.08.1992**

(54) **Data reading and image processing system for CD-ROM**

System um Daten auszulesen und Bilder von CD-ROM zu verarbeiten

Système pour lire des données et pour traiter des images stockées sur CD-ROM

(84) Designated Contracting States:
DE GB IT

(30) Priority: **30.08.1991 JP 219677/91**
12.12.1991 JP 351393/91

(43) Date of publication of application:
03.03.1993 Bulletin 1993/09

(60) Divisional application: **95113152.3**

(73) Proprietor: **SEGA ENTERPRISES, LTD.**
Tokyo 144 (JP)

(72) Inventors:
- **Terasima, Junichi**
  Tosima-ku, Tokyo (JP)
- **Asai, Toshinori**
  Ota-ku, Tokyo (JP)
- **Kawahori, Masaki**
  Hanamigawa-ku, Chiba (JP)

(74) Representative: **Prüfer, Lutz H., Dipl.-Phys.**
Harthauser Strasse 25d
D-81545 München (DE)

(56) References cited:
EP-A- 0 099 189
EP-A- 0 109 189
GB-A- 2 104 760
US-A- 5 006 936

EP 0 529 658 B1

Description

The present invention provides a data reading and image processing system using a compact disc storage device and controls a music and video entertainment system that provides game play with operator interface.

Video game systems have been extremely popular in providing interactive game play with an operator. Generally, these video game systems have used a microprocessor-based controller that can be connected to a television set and can receive ROM cartridges for providing game play on the video screen with operator controls enabling an interaction with the play of the game. While these game systems have proven to be extremely popular, there has been an increasing demand for more complex game play and more detailed video images. As a result, video game systems have sought to use the increased storage capacity of optical compact disc ROMs (CDs), and have also sought to expand the entertainment possibilities, such as the reproduction of music by a CD player that can be used for not only storing video images, but also the conventional music data associated with a CD player.

In the conventional image processing systems using a CD, one CPU system is used for controlling both the reading of image data and the processing of the image data for image display. As a result, when image data processing or image display is being carried out, other processing and control operations cannot be carried out. As a consequence, the processing speed is substantially decreased, and the capacities of the expanded memory of the CD-ROM is limited. While the compact disc was originally a medium partially established for recording sound, its capability of recording a much larger amount of information than conventional recording media in the form of a digital recording lends itself to recording information other than audio information, such as video information, etc. When used in a television game system, the video information that is stored on the CD-ROM is accessed throughout the progress of the game. Thus, video information that is stored on a CD-ROM must be read out and used as video images of the game, depending upon the various game play options that can be established by the operator's skill and choices.

While the CD-ROM permits a TV game machine to provide a much better quality of display of video images, there has been a limitation in its adaptability to the conventional data reading and imaging processing systems that have been used in this field. As can be appreciated, TV game entertainment systems are relatively competitive, and price limitations impose serious constraints on the hardware components that can be utilized.

Another problem that has occurred exists when the CD operation requires a video display on the TV picture or CRT, such as when various operator instructions must be input into the system. In a play action mode, it is difficult to switch to an operator menu while the CD graphic image is being displayed. Usually in the conventional operation, in order to switch, the CD operation that is currently in play must be stopped, and an operational picture or menu is displayed. Only after the operation with that menu is completed can the game play or CD graphic image be again displayed. Further, when a particular CD program is to be selected, e.g., a program selection menu in the conventional scheme, the display can be made only for a presubscribed number of programs, and there is a limitation on the number of programs that can be assigned or the degree of complicated instructions that can be implemented.

Figure 3 shows a conventional CD data read and image processing device with data stored on a CD-ROM being read out for processing. CPU 30 controls both a CD-ROM drive unit 32 for reading the data recorded on the CD-ROM and an image processing unit 34 for displaying the data recorded on the CD-ROM as video images. The video image processed by image processing unit 34 is displayed on a TV screen 36. In order to retain the recording data of the CD-ROM for operational processing, CPU 30 has a random access memory 38.

CD-ROM drive unit 32 can read the data from CD-ROM at a rate of 2048 bytes per 1/75-second. However, in order to display a video image using image processing unit 34, it is necessary to process the read data at a different synchronization speed of 1/60-second in the case of an NTSC video format. As the synchronization timing of CD-ROM drive unit 32 and image processing unit 34 are different from each other, there are resulting problems related to the operation of the CD data read and image processing system.

The operation of the conventional CD data read processing device may be further explained with reference to Figures 4-6. In Figures 4 and 5, the operation is carried out with a priority set for a CD interruption from CD-ROM drive unit 32 over the video interruption from the image processing unit 34. The image data of 2048 x 5 bytes (1 scene) inputted in five cycles from the CD-ROM in 1/75-second for each cycle are outputted as a video image in four cycles by the image processing unit 34.

As shown in Figure 4, because the CD interruption from CD-ROM drive unit 32 is set with priority, data from CD-ROM is stored in buffer area A of memory 38 at a rate of 2048 bytes per 1/75-second. On the other hand, image processing unit 34 generates a video interruption for processing the data stored in buffer area B of memory 38 at a rate of 2560 bytes per 1/60-second to form a video image. If the read control of CD-ROM drive unit 32 has not ended, data processing is carried out by image processing unit 34, only after the CPU 30 is released from the read control mode.

In addition, as the busy time of CPU 30 is long due to image processing unit 34, when CD interruption is generated before the end of data processing by image processing unit 34, such as after 4/75-second, CD interruption is set as priority, and CD-ROM read control by CD-ROM drive unit 32 is carried out by CPU 30. As shown in Figure 4, data processing by image processing unit 34 is interrupted.

When the busy time of CPU 30 for image processing unit 34 becomes even longer, as shown in Figure 5, interruption of data processing by image processing unit 34 takes place even more frequently (after 3/75-second, 4/75-second).

Consequently, it is considered to let the video interruption from image processing unit 34 take priority over the CD interruption from CD-ROM processing unit 32. When the busy time of CPU 30 for image processing unit 34 is short, during the period when CPU 30 is not busy for image processing unit 34, CD-ROM read control by CD-ROM drive unit 32 can be carried out. However, as shown in Figure 6, when the busy time of CPU 30 for image processing unit 34 becomes longer, the CD-ROM read control by CD-ROM drive unit 32 interrupts after, say, 1/60-second by video interruption.

From EP-A-0 109 189 a video display system for marketing items is known which includes a video disc player and a video disc for storing video information and audio information about items to be sold. A video display and an audio-amplifier communicate this information to a user of the terminal. A keyboard may be used for entering item order information. A unique video switch and character generator is included for displaying text on the video display.

Thus, it is the object of the present invention to solve the discrepancy in synchronization timing of the CD-ROM drive unit and the image processing in an economical manner. Further a switching of the operational picture being displayed on a video screen should be facilitated.

This object is solved by a video computer game system with the features of claim 1, and by a multi-function entertainment system with the features of claim 10.

Preferred developments of the invention are given in the respective subclaims.

The present invention provides a video computer game system or entertainment system which enables an operator to play a game stored as data on a compact disc ROM that can be read at a first synchronization time period that is different from a second synchronization time period necessary for processing the data to provide video drive signals. The compact disc data processing system can include a memory unit that can receive data read from a CD disc through a CD-ROM drive unit. A first computer system can control the reading of data by the CD-ROM drive unit and can store the read data in the memory unit in coordination with the first synchronization time period. An image processing circuit can process the read data to provide video drive signals in coordination with a second synchronization time period. A second computer system can control the processing of the video drive signals during the second synchronization time period. A control unit such as a gate array or computer-controlled switch system can coordinate the storage of the read data into the memory unit and the reading of the data out of the memory unit to enable a coordination of the processing of data by the first and second computer systems. The two computer systems can function independently in a parallel processing of data to enhance both the processing speed and capabilities of the entertainment game system.

In operation, a CD graphics picture can further include a switch instruction region that is set for switching to an operational picture. Conversely, the operational picture can also include a switch instruction region for switching to the CD graphic. Thus, a cursor or other operator-controlled designating device can interact with the switch regions so that switching can be performed even during a play mode of operation. Consequently, by using the function of setting the operational picture, an image of the CD graphics can be utilized. Additionally, as a number of programs in the CD can be displayed on a picture, the programs can be selected easily, for example, with the aid of a scrolling function, and cancellation of a selected program also can be easily done. Thus, setting the operational functions desired by the operator on the video screen can be easily accomplished.

In summary, the image data reading and image processing system using two independent CPU's, which can perform independent operations simultaneously, enable data processing to be carried out at a high speed and with high efficiency while further enhancing the ease with which the operator can interface with switched instruction regions on various video displays on the CRT. The first CPU system can be used for image processing the data from the CD with a memory for storing image data processed by the first CPU system via a switching device. A second CPU system can read and process image data from the memory via the switching device. A video data display processor circuit can input the process data from the second CPU and display them on a display screen. Switching can be carried out between the CD picture being played and the operational picture and the program selection on the CD can be performed with a scrolling function.

The objects and features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages, may best be understood by reference to the following description, taken in connection with the accompanying drawings.

Figure 1 is a block diagram of the CD data read and image processing system of this invention;

Figure 2 is a diagram illustrating an operation of the CD data read and image processing of this invention;

Figure 3 is a block diagram of a conventional CD data read and image processing system;

Figure 4 is a diagram illustrating an operation of the conventional CD data read and image processing;

Figure 5 is a diagram illustrating the operation of the conventional CD data read and image processing;

Figure 6 is a diagram illustrating the operation of the conventional CD data read and image processing;

Figure 7 is a block diagram illustrating a configuration of an alternative example of this invention;

Figure 8 is a flowchart illustrating the operation of the configuration shown in Figure 7;

Figure 9 is a concept diagram illustrating the CD system control unit;

Figures 10A and 10B are diagrams illustrating an example of an operation picture and a play picture;

Figure 11 is a flowchart illustrating a switching operation of the operation picture and the play picture;

Figures 12A and 12B are diagrams illustrating the selection of music on a CD;

Figure 13 is a diagram illustrating the scrolling of program selection;

Figure 14 shows the configuration of a MEGA-CD; and

Figure 15 shows the connection relationship between the MEGA-CD and a MEGA-drive.

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventors of carrying out their invention.

Various modifications, however, will remain readily apparent to those skilled in the art, since the generic principles of the present invention have been defined herein specifically to provide an improved data reading and image processing system for an entertainment system.

This invention will be explained in more detail with reference to an example illustrated by Figures 1 and 2.

CPU 10 for controlling the reading of data from a CD is set for controlling CD-ROM drive unit 12 to read the data recorded on a CD-ROM (not shown). CPU 14 for controlling the video signals is set for controlling an image processing unit 16 for displaying the recording data of the CD-ROM as a video image. The video image processed by image processing unit 16 is displayed on a TV screen 18.

A gate array 20 interconnects with CD CPU 10 and video CPU 14 between memories 22A and 22B, and it can control the operation of CD CPU 10 and video CPU 14. That is, under control of CD CPU 10, CD recording data read from CD-ROM drive unit 12 at a timing of 1/75-second are stored in memory 22A or memory 22B. At the same time, the CD recording data read from memory 22B or memory 22A are processed by image processing unit 16 for each 1/60-second under control of video CPU 14. At a timing not occupied by both CD CPU 10 and video CPU 14, gate array 20 can control a data exchange between memory 22A and memory 22B.

The operation of the CD data read and image processing system in this example can be explained with reference to Figure 2.

As shown in Figure 2, with respect to a CD interruption from CD-ROM drive unit 12, CD CPU 10 immediately performs the processing of reading data, and the CD recording data are stored by way of gate array 20 into, say, memory 22A. On the other hand, with respect to a video interruption from image processing unit 16, video CPU 14 immediately performs an image processing, and the CD recording data stored in memory 22B are taken out via gate array 20 and are displayed as a video image on TV screen 18. When the processing of the data of one scene by CD CPU 10 and video CPU 14 is completed, data exchange is carried out between memory 22A and memory 22B and the data processing for the next scene is accordingly prepared.

In this way, for the CD data read and image processing system in this application example, CD CPU 10 for controlling CD-ROM drive unit 12 and video CPU 14 for controlling image processing unit 16 are operated separately from each other. Consequently, there is no interruption in the processing of data due to a busy CPU as in the conventional scheme, and the data of CD-ROM can be both read and image processed smoothly.

This invention is not limited to the aforementioned application, and various variations may be applied. For example, in the aforementioned application example, read processing is performed for data recorded on CD-ROM. However, this invention can also be applied in the read processing of data recorded on other CD's, such as CD, CD-ROM-XA, CD-I, CD-G, CD-V, etc.

In the aforementioned application example, the CD recording data recorded on a CD-ROM are processed and the TV image is displayed. However, this invention may also be applied in the processing of other types of data recorded on the CD-ROM in addition to image data.

As explained above, according to this invention, a first CPU for controlling the CD drive unit and a second CPU for controlling the data processing unit are set separately; hence, even when the synchronization timing of the CD drive unit is different from the synchronization timing of the data processing unit, the CD data can still be read and processed smoothly without interruption.

An alternative embodiment of the present invention is defined to effectuate a switching image instruction to be realized on both a CD graphic image and an operational picture to facilitate operator selection and control of the entertainment system. Figure 7 shows an example of a configuration of this invention. There are again two separate CPU's 100 and 101. Memory 121 is connected to CPU 100, while memory 122 is connected to CPU 101. Via a switch having contact points a and b (such as an analog switch 105), memory (RAM) 104 can be connected to CPU 100 and CPU 101. Memory 104 is divided into a first area containing the image data and a second area containing the data for transfer. Switch 105 can be controlled by CPU 100. The data from memory 104 processed by CPU 101, are sent to video data display unit 102, and the processed image is displayed on CRT 103. The information of CD-ROM 120 is inputted to memories 104 and 121, and CD 120 is operated by CPU 100 with the aid of a command MC from a CD-BIOS, to be explained later.

For this configuration, operation is illustrated in Figure 8. First of all, CPU 100 turns switch 105 to contact point a (step S1); then, CPU 100 transfers command MC with respect to CD 120, and image processing is carried

out together with memories 104 and 121 (step S2). The image data needed for the image processing are stored into the first area of memory 104 (step S3). Then, according to the image processing, the data for transfer are written into the second area (step S4), followed by turning switch 105 to contact point b by CPU 100 (step S5). Then, together with memory 122, CPU 101 processes the necessary information on the first area according to the information of the second area, and the processed information is transferred to CRT 103 via video display processing unit 102 (step S6).

In this configuration, there are two CPU's 100 and 101, and the connection to memory 104 is changed via switch 105. In this way, independent operations can be carried out. Consequently, for example when CPU 100 performs image processing with respect to CD 120, CPU 101 can perform other processing (such as key-in by the operator), and the overall processing speed can thus be increased.

Figure 9 is a concept diagram of the CD system control unit. Each rectangular frame indicates a process fixed on the ROM in the CD, and it operates for feeding to the RAM. A dot represents a control relation, and a circle represents the flow of the data. The CD system control process is a process with operation on the SUB-CPU, which consists of the various control processes for operating the hardware directly and the interface process which is used to control them by forming a bridge with the user process. The general state of the hardware is as follows: "CDD" stands for compact disc driver, which is a mechanism for reproduction of music data. It carries a dedicated 4-bit CPU for MEGA control. "CDC" stands for CD data controller, which is a chip that can output the data from the CD after making any error correction of the CD-ROM standard. It has a 16-kilobyte buffering memory, and can buffer 5-frame decode data. "SCD" stands for a sub code 9a function contained in MEGA-CD gate array (MCG), and there is a 128-byte buffering memory contained in MCG. "FDR" stands for fader, which has the function of controlling the volume of music data (CD-DA) directly outputted from the CD drive. "LED" stands for light-emitting diode, which has the function of displaying the state of the CD drive. There are a green LED and a red LED.

The general feature of the process is as follows. In "INITIAL PROCESS" 1, the CPU is reset, and the equipment is initialized to a start state, with necessary initialization for the hardware and for the various control processes. In an interruption prohibitive state, a time of 100 msec or longer is needed. In "SYSTEM CONTROL PROCESS" 2, implementation of the system process and user process 3 is controlled, and management is performed on the interruption vector and BIOS call entry. In "CD-BOOT PROCESS" 4, the program is loaded from CD-DISC, and the control process is carried out for the various hardware depending on the requirement of the application. In "CDD CONTROL PROCESS" 5, the mechanism of the CD drive is controlled. In "CDC CONTROL PROCESS" 6, the data outputted from the CD drive have their errors corrected at "CDC." In "SCD CONTROL PROCESS" 7, the sub code data outputted from the CD drive and stored in MCG are read and error checking and error amendment are carried out. In "FDR CONTROL PROCESS" 8, the volume of the music data directly outputted from the CD drive is controlled. In "LED CONTROL PROCESS" 9, ON/OFF of the LED is controlled to represent the state of the CD drive. In "USER PROCESS" 3, BIOS is called depending on the application.

The content of the BIOS call is as follows. That is, when music is to be reproduced or data are to be read using the CD drive, a command is sent to program (BIOS) which is in charge of managing and controlling the peripheral hardware. In addition, there are also programs for management of the backup RAM and for booting from CD-DISC. After end of the initial process, the interruption of level 2 (software V-INT) and level 4 (CDD) is in the allowed state. Later, interruptions of level 5 (CDC) and level 6 (SCD) become the allowed or prohibited state by the BIOS call related to CD-ROM. When these interruptions are prohibited, BIOS cannot perform the normal operation; hence, in the case of control of the interrupt mask control port, the allowed state of the aforementioned levels absolutely cannot be changed. (When the allowed state of the other levels is changed, the BIT operation command is used.) As it is an indivisible processing, although there is no problem when the interrupt prohibiting state is a short time (on the order of μsec) due to the variation in the "SR" register, when the time is longer (on the order of msec), problems may take place in reading of the data. On the other hand, the level should not be set lower than the present interruption level. For CD-BIOS, as processing is carried out in the interrupt processing of level 4 or higher, BIOS call cannot be called in the interrupt processing for level 4 or higher. (For the interruption of level 4 or higher, as it is dedicated to the CD system, the user cannot use it.) Although implementation is fast for commands related to BIOS, LED, FADER, SCD, and CDC, for commands related to DRIVER, CD-DA, and CD-ROM, as the commands are received only upon request, a longer time is needed for implementation.

Figure 14 shows the configuration of MEGA-CD30. In this case, connection is made to TV and audio equipment, and one can optimally enjoy a software game (CD-ROM), music (CD), and karaoke (CD graphics). All of the operation is carried out by control pad 20 shown in Figure 15, and it is implemented by selecting the command on the control picture. If radio cassette equipment is connected, a high-quality stereo sound can be further played. On control pad 20, there is a direction button 21 which can be used to move a cursor on the screen in the direction for selecting the command, a start button 25 which commands the control picture, a button 22 which determines the command selected by direction button 21, and buttons 23 and 24 which indicate an ON/OFF state of the control panel. On the control panel, the music

number, play time, channel, play command, program selection command, etc., are displayed.

Figure 15 shows the connection relationship between MEGA drive 40 and MEGA-CD 30 and other equipment. MEGA drive 40 is fixed on MEGA-CD 30 via a joint steel sheet and screws, and is connected to an AC adaptor. Control pad 20 is connected to MEGA-CD 30, and a TV set is connected to MEGA drive 40 via a DIN-plug cord.

According to this invention, for CD graphics, program music selection and other functions can be used effectively as a switch can be made between the operation picture on the screen and the picture of the CD graphics. Figure 10A illustrates the operation picture, which contains a switching area 110 for indicating a switch to the play picture. Figure 10B shows the play picture, which also contains a switching area 111 for indicating a switch to the operation picture. The operator can move a cursor for activating the switching area.

Figure 11 is a flowchart illustrating the switch operation between the operation picture and the CD graphics. During the operation picture processing shown in Figure 10A (step S10), when the cursor denotes switching area 110 and indicates a switch to the play picture (step S11), the play picture processing of the CD graphics as shown in Figure 10B is reached (step S12). Then, as the cursor denotes switching area 111 on the play picture, and the switch to the operation picture is indicated (step S13), the operation processing state shown in Figure 10A is reached. In this way, a switch action can be performed between CD graphics and the operation picture during the play process; hence, the functions set on the operation picture can be used for the CD graphics. In addition, the picture processing of the CD is continued in the operation picture processing, and when the play picture is recovered, the play picture at the moment is displayed.

Figures 12A and 12b illustrate the program selection of the CD. Figure 12B shows the individual music pieces contained on the CD. As the number is denoted by the cursor as shown in Figure 12B, the selected number is represented as a sequential program as shown in Figure 12A. When there are 21 or more music pieces on the CD, a scroll display as shown in Figure 13 is performed to facilitate selection of the music. As shown in Figure 12A, when music is to be canceled from the program, one may simply move the cursor to the program number, and the selected program number can be canceled, and the later music pieces are shuffled forward.

According to this invention, in the image processing system, there are two CPU's which can operate independently; hence, high-speed processing can be carried out. In this way, even during the play process, a switch between the operation control picture and the picture of the CD graphics can still be carried out. In addition, due to the scroll function, selection of the music pieces of the CD can be performed easily.

Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiment can be configured without departing from the scope of the invention, as defined in the appended claims.

Claims

1. A video computer game system that enables an operator to play a game stored as data on a compact disc that can be read at a first synchronization time period that is different from a second synchronization time period necessary for processing the data to provide video drive signals, comprising:

   a first memory unit (22A, 104);

   means (12, 120) for reading data stored on a compact disc;

   a first computer system (10, 100) for controlling the reading of data by the reading means (12, 120) and storing the read data in the first memory unit (22A, 104) in coordination with the first synchronization time period;

   image processing means (16, 102) for processing the read data to provide video drive signals in combination with the second sychronization time period;

   a second computer system (14, 101) for controlling the processing of video drive signals during the second synchronization time period;
   and

   control means (20, 105) for coordinating the storage of read data into the first memory unit (22A, 104) and reading of data out of the first memory unit (22A, 104) to enable a coordination of the processing of data by the first and second computer systems (10, 14; 100, 101).

2. The system of claim 1, comprising:

   a second memory unit (22B);

   the first computer system (10) storing the read data in one of the first memory unit (22A) and the second memory unit (22B);

   the image processing means (16) providing the video drive signals from one of the first memory unit (22A) and the second memory unit (22B).

3. The system of claim 1 or 2, wherein

   the reading means (12, 120) comprises

   a CD drive unit which can read CD recording data recorded on the compact disc in a first time period;

   the image processing means (16, 102) processing the CD recording data in a second time period different form the first time period.

4. The system of one of claims 1 to 3, wherein the control means (20) includes a gate array circuit (20).

5. The system of one of claims 1 to 4, wherein the control means includes a switch member (105) controlled by one of the first and second computer systems (100, 101).

6. The system of one of claims 1 to 5, wherein the control means can move data stored in the first memory unit (104) in a third synchronization time period to enable the computer system to process video drive signals.

7. The system of one of claims 1 to 6, further including a video display member (18, 103) and means for providing a switching image (110, 111) on the video display member (18, 103).

8. The system of one of claims 1 to 7, further including means to scroll the identification of data available on the compact disc to the operator.

9. The system of claim 7 or 8, further including an operator control panel (20) to provide a cursor for interface with the switching image (110, 111).

10. A multifunction entertainment system having video images and audio sounds that can be played from a compact disc ROM and that can be selected by an operator interfacing with a video screen (103), comprising:

a first CPU (100) for performing video image processing of data stored on the compact disc;

a memory (104) for storing data;

a CD drive unit for reading data stored on the compact disc;

a second CPU (101) for driving the CD drive unit and processing the data for storage in the memory (104);

a video data display processing means (102) for receiving the data from the memory (104) and controlled by the first CPU (100) for displaying the processed data on the video screen (103);

means (105) for switching a connection to the memory between the first CPU (100) and the second CPU (101); and

means for generating a switch video image region (110, 111) on the video screen to permit the operator to make a program selection.

Patentansprüche

1. Videocomputerspielsystem, das einem Bediener ermöglicht, ein Spiel zu spielen, das als Daten auf einer Kompaktdisk gespeichert ist, die mit einer ersten Synchronisationszeitdauer gelesen werden können, die sich von einer zweiten Synchronisationszeitdauer unterscheidet, die zum Verarbeiten der Daten zum Vorsehen von Videotreibersignalen nötig ist, mit:
einer ersten Speichereinheit (22A, 104);
einem Mittel (12, 120) zum Lesen von auf einer Kompaktdisk gespeicherten Daten;
einem ersten Computersystem (10, 100) zum Steuern des Lesens von Daten durch das Lesemittel (12, 120) und Speichern der gelesenen Daten in der ersten Speichereinheit (22A, 104) in Koordination mit der ersten Synchronisationszeitdauer;
einem Bildverarbeitungsmittel (16, 102) zum Verarbeiten der gelesenen Daten zum Vorsehen von Videotreibersignalen in Kombination mit der zweiten Synchronisationszeitdauer;
einem zweiten Computersystem (14, 101) zum Steuern des Verarbeitens der Videotreibersignale während der zweiten Synchronisationszeitdauer; und
einem Steuermittel (20, 105) zum Koordinieren der Speicherung der gelesenen Daten in der ersten Speichereinheit (22A, 104) und des Lesens der Daten aus der ersten Speichereinheit (22A, 104) und zum Ermöglichen einer Koordination der Datenverarbeitung durch das erste und zweite Computersystem (10, 14; 100, 101).

2. System nach Anspruch 1, mit:
einer zweiten Speichereinheit (22B);
wobei das erste Computersystem (10) die gelesenen Daten in eine der ersten Speichereinheit (22A) und der zweiten Speichereinheit (22B) speichert;
das Bildverarbeitungsmittel (16) die Videotreibersignale von einer der ersten Speichereinheit (22A) und der zweiten Speichereinheit (22B) vorsieht.

3. System nach Anspruch 1 oder 2, bei dem das Lesemittel (12, 120) eine CD-Antriebseinheit aufweist, die CD-Aufzeichnungsdaten während einer ersten Zeitdauer lesen kann, die auf der Kompaktdisk aufgezeichnet sind; das Bildverarbeitungsmittel (16, 102) die CD-Aufzeichnungsdaten in einer zweiten Zeitdauer unterschiedlich von der ersten Zeitdauer verarbeitet.

4. System nach einem der Ansprüche 1 bis 3, bei dem das Steuermittel (20) eine Gatterfeldschaltung (20) enthält.

5. System nach einem der Ansprüche 1 bis 4, bei dem das Steuermittel ein Schaltteil (105) aufweist, das durch eines des ersten und zweiten Computersystemes (100, 101) gesteuert wird.

6. System nach einem der Ansprüche 1 bis 5, bei dem das Steuermittel Daten, die in der ersten Speichereinheit (104) gespeichert sind, in einer dritten Synchronisationszeitdauer bewegen kann, so daß das Computersystem Videotreibersignale verarbeiten kann.

7. System nach einem der Ansprüche 1 bis 6, weiter mit einem Videodarstellungsteil (18, 103) und Mittel zum Vorsehen eines Schaltbildes (110, 111) auf dem Videodarstellungsteil (18, 103).

8. System nach einem der Ansprüche 1 bis 7, weiter mit einem Mittel zum Rollen der Identifikation der auf

der Kompaktdisk für den Bediener zur Verfügung stehenden Daten.

9. System nach Anspruch 7 oder 8, weiter mit einer Bedienersteuertafel (20) zum Vorsehen eines Cursors zur Wechselwirkung mit dem Schaltbild (110, 111).

10. Multifunktionsunterhaltungssystem mit Videobildern und Audiotönen, die von einem Kompaktdisk-ROM gespielt werden können und die durch einen mit einem Videoschirm (101) wechselwirkenden Bediener ausgewählt werden können, mit:
einer ersten CPU (100) zum Durchführen von Videobildverarbeitung von auf der Kompaktdisk gespeicherten Daten;
einem Speicher (104) zum Speichern von Daten;
einer CD-Antriebseinheit zum Lesen der auf der Kompaktdisk gespeicherten Daten;
einer zweiten CPU (101) zum Treiben der CD-Antriebseinheit und zum Verarbeiten der Daten zur Speicherung in dem Speicher (104); einem Videodatenanzeigeverarbeitungsmittel (102) zum Empfangen der Daten von dem Speicher (104), das von der ersten CPU (100) zum Darstellen der verarbeiteten Daten auf dem Videoschirm (103) gesteuert wird;
einem Mittel (105) zum Schalten einer Verbindung zu dem Speicher zwischen der ersten CPU (100) und der zweiten CPU (101); und einem Mittel zum Erzeugen eines Schaltvideobildgebietes (110, 111) auf dem Videoschirm zum Ermöglichen, daß der Bediener eine Programmauswahl durchführen kann.

Revendications

1. Système de jeu vidéo sur ordinateur, qui met un opérateur à même de jouer un jeu mis en mémoire sous forme de données sur une disque compacte qui est lisible à un premier intervalle de temps de synchronisation, qui est différent d'un deuxième intervalle de temps de synchronisation, qui est requis afin de traiter les données afin de fournir des signaux d'attaque vidéo, comprenant:
une première unité de mémoire (22A, 104);
des moyens (12, 120) à lire des données mises en mémoire sur une disque compacte;
un premier système d'ordinateur (10, 100) à commander la lecture de données moyennant lesdits moyen de lecture (12, 120) et à mettre les données lues en mémoire dans ladite première unité de mémoire (22A, 104) de façon coordonnée avec ledit premier intervalle de temps de synchronisation;
des moyens (16, 102) de traitement d'images à traiter les données lues afin de fournir des signaux d'attaque vidéo en combinaison avec ledit deuxième intervalle de temps de synchronisation;
un deuxième système d'ordinateur (14, 101) à commander le traitement desdits signaux d'attaque vidéo pendant ledit deuxième intervalle de temps de synchronisation;
et
des moyens de commande (20, 105) à coordonner la mise en mémoire des données lues dans ladite première unité de mémoire (22A, 104) et la lecture de données de ladite première unité de mémoire (22A, 104), afin de permettre une coordination du traitement de données par lesdits premier et deuxième systèmes d'ordinateur (10, 14; 100, 101).

2. Le système selon la revendication 1, comprenant:
une deuxième unité de mémoire (22B);
ledit premier système d'ordinateur (10) mettant en mémoire les données lues soit dans ladite première unité de mémoire (22A), soit dans ladite deuxième unité de mémoire (22B);
lesdits moyens de traitement d'images (16) fournissant lesdits signaux d'attaque vidéo soit de ladite première unité de mémoire (22A), soit de ladite deuxième unité de mémoire (22B).

3. Le système selon la revendication 1 ou 2, dans lequel:
lesdits moyens de lecture (12, 120) comprennent
une unité d'entraînement de disque compacte, qui est apte à lire des données d'enregistrement CD, qui sont enregistrées sur ladite disque compacte dans un premier intervalle de temps;
lesdits moyens de traitement d'images (16, 102) traitant les données d'enregistrement CD dans un deuxième intervalle de temps, qui est différent dudit premier intervalle de temps.

4. Le système selon une quelconque des revendications 1 à 3, dans lequel lesdits moyens de commande (20) comprennent un circuit à matrice de grilles (20).

5. Le système selon une quelconque des revendications 1 à 4, dans lequel lesdits moyens de commande comprennent un élément commutateur (105) commandé par un desdits premier et deuxième systèmes d'ordinateur (100, 101).

6. Le système selon une quelconque des revendications 1 à 5, dans lequel lesdits moyens de commande sont aptes à transférer des données mises en mémoire dans ladite première unité de mémoire (104) dans un troisième intervalle de temps de synchronisation, afin de permettre le traitement des signaux d'attaque vidéo par le système d'ordinateur.

7. Le système selon une quelconque des revendications 1 à 6, qui comprend de plus un dispositif de visualisation vidéo (18, 103) et des moyens à fournir

une image en commutation (110, 111) sur ledit dispositif de visualisation (18, 103).

8. Le système selon une quelconque des revendications 1 à 7, qui comprend en outre des moyens à laisser l'identification des données disponible sur ladite disque compacte défiler à l'opérateur.

9. Le système selon la revendication 7 ou 8, qui comprend également un tableau de commande par l'opérateur (20), à fournir un curseur pour l'interface avec ladite image en commutation (110, 111).

10. Système du spectacle à fonctions multiples, comprenant des images vidéo et des sons audio, lesquels on peut jouer d'une disque compacte à mémoire morte, et lesquels sont disponibles au choix par un opérateur, en faisant interface avec un écran vidéo (103), qui comprend:

une première unité centrale de traitement (100) à réaliser le traitement d'images vidéo à la base des données mises en mémoire sur la disque compacte;

une mémoire (104) à mémoriser des données;

une unité d'entraînement d'une disque compacte pour la lecture des données mises en mémoire sur la disque compacte;

une deuxième unité centrale de traitement (101) à commander ladite unité d'entraînement d'une disque compacte et à traiter les données pour leur mémorisation dans ladite mémoire (104);

des moyens de traitement de la visualisation des données vidéo (102) à recevoir les données de ladite mémoire (104), et sous la commande de ladite première unité centrale de traitement (100) pour la visualisation des données traitées sur ledit écran vidéo (103);

des moyens (105) à commuter un raccord à la mémoire entre ladite première unité centrale de traitement (100) et ladite deuxième unité centrale de traitement (101); et

des moyens à engendrer une aire de commutation des images vidéo (110, 111) sur ledit écran vidéo afin de permettre un choix du programme par l'opérateur.

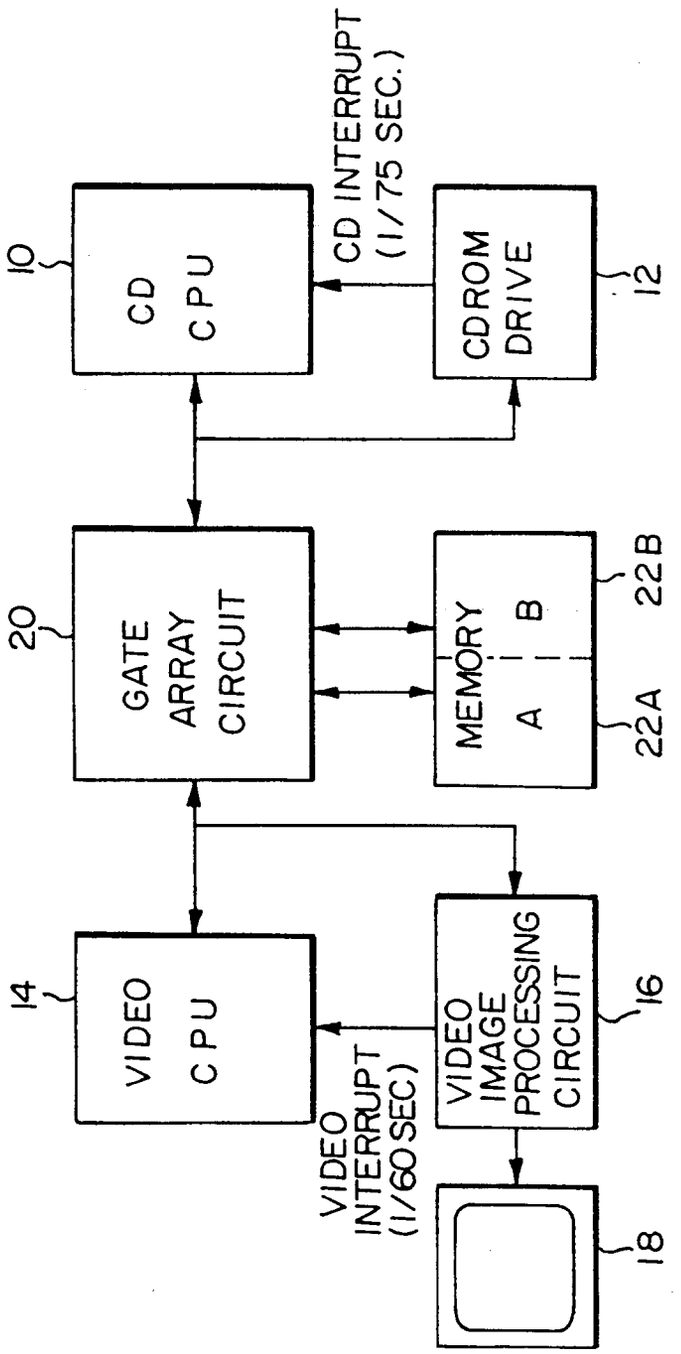
10
CD CPU
CD INTERRUPT (1/75 SEC.)
CDROM DRIVE
12
20
GATE ARRAY CIRCUIT
MEMORY
A
B
22A
22B
14
VIDEO CPU
VIDEO INTERRUPT (1/60 SEC)
VIDEO IMAGE PROCESSING CIRCUIT
16
18

FIG. 1

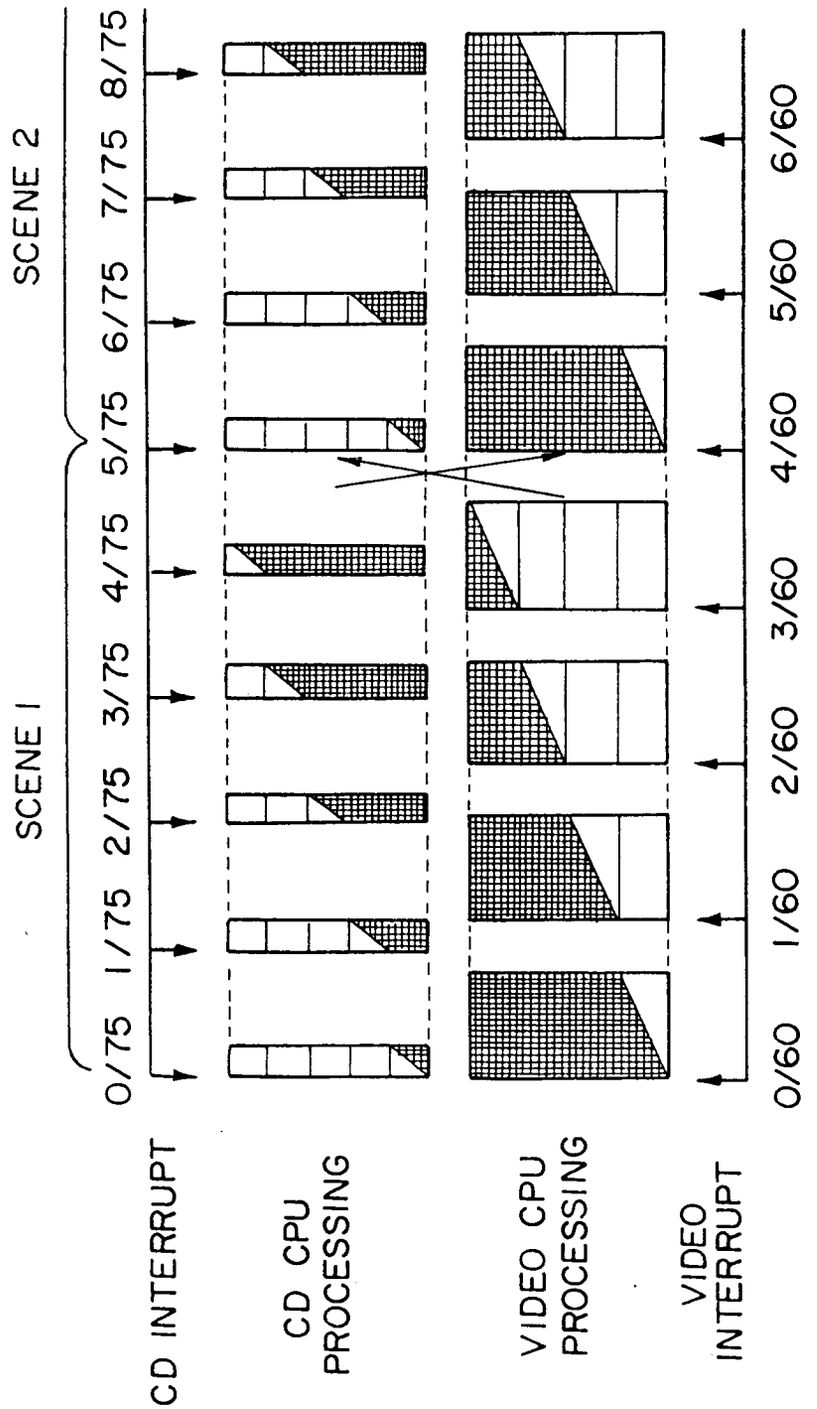
SCENE 1
SCENE 2
0/75
1/75
2/75
3/75
4/75
5/75
6/75
7/75
8/75
0/60
1/60
2/60
3/60
4/60
5/60
6/60
CD INTERRUPT
CD CPU PROCESSING
VIDEO CPU PROCESSING
VIDEO INTERRUPT

FIG. 2

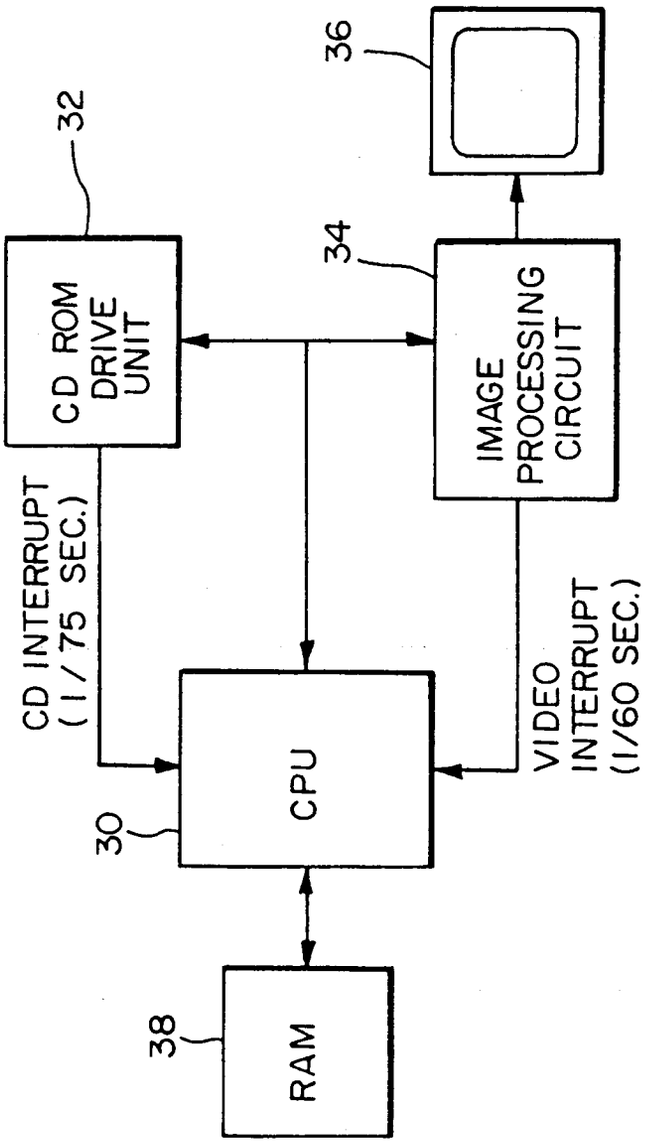
36
32
34
CD ROM DRIVE UNIT
IMAGE PROCESSING CIRCUIT
CD INTERRUPT (1/75 SEC.)
VIDEO INTERRUPT (1/60 SEC.)
30
CPU
38
RAM

FIG. 3

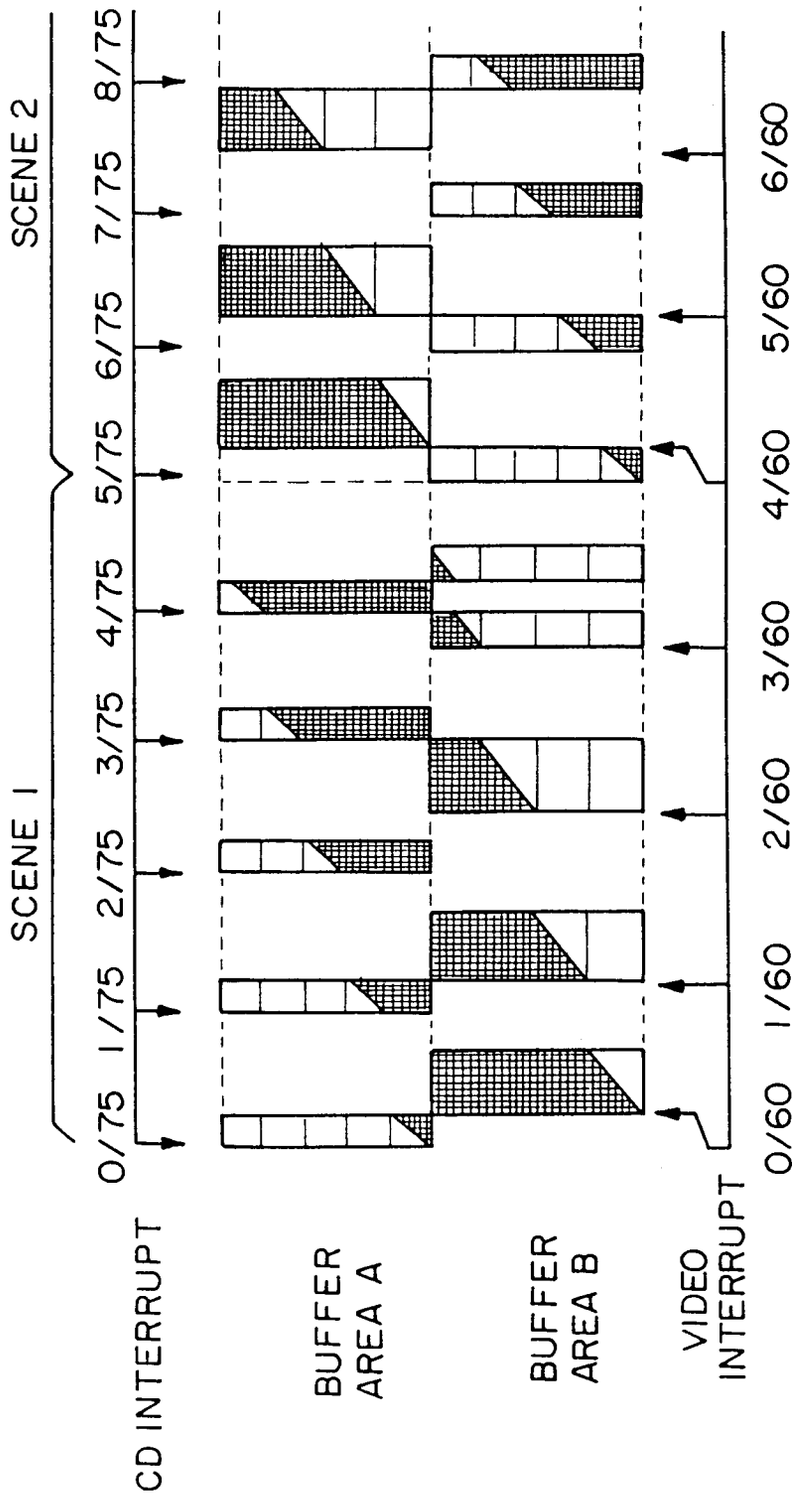
SCENE 1
SCENE 2
0/75
1/75
2/75
3/75
4/75
5/75
6/75
7/75
8/75
0/60
1/60
2/60
3/60
4/60
5/60
6/60
CD INTERRUPT
BUFFER AREA A
BUFFER AREA B
VIDEO INTERRUPT

FIG. 4

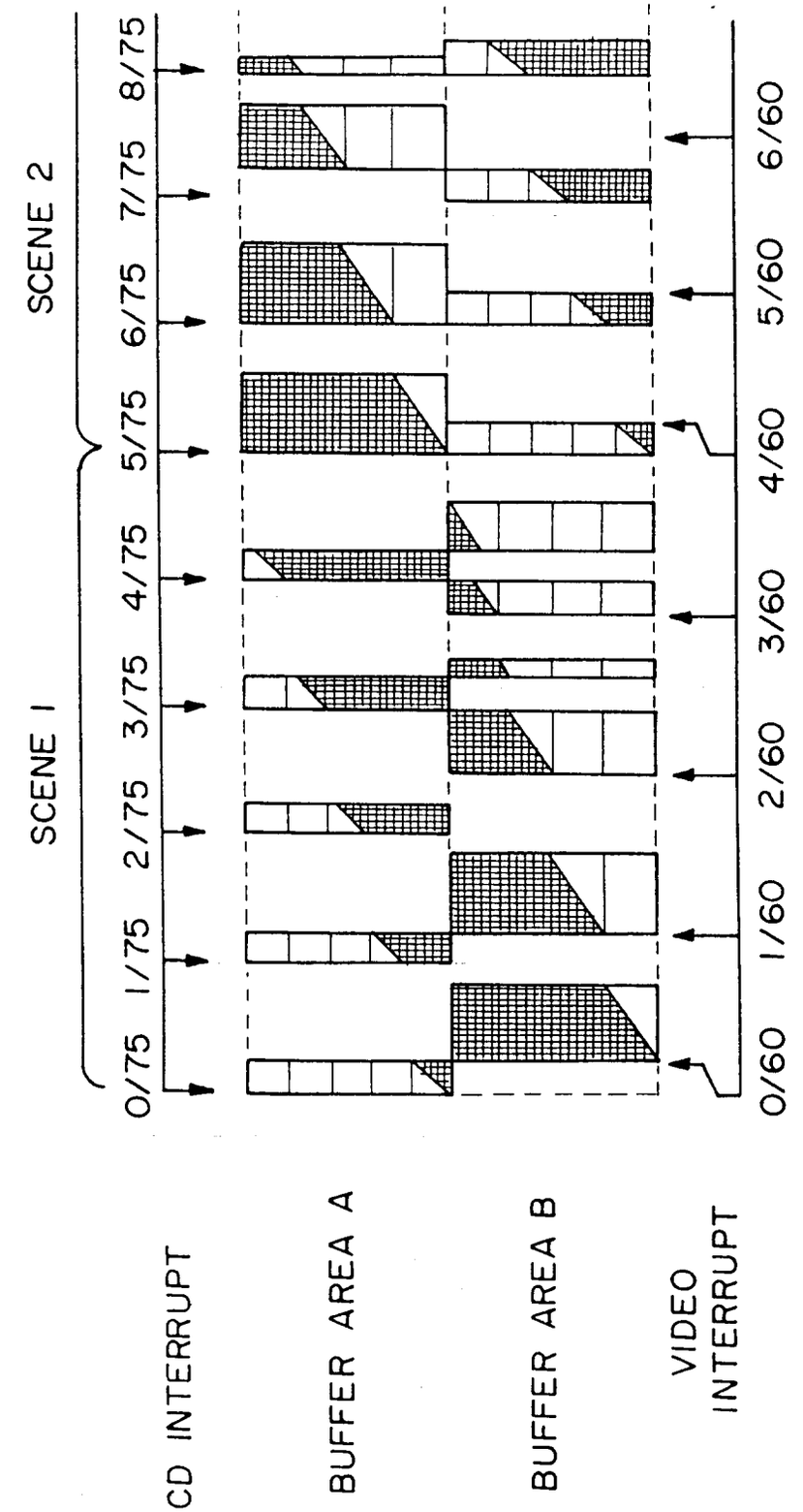
SCENE 1
SCENE 2
0/75
1/75
2/75
3/75
4/75
5/75
6/75
7/75
8/75
0/60
1/60
2/60
3/60
4/60
5/60
6/60
CD INTERRUPT
BUFFER AREA A
BUFFER AREA B
VIDEO INTERRUPT

FIG. 5

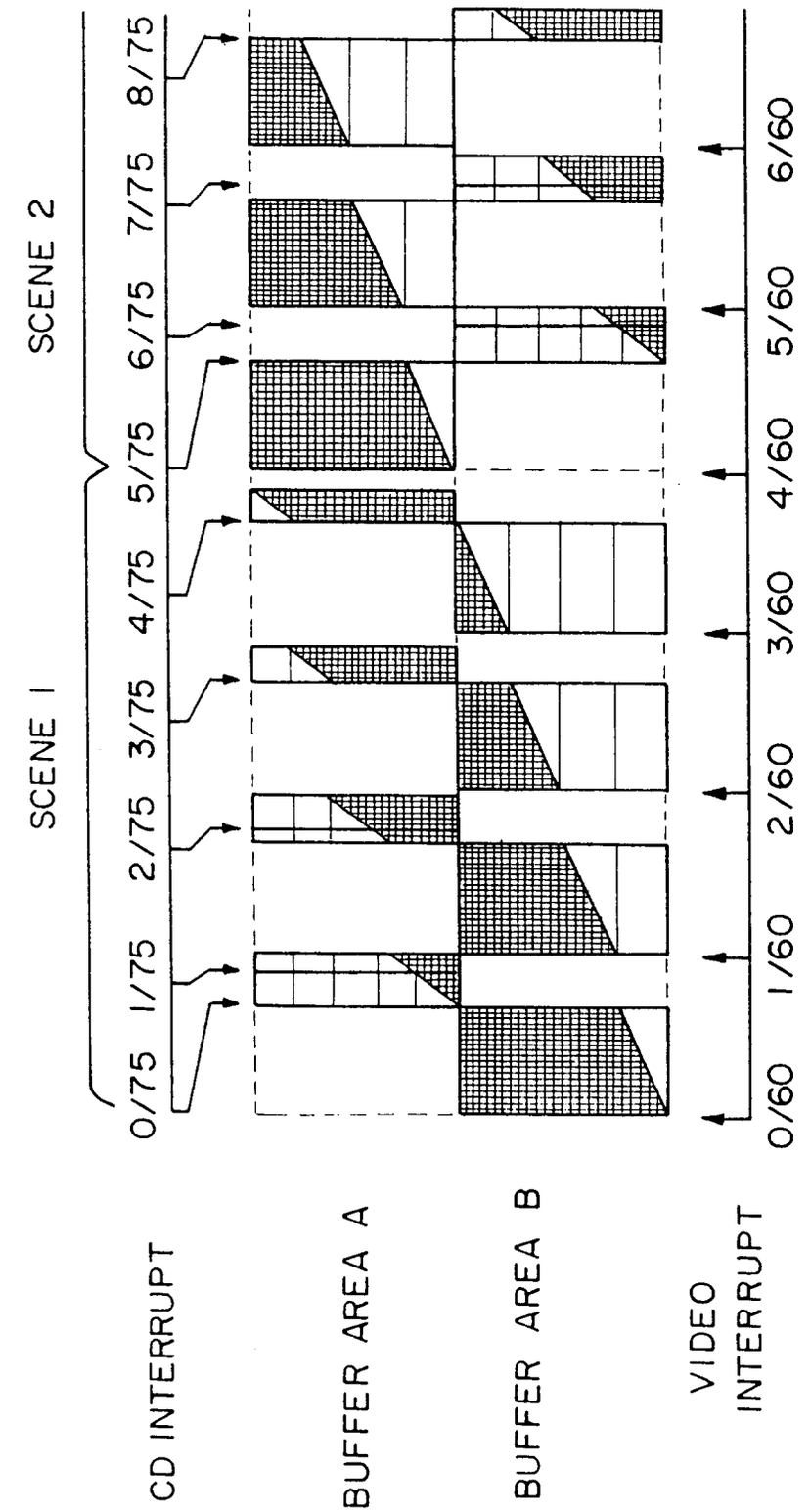
SCENE 1
SCENE 2
0/75
1/75
2/75
3/75
4/75
5/75
6/75
7/75
8/75
0/60
1/60
2/60
3/60
4/60
5/60
6/60
CD INTERRUPT
BUFFER AREA A
BUFFER AREA B
VIDEO INTERRUPT

FIG. 6

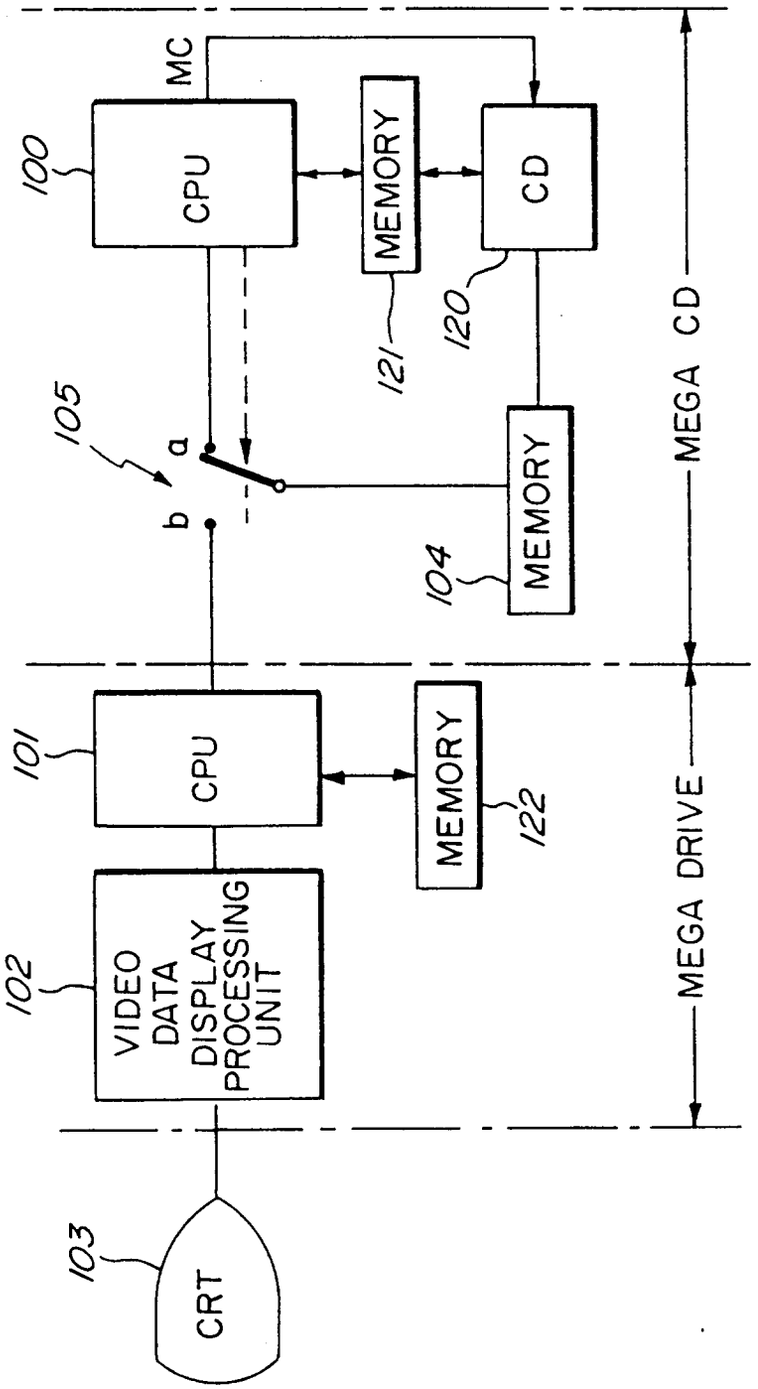
MC
100
CPU
MEMORY
CD
121
120
105
a
b
104
MEMORY
MEGA CD
101
CPU
MEMORY
122
102
VIDEO DATA DISPLAY PROCESSING UNIT
MEGA DRIVE
103
CRT

FIG. 7

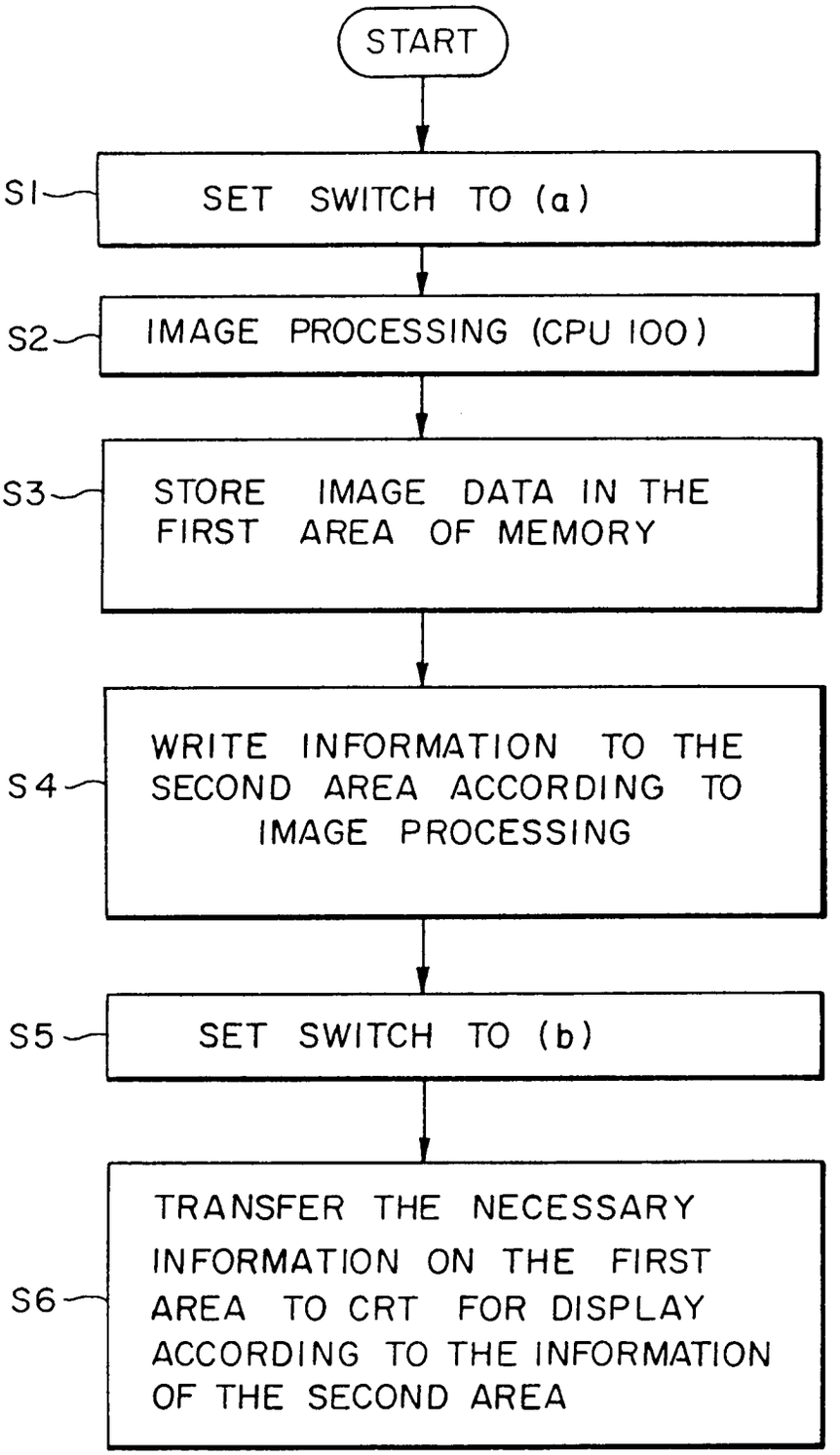
START
S1
SET SWITCH TO (a)
S2
IMAGE PROCESSING (CPU 100)
S3
STORE IMAGE DATA IN THE FIRST AREA OF MEMORY
S4
WRITE INFORMATION TO THE SECOND AREA ACCORDING TO IMAGE PROCESSING
S5
SET SWITCH TO (b)
S6
TRANSFER THE NECESSARY INFORMATION ON THE FIRST AREA TO CRT FOR DISPLAY ACCORDING TO THE INFORMATION OF THE SECOND AREA

FIG. 8

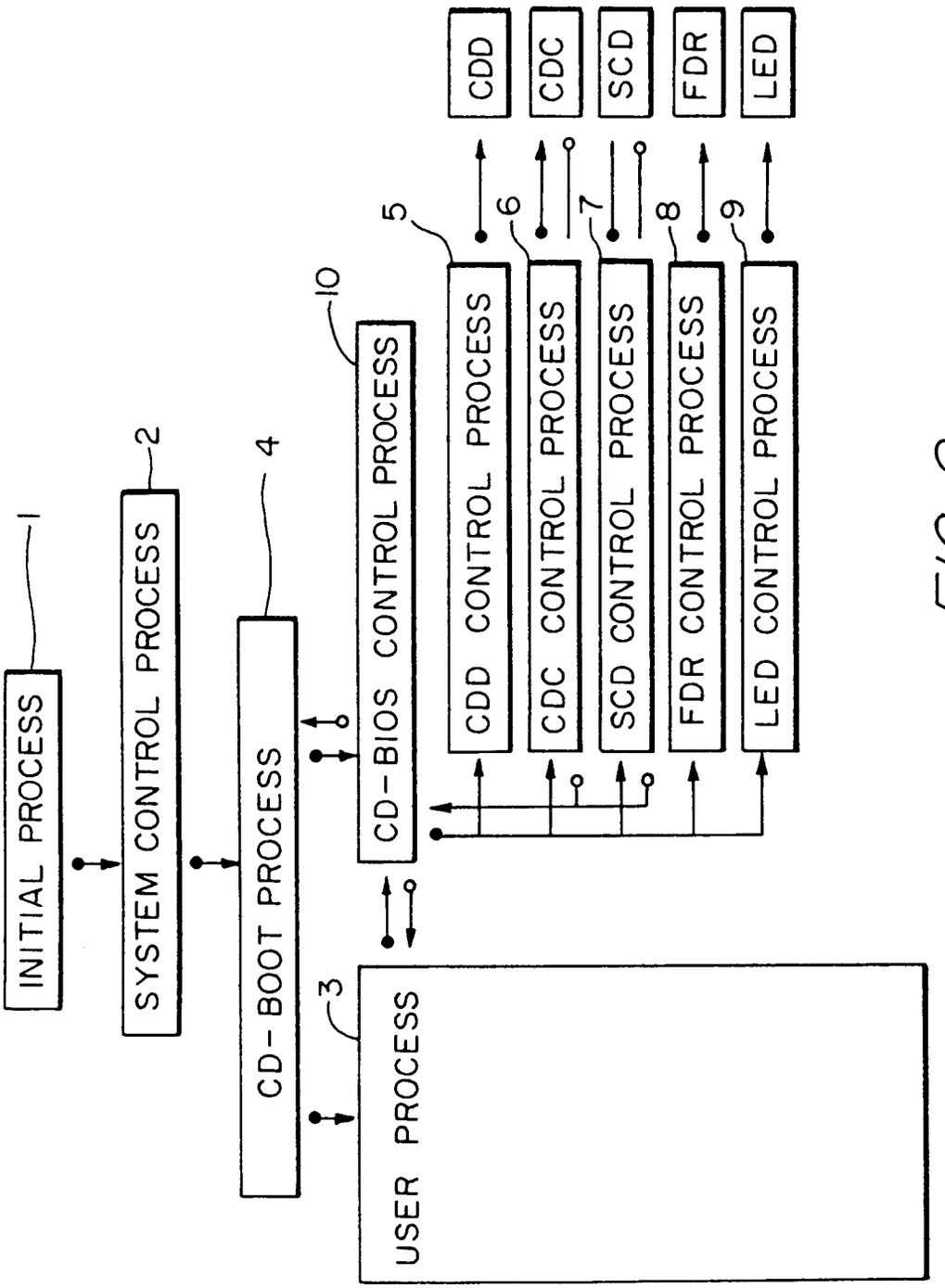
INITIAL PROCESS
1
SYSTEM CONTROL PROCESS
2
CD-BOOT PROCESS
4
USER PROCESS
3
CD-BIOS CONTROL PROCESS
10
CDD CONTROL PROCESS
5
CDC CONTROL PROCESS
6
SCD CONTROL PROCESS
7
FDR CONTROL PROCESS
8
LED CONTROL PROCESS
9
CDD
CDC
SCD
FDR
LED

FIG. 9

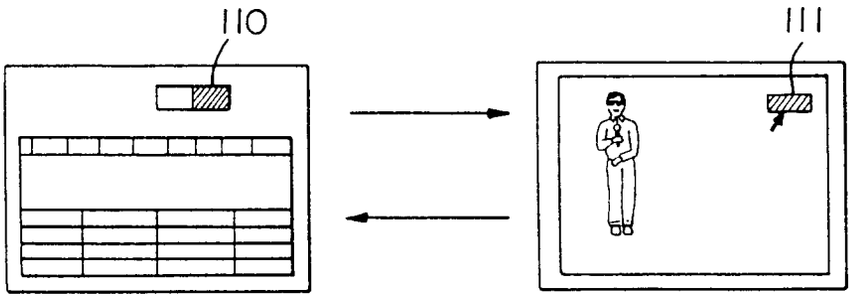

FIG. 10A FIG. 10B

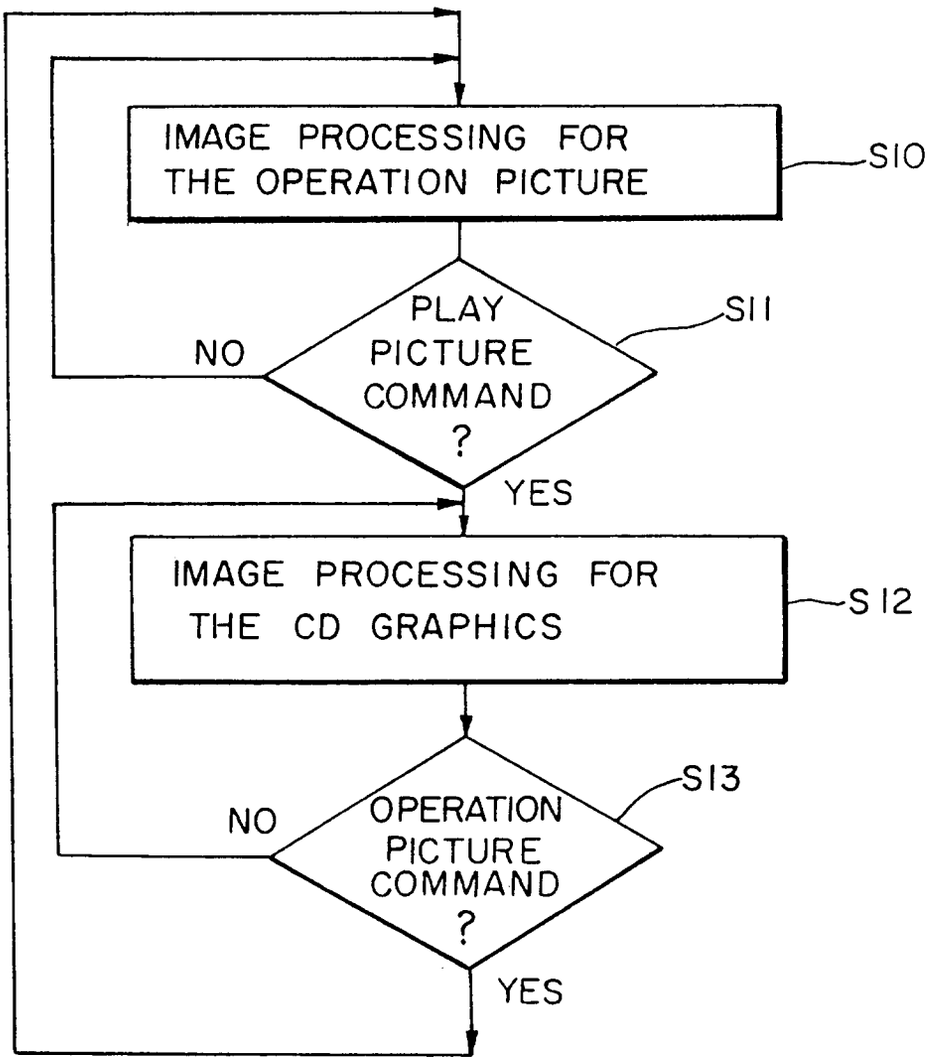

FIG. 11

1	3	5	6	12	8				

FIG. 12A

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

FIG. 12B

11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

FIG. 13

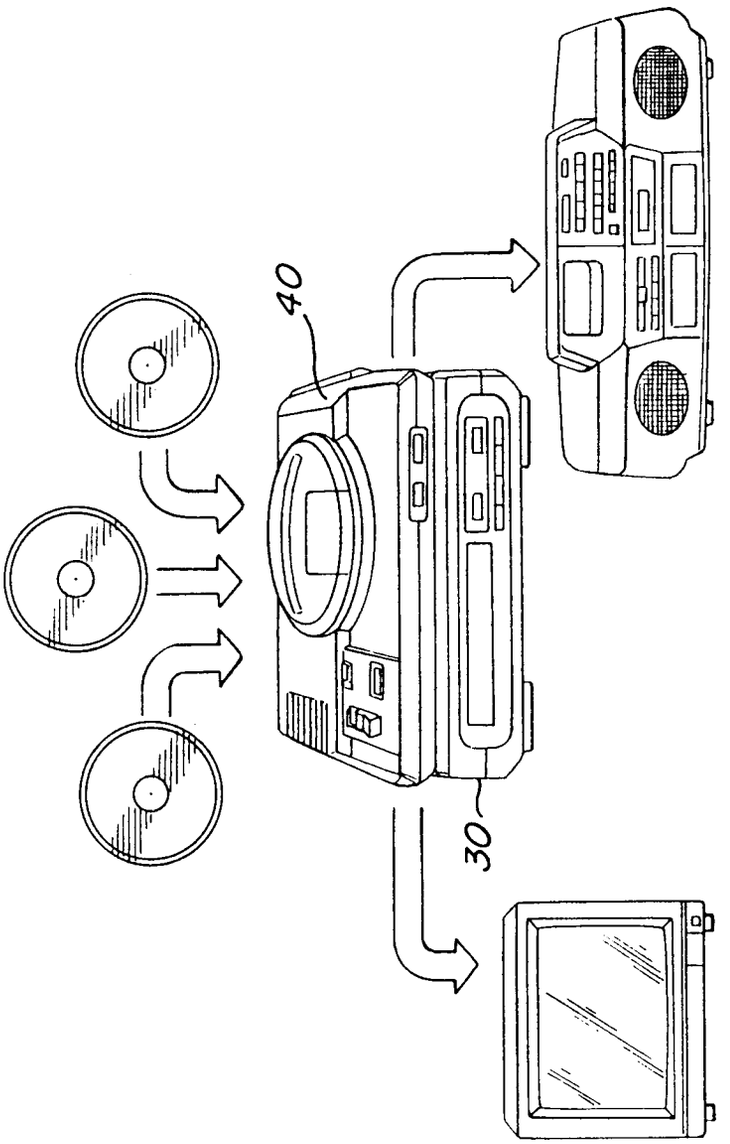

FIG. 14

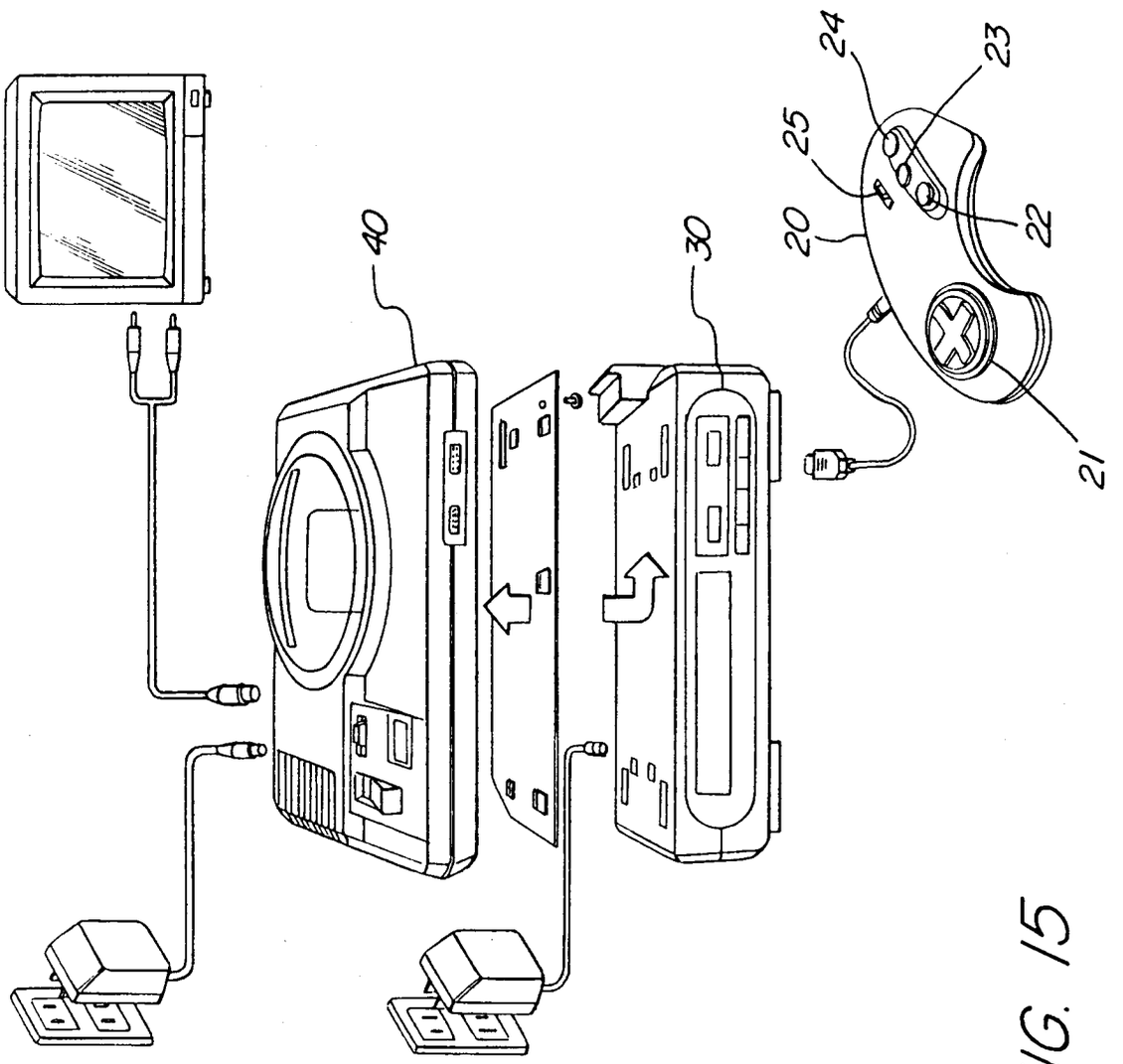

FIG. 15