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METHOD OF AND SYSTEM FOR CONTROLLING TAPE RECORDER WITH COMPUTER

This invention relates to a method of and a system for controlling a tape recorder, particularly a video tape recorder, with a computer.

Heretofore, inconvenience has been sometimes encountered because separate displays for a video image and a computer image have been required in the use of a video tape for home use in particular, even if two types of software are prepared for a video tape recorder set for home use and a computer set, both of which are combined for the associated operation.

For example, there is produced a video image program of "intellectual tests" for infants. Suppose, in order to find the power of observation of an infant, an image of seven piled-up apples is shown to the infant for 90 sec for example, and a number of the apples counted by the infant is input into a computer through a keyboard of the computer. In that case, firstly, a teacher searches for the aforesaid portion recorded on a video cassette tape by a video tape recorder set for home use, and presses a switch

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for reproduction. Subsequently, the teacher, watching a clock, presses a switch for stop at the time when 90 sec has elapsed. On the other hand, the infant has had to watch a displayed picture of the video tape recorder set, then press a numeral 7 by use of the keyboard of the computer set, watching a displayed picture of the computer set disposed adjacent the video tape recorder set, and thereafter, confirm the answer through a display of the computer set. Simultaneously, the teacher has had to calculate how many seconds have elapsed before the numeral is pressed. Therefore, the displays should have been watched alternately every time an operation is made, and moreover, very complicated operations have been required.

Particularly, the video image is involved with many problems, and, when the program continues for a long period of time, much inconvenience has been encountered. This is because, in a video tape recorder set for home use, a head for sounds is out of touch with the fast forwarding and rewinding, whereby it is impossible to automatically control the operation mode of the reproduction, halt, fast forwarding, rewinding or pause in response to an external signal.

On the other hand, in recent years, there have been such television receivers for home use, capable of displaying a signal from a computer directly. With these television receivers, however, the change-

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over between the so-called RGB function and a video image cannot be automatically controlled, but has to be manually switched, thus leading to difficulty in operation.

In accordance with one aspect of the present invention, a method of controlling a tape recorder with a computer comprises i) recording successive address data in a predetermined track of a tape loaded in the tape recorder, reading the recorded address data, and storing address data of a start and an end of a predetermined data portion; and

ii) subsequent to step (i) selecting the predetermined data portion by controlling an operation mode of the tape recorder in accordance with the address data of the start and the end of the data portion, and causing an image from the computer and data from the tape recorder to be alternately or simultaneously output.

In accordance with another aspect of the present invention, a system for controlling a tape recorder with a computer comprises a computer; a tape recorder connected to the computer through an interface; an output unit capable of outputting an image from the computer and data from the tape recorder; an address write-in circuit for successively recording address data in a predetermined track of a tape loaded in the tape recorder in response to a command from the computer; an address read-in circuit for reading the address data, previously recorded in the tape in response to a command from the computer; a store for storing address data of a start and an end of a predetermined data portion; and a relay unit for controlling an operation mode of the tape recorder, the arrangement being such that the computer controls an operation mode

of the tape recorder through the relay unit in accordance with the address data of the start and the end of the predetermined data portion when the data portion is selected, and causes the output unit to alternately or simultaneously output the image from the computer and the data from the tape recorder.

With this invention an operation mode of a tape recorder, particularly a video tape recorder can be automatically controlled by a computer and images from both the computer and video tape recorder can be displayed on a single display.

The output unit may include a cathode-ray tube (CRT) of a television receiver set for home use with a computer signal function, a television CRT for a computer (including a CRT capable of superimposing a video signal on a computer signal and capable of displaying even when the scanning lines are different from each other), or a system utilising a superimposing unit, and the like.

Some examples of methods and systems in accordance with the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a block diagram showing one example;

Figure 2 is a block diagram showing in more detail portions of the example of Figure 1;

Figure 3 is a block diagram showing a device for recording address data in the video tape recorder; and,

Figure 4 is a block diagram showing another example.

Description will hereunder be given of the present invention in conjunction with the embodiments shown in the drawings. In Fig. 1, connected to a computer set 1 such as a microcomputer, personal computer, terminal computer (including a single set having a microcomputer function, such for example as a control board mounted thereon with a microcomputer) are a video tape recorder set 3 for home use having a function of a sound duplex channel or sound multi-channel through an interface 2, and a television receiver 4 having a so-called RGB function, i.e.,

capable of displaying a computer signal, through a remote control device 5 for picture switching. With the above arrangement, when the picture condition of the television receiver 4 is switched to a television picture through the remote control device 5 in response to a command from the computer set 1, a television image is displayed, when switched to a video picture, a video image from the video tape recorder set 3 is displayed, and, when switched to an RGB picture, an image from the computer set 1 is displayed, all in selective manner.

Furthermore, as shown in Fig. 2, the interface 2 includes: an address write-in circuit 10 for successively recording address data AD, for example, data 0 to 65,000, in a second sound channel track, as being a predetermined track, of the video tape loaded in the video tape recorder set 3 in response to an address read-in circuit 11 for reading the address data AD recorded in the video tape in response to an address read-in command RC from the computer set 1 and storing a start address data (S address data) and an end address data (E address data) of an image portion desired to be watched and listened to in the computer set 1; and a relay unit 12 for controlling an operation mode of the video tape recorder set 3 through a remote control device 6 in response to a control command CC from the computer set 1 and switching a picture of the

television receiver 4 through the remote control device 5.

The relay unit 12 is constituted by a relay control circuit 13 and a plurality of relays 14 through 21. Of these relays 14 through 21, the relays 14 through 18 give mode signals MS to the remote control device 6 to set operation modes of the video tape recorder set 3 through the remote control device 6. More specifically, the video tape recorder set 3 is set to a reproduction mode in response to a mode signal from the relay 14, to a halt mode in response to a mode signal from the relay 15, to a fast forwarding mode in response to a mode signal from the relay 16, to a rewinding mode in response to a mode signal from the relay 17 and to a pause mode in response to a mode signal from the relay 18, respectively. Furthermore, the relay 19 gives a picture control signal to the remote control device 5, whereby the television receiver 4 is switched to any one of a "television picture", "video picture" and "RGB picture". Further, the relays 20 and 21 are utilized for controlling the driving force for an external motor and the like. Additionally, in the drawing, designated at 21' is an external terminal of the second sound channel of the video tape recorder set 3, and 22 an external image terminal and a terminal of a first sound output channel of the video tape recorder set 3, both of which are connected to the television

receiver 4.

Description will hereunder be given of action of this embodiment.

Firstly, to record the address data in the video tape, the video tape is loaded in the video tape recorder set 3, and thereafter, the computer set 1 is caused to emit an address write-in command WC, whereby the address write-in circuit 10 is actuated and the address data AD generated in the address write-in circuit 10 are successively recorded in the second sound channel track of the video tape. In this case, as for the write-in of the address data, as shown in Fig. 3 for example, the video tape recorder set 3 may be connected to the computer set 1 through an interface 7 having only an address data generating circuit, whereby the address data may be written into the video tape by the address data generating circuit of the interface 7.

Thus, the start address data (S address data) and the end address data (E address data) of the desired image portion of the video tape, in which the address data are recorded, are attached thereto with a title of the image portion for example, and the title is previously stored in the computer set 1.

Now, the picture of the television receiver 4 is brought into the condition of the "RGB picture" and the video tape is rewound to the initial position, and the aforesaid question of the "image of apples" is

disposed at a position 1/3 from the beginning of the video tape. If the infant presses a key of a question (1) in the keyboard of the computer set 1 as a selective operation for the question, then, firstly, the relay 16 is turned ON in response to the control command CC from the computer set 1 in accordance with a computer program. Thereupon, the video tape recorder set 3 is operated in the fast forwarding mode through the remote control device 6 in response to the mode signal MS due to the turn-ON of the relay 16. In this case, due to a difference between the address data of the present position read in by the address read-in circuit 10 and S address data, a time period, during which the video tape is to be fast forwarded to a position in front of S address data, is calculated, and the video tape is fast forwarded for the time period. When the video tape is fast forwarded by this fast forwarding to the position in front of S address data and stopped thereat, the relay 14 is turned ON in response to the mode command MC from the computer set 1, and in response to the mode signal MS due to the turn-ON of the relay 14, the video tape recorder set 3 is operated in the reproduction mode through the remote control device 6.

During this reproduction operation, the address read-in circuit 11 is operated in response to the address read-in command RC from the computer set 1, whereby the address data AD of the video tape are

successively read in. Meanwhile, when the address data AD thus read in reach S address data, the relay 15 is turned ON in response to the control command CC from the computer set 1, whereby, in response to the mode signal MS due to the turn-ON of the relay 15, the video tape recorder set 3 is stopped through the remote control device 6. Simultaneously, the relay 19 is turned ON in response to the control command CC from the computer set 1, whereby the picture of the television receiver 4 is switched to the "video picture" capable of displaying the video image, through the remote control device 5 in response to the picture switching signal due to the turn-ON of the relay 19. Subsequently, the relay 14 is turned ON in response to the control command CC from the computer set 1, whereby, in response to the mode signal MS due to the turn-ON of the relay 14, the video tape recorder set 3 is operated in the reproduction through the remote control device 6. If a program for pronouncing "pee" for example at this time is inserted into the computer set 1, then the start of the "reproduced" image can be made known.

When the reproduction operation is started, the "image of apples" is displayed on the television receiver 4 by the external image (signal D) terminal 22 of the video tape recorder set 3 and a cord connecting the terminal 22 of the first sound output channel (signal E) to the television receiver 4. At this time,

the address read-in circuit 11 is operated, whereby the address data AD recorded in the video tape are successively read in. When the address data AD thus read in reach E address data, the "image of apples" of the video image comes to an end, whereby the relay 15 is turned ON in response to the control command CC from the computer set 1, whereby the video tape recorder set 3 is stopped through the remote control device 6 in response to the mode signal MS due to the turn-ON of the relay 15. In this case, the forwarding rate during the reproduction operation is determined so that a time period for reproduction from S address data to E address data may be 90 sec for example.

Here, if the inputted answer by the infant through the keyboard of the computer set 1 after the infant looked at the picture of the television receiver 4 is correct, then the relay 17 is turned ON in response to the control command CC from the computer set 1, whereby, in response to the mode signal MS due to the turn-ON of the relay 17, the video tape recorder set 3 is rewound through the remote control device 6. By this, the video tape is rewound to the initial position, and simultaneously, the relay 19 is turned ON, whereby, in response to the picture switching signal due to the turn-ON of the relay 19, the picture of the television receiver 4 is switched to the "RGB picture" capable of displaying the image from the computer set 1 through

the remote control device 5, whereby, on the picture, there are displayed the contents showing the answer is correct and the time period required for inputting the answer, for example. On the other hand, when the answer is incorrect, the video tape is returned to the position of S address data and the same process as above is repeated. Additionally, when the relay 18 is turned ON in response to the control command CC from the computer set 1 in the course of the operation, the video tape recorder 3 may be brought into a pause. When desirable address data AD is specified by the computer 1, the video tape may be returned to a position between S address data and E address data as necessary.

In consequence, according to this embodiment, the address data AD are previously and successively stored in the sound channel of the video tape for home use, the so-called RGB function of the television receiver 4 for home use is utilized to search a start and an end of a desired image portion out of the images recorded in the video tape, and the address data of the start and the end are inputted into the computer set 1, whereby, in accordance with a program in the computer set 1, the switch for reproduction of the video tape recorder set 3 is turned ON by the remote control device 6 for the video tape recorder through the relay unit 12, whereby the video tape condition is turned into the image reproducing condition. At this time,

in order to give a priority to the video signal from the video tape recorder set 3, there is no need to manually switch the remote control device 5 for the television picture switching to reproduce and display the video image on a cathode-ray tube (CRT) of the television receiver 4 for home use, but, the remote control device 5 can be automatically switched in accordance with the computer program. Subsequently, when the video image is reproduced to the position of E address data and E address data is sensed by the computer set 1, the relay 15 for halt is operated to stop the reproducing condition of the video tape, simultaneously, the picture condition of the television receiver 4 is switched to the "RGB picture" through the remote control device 5 attached to the television receiver 4 in response to the picture switching signal due to the turn-ON of the relay 19, and subsequently, the program of the computer set 1, such for example as a plurality of image titles recorded on the video tape, is displayed, so that the image from the video tape recorder set 3 can be automatically switched to the image from the computer set 1 to be displayed on the picture of the single television receiver 4.

On the other hand, in the case of the aforesaid questions for the infants, where softwares for the video image and the computer image exchange the information in both directions, the computer produces the time

program so that the forwarding time period of the video tape recorder 3 can be automatically detected, and the time period until the infant, or user, presses the key of the correct answer, can be detected. By virtue of this, no manual labor is required at all, and questions can be automatically and successively given out. In the case of an incorrect answer, the video tape can return to the position of S address data again (repeat function).

In view of this, the above-described system is applicable to the studies on collected questions for the driving license of the motor vehicle, national examinations for the license of medical and dental practices and so forth. In such case, it is possible to display both the video image and the computer program on the single CRT, i.e., alternate displays of the computer signal and the video signal on one CRT, so that very effective studies can be made.

Further, in the case where students are to select a firm for securing a position, video images of a multiplicity of firms and computer programs are previously prepared on the school's side, and further, if there are produced video images for the guide to scores of firms classified by industry, forming into graphic charts the data of the achievements of respective firms such as the turnover and settlement of accounts,

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then each of students can select and observe a firm to his taste. In this case, if a printer or the like is added thereto, then the data of the firms can be printed on paper, so that each of students can be convinced of his selection, thereby enabling remarkable effects.

Further, in the case of explaining a piece of commodity, it is possible to produce an animated "moving catalogue" from the characteristics of video images, without using any paper catalogue. Furthermore, as an expansion of the scope of applications, the relay unit connected thereto with a motor, lamp and the like is usable to express an advertisement display as being a moving image. As a specific example of this, when, out of several sorts of blouses and several sorts of skirts, one pair of blouse and skirt are moved from opposite ends to the center and vertically arranged for "color matching", if a client is not pleased with the pair, then another pair of blouse and skirt may be moved and arranged again. When the client is pleased with the pair, a previously produced video image of a model wearing the pair may be observed through switching.

In addition, in the above embodiment, the image from the computer set 1 and the image from the video tape recorder 3 may be alternately displayed on the picture of the television receiver 4. The computer signal or computer image is overlapped with

the image recorded on the video tape, and the resultant image may be simultaneously displayed on the television receiver 4. As shown in Fig. 4 for example, a signal composing circuit 31 is provided on the interface 2, and, in this signal composing circuit 31, the computer signal input from the computer set 1 through a relay 32 is composed with the video image signal input from the video tape recorder set 3 through the relay 32, so that the resultant composed image signal may be displayed on the television receiver 4.

Furthermore, in the above embodiment, a video tape recorder has been used. However, for example, a tape recorder recording only the sounds of various teaching materials, a data recorder and the like can be utilised, recording a plurality of address data in a vacant track of the cassette tape thereof, and, if the aforesaid recorders are controlled in accordance with the address data, then the contents of the aforesaid tape recorders can be displayed integrally with the computer images.

Along with the tendency of the audio sets, in which the analogue signal is changed to the digital signal so as to obtain sounds of better quality in recent years, there is observed such a practice that an analogue/digital converter (for example, a pulse code modification(P. C. M.) processor) is connected to a video tape recorder set for home use, whereby music and the like are recorded in an image track portion instead

of a video image. In this case, when music, not an image, is recorded by the digital signals in the video tape, difficulty is encountered in suitably selecting a specific number of pieces of music. In this case also, the utilization of the present system makes it possible to display the titles of "auto program search" and "end" for operation, so that the selection of a specific number of pieces of music can be facilitated and desired pieces of music can be continuously and automatically played.

Further, in the case where a video tape recorder is utilized such that several types of programs are recorded (written in) by the digital signals in the image track portion of the video tape, heretofore, there has been practised that the same programs are recorded on a cassette tape, a program back-up machine, etc., or several pieces of disks. Such records are held as the reserve, and, for the "read-out", i.e., "auto program search", the computer successively examines and searches the title inserted into the programs, thus presenting the disadvantage of requiring much labor. In this case also, the utilization of this system makes it possible to display the titles of data (index system), so that the "write-in" and "read-in" can be efficiently and quickly executed. In this case, a relay circuit for the write-in is additionally provided, relays of which should make the operations of "recording"

of a remote control device for the video set.

Further, in the above embodiment, the address data AD has been recorded in the second sound channel track. However, the address data may be recorded in a track for the address data write-in's exclusive use which is provided separately of the sound channel track or tracks, or may be recorded in either one or both of the first and second sound channel tracks, both of which are not used in a system where the sounds are recorded between the image signals. In any case, the address data AD may be recorded in a predetermined track in the tape.

As has been described hereinabove, the present invention can provide a method of and a system for controlling a video tape recorder with a computer, wherein an operation mode of the video tape recorder set is automatically controlled by the computer set and images from the both sets can be displayed on a single display.

CLAIMS

1. A method of controlling a tape recorder with a computer, the method comprising i) recording successive address data in a predetermined track of a tape loaded in the tape recorder, reading the recorded address data,and storing address data of a start and an end of a predetermined data portion; and

ii) subsequent to step (i) selecting the predetermined data portion by controlling an operation mode of the tape recorder in accordance with the address data of the start and the end of the data portion, and causing an image from the computer and data from the tape recorder to be alternately or simultaneously output.

2. A method of controlling a tape recorder with a computer according to claim 1, wherein, when the predetermined data portion is selected, the tape recorder is fast forwarded to a position in front of the address data of the start, and thereafter, operated in a reproduction mode to the address data of the end.

3. A method of controlling a tape recorder with a computer according to claim 2, wherein the fast forwarding operation is carried out for a period calculated from a difference between the address data of the present position and the address data of the start.

4. A method of controlling a video tape recorder with a computer according to any of the preceding claims, wherein the image from the computer and an image from the video tape recorder are alternately or simultaneously displayed on a single display unit.

5. A method of controlling a video tape recorder with a computer according to claim 4, wherein the address data are recorded in a sound channel track of a video tape.

6. A system for controlling a tape recorder with a computer, the system comprising a computer; a tape recorder connected to the computer through an interface; an output unit capable of outputting an image from the computer and data from the tape recorder; an address write-in circuit for successively recording address data in a predetermined track of a tape loaded in the tape recorder in response to a command from the computer; an address read-in circuit for reading the address data, previously recorded in the tape in response to a command from the computer; a store for storing address data of a start and an end of a predetermined data portion; and a relay unit for controlling an operation mode of the tape recorder the arrangement being such that the computer controls an operation mode of the tape recorder through the relay unit in accordance with the address data of the start and the end of the predetermined data portion when the data portion is selected, and causes the output unit to alternately or simultaneously output the image from the computer and the data from the tape recorder.

7. A system for controlling a tape recorder with a computer according to claim 6, wherein the address write-in circuit and the address read-in circuit are provided on the interface.

8. A system for controlling a tape recorder with a computer according to claim 6 or claim 7, wherein the relay unit comprises a plurality of relays for operating the tape recorder in operation modes of reproduction, halt, fast forward, rewind, and pause.

9. A system for controlling a video tape recorder with a computer according to any of claims 6 to 8, wherein the output unit is a cathode-ray tube of a television receiver set for home use with a computer signal function.

10. A system for controlling a video tape recorder with a computer according to any of claims 6 to 8, wherein the output unit is a television cathode-ray tube for a computer.

11. A system for controlling a video tape recorder with a computer according to claim 10, wherein the television cathode-ray tube for a computer is a cathode-ray tube having a superimposing function.

12. A system for controlling a video tape recorder with a computer according to claim 10 or claim 11, wherein the television cathode-ray tube for a computer is capable of displaying even when the scanning lines are different from each other.

13. A system for controlling a tape recorder with a computer according to any of claims 6 to 8, wherein the output unit is a system utilising a superimposing unit.

14. A system for controlling a video tape recorder with a computer according to any of claims 6 to 13, wherein the data portion is an image portion, and when the predetermined image portion is selected, the computer is arranged to cause the tape in the tape recorder to be fast forwarded to a position in front of the address data of the start of the predetermined image portion via the relay unit and to stop thereat, and thereafter to cause the output unit to switch to a condition capable of displaying

the image from the video tape recorder, to cause the video recorder subsequently to operate in a reproduction mode from the postion stopped to the address data of the end and to stop thereat, and to cause the output to switch to a condition capable of displaying the image from the computer, and simultaneously the video tape recorder to rewind.

15. A system for controlling a video tape recorder with a computer according to any of claims 6 to 13, wherein the data portion is an image portion, and the relay unit controls an operation mode of the video tape recorder through a remote control device, and switches a picture condition of the output unit through a remote control device, the arrangement being such that, when the predetermined image portion is selected, a time period of fast forwarding the video tape to a position at least in front of a start address data is calculated according to a difference betewen the address data of the present position read by the address read-in circuit and the start address data, the video tape recorder is fast forwarded for the time period thus calculated and stopped, thereafter the display set is switched to a condition capable of displaying an image from the video tape recorder through the remote control device, a forwarding rate for reproduction is determined so that a time period for reproduction from the start address data to the end address data may be set at a predetermined time, the video recorder is operated in reproduction mode at the determined forwarding rate until the address data from the address read-in circuit reaches the end address data and the tape is stopped, subsequently the output unit is switched to a condition capable of displaying an image from the computer through the remote control device, and simultaneously, the video tape recorder is rewound.

16 A method of controlling a tape recorder with a computer substantially as herein described with reference to any of the examples shown in the accompanying drawings.

17. A system of controlling a tape recorder with a computer, substantially as herein described with reference to any of the examples shown in the accompanying drawings.