

DEVICE FOR COMBINING VCR AND TV

The present invention relates to a video cassette recorder (VCR) including a television set. It also relates to a device for interfacing a video cassette recorder (VCR) with a television set having a video display, particularly where the VCR and television set have respective tuners, and the VCR tuner is of a type responsive automatically to program codes ("VCR plus").

Lately a device for controlling VCRs by a TV program specifying code consisting of several digits of numbers known as a "Plus Code" or "G Code" is widely used in countries such as the United States. After storing a number of the specifying codes, such a device controls the VCR so that the latter automatically performs one by one recording of TV programs designated by the codes.

Such specifying codes are published in TV program listings of newspapers or TV guides. Users are able to control VCRs by inputting the codes through the keypad after initializing the device once. However, such a convenient device is useless if the user does not want to record any TV program on the VCR.

According to the present invention there is provided a device for combining a video cassette recorder (VCR) and a television set, wherein by selectively connecting an input terminal of a display means of said TV set to either an output terminal of a first tuner for said TV set or to an output terminal of a second tuner for said VCR, which is operable via a remote control box automatically controlled program codes, it is possible to monitor on said TV set:-

- (i) an output of the second tuner which is controlled in accordance with a program code, even though no videotape has been loaded into said VCR;
- (ii) a program on a channel different from that of said VCR by means of the first tuner, by controlling the second tuner and said VCR in accordance with a program code, when a videotape has been loaded into said VCR; and

(iii) by means of a manual switch provided in the device, the output of the second tuner, which is controlled in accordance with a program code, even though a videotape has been loaded into said VCR.

In another closely related aspect of the present invention there is provided a device for interfacing a video cassette recorder (VCR) with a television set having a video display, said VCR and television set having respective tuners, and the VCR tuner being of a type responsive automatically to program codes via a remote control unit, the device comprising:

means for detecting whether a videotape is loaded in said VCR;

a switch for supplying to said television set signals from the tuner of said VCR or from the tuner of said television set;

means responsive to said detecting means for controlling said switch between a first operating state to supply said video display with signals from the tuner of said VCR in accordance with a program code, when no tape is loaded in said VCR, so that the output of the VCR tuner can be monitored by a user, and a second operating state to supply said video display with signals from the tuner of said television set while said VCR tuner is operating in accordance with a program code, when a videotape is loaded in said VCR, so that the user can watch on the television set a program on a channel different from that of the VCR; and

a manual control element for operating said switch to attain the first operating state even when a videotape is loaded in the VCR.

The present invention extends to a method of interfacing a video cassette recorder (VCR) with a television set having a video display, said VCR and television set having respective tuners, and the VCR tuner being of a type responsive automatically to program codes via a remote control unit, the method comprising:

detecting whether a videotape is loaded in said VCR;
supplying to said television set by means of a
switch signals from the tuner of said VCR or from the
5 tuner of said television set;

controlling said switch between a first operating
state to supply said video display with signals from the
tuner of said VCR in accordance with a program code, when
no tape is loaded in said VCR, so that the output of the
10 VCR tuner can be monitored by a user, and a second
operating state to supply said video display with signals
from the tuner of said television set while said VCR
tuner is operating in accordance with a program code,
when a videotape is loaded in said VCR, so that the user
15 can watch on the television set a program on a channel
different from that of the VCR; and

operating said switch to attain the first operating
state even when a videotape is loaded in the VCR.

The aforesaid method has steps analogous to the
20 apparatus features herein disclosed.

The present invention can preferably allow a TV set
to display the same program as that of a VCR through the
VCR even though a videotape, for example, VHS tape, is
not loaded into the VCR, by utilizing a VCR control
25 system controlled by the "G Code".

Hence, the present invention can enable individual
or combination use of two tuners.

Preferred features of the invention are now

described, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a block diagram illustrating an embodiment of the present invention.

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(Legend)

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1. Tuner (contained in TV 5)
2. Tuner (contained in VCR 4)
3. Analog switch
4. VCR
- 4-1. Tape detection output terminal
- 4-2. Video output terminal
- 4-3. Stop input terminal
5. Television Set
- 5-1. Television input terminal
- 15 5-2. Video input terminal
6. Change-over switch
7. Flip-flop
8. Light emitting diode
9. AND gate

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In the drawing, numeral 1 refers to a tuner which is contained in television set 5, and 2 to a tuner which is contained in VCR 4. Both tuners are connected to the present device as shown. Numeral 3 refers to an analog switch for VCR 4. When the control terminal (con) of analog switch 3 has a low voltage, contact "a" is closed as shown in the drawing. When the control terminal has a high voltage, however, contact "b" is closed.

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Numeral 4 refers to a VCR. Numeral 4-1 refers to a tape detection output terminal which outputs a high level voltage when a videotape (not shown) is loaded into VCR 4. Numeral 4-2 refers to a video output terminal, and 4-3 to a stop input terminal which is connected to a stop button (not shown) to terminate movement of the aforementioned videotape. Numeral 5 refers to a television set, 5-1 to a television input terminal which receives output from the aforementioned tuners 1 and 2

via analog switch 3, and 5-2 to a video input terminal which receives a video output generated by VCR 4.

5 Numeral 6 refers to a change-over switch which registers that no videotape has been loaded into the aforementioned VCR 4 even though a videotape (not shown) is actually loaded. An output of change-over switch 6 triggers binary type flip-flop 7, wherein an output Q of flip-flop 7 is switched from high level to low level and vice versa. The state of outputting can be monitored
10 through light emitting diode 8.

Numeral 9 refers to an AND gate. Terminal "a" connected to tape detection output terminal 4-1 has a high voltage when the aforementioned videotape is loaded. When terminal "b" has a high voltage in accordance with
15 an output of flip-flop 7, the voltage of output terminal "c" becomes high and the point of contact of analog switch 3 is switched to the position ("b") opposite to that ("a") of Fig. 1. When terminal "b" of AND gate 9 has a low voltage, output terminal "c" always has a low
20 voltage and the point of contact of analog switch 3 is in the position ("a") shown in Fig. 1. When the aforementioned output terminal "c" has a low voltage, change-over switch 6 registers that no videotape has been loaded into VCR 4 even though a videotape is actually
25 loaded.

Incidentally, the present VCR is controlled by "G Codes" (the Japanese version of Gemstar's (trademark) Plus Codes) lately published in Japanese newspapers such as "The Asahi".

30 Operation of the present embodiment will be subsequently described.

(i) Description of the operation in the case that although no videotape has been loaded into the VCR, in accordance with the reservation designated by the "Plus Code" both the VCR and TV set are turned on and the TV set displays the same program as that of the VCR.
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The following description is predicated upon the

assumption that a TV program reservation designated by the "G Code" is registered in a remote control box (not shown), for example, "Video Plus" (in Japan) or "VCR Plus" (in the US).

5 When the starting time of the recording arrives in accordance with the aforementioned reservation, coded infrared rays are emitted from the aforementioned remote control box. The light sensor (not shown) of VCR 4 receives the infrared rays, and the power source of TV set 5, which is constituted to be linked with the power source of VCR 4, is turned on with television input terminal 5-1 being set in an operative condition. Further, the aforementioned infrared ray commands that the currently set channel of VCR 4 be switched to the reserved channel and VCR 4 be set to a recording mode. As no videotape has been loaded into VCR 4, however, VCR 4 is turned on and the channel is switched by tuner 2, but VCR 4 cannot be set to the recording mode.

15 When no videotape is loaded into VCR 4 as stated above, an output of detection output terminal 4-1 has a low voltage, and therefore output terminal "c" of AND gate 9 has a low voltage. As it is clear from the above, the point of contact of analog switch 3 is positioned as shown in Fig. 1. TV set 5 receives an output of tuner 2 via television input terminal 5-1 and contacts "a" and "c" of analog switch 3, wherein the same program as that of VCR 4 is displayed. Accordingly, even if the user did not want to record the pre-reserved program on VCR 4 or forgot that the program had been reserved, he or she would still see the programme on TV set 5.

25 When the finish time of the recording arrives in accordance with the "G Code", the power sources of VCR 4 and TV set 5 are turned off in response to the coded infrared ray emitted from the aforementioned remote control box.

35 (ii) Description of the operation in the case that a TV program can be watched on TV set 5 while another TV

program, which was reserved in accordance with the "G Code", is being recorded on a videotape loaded into VCR 4.

If VCR 4, into which a videotape is loaded, and TV set 5 are turned on in response to the coded infrared ray, which is emitted from the remote control box at the aforementioned starting time of the recording, an output of tape detection output terminal 4-1 rises to a high level and is applied to input terminal "a" of AND gate 9.

On the other hand, input terminal "b" of AND gate 9 is connected to the output terminal of flip-flop 7, and is maintained at a high level during the initialization that occurs when flip-flop 7 is turned on. (As will be mentioned later, when change-over switch 6 is pressed, input terminal "b" is switched to a low level, however, when the switch is pressed again, the terminal is returned to a high level, and this operation is repeated as occasion demands.) Therefore, output terminal "c" of AND gate 9 rises to a high level, and the point of contact of analog switch 3 is switched to the position ("b") opposite to that ("a") of Fig. 1. In the above situation, an output of tuner 2 is applied to VCR 4, and therefore the pre-reserved TV program is recorded on the videotape.

An output of tuner 1 is applied to TV set 5 via television input terminal 5-1 and contacts "b" and "c" of analog switch 3, wherein the output is displayed on the television screen. In this situation, as tuners 1 and 2 are independent of each other, the user can change the channel of TV set 5 at his or her discretion in order to watch a desired TV program regardless of the current channel of VCR 4.

(iii) Description of the operation in the case that a TV program on the channel to which VCR 4 is currently set can be monitored on TV set 5 by making a change-over switch register that no videotape has been loaded into VCR 4 even after a videotape was actually loaded into the

VCR.

As stated in item (ii), when a videotape is loaded into VCR 4, any TV program can be watched on TV set 5 regardless of the channel to which VCR 4 is currently set. In the case of item (i), in order to monitor on TV set 5 the channel to which VCR 4 is currently set in accordance with the "G Code", it is required to prevent the insertion of videotape into VCR 4. However, some users may think that it is more convenient to keep a videotape in VCR 4 all the time. For such a case, change-over switch 6 is provided so that the channel to which VCR 4 is set can be monitored on TV set 5.

When the aforementioned change-over switch 6 is pressed, an output of binary type flip-flop 7 is switched from the aforementioned high level to a low level. At this time, input terminal "b" of AND gate 9 is kept at a low level and its output is applied to stop input terminal 4-3. This simulates the condition of a stop button being pressed, so that a videotape loaded into VCR 4 is suspended from operation even though VCR 4 is turned on.

In this situation, when VCR is turned on and a channel of tuner 2 is set in response to an infrared ray from the aforementioned remote control box, an output of tape detection output terminal 4-1 rises to a high level because a videotape has already been loaded into VCR 4. Therefore, input terminal "a" of AND gate 9 is raised to a high level. However, output terminal "c" of AND gate 9 is still kept at a low level because input terminal "b" of AND gate 9 is kept at a low level as stated above. Therefore, the point of contact of analog switch 3 is not switched.

In the above situation, an output of tuner 2 is applied to VCR 4 and also to TV set 5 via terminals "a" and "c" of analog switch 3 at the same time. Therefore, the user can monitor on TV set 5 the same channel as that of VCR 4.

As stated above, by selectively connecting an input terminal of TV set 5 for monitoring purposes to either an output terminal of tuner 1 for TV set 5 or to an output terminal of tuner 2 for VCR 4, which is automatically controlled by the "G Codes" ("Plus Codes" in the United States) even though no videotape has been loaded into VCR 4, the present application enables the following:

(i) Monitoring on TV set 5 an output of tuner 2 for VCR 4, which is controlled in accordance with the "G Codes" even though no videotape has been loaded into VCR 4.

(ii) Watching on TV set 5 a program on a channel different from that of VCR 4 by means of tuner 1, by controlling tuner 2 and VCR 4 in accordance with the "G Code" when a videotape is loaded into VCR 4, as in the case of standard recording.

(iii) Carrying out the same operation as that of (i) by means of the aforementioned manual switch (change-over switch 6) even though a videotape is loaded into VCR 4, or more specifically, monitoring on TV set 5 an output of tuner 2 for VCR 4, which is controlled in accordance with the "G Codes", without operating the videotape.

Also, the present application serves to avoid missed TV programs by displaying without fail on TV set 5 the pre-reserved TV programs designated by the "G Codes", and facilitates at this time the decision as to whether or not the programs should be recorded. Therefore, the present application is of great practical value.

It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.



CLAIMS

1. A device for combining a video cassette recorder (VCR) and a television set, wherein by selectively
5 connecting an input terminal of a display means of said TV set to either an output terminal of a first tuner for said TV set or to an output terminal of a second tuner for said VCR, which is operable via a remote control box automatically controlled program codes, it is possible to
10 monitor on said TV set:-

(i) an output of the second tuner which is controlled in accordance with a program code, even though no videotape has been loaded into said VCR;

(ii) a program on a channel different from that of
15 said VCR by means of the first tuner, by controlling the second tuner and said VCR in accordance with a program code, when a videotape has been loaded into said VCR; and

(iii) by means of a manual switch provided in the device, the output of the second tuner, which is
20 controlled in accordance with a program code, even though a videotape has been loaded into said VCR.

2. A device for interfacing a video cassette recorder (VCR) with a television set having a video display, said
25 VCR and television set having respective tuners, and the VCR tuner being of a type responsive automatically to program codes via a remote control unit, the device comprising:

means for detecting whether a videotape is loaded in
30 said VCR;

a switch for supplying to said television set signals from the tuner of said VCR or from the tuner of said television set;

means responsive to said detecting means for
35 controlling said switch between a first operating state



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to supply said video display with signals from the tuner of said VCR in accordance with a program code, when no tape is loaded in said VCR, so that the output of the VCR tuner can be monitored by a user, and a second operating state to supply said video display with signals from the tuner of said television set while said VCR tuner is operating in accordance with a program code, when a videotape is loaded in said VCR, so that the user can watch on the television set a program on a channel different from that of the VCR; and

a manual control element for operating said switch to attain the first operating state even when a videotape is loaded in the VCR.

3. The device of Claim 2, wherein said switch comprises an analog switch.

4. The device of Claim 2 or 3, wherein said manual control element drives a flip-flop for controlling said switch.

5. The device of Claim 4, wherein said flip-flop further controls a stop function of said VCR.

6. The device of Claim 4 or 5, wherein said manual control drives said flip-flop between first and second logic states, alternately with successive manual operations of said control element.

7. The device of any of Claims 2 to 6, including a logic gate having input terminals supplied by signals from said videotape detecting means and said manual control element, and an output terminal supplying a control signal to said switch.

8. A video cassette recorder in combination with the device of any of Claims 2 to 7.



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9. A television set having a video display, in combination with the device of any of Claims 2 to 7.

5 10. Apparatus comprising a video cassette recorder, a television set having a video display, and the device of any of Claims 2 to 7.

10 11. A method of interfacing a video cassette recorder (VCR) with a television set having a video display, said VCR and television set having respective tuners, and the VCR tuner being of a type responsive automatically to program codes via a remote control unit, the method comprising:

15 detecting whether a videotape is loaded in said VCR;
supplying to said television set by means of a switch signals from the tuner of said VCR or from the tuner of said television set;

20 controlling said switch between a first operating state to supply said video display with signals from the tuner of said VCR in accordance with a program code, when no tape is loaded in said VCR, so that the output of the VCR tuner can be monitored by a user, and a second operating state to supply said video display with signals
25 from the tuner of said television set while said VCR tuner is operating in accordance with a program code, when a videotape is loaded in said VCR, so that the user can watch on the television set a program on a channel different from that of the VCR; and

30 operating said switch to attain the first operating state even when a videotape is loaded in the VCR.

35 12. A device for interfacing a video cassette recorder with a television set having a video display, substantially as herein described with reference to and as illustrated in the accompanying drawing.