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(54) **Improved video cassette recorder**

Videokassettenaufnahmegerät

Enregistreur pour cassettes vidéo

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(73) Proprietor: **EDICO S.r.l.**
00197 Roma (IT)

(72) Inventors:
- **Dini, Roberto**
  I-10098 Rivoli (TO) (IT)
- **Farina, Attilio**
  I-10137 Torino (IT)

(74) Representative: **Eisenführ, Speiser & Partner**
Patentanwälte Rechtsanwälte
Postfach 10 60 78
28060 Bremen (DE)

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Description

[0001] The present invention relates to a video cassette recorder, supplied with means for receiving a television program, means for recording the latter, a clock, a data memory, means for storing in said memory the time in which a program that is desired to be recorded begins and control means for reading said clock and said memory and for activating said receiving means and said means for recording the television program at the indicated time or at a pre-determined interval of time before.

[0002] Video cassette recorders having the above mentioned characteristics are known for example from EP-A-0 351 120, FR-A-23 69 761, US-A-4,206,483 or EP-A-0 112 589. EP-A-0 351 120 describes a video cassette recorder supplied with means for receiving a television program, means for recording the latter, a clock, a data memory, means for storing in said memory, the time at which a program that is desired to be recorded begins and control means for reading said clock and said memory and for activating said receiving means and said means for recording the television program at the indicated time or at a predetermined interval of time before and the programming of the recording operation can be maintained without interfering within normal use of the recorder. In case that the user has preprogrammed the videorecorder and the user leaves the preprogramming mode to use the videorecorder in a normal way, the video recorder according to EP-A-0 351 120 reminds the user that he has made a timer programming at the videorecorder. Such reminder is realised by a periodical blinking of display means at the videorecorder display. In case that the user has displaced the cassette after the timer programming there will be displayed at the video recorder display by a blinking display that no cassette is in the video recorder. From EP-A-0 112 589 it is known a video recorder according to the preamble of claim 1.

[0003] As is known, in fact all video cassette players are normally supplied with a permanent working clock, and means for programming the turning on of the recorder to a determined television channel at an established time.

[0004] Such time is normally that accorded to the program that is desired to be recorded; it is however possible to program the turning on of the appliance some time before the time accorded, so as not to risk missing the beginning of the program of interest. Furthermore, as the recorder has been arranged to be turned on at the indicated time, it is necessary that an appropriate organ, usually a key, that can be distinguished for example with "Timer", be depressed. The key activates a delay condition and the recorder is no longer available for normal use, such as reproduction or recording, or any other possible operation; it is however possible to remove the delay condition, and then carry out the desired operation , but it is necessary that the key be newly depressed, otherwise the programming will not be effective.

[0005] This is inconvenient, as the programming can be effected many hours before the actual recording, and in the meantime it is no longer possible to use the appliance, or it is necessary to remember, after, to renew by means of the "Timer" key the operative position

[0006] It is also known a type of video cassette recorder that allows for normal use after being programmed; in such a case however there exists the risk that the user change cassette, and forget to reinsert the cassette that had been introduced for the programmed recording, the result being that the recording is on the wrong cassette, perhaps cancelling something, or recording nothing the second cassette is protected; it may also occur that the user does not replace, but simply rewinds, for example to the beginning of the cassette, so as to view a recording, and forget the cassette in a mistaken position, with the consequent loss of a previous recording, during the act of the programmed recording.

[0007] It also to be taken in consideration that the users may be more than one, and the second may not necessarily be informed of the fact that the video recorder has been programmed to record.

[0008] It is therefore clear that even this second kind of video recorder is not satisfactory is as much that it allows for mistaken recording to be easily made, with unpleasant consequences.

[0009] The present invention has the aim of indicating the possibility of realising a video cassette recorder that allows the use of the applicance after a recording has been carried out, having a sufficient protection system against eventual errors.

[0010] It is object of the invention to improve a video recorder having the features according to EP-A-0 351 120 and to avoid the disadvantages of such videorecorder.

[0011] In reaching such aims and to solve the object, the present invention proposes a video cassette recorder according to claim 1.

[0012] Further aims and advantages of the present invention will become clear from the following detailed description and annexed drawings, supplied as a non-limiting example, wherein:

figure 1 represents the block diagram of part of the electric circuit of a video cassette recorder according to the invention;

figure 2 schematically represents a significant part of the logic circuit of the control unit of the appliance in figure 1;

figure 3 schematically represents a second significant part of the logic circuit of the control unit of the appliance in figure 1;

figure 4 schematically represents a third significant

part of the logic circuit of the control unit of the appliance in figure 1.

[0013] In figure 1 reference number 13 indicates the input for the antenna signal of the receiving block input for the antenna signal of the receiving block circuit of the video cassette recorder.

[0014] Number 10 indicates a conventional television tuner, number 11 the customary intermediate frequency amplifier with video detector; number 12 indicates a decoding circuit of a transmitted label, associated to the television signal and containing for example a code number and the time accorded the beginning of the program, a label of this type is the beginning of the program, a label of this type is that for example provided in the system known as V.P.S. (Video Programming System).

[0015] Number 1 indicates the whole of the receiving circuits 10, 11 and 12; number 16 indicates the demodulated video signal, outputted from circuit 11.

[0016] Number 2 indicates a control unit, for example a microcomputer, that manages the system; this is connected to block 12 that receives at terminal 21 the transmitted label; it is connected to a clock calendar 4, through terminal 22 and to a memory 3 through terminal 23.

[0017] The memory 3 is arranged so as to receive through an interface 53 the user data relative to the program to be recorded (label 37 of the desired program, and television channel 36) or any other suitable device for introducing data.

[0018] The microcomputer 2, through the terminal 24, can address the memory 3; through terminal 25 it can control the beginning and the end of recording on the recorder 7; through terminal 26 it can control the tuner 10 so as to select the program chosen by the user; and, through terminal 27 and a supply device (15), is able to turn on or off the receiving part of the system.

[0019] The microcomputer, through terminal 28 can control an alphanumeric display 6, for displaying warning messages (for example of the LED type); through terminal 29 it can control an acoustic advisor 8 (a normal buzzer) that can be manually disconnected.

[0020] Finally the microcomputer is connected through its bus, with a peripheral device, indicated with number 5, containing a programmable timer.

[0021] The actual recorder 7 receives from block 11 the video and audio signals to be recorded through conductors 16 and 72; this being preferable a recorder of the cassette type, and is supplied with a cassette sensor, not represented in the figure, that remains active even in the stand by mode of the appliance; it also comprises a signalling system of the activation of the motor for fast forwarding or rewinding the cassette; both the cassette sensor and the signalling system of the activation of the motor are connected to the microcomputer 2.

[0022] The microcomputer 2 may be of the type commercially available, for example a central processing unit Z8400 by S.G.S.; the peripheral device 5 may be in such a case a counter timer circuit Z8340 by the same company. The Z8430 is programmable via software, it is directly interfaced with the CPU and has 4 independent counters timer of 8 bit, that can be cascaded; each counter is associated to a pre-scaler, that can be commutated via software between two division values (16/256); in this way the delay can be programmed for intervals ranging from a minimum of 4 microseconds to a maximum of approximately 74 hours; at the end of the count the Z8430 can be programmed to send interrupt request to the CPU.

[0023] Naturally, instead of the Z8400 any other suitable microprocessor can be utilised, and instead of the Z8430 a similar counter timer circuit that can be interfaced with the microprocessor used.

[0024] In figure 2 a part of the logic circuit of the central control unit 2 (figure 1) is schematically represented, that enables the realisation of programming a recording.

[0025] Such a circuit can be indifferently realised with the wired logic system or with a system of programmed logic, i.e. utilising a microprocessor; said second system is generally less expensive, as video cassette recorders generally are generally contain one or more microprocessors.

[0026] Block 100 is the initial block of the programming operation; control passes to the successive block 101.

[0027] Block 101 is a control block; it controls whether the user has proceeded with a programming request (for instance by means of a suitable key of the data introduction unit 53); in the affirmative case control passes to block 102; in the negative case control passes back to block 101 (in all the control blocks the inferior output is the YES output: the lateral output is the NO output).

[0028] Block 102 provides for:

- asking the user for the data to be inserted in the memory 3 (program code, starting time and reception channel);
- verifying the compatibility of the data introduced;
- memorising the data in memory 3;
- calculating the intervening interval between the actual time and the time of the foreseen recording activation;
- programming the timer of the device 5 for the calculated interval of time;
- starting the timer 5;
- enabling the interrupts;
- raising a programmed recording flag (RP);
- supplying control to block 103.

[0029] Block 103 is the terminal block of the end of operations; control can return to the initial block 100 or another similar operative block of the control circuit.

[0030] In figure 3 a second part of the logic circuit of the central control unit 2 is schematically represented, that enables the realisation of the programmed recording at the foreseen time.

[0031] Block 200 is the initial block of the automatic recording operation; control arrives at block 200 as an effect of the "interrupt" command generated by the timer 5 upon the termination of the period of time stated by block 102; block 200 carried out the normal operations such as:

- disables the interrupts;
- saves the return address;
- reads the address of the interrupt routine;
- jumps to such address, i.e. passes control to the successive block 201.

[0032] Block 201 is a control block; it controls whether reception, displaying, recording or reproducing activity is underway; in the affirmative case control passes to block 202; in the negative case control passes to block 204.

[0033] Block 203 provides for the display of a message for the user, of the type: "the programmed recording of channel X is about to begin; if not cancelled by the user by pressing key Y, it will begin within one minute". Control is then supplied to block 203.

[0034] Block 203 is a control block; it controls whether the cancel command takes place within one minute, in the positive case control passes to block 209; in the negative case control passes to block 204.

[0035] Block 204 provides for starting the operation of programmed recording:

- by tuning in to the requested channel;
- by supplying the control to block 205.

[0036] Block 205 is a control block: a control of the label contained in signal 16 is carried out, comparing it with that (37) contained in the memory 3, if the label coincides control passes to block 206; on the contrary control passes back to block 205.

[0037] Block 206 provides for activating the recording on behalf of the recording device 7; control then passes to block 207.

[0038] Block 207 is a control block that provides for controlling the received label; if the label is substituted (i.e. in the case that it does not correspond to that in the memory), i.e. the program has finished, control passes to block 208; on the contrary control returns to block 207.

[0039] Block 208 provides for interrupting the recording deactivating the receiving means 1 and the recorder 7; it also provides for lowering the programmed recording flag (RP); control therefore passes to block 209.

[0040] Block 209 carries out the operation "return from interrupt' (RETI), that is it supplies the control to the block that had control during the moment in which the "interrupt" signal had been received.

[0041] In figure 4 a third part of the logic circuit of the central control unit 28 is schematically represented, that allows for using the recorder, after that a recording has been programmed, without any risks.

[0042] Block 300 is the initial block of normal use operations; from block 300 control passes to block 301.

[0043] Block 301 is a control block: control of the programmed recording flag (RP) is carried out; if the flag is raised control passes to block 302; on the contrary control passes to block 302A.

[0044] Block 302 provides for displaying on the display 6 a message of the type "Attention a recording has been programmed!"; control then passes to block 302A.

[0045] Block 302A provides for accepting the commands given by the user, but before carrying them out, passes control to block 303.

[0046] Block 303 is a control block: control as to whether the motor of the recorder 7 has been activated is carried out, signalled by said signalling system: in the affirmative the control is passed to block 305; on the contrary control passes to block 304.

[0047] Block 304 is a control block: control as to whether the cassette has been extracted is carried out, based on the state of the relative sensor: in the affirmative case control is passed to block 306; on the contrary control passes to block 307.

[0048] Block 305 provides to raise the motor activated flag (PL); the control then passes to block 307.

[0049] Block 306 provides for raising the extracted cassette flag (CE); control is then supplied to block 307.

[0050] Block 307 provides to execute the user commands and passes the control to block 308.

[0051] Block 308 is a control block: control is carried out of the programmed recording flag (RP); if the flag is raised control is passed to 309; on the contrary control passes to block 313.

[0052] Block 309 is a control block: control is carried out of the extracted cassette flag (CE); if the flag is raised control passes to block 310; on the contrary control passes to block 311.

[0053] Block 310 provides for:

- activating the acoustic advisor 8, that remains active until manually deactivated;
- displaying on the display a message of the type "The cassette has been extracted, has the original cassette been replaced with the tape in the correct position?"; the message remains visible until the acoustic advisor 8 is deactivated;
- passing the control to block 313.

[0054] Block 311 is a control block: control of the activated motor flag is carried out (PL); if the flag is raised control passes to block 312; on the contrary control is passed to block 313.

[0055] Block 312 provides for:

- activating the acoustic advisor 8, that remains active until it is manually deactivate;
- displaying on the display a message of the type "The tape has been moved from its original position; has the original position been re-stored?"; the mes-

sage remains visible until the acoustic advisor 8 has been deactivate;
- passing the control to block 313.

[0056] Block 313 is the final block of end of operations; control can return to block 300 or another similar operative block of the control circuit.

[0057] The characteristics of the described video cassette recorder result in being clear from the present description and annexed drawings. From the present description the advantages of the video cassette recorder object of the present invention also result in being clear. In particular they consist in the fact that even though programming for carrying out a recording at a given time has been made, the recorder is still usable by the user for other operations to be carried out in the meantime, and the user is informed of any eventual risks connected to such usage.

[0058] It is to be supposed that numerous variants are possible by the man skilled in the art to the video cassette recorder described as an example, without however departing from the novelty principles inherent in the invention; among the many, the possibility of using the microcomputer 2 for realising more functions, for example controlling the tuning can be cited.

Claims

1. Video cassette recorder, supplied with means (1) for receiving a television program, means (7) for recording the latter, a clock (4), a data memory (3), means (53) for storing in said memory (3) the time at which a program that is desired to be recorded begins and control means (2) for reading said clock (4) and said memory (3) and for activating said receiving means (1) and said means for recording (7) the television program at the indicated time or at a pre-determined interval of time before and the programming of the recording operation can be maintained without interfering with the normal use of the recorder, **characterized by** the fact that means (303, 306), are provided for controlling, whether the recorder is being used after having been programmed, controlling if the cassette tape position has been changed, through said normal use and by display means (312, 6, 8) for displaying a warning message for the user whether such said use may have placed the recording of the program at risk by said change of the tape position of the cassette.

2. Video cassette recorder, according to claim 1, **characterised by** the fact it comprises timing means (5), independent from said control means (2) for determining the instant in which the recording operation begins.

3. Video cassette recorder, according to claim 2, **characterised by** the fact that said timing means (5) comprise an electronic digital counter unit (Z8430) able to keep count of an interval of time of at least 24 hours and can be interfaced with said control means (2).

4. Video cassette recorder, according to claim 2, **characterised by** the fact that said timing means (5) comprise an electronic digital counter unit (Z8430) able to keep count of an interval of time of at least 72 hours and can be interfaced with said control means (2).

5. Video cassette recorder, according to any one of the previous claims, **characterised by** the fact that said control means (2) comprise means (102) for:

   - asking the user for the data to be inserted in memory 3;
   - calculating the intervening interval between the actual time and the time of the forecasted activation for the recording;
   - programming the device (5) for the calculated interval of time;
   - starting the timer (5).

6. Video cassette recorder, according to any one of the previous claims, **characterised by** the fact that said control means (2) comprise means (201) for verifying whether reception, displaying, recording or reproducing activity is under way and means (203) for the display of a warning message for the user (of the type) the programmed recording of channel X is about to begin; if not cancelled by the user by pressing key Y, it will regularly begin within one minute".

7. Video cassette recorder, according to any one of the previous claims, **characterised by** the fact that means (301) are provided for controlling whether the recorder is used after having been programmed, and means (302, 6) for displaying a warning message.

8. Video cassette recorder, according to claim 7, **characterised by** the fact that said means for controlling whether, upon use of the recorder after having been programmed, the cassette has been removed, comprising an extracted cassette sensor.

9. Video cassette recorder, according to claim 8, **characterised by** the fact that said cassette sensor remains active even in the stand by condition.

10. Video cassette recorder, according to claim 1, **characterised by** the fact that said warning comprises the viewing of a message on the display (6).

11. Video cassette recorder, according to claim 1, **characterised by** the fact that said warning comprises a sound signal produced by an acoustic advisor (8).

12. Video cassette recorder, according to claim 1, **characterised by** the fact that said tape position change sensor remains active even in the stand by position.

13. Video cassette recorder, according to anyone of the previous claims, **characterised by** the fact that said means for controlling whether, upon use of the recorder (7) after having been programmed, the cassette tape position has been changed, comprise a signalling system for enabling the motor in forward or in rewind mode of the tape.

14. Video cassette recorder, according to claim 1, **characterised by** the fact that said warning comprises the display of a message on the screen (6).

15. Video cassette recorder, according to claim 12, **characterised by** the fact that said warning comprises a sound signal produced by an acoustic advisor (8).

16. Video cassette recorder, according to any one of the previous claims, **characterised by** the fact that it comprises circuitry mean (12) for decoding a transmitted label, associated to the television signal and containing for example a code number and the forecasted time of the beginning of the program.

17. Video cassette recorder, according to claim 16, **characterised by** the fact that said circuitry means (12) for decoding a transmitted label, are those provided in the known system V.P.S. (Video Programming System).

18. Video cassette recorder, according to any one of the previous claims, **characterised by** the fact that said control means (2) comprise a logic circuit realised with the wired logic system.

19. Video cassette recorder, according to anyone of the previous claims, **characterised by** the fact that said control means (2) comprise a logic circuit realised with the programmed logic system, i.e. with the use of a microprocessor (Z8400).

20. Video cassette recorder, according to claim 19, **characterised by** the fact that said control means (2) comprise means (102) for enabling the interrupt signals.

21. Video cassette recorder, according to claim 19, **characterised by** the fact that said microprocessor (Z8400) is used for also managing other uses of the video cassette recorder.

22. Video cassette recorder, according to claims 3 or 4, **characterised by** the fact that said electronic digital counter unit (Z8430) comprises a series of programmable counters, cascaded between themselves.

23. Video cassette recorder, according to claim 22 **characterised by** the fact that at least one of said programmable counters is associated to a prescaler.

24. Video cassette recorder, according to claim 22, **characterised by** the fact that said pre-scaler can be commutated between at least two divisional values.

25. Video cassette recorder, according to claim 19, **characterised by** the fact that said electronic digital counter unit (Z8430) at the end of the count can be programmed to send an interrupt request to said microprocessor (Z8400).

26. Video cassette recorder, according to claims 3 or 4, **characterised by** the fact that said electronic digital counter unit (Z8430) can be interfaced with said control means (2) by means of a data bus.

Patentansprüche

1. Videokassettenrekorder, welcher mit einer Einrichtung (1) zum Empfangen einer Fernsehsendung ausgestattet ist, einer Einrichtung (7) zum Aufzeichnen der Letzteren, einer Uhr (4), einem Datenspeicher (3), einer Einrichtung (53) zum Speichern des Zeitpunktes in dem Speicher (3), zu welchem eine Sendung beginnt, welche aufgezeichnet werden soll, und einer Steuerungseinrichtung (2) zum Lesen der Uhr (4) und des Speichers (3) und zum Aktivieren der Empfangseinrichtung (1) und der Einrichtung zum Aufzeichnen (7) der Fernsehsendung zu der angegebenen Zeit oder um ein vorbestimmtes Zeitintervall vorher, und die Programmierung des Aufzeichnungsvorgangs kann ohne Beeinflussung der normalen Verwendung des Rekorders unterstützt werden,
dadurch gekennzeichnet, daß Einrichtungen (303, 306) zum Steuern vorgesehen sind, ob der Rekorder verwendet wird, nachdem er programmiert wurde, Steuern, wenn die Position des Bandes der Kassette während der normalen Verwendung verändert wurde, und durch eine Anzeigeeinrichtung (312, 6, 8) zum Anzeigen einer Warnmitteilung für den Benutzer, daß diese Verwendung die Aufzeichnung der Sendung durch die Änderung der Bandposition der Kassette gefährden kann.

2. Videokassettenrekorder nach Anspruch 1,

dadurch gekennzeichnet, daß er eine Zeitsteuerungseinrichtung (5) umfaßt, welche unabhängig von der Steuerungseinrichtung (2) ist, zum Festlegen des Momentes, in welchem der Aufzeichnungsvorgang beginnt.

3. Videokassettenrekorder nach Anspruch 2, **dadurch gekennzeichnet, daß** die Zeitsteuerungseinrichtung (5) eine elektronische Digitalzählereinheit (Z8430) umfaßt, welche in der Lage ist, ein Zeitintervall von wenigstens 24 Stunden zu zählen und an die Steuerungseinrichtung (2) angeschlossen sein kann.

4. Videokassettenrekorder nach Anspruch 2, **dadurch gekennzeichnet, daß** die Zeitsteuerungseinrichtung (5) eine elektronische Digitalzählereinheit (Z8430) umfaßt, welche in der Lage ist, ein Zeitintervall von wenigstens 72 Stunden zu zählen und an die Steuerungseinrichtung (2) angeschlossen sein kann.

5. Videokassettenrekorder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** die Steuerungseinrichtung (2) eine Einrichtung (102) umfaßt, um:

- den Benutzer nach den Daten zu fragen, die in den Speicher (3) einzufügen sind;
- das Intervall zwischen der tatsächlichen Zeit und der Zeit der vorhergesagten Aktivierung der Aufzeichnung zu berechnen;
- die Vorrichtung (5) für das berechnete Zeitintervall zu programmieren;
- den Timer (5) zu starten.

6. Videokassettenrekorder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** die Steuerungseinrichtung (2) eine Einrichtung (201) zum Verifizieren umfaßt, ob der Empfangs-, Anzeige-, Aufzeichnungs- oder Wiedergabe-Vorgang in Gang ist, und eine Einrichtung (203) für die Anzeige einer Warnmitteilung für den Benutzer (der Art) "die programmierte Aufzeichnung des Kanal X beginnt bald; wenn sie von dem Benutzer nicht durch Drücken der Taste Y gelöscht wird, beginnt sie regulär innerhalb einer Minute" ("the programmed recording of channel X is about to begin; if not cancelled by the user by pressing key Y, it will regularly begin within one minute".

7. Videokassettenrekorder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** Einrichtungen (301) vorgesehen sind zum Steuern, ob der Rekorder benutzt wird, nachdem er programmiert wurde, und Einrichtungen (302, 6) zum Anzeigen einer Warnmitteilung.

8. Videokassettenrekorder nach Anspruch 7, **dadurch gekennzeichnet, daß** die Einrichtung zum Steuern, ob bei der Verwendung des Rekorders, nachdem er programmiert wurde, die Kassette entfernt wurde, einen extrahierten Kassettensensor umfaßt.

9. Videokassettenrekorder nach Anspruch 8, **dadurch gekennzeichnet, daß** der Kassettensensor auch im Stand-By-Betrieb aktiv bleibt.

10. Videokassettenrekorder nach Anspruch 1, **dadurch gekennzeichnet, daß** die Warnung die Darstellung einer Mitteilung in der Anzeige (6) umfaßt.

11. Videokassettenrekorder nach Anspruch 1, **dadurch gekennzeichnet, daß** die Warnung ein von einem akustischen Signalgeber (8) erzeugtes Tonsignal umfaßt.

12. Videokassettenrekorder nach Anspruch 1, **dadurch gekennzeichnet, daß** der Bandpositionsveränderungssensor auch im Stand-By-Betrieb aktiv bleibt.

13. Videokassettenrekorder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** die Einrichtung zum Steuern, ob bei der Verwendung des Rekorders (7), nachdem er programmiert wurde, die Bandposition verändert wurde, ein Anzeigesystem umfaßt, um den Motor im Vorlauf oder Rückspulmodus des Bandes freizugeben.

14. Videokassettenrekorder nach Anspruch 1, **dadurch gekennzeichnet, daß** die Wamung die Anzeige einer Mitteilung auf dem Bildschirm (6) umfaßt.

15. Videokassettenrekorder nach Anspruch 12, **dadurch gekennzeichnet, daß** die Warnung ein von einem akustischen Signalgeber (8) erzeugtes Tonsignal umfaßt.

16. Videokassettenrekorder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** er eine Schaltungseinrichtung (12) zum Dekodieren einer gesendeten Kennung umfaßt, welche dem Fernsehsignal zugeordnet ist und zum Beispiel eine Kode-Nummer und die voraussichtliche Zeit des Beginns der Sendung enthält.

17. Videokassettenrekorder nach Anspruch 16, **dadurch gekennzeichnet, daß** die Schaltungsein-

richtung (12) zum Dekodieren einer gesendeten Markierung diejenige ist, die in dem bekannten VPS-System (Videoprogrammiersystem) vorgesehen ist.

18. Videokassettenrekorder nach einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß die Steuerungseinrichtung (2) eine Logikschaltung umfaßt, welche mit verdrahteter Logik verwirklicht ist.

19. Videokassettenrekorder nach einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß die Steuerungseinrichtung (2) eine Logikschaltung umfaßt, welche mit programmierter Logik verwirklicht ist, d.h. unter Verwendung eines Mikroprozessors (Z8400).

20. Videokassettenrekorder nach Anspruch 19,
dadurch gekennzeichnet, daß die Steuerungseinrichtung (2) eine Einrichtung (102) zum Freigeben des Interrupt-Signals umfaßt.

21. Videokassettenrekorder nach Anspruch 19,
dadurch gekennzeichnet, daß der Mikroprozessor (Z8400) ebenfalls zum Verwalten anderer Verwendungen des Videokassettenrekorders verwendet wird.

22. Videokassettenrekorder nach Anspruch 3 oder 4,
dadurch gekennzeichnet, daß die elektronischen Digitalzählereinheit (Z8430) eine Reihe von programmierbaren Zählern umfaßt, welche untereinander kaskadiert sind.

23. Videokassettenrekorder nach Anspruch 22,
dadurch gekennzeichnet, daß wenigstens einer der programmierbaren Zähler einem Frequenzteiler zugeordnet ist.

24. Videokassettenrekorder nach Anspruch 22,
dadurch gekennzeichnet, daß der Frequenzteiler zwischen wenigstens zwei Teiler-Werten umschaltbar ist.

25. Videokassettenrekorder nach Anspruch 19,
dadurch gekennzeichnet, daß die elektronische Digitalzählereinheit (Z8430) am Ende der Zählung programmiert sein kann, um eine Interrupt-Anforderung zu dem Mikroprozessor (Z8400) zu senden.

26. Videokassettenrekorder nach Anspruch 3 oder 4,
dadurch gekennzeichnet, daß die elektronische Digitalzählereinheit (Z8430) durch einen Datenbus an die Steuerungseinrichtung (2) angeschlossen sein kann.

Revendications

1. Enregistreur pour cassettes vidéo, pourvu de moyens (1) pour recevoir un programme de télévision, de moyens (7) pour enregistrer ce dernier, une horloge (4), une mémoire de données (3), des moyens (53) pour stocker dans ladite mémoire (3) l'heure à laquelle commence un programme que l'on souhaite enregistrer et des moyens de commande (2) pour lire ladite horloge (4) et ladite mémoire (3) et pour actionner lesdits moyens de réception (1) et lesdits moyens pour enregistrer (7) le programme de télévision à l'heure indiquée ou dans une tranche horaire prédéterminée à l'avance et la programmation de l'opération d'enregistrement peut être conservée sans perturber l'utilisation normale de l'enregistreur, **caractérisé en ce que** les moyens (303, 306) sont prévus pour contrôler si l'enregistreur est utilisé après avoir été programmé, pour contrôler si la position de la bande de la cassette a été modifiée lors de ladite utilisation normale, et par des moyens d'affichage (312, 6, 8) pour afficher un message d'avertissement pour l'utilisateur le prévenant que ladite utilisation peut avoir compromis l'enregistrement du programme par ladite modification de la position de la bande de la cassette.

2. Enregistreur pour cassettes vidéo selon la revendication 1, **caractérisé par le fait qu'**il comprend des moyens de synchronisation (5) indépendants desdits moyens de commande (2) pour déterminer l'instant auquel démarre l'opération d'enregistrement.

3. Enregistreur pour cassettes vidéo selon la revendication 2, **caractérisé par le fait que** lesdits moyens de synchronisation (5) comprennent une unité de compteur numérique électronique (Z8430) pouvant conserver le comptage d'un intervalle de temps d'au moins 24 heures et que l'on peut interfacer avec lesdits moyens de commande (2).

4. Enregistreur pour cassettes vidéo selon la revendication 2, **caractérisé par le fait que** lesdits moyens de synchronisation (5) comprennent une unité de compteur numérique électronique (Z8430) pouvant conserver le comptage d'un intervalle de temps d'au moins 72 heures et que l'on peut interfacer avec lesdits moyens de commande (2).

5. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** lesdits moyens de commande (2) comprennent des moyens (102) pour :

- demander à l'utilisateur les données à insérer dans la mémoire 3 ;

- calculer l'intervalle intervenant entre le temps réel et le temps de l'actionnement prévu pour l'enregistrement ;
- programmer le dispositif (5) pour l'intervalle de temps calculé ;
- démarrer la minuterie (5).

6. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** lesdits moyens de commande (2) comprennent des moyens (201) pour vérifier si la réception, l'affichage, l'enregistrement ou la reproduction est en route et des moyens (203) pour afficher un message d'avertissement pour l'utilisateur (du type) "l'enregistrement programmé de la chaîne X va démarrer ; si l'utilisateur ne l'annule pas en appuyant sur la touche Y, l'enregistrement commencera comme prévu dans une minute".

7. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** les moyens (301) sont prévus pour contrôler si l'enregistreur est utilisé après avoir été programmé, et les moyens (302, 6) pour afficher un message d'avertissement.

8. Enregistreur pour cassettes vidéo selon la revendication 7, **caractérisé par le fait que** lesdits moyens pour contrôler, si l'enregistrement est utilisé après avoir été programmé, que la cassette a été retirée, comprennent un capteur de cassette expulsée.

9. Enregistreur pour cassettes vidéo selon la revendication 8, **caractérisé par le fait que** ledit capteur de cassette reste actif même en état de veille.

10. Enregistreur pour cassettes vidéo selon la revendication 1, **caractérisé par le fait que** ledit avertissement comprend la visualisation d'un message sur le dispositif d'affichage (6).

11. Enregistreur pour cassettes vidéo selon la revendication 1, **caractérisé par le fait que** ledit avertissement comprend un signal sonore produit par un avertisseur acoustique (8).

12. Enregistreur pour cassettes vidéo selon la revendication 1, **caractérisé par le fait que** ledit capteur de changement de position de la cassette reste actif même en position de veille.

13. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** lesdits moyens pour contrôler, si l'enregistreur (7) est utilisé après avoir été programmé, que la position de la cassette a été changée, comprennent un système de signalisation pour permettre au moteur de se mettre en mode avance ou retour cassette.

14. Enregistreur pour cassettes vidéo selon la revendication 1, **caractérisé par le fait que** ledit avertissement comprend l'affichage d'un message sur l'écran (6).

15. Enregistreur pour cassettes vidéo selon la revendication 12, **caractérisé par le fait que** ledit avertissement comprend un signal sonore produit par un avertisseur acoustique (8).

16. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait qu'**il comprend des moyens de circuits (12) pour décoder une étiquette émise, associée à un signal télévisuel et contenant par exemple un numéro de code et l'heure prévue du début du programme.

17. Enregistreur pour cassettes vidéo selon la revendication 16, **caractérisé par le fait que** lesdits moyens de circuits (12) pour décoder une étiquette émise, sont ceux prévus dans le système V.P.S. (Video Programming System) (Système de programmation vidéo).

18. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** lesdits moyens de commande (2) comprennent un circuit logique réalisé avec le système de logique câblée.

19. Enregistreur pour cassettes vidéo selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** lesdits moyens de commande (2) comprennent un circuit logique réalisé avec le système de logique programmée, c'est-à-dire en utilisant un microprocesseur (Z8400).

20. Enregistreur pour cassettes vidéo selon la revendication 19, **caractérisé par le fait que** lesdits moyens de commande (2) comprennent des moyens (102) pour permettre d'interrompre les signaux.

21. Enregistreur pour cassettes vidéo selon la revendication 19, **caractérisé par le fait que** ledit microprocesseur (Z8400) est également utilisé pour gérer d'autres utilisations de l'enregistreur pour cassettes vidéo.

22. Enregistreur pour cassettes vidéo selon les revendications 3 ou 4, **caractérisé par le fait que** ladite unité de compteur numérique électronique (Z8430) comprend une série de compteurs programmables, reliés entre eux en cascade.

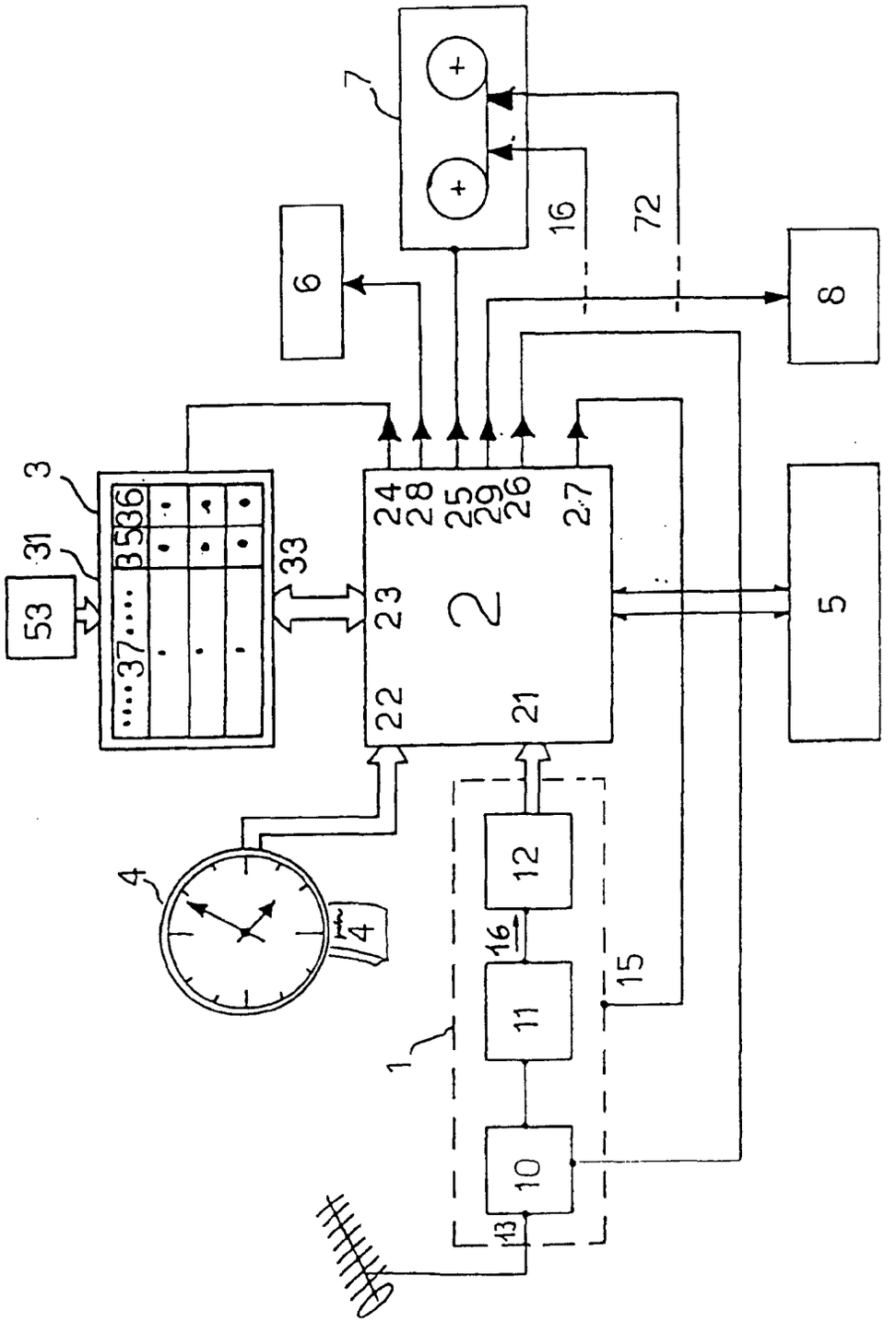
23. Enregistreur pour cassettes vidéo selon la revendication 22, **caractérisé par le fait qu'**au moins un desdits compteurs programmables est associé à un diviseur préalable.

24. Enregistreur pour cassettes vidéo selon la revendication 22, **caractérisé par le fait que** ledit diviseur préalable peut être commuté entre au moins deux valeurs de division.

25. Enregistreur pour cassettes vidéo selon la revendication 19, **caractérisé par le fait que** ladite unité de compteur numérique électronique (Z8430) peut être programmée à la fin du comptage pour délivrer une demande d'interruption au dit microprocesseur (Z8400).

26. Enregistreur pour cassettes vidéo selon les revendications 3 ou 4, **caractérisé par le fait que** ladite unité de compteur numérique électronique (Z8430) peut être interfacée avec lesdits moyens de commande (2) au moyen d'un bus de données.

FIG. 1



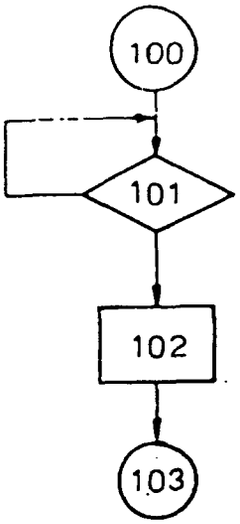
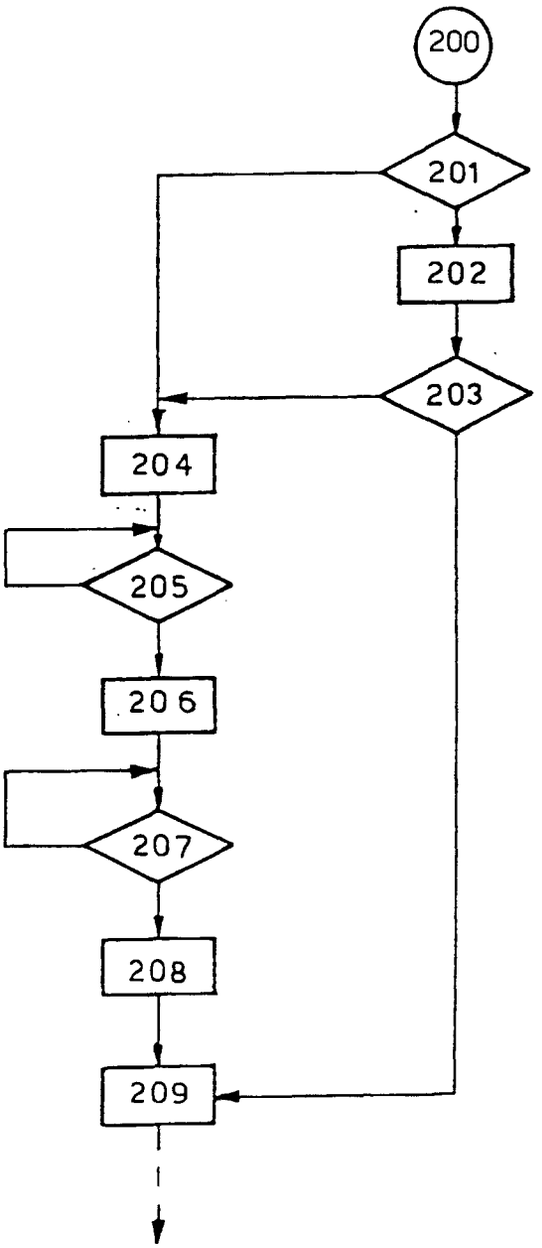


FIG. 2

FIG. 3



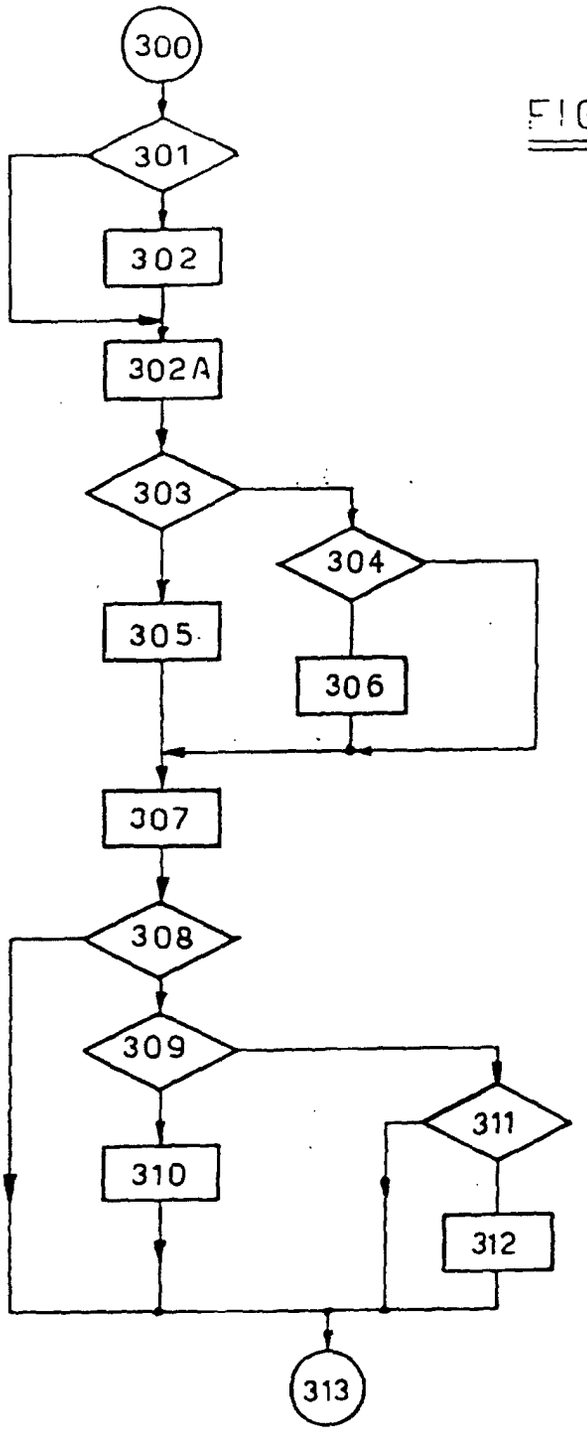


FIG. 4