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# United States Patent [19]

Levine

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[54] **TELEVISION SYSTEM MODULE WITH REMOTE CONTROL CODE DETERMINATION**

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[51] **Int. Cl.**[5] ..... **H04N 5/44**

[52] **U.S. Cl.** ..... **348/734**; 358/335

[58] **Field of Search** ..... 358/194.1, 335, 139, 358/335; 359/142; 340/825.69, 825.75; 381/110; 348/734, 731; 455/4.1, 6.1, 186.1, 352; H04N 5/44

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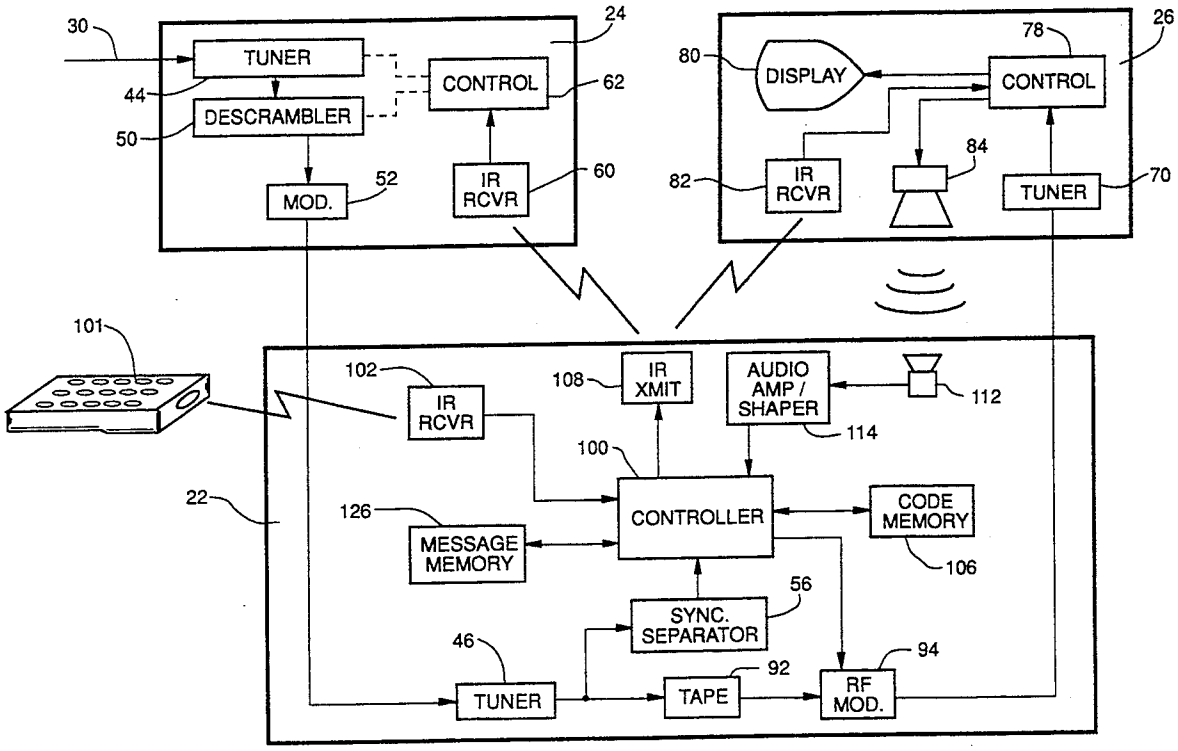
*Assistant Examiner*—Nathan J. Flynn
*Attorney, Agent, or Firm*—Krass & Young

[57] **ABSTRACT**

A video recorder, adapted for use in conjunction with a remotely controllable unit associated with television recording and/or viewing, contains a remote-control signal transmitter to transmit control codes to the associated unit, and means to analyze the operation of the associated unit in response to the control codes. An electronic controller causes the transmitter to transmit test codes to the associated unit, then analyzes the resulting operation of the associated unit to determine its control codes, which it stores in a memory for later use.

**15 Claims, 3 Drawing Sheets**



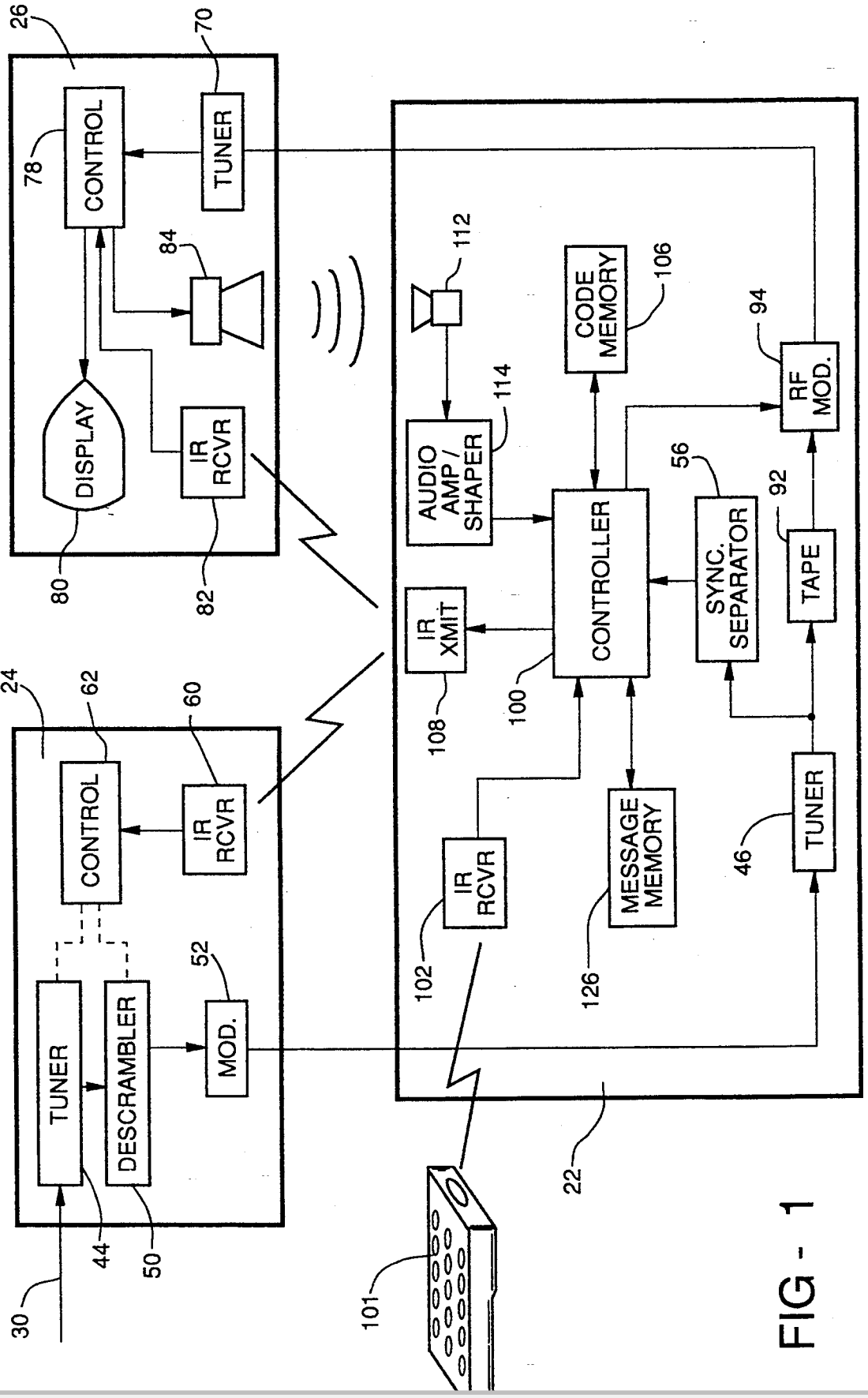
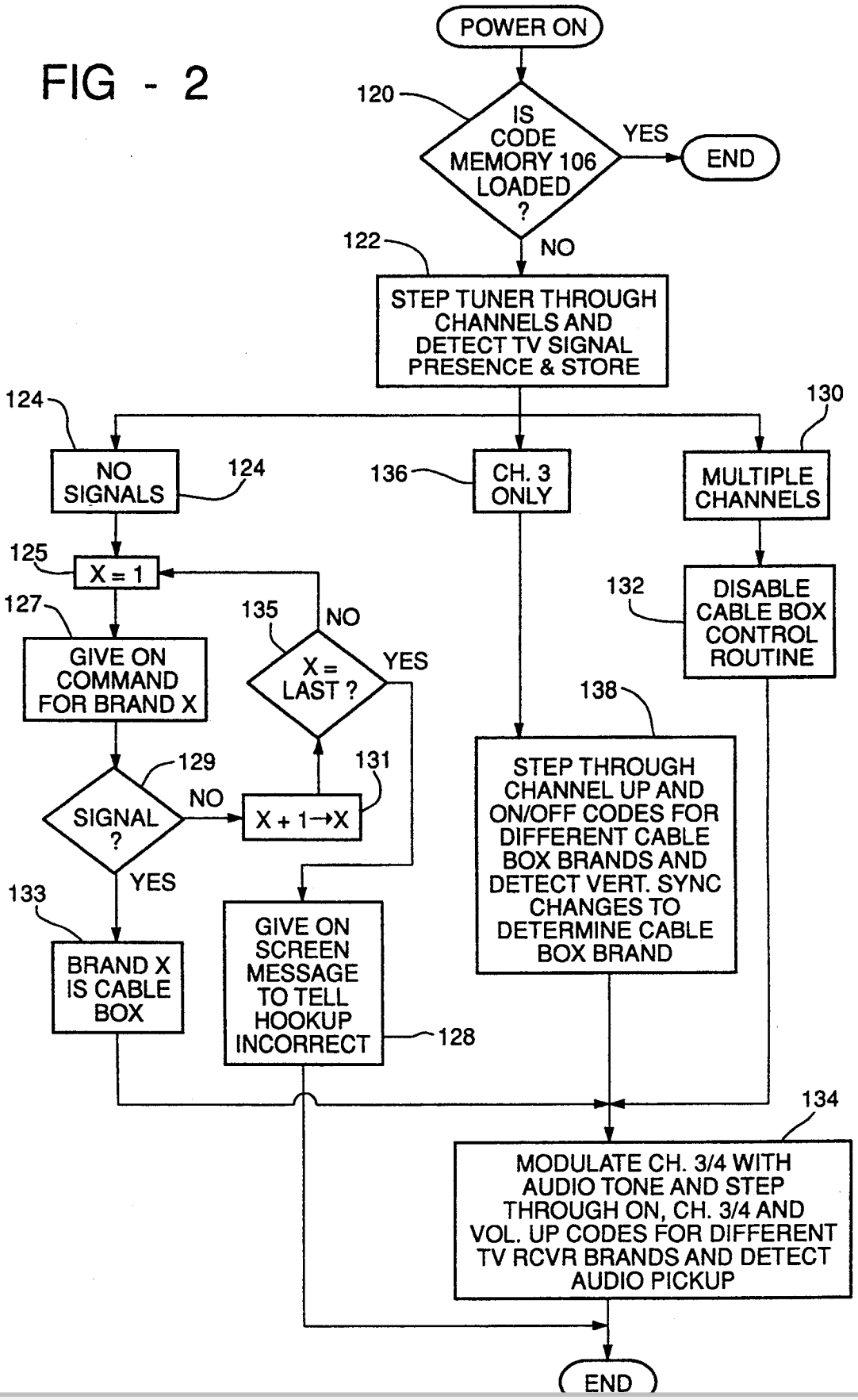



FIG - 1

FIG - 2



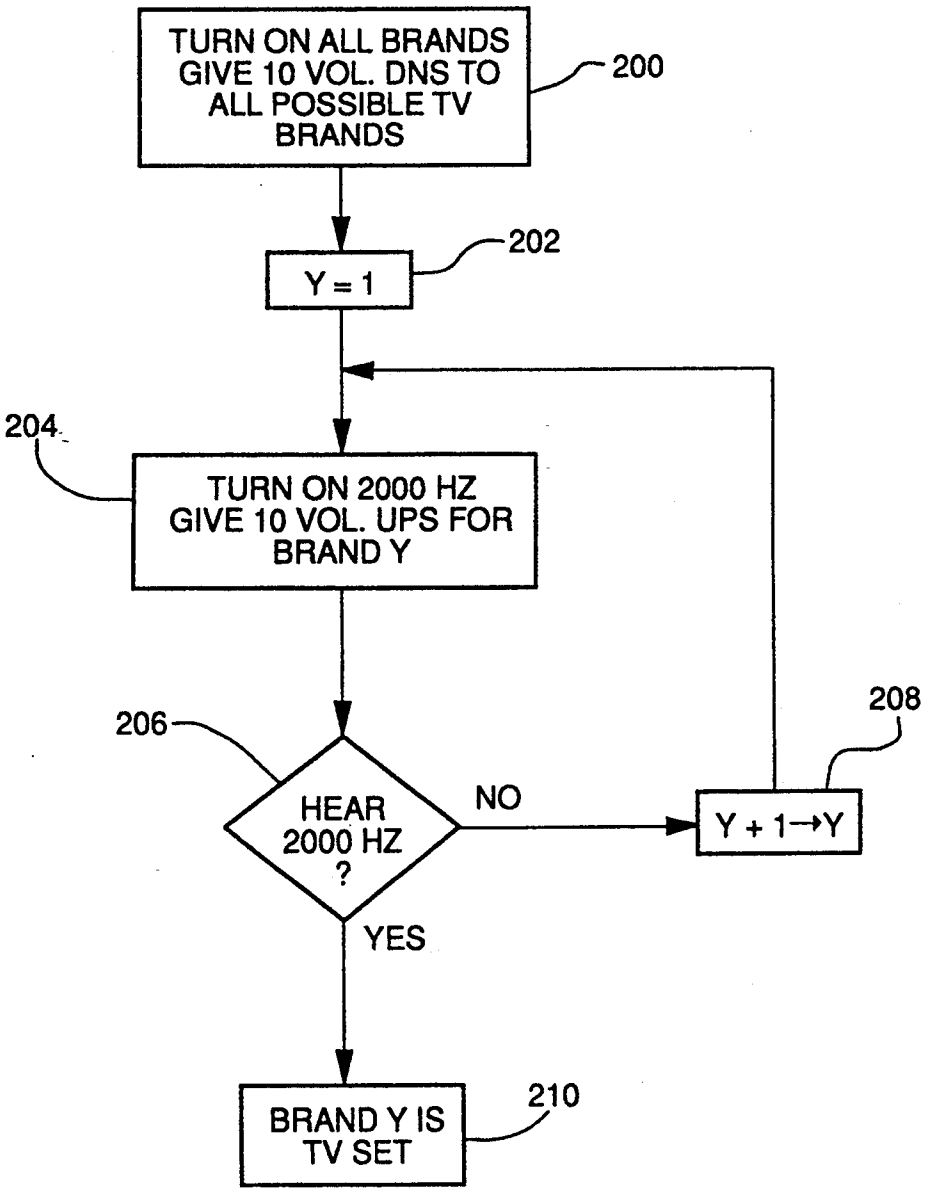



FIG - 3

# TELEVISION SYSTEM MODULE WITH REMOTE CONTROL CODE DETERMINATION

## FIELD OF THE INVENTION

This invention relates generally to television viewing systems employing modules such as VCR's, cable boxes or the like, which are remotely controllable, and more particularly to modules incorporating transmitters for remotely controlling associated modules, and having the capability of automatically determining the remote control codes of the associated modules.

## BACKGROUND OF THE INVENTION

A typical consumer-oriented television viewing and recording system may include several modular units addition to a television receiver or monitor. A video recorder (VCR) is commonly used for the recording of broadcast programming and the playback of pre-recorded cassettes. When the broadcasts are received over a cable system, a separate cable tuner/descrambler or "cable box" is commonly employed to decipher premium or "pay" channels. Other associated units may further be included, such as a receiver to tune and descramble programs broadcast via satellite.

These units typically incorporate an infrared receiver which allows the operator, through use of a hand-held transmitter, to turn the unit on and off, control the channel setting of the units' tuner, etc. My U.S. Pat. No. 5,123,046 discloses a VCR with a built-in transmitter for sending remote control codes to an associated unit such as a cable box. This allows the future, unattended recording system of the VCR to energize the cable box and properly set its tuner at the time of a programmed recording. It also allows the control of both units from a single remote transmitter since the VCR can relay control commands to the cable box. The same type of control can be exercised over a remotely controllable T.V. receiver. Alternatively, either the cable box or the T.V. receiver could incorporate the transmitter and the VCR could act as a "slave."

At the present time there is no industry standard for remote control codes so it is necessary for the operator of a multi-unit system of a master and one or more slave units to perform an initializing routine of the same type required with so-called "universal" remote control transmitters. This routine allows the transmitter to determine the control codes for the slave units and store the codes in a memory for future use. These initialization routines are difficult for the average consumer to perform unless they carefully follow the instructions which accompany the unit.

In view of these problems, there is a need for a T.V.-related piece of equipment which can serve as a central receiver of operator commands, and control associated units accordingly. To ease installation, such a device should be able to "learn" the control codes of an associated unit to facilitate VCR and T.V. set control in accordance with operator recording/viewing requests.

## SUMMARY OF THE INVENTION

The present invention is directed toward a modular unit adapted for use in conjunction with one or more remotely controllable units associated with television recording and/or viewing. In a preferred embodiment of the invention, which will subsequently be disclosed in detail, the "master" modular unit constitutes a video recorder and the following description will refer to a video recorder with the understanding that another unit, such as the cable box, could act as the master. The video recorder "master" contains a remote-control signal transmitter to transmit control codes to one or more associated "slave" units, and means to analyze the operation of the associated units in response to the control codes. During an initialization routine, an electronic controller causes the master transmitter to send test codes to the associated unit, then analyzes the resulting operation of the associated unit to determine its control codes, which it stores in a memory for later use in control of the associated unit.

In a preferred embodiment of the invention, the associated unit contains a multi-channel tuner, another video recorder is adapted to receive and analyze the R.F. output signal from the tuner to determine its operation in response to the test control codes. When the associated unit is a cable tuner/descrambler, the video recorder derives a video signal from the R.F. output of the tuner/descrambler and analyzes the synchronization of the video signal to identify the tuned channel. When the associated unit is a television receiver, the video recorder is adapted to receive and analyze an acoustic signal generated by the T.V.

Before the video recorder can analyze the control codes of associated units it must make a determination as to whether it is receiving a signal source from an auxiliary unit which provides output on only a single channel or if it is connected directly to a multi-channel signal source such as a cable. The preferred embodiment to the invention includes means for automatically analyzing the nature of its input signal to make this determination as the first operation in its initialization routine.

Other objects and advantages of the present invention will be made clear by the following detailed description of a preferred embodiment to the invention and an alternative embodiment. The description makes reference to the accompanying drawings in which:

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a preferred embodiment of the present invention incorporating a VCR connected in series with a cable box and a T.V. set;

FIG. **2** is a flow chart used to illustrate how the VCR of the system of FIG. **1** ascertains the control codes of the related cable tuner/descrambler; and

FIG. **3** is a flow chart illustrating a subroutine of the chart of FIG. **2**.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a video recorder (VCR) **22** forming a preferred embodiment of the present invention is illustrated in block-diagram form connected to receive the R.F. output of a typical cable tuner/descrambler or "cable box" **24** and to provide an R.F. output to a television receiver (T.V.) **26**. All units are preferably remotely controllable via infrared signals. A multi-program signal source, such as that provided over CATV cable **30**, is connected to the cable box **24**.

This arrangement for interconnection between a cable box, VCR and T.V. receiver is one of several possible arrangements. It has the virtue of simplicity, but does not allow the user to view one channel while recording another channel. Other arrangements are possible.

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