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(54) Title: ADDRESSABLE CABLE TELEVISION CONTROL SYSTEM WITH VIDEO FORMAT DATA TRANSMISSION
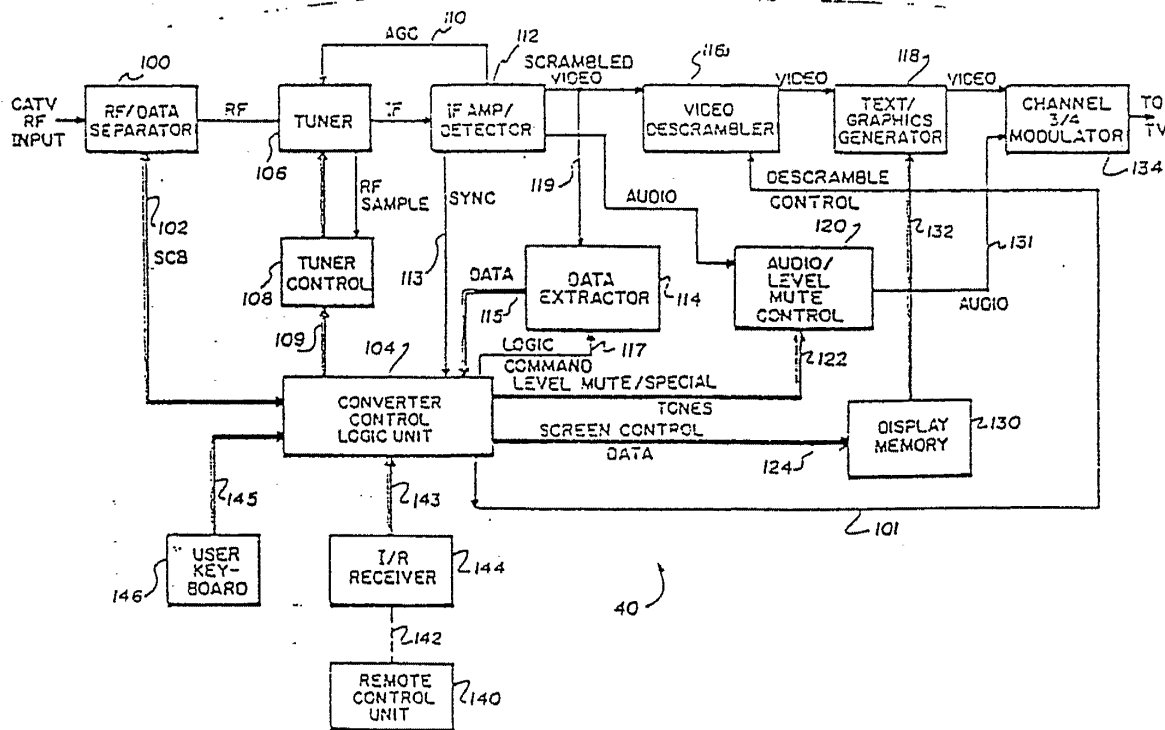
(57) Abstract

An addressable cable television control system controls television program and data signal transmission from a central station (11) to a plurality of user stations. The data signals include both control and text signals in video line format which are inserted on the vertical interval of the television signals, thereby freeing all channels for transmission of both television and data signals. Moreover, full-channel teletext data in video line format may be transmitted on dedicated next channels with the modification of only head end processors (16). An intelligent converter (40) at each remote user location uses the data signals to control access to the system on the basis of channel, tier of service, special event and program subject matter. The converter uses a graphics display generator (118) to generate display signals for the presentation of the text data on the television receiver (36) and for the generation of predetermined messages for the viewer concerning access, emergencies and other functions. The converter processes vertical interval text data and selected full-channel text data, both transmitted in video line format. The keyboard of the subscriber (146, 168) provides a number of different functional inputs for the subscriber to interface with the system. The converter (40) also includes apparatus for interfacing with two-way interactive data acquisition and control systems

1

ADDRESSABLE CABLE TELEVISION CONTROL SYSTEM WITH VIDEO FORMAT DATA TRANSMISSION

CROSS REFERENCE TO RELATED APPLICATION

This is a continuation-in-part application of our prior co-
5   pending application, U.S. Serial No. 06/135,987, filed March 31, 1980.

BACKGROUND OF THE INVENTION

This invention relates to an addressable cable television control
system. More particularly, the present invention relates to a cable
television system having a multiple-function addressable converter and
10   including data transmission in video format during the vertical interval
of the video field or during substantially the entire video field.

In recent years, the availability of cable television programs
and services for the general public has expanded rapidly. Com-
munication satellites have enabled nationwide programming for a
15   number of "super stations". Sophisticated two-way interactive cable
communication systems have laid the groundwork for a wide spectrum
of cable television and data communication services for the consuming
public. After years of development, cable television systems have been
or are now being installed in many major cities to provide the
20   television consumer with a vast array of programming choices as well
as many other services which can be utilized at home, such as
shopping, banking and schooling. Other services provided by such
systems incude home security monitoring, medical and emergency
alert signaling and information retrieval.
25   In order to provide these new services and programs in a
systematic and efficient manner, generalized control systems are
required which can supervise access to both one-way and two-way

sophisticated cable communication systems having different degrees of complexity. Control is required to differentiate and limit access on several bases, including different levels or tiers of subscribers to different television channels, and different programs and events on a

5　given channel. In addition, for many subscribers it is desirable to be able to limit access to certain programs because of the program subject matter. Presently, there are no cable systems having this degree of sophistication in controlling program access. Even simpler conventional cable systems which provide for limiting program access

10　must be two-way interactive systems requiring more complex and expensive equipment than one-way systems.

Besides this problem of coordinating cable communications, the need for efficiency in the transmission of data has become increasingly apparent. Athough approximately 55 video and sound

15　channels are presently available between the allocated television frequencies of 50 and 400 megahertz, the varied types of possible cable television programming and data transmission services require the efficient utilization of these frequencies. For example, cable television programming includes movies, special events, news, con-

20　sumer programming, community access and religious programming. An almost limitless range of data can be provided, including reports on stock and money markets, weather reports, airline schedules, shopping directories, entertainment schedules, traffic reports, home security data emergency and first aid information and unlimited library textual

25　information. The possibility for cable system operators to lease available cable channels to private concerns for these and other services makes it imperative that cable transmission control be efficient and flexible. In order to effectively utilize the available portion of the electromagnetic spectrum for such a wide variety of

30　programming and data transmission, the cable system should be able to process the data quickly and efficiently while using relatively simple and inexpensive equipment which is affordable to the general consuming public.

In the last few years, various experiments have been conducted

35　regarding the transmission of data over the vertical blanking interval of a normal television signal. This interval in the video signal occurs

60 times each second as the cathode ray tube beam sweeps from the bottom to the top of the TV screen and is relatively unused for the transmission of data. Some early systems such as that shown in U.S. Patent 3,769,579- issued on October 30, 1973, utilized the vertical
5   interval for transmitting control signals to individual transponders at the subscriber locations. More recently, there has been experimentation with television broadcasting systems which transmit visual data on the vertical blanking interval, referred to as teletext transmission, for display as pages of text on suitably equipped
10 television receivers. These experimental systems have generally been limited to over-the-air broadcasting of teletext transmissions for a single channel, and the necessary apparatus for cable television systems has been regarded as too complicated and expensive to be practical when compared to the high-speed transmission of compact
15 data over a dedicated channel.

It is desirable in many instances to dedicate an entire television channel to the transmission of data rather than video signals. Prior art systems for dedicated data channels typically require special transmitters and receivers different from those used for the trans-
20 mission of video signals in order to achieve the desired high baud (bits per second) rate to efficiently utilize the channel bandwidth. This special data transmission equipment has resulted in substantial cost and complexity, particularly at each remote user terminal where a different receiver is usually required for each dedicated data channel.
25 A simple and inexpensive system for the high speed transmission of data on a dedicated data channel has been greatly needed.

SUMMARY OF THE INVENTION

The present invention provides a relatively inexpensive and simple cable television system having the capability of controlling
30 access to a wide range of television program and data signals while efficiently transmitting data signals in a video format during the vertical interval (VI) of each television program channel. This VI data not only provides control data for an intelligent converter unit, but also provides a substantial amount of textual data per channel for use
35 either to provide additional data to supplement a channel television program or as a separate all textual and graphic channel.

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