

programming preferences. As mentioned above, the viewer may choose as few or as many criteria as desired. One criteria depicted in the main menu 1130 is the mood criteria 1134. Upon selection by the viewer of the mood criteria 1134, a submenu 1136 will appear on the screen, depicted in FIG. 11b. The mood submenu 1136 allows the viewer to pick from a list of subjective moods 1138, such as SERIOUS, THOUGHTFUL, LIGHT, TIRED, SAD, etc. Preferably the viewer will use a cursor or highlight bar to scroll down the list of subjective moods and select the preference entries desired by clicking on a select button on either the remote or on the set top terminal 220. The viewer can select one or more of these moods with the exception that the program will not allow the selection of what it determines to be mutually exclusive moods (e.g., HAPPY and SAD). This is accomplished by locking out a mood selection when its opposite has already been chosen.

The selected moods are cross referenced (or mapped) with a list of key words from a downloadable thesaurus table stored preferably in either ROM, EPROM or on disc at the set top terminal 220. The key words will then be used to directly search the abstracts in the program abstract database (not shown).

Referring back to FIG. 11a, the viewer can select the program TYPE criteria 1144 in which to further distinguish the programs by program preference. Upon selection of the TYPE criteria 1144, the TYPE submenu 1146, as shown in FIG. 11c, will appear on the screen. This submenu 1146 consists of a number of descriptive adjectives 1148 that will preferably be used directly as key words to search the abstracts resident in the program database. The viewer can select one or more adjectives 1148 to make the search more selective.

Again, referring back to FIG. 11a, if the viewer selects the standard category/genre criteria 1152 shown in the main menu, the category/genre submenu 1154 will appear as shown in FIG. 11d, allowing the viewer to qualify a search to one or more of the program categories downloaded to the database (example: MOVIE, DRAMA, CHILDREN, etc.).

FIG. 11a shows that a viewer can also refine a search by selecting a favorite actor 1158. Selecting the actor criteria 1158 will allow a viewer to fill in a name entry window 1160. The name entry window 1160 is limited to six letters in the preferred embodiment with the cursor on the first location, and a name is entered sequentially one letter at a time. The channel up/down key, either on the remote or set top terminal 220, allows the viewer to scroll forward and backward, respectively, through the alphabet. When the desired letter has been chosen and entered, the viewer can use the volume up/down key to move left and right in the name through all the letter positions, until the actor's name has been fully or partially entered. The search tool will search for all the occurrences of the letters entered. If the name has been fully entered, a precise search of the program abstract database will be conducted for that name. If the name has been only partially entered, the search tool will look for a closest match to the partially entered name.

The TIME criteria 1162 allows a viewer to choose the preferred time of day, the preferred duration (in 30 minute increments up to 2 hours), and the preferred day of the week. An alternative embodiment would allow the viewer to select to X hour time periods for a certain day in which to search.

The YEAR criteria 1164 preferably comprises groupings of years. For example, the current year and programs five to ten years old, ten to 20 years old, 20 to 40 years old, and older than 40 years. If desired, the viewer can highlight more

than one group of years. If the viewer does not highlight any grouping of years, then all years are assumed desired by the viewer.

The STANDARD RATING criteria 1166 allows the viewer to qualify the search to one or more of the MPAA ratings (G, PG, PG-13, R, NC-17).

In alternative embodiments, the actors, time, years, ratings, etc., can also be selected through the provision of submenus similar to those depicted in FIGS. 11b-11d.

The preferred embodiment also provides for "negative" searches. In this type of search, words descriptive of a program type of no interest to the viewer can either be used directly as key words or mapped into key words in the downloaded thesaurus. If the key words are found in a program during a search of the database, the program is automatically excluded from the selection list. For example, if the viewer does not desire to view any X or R rated movies, the viewer can simply choose to exclude movies rated as X or R by selecting these ratings on the main menu.

In this embodiment, after the viewer has selected as many of the entries as desired, and then hits the "go" button or alternatively selects by cursor or highlight a "go" menu item on the menu screen, the corresponding search will commence. Any typical search tool can be used to search the program abstract database. For example, a Boolean search can be used to scan the database of textual entries and retrieve the textual entries that satisfy the Boolean search. The programs which meet the search criteria (contain the key words corresponding to entries) selected by the viewer will be counted and the count displayed in the "No. Selections" box 1170 in the upper right hand corner of each of the screens 1130, 1136, 1146, 1154 of FIG. 11a through 11d.

If the viewer desires to view a list of all of these selections and/or corresponding abstracts, the viewer may select the VIEW option 1172 in the main menu 1130. Upon selection of the view option, the microprocessor 602 instructs the selection list menu 1174, as shown in FIG. 11e, to be displayed on the screen. The viewer can scroll down the list by using the cursor and select the desired movie by clicking on the desired program indicated by cursor or highlight. In FIG. 11e, for example, the viewer has selected the John Wayne movie GREEN BERETS. After making the selection, the program is displayed on the screen, but if there are too many or too few programs listed, or the viewer decides not to watch any of the selected programs, the viewer has the option of returning to the main menu by selecting the RETURN TO MAIN MENU box 1176. Once the main menu screen 1130 is displayed, the viewer may choose to begin a completely new search, or alternatively, may refine the prior search. If the viewer chooses to perform a refined search, the viewer can access the various submenus and choose further preference entries resulting in a more precise search and fewer number of program selections.

It is understood that this embodiment of searching program abstract databases can be combined with the other methods described below, including viewer profile data and most often watched information. For example, different criteria can be assigned different weights (weighting the criteria's preference entries). Then based on an evaluation of the weighted preference entries, only those programs satisfying a minimum weighted index would show up as a selection to be suggested to the viewer.

Alternatively, program indicators can be generated and used in assigning a weight number to programs. The weight a program is assigned could be based on either most watched program information, favorite channel, or personal profile as described below. The list of suggested entries resulting from

The program abstract search methodology described above could then be further refined and reduced based on the results of accumulating the weighted indicators corresponding to the programs listed. For example, weighted numbers can be assigned to programs based primarily on the category of the program. The weighted numbers are used by the system to refine the search. Those programs suggested from the program abstract search can then be prioritized and either displayed in prioritized order or further refined by deleting programs not satisfying a minimum weight threshold thereby reducing the list of suggested programs displayed to the viewer. The refined list is then displayed to the viewer.

c. Other Program Suggestion Embodiments

In another "Responsive" embodiment, a favorite channel list can be established based on responses to inquiries. In this embodiment, menus can be used to query a subscriber and allow the subscriber to select eight favorite channels for later display. FIG. 12a depicts a menu 1180, the Broadcast TV Menu, with a favorite channels category of program menus 1182 for selection. FIG. 12b shows an example of a favorite channel program submenu 1184 being displayed. Although a variety of types of information can be requested, mood questions and inquiries on personal information about a subscriber are preferred for this responsive method of selecting programs for viewers.

In another embodiment, both favorite channels and often watched channels features can be utilized during menu selection. As described above, favorite channels can be stored in memory in the set top terminal 220 for later use. In addition to favorite channels, the broadcast TV menu 1180, as a separate often watched channels category 1186 which allows the subscriber or the set top terminal 220 in a learning mode to choose eight additional channels for display.

In another embodiment, in a manner similar to learning the most often watched channels of the subscriber, the terminal can also determine the most often watched programs by the subscriber. After developing (or learning) a list of popular shows or querying the subscriber for a list of popular shows the terminal can display a customized submenu allowing the subscriber to choose one of the suggested popular shows available for viewing. In order to display suggested programs that are available, the set top terminal 220 must cross reference the available programs with the viewer's choices. This can be accomplished using the program control information signal. After the cross reference, a popular show submenu similar to the favorite channel submenu shown in FIG. 12b may be displayed on the television or monitor.

In one embodiment, a sophisticated program viewing suggestion feature is available as an optional feature for the subscriber. This feature gives the indecisive viewer or lazy viewer specific suggestions as to which programs the viewer should watch. The set top terminal 220 uses a combination of intelligent and responsive methodologies along with a matching algorithm to accomplish the program viewing suggestion feature.

In order for the set top terminal 220 to make decisions on which programs the subscriber should watch, the terminal creates a personal profile for the particular viewer. Using the data in the particular viewer's personal profile, subscriber mood information and the television program information available in the program control information signal, the set top terminal 220 is able to select a group of programs which the particular viewer is most likely to watch.

Specifically, the set top terminal 220 builds a personal profile for each viewer and stores the information in a

memory file by viewer name. To build a personal profile, the viewer answers a series of questions presented on a series of menu screens. These personal profile screens request the viewer to input information such as name, sex, age, place of birth, place of lower school education, employment type, level of education, amount of television program viewing per week, and the number of shows in particular categories that the viewer watches in a given week such as, sports, movies, documentaries, sitcoms, etc. A universal remote control 900 with alpha-numeric buttons may be used to assist in entering the demographic data. Any subscriber demographic information which will assist the set top terminal 220 in suggesting television programs to the viewer may be used. This raw data must be interpreted, formatted, and stored in memory by the set top terminal 220. Preferably the gathered data is processed and stored in a relational database. Once a personal profile has been created (in a particular set top terminal 220), it can be indefinitely stored in nonvolatile memory.

Alternatively, the personal profile information may be electronically transmitted to the set top terminal 220 from a remote location such as the cable headend 208 or billing site. In some cable systems, personal profile information is stored at the billing site. This information can be electronically transmitted via phone or cable to the set top terminal 220. The set top terminal 220 must receive the data, interpret the data, and format the data for storage in a database in memory, as well as for later use.

A selection at the home menu screen 1010 (FIG. 8) activates the program selection feature. Following activation of the program selection feature, as shown in FIGS. 12c-12e, the set top terminal 220 will present the viewer with a series of brief questions to determine the viewer's mood at that particular time. For example, the first mood question screen 1190 may ask the viewer to select whether a short (30 minute), medium (30-60 minute), or long (60 plus minute) program selection is desired, as shown in FIG. 12c. The second mood question screen 1192 requests the viewer to select between a serious program, a thoughtful program, or a light program, as shown in FIG. 12d. And the third mood question screen 1194 requests whether the user desires a passive program or an active program, as shown in FIG. 12e. The viewer makes a selection in each question menu utilizing the cursor movement keys and "go" button on his remote control 900. A variety of other mood questions are possible such as the fatigue level of the viewer, whether the viewer is in the mood for older programming, etc.

After the viewer has responded to the mood question menus which determine the viewer's mood, the set top terminal 220 uses a matching algorithm to find the best programming matches for the viewer and displays an offering of several suggested programs to the viewer (three or more programs are preferred). The matching algorithm compares the viewer profile data, mood data, and most often watched program information (if available, or favorite program information) with information about the program derived from the program control information (or STTICIS) signal, such as show category, description type, length, etc. Using the personal profile information and mood questions suggested above, the following types of outcomes are possible.

If the set top terminal 220 is presented with a young female viewer, educated in Boston who watches sitcoms on a regular basis, and desires a short, light, passive program, a match might be found with the 30-minute sitcom Cheers, the sitcom Designing Women, or Murphy Brown. Taking another example, for a middle-aged male viewer from the

ston area, wishing a longer length, light, passive program, the New England Patriots Football™ game, the Boston Red Sox Baseball™ game or a science fiction movie might be suggested.

With this program selection feature, the set top terminal 220 can intelligently assist the specific viewer in selecting a television program from among hundreds of available choices. The viewer is preferably offered a graphic menu of suggested program choices from which to choose.

Instead of the set top terminal 220 requiring an input of personal profile information, the terminal may also "learn" the personal profile information. A subscriber's viewing habits may be "learned" by maintaining historical data on the subscriber and analyzing this data. The historical data may include the channels (or networks) and types of programs the viewer has most frequently watched, time of viewing, duration of viewing, duration of programs viewed etc. This information must then be analyzed to profile the viewer.

In the preferred "learning" embodiment, the personal profile information is time and date sensitive in that program indicators will be different depending on the date and time of day. For example, a working male with a high school education who has been active in sports or enjoys sporting events might have a heavily weighted sport program indicator during the day on the weekend days but a heavy comedy program indicator in the late evenings on weekdays. His profile might show light programming on working day evenings. After analysis, the indicators can be communicated to the weighing algorithm and the matching algorithm

which selects the suggested television programs. The matching algorithm may be implemented through the use of a logic network. The logic network includes a signal detector which could be used for storing and accumulating the weighted indicators. Based on the accumulated weighted indicators, the logic network could provide a selection signal for use in matching to a suggested program.

Examining FIG. 13a, two gathering steps are required, personal information and mood information gathering, denoted at blocks 1202, 1206, respectively. As described above, there are several methods in which this information may be gathered. Once it is gathered, it may be stored (and updated as necessary) for future use. The indicators may be newly calculated for each subscriber entry into the program selection system. Alternatively, at least each time the information gathered is changed or updated, the information must be reinterpreted and converted into preferred program indicators, blocks 1212, 1214.

Program indicators should at a minimum indicate the type of programming to be suggested. To accomplish this, television programs are divided into program categories preferably the same or similar to those categories used for the menu sequence for menu selection of programs (described in the detailed description of the set top terminal 220). For example, sports, comedy, news, documentaries, and hit movies may be program categories. Although a variety of program indicators can be used, the preferred method is to assign a weight to each program category. Thus, a database of information can be analyzed and weights can be assigned to the program categories such as sports (40), comedy (30), news (20), documentaries (5), hit movies (5).

Using the example shown in FIG. 13a, a set of preferred program indicators consisting of categories and weights are assigned based on the personal profile data. A second set of preferred program indicators are assigned based upon the mood data. These two sets of preferred program indicators would then be analyzed and weighted, block 1218, prior to entering the matching algorithm, block 1222.

In a specific example, a subscribers updated personal profile might indicate: sports (40), comedy (30), news (20), documentaries (5), hit movies (5); The subscribers mood might indicate: sports (40), comedy (20), news (5), documentaries (5), hit movies (30). The weight given to mood might be a factor of three while the weight given to personal profile might be a factor of one, since mood information is the more recent and important information. The weighted indicators passed onto the matching algorithm would be three times the mood indicators plus one times the personal profile indicators, namely: sports (160), comedy (90), news (35), documentaries (20), hit movies (95). Therefore, the matching algorithm will focus on sports but also provide selections in hit movies and comedy. The matching algorithm is unlikely to suggest any programs in the news or documentaries categories.

The more areas of information that are gathered and used for indicators, the more weighing factors and calculations that are necessary by the weighing algorithm. Other more sophisticated methods of weighing the importance of the data may be used.

The matching algorithm receives program control signal information, block 1226, and extracts needed information therefrom, block 1230, then matches programs with subscribers. The matching algorithm involves three primary steps: (1) eliminating programs that are out of the subscribers desired time frame, (2) eliminating programs in program categories that the subscriber is not interested in watching, and (3) determining priority of desired programs. Finally, the selected programs are displayed, block 1234.

The first two steps eliminate the programs in which the viewer has shown no interest. The first step eliminates programs out of time sequence (current start time or next half hour) and outside the desired length (e.g. 30-60 minutes). With two or three hundred channels in the program delivery system this would reduce the program choices by approximately two thirds to roughly 100 programs.

The next step eliminates programs in program categories that have received the lower program indicator numbers. For instance, in the example above the news and documentaries program category received low indicator numbers. Programs in these categories are eliminated. This generally reduces the number of programs by at least 40 percent from about 100 to 60 or so programs.

The next step is to assign weight numbers to each program. Weight numbers are assigned to programs based primarily on the category of the program. If programs are in two program categories (e.g. hit movie and comedy) an average is taken of the two assigned weight numbers for each program category. The weighted numbers are used by the system as the subscribers selection criteria.

Having weighted the programs, the number of relevant programs can be reduced by examination of the weighted numbers. It is preferred that ultimately the hundreds of available television programs be reduced to the twenty or so programs most likely to be viewed by the subscriber.

A variety of methods can be used to determine the final priority of the programs. Where using certain selection methodologies, programs in the same category have the same weight, other finer methods of differentiation may be used. For example, programs receiving the same weight can be further distinguished by network. Programs on the major networks may take priority over programs on smaller networks. Programs that are on networks that the viewer watches more frequently can be given priority over networks less frequently watched. Another example of differentiation is that newer programs (more recently filmed programs) are

even priority over older programs. Finer methods of gradation may be accomplished by refining the weighted numbers assigned to the programs or through simple reprioritizing of programs on the short list of twenty programs.

Following the matching, the programs may be displayed on a menu screen generated as described earlier. A signal identifying the suggested programs is generated to assist in the menu generation process. It is preferred that 4 to 8 selections are shown on a menu screen. If none of these selections are satisfactory to the viewer, then a second and third menu screen of program choices may be displayed. Upon selection of a program the set top terminal tunes or switches the viewer to the chosen program.

In an alternative embodiment, as shown in FIG. 13b (commonly numbered with FIG. 13a except for block 1238), program watched information, block 1238, can be used directly in the matching algorithm. One way in which the program watched information can be used directly by the matching algorithm is by determining and using the often watched information in the final decision step. After the matching algorithm has ordered a selection of programs for the viewer the often watched program list may be used to modify or refine the final program list prior to display. For example, the matching algorithm may choose 20 of 100 programs and order the programs 1 through 20 from the most likely to the least likely viewer choices. This ordered list of 20 is compared with the most often watched program list.

A simple use of the list would be to compare between the ordered list of 20 selected programs and the often watched list, to locate the matches or closely related programs and increase the order number of those programs or "bump up" those programs on the ordered list. A second method would be to increase the located programs weighted number before ordering the 20 programs according to weight. In either case, the effect is that the often watched programs are shifted to a higher priority on the list of twenty programs and ultimately may be placed on the first suggested menu screen of programs. A third method of using the information would be to locate any often watched program existing within the 100 current programs and assign each located program a high weighted value before the matching algorithm calculations described above are performed.

In an alternative embodiment, additional coded information is provided to the set top terminal 220 via the program control information signal to assist with the program selection. For example, demographic codes for each program may be sent via the program control information signal. Additional bits could be added to the frame shown in FIG. 7a to facilitate the communications of the code from the controller to the set top terminal 220. A code table could be stored in memory at the network controller 214. Each code would correspond to an attribute. In this embodiment, a program database would comprise a listing of hundreds of programs along with codes which provide descriptive attributes pertaining to the program. These attributes could be similar to the entries already described above in the menus of FIGS. 11a-11e. The demographic codes describe the subscriber demographics most likely to match with the program. Thus, a comparison of the stored demographics in the personal profile and the demographic codes will render a list of preferred programs for the subscriber. Those skilled in the art will realize that a variety of information may be sent by code via the program control information signal.

Although the embodiments specifically describe the use of several sources of information to suggest programs to the subscriber (i.e. mood and personal profile), those skilled in

the art will realize that any one source of information or many more sources may be used. Those skilled in the art will also realize that this program suggestion methodology is not limited to the specific types of information described but can be used with various types of information that indicate a viewer preference.

Using these methodology, it is even possible for the set top terminal 220 to suggest programs for two viewers. By using two sets of viewer profile information, the matching algorithm can find the best match for joint viewing. For example, the set top terminal 220 can suggest programs for a couple watching television simultaneously. The terminal would use the data stored in memory for each of the two viewers and determine the couples program selections which are similar or overlap. This method of program selection can resolve disputes between viewers.

After a subscriber selects a suggested program from a menu screen or list of the selection feature, the microprocessor 602 electronically informs the tuning and decompressing hardware of the bandwidth location of the appropriate program (within the television program signal). Armed with this information the set top terminal 220 is able to display the program for the viewer on a television, monitor or similar device. Alternatively, a preview menu screen 1142 as shown in FIG. 14 may be shown to the subscriber which describes and previews the program selection. The preview menu screens may include live video or stills 1144 depicting the program selected.

The terms and descriptions used herein are set forth by way of illustration only and are not meant as limitations. Those skilled in the art will recognize that numerous variations are possible within the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data, the set top terminal comprising:

a means for gathering the subscriber specific data to be used in selecting programs;

a means, connected to the gathering means, for storing the subscriber specific data;

means for receiving the program control information containing the program description data;

program selection means, operably connected to the storing means and the receiving means, for selecting one or more programs using a subscriber's programming preferences and the program control information, comprising:

a processor, wherein the subscriber programming preferences are generated from the subscriber specific data; and

means, operably connected to the program selection means, for suggesting the selected programs to the subscriber.

2. The set top terminal of claim 1 wherein the means for gathering the subscriber specific data comprises a means for obtaining the subscriber specific data from a remote location.

3. The apparatus of claim 1 wherein the program selection means resides within a set top terminal.

4. The set top terminal of claim 1 wherein the set top terminal receives menu details from the television program delivery system, a display is used, and wherein the means for gathering subscriber specific data comprises:

a memory device for storing received menu details;

- a means, connected to the memory device, for generating menu screens by integrating the program control information with the stored menu details;
- a means, connected to the generating means, for eliciting subscriber responses using the generated menu screens; and
- a subscriber interface means for entering subscriber responses.

5. The set top terminal of claim 4 wherein the stored menu details include a cursor overlay, the means for generating menu screens comprises a means for generating the cursor overlay, the generated menu screens are displayed on the display, and wherein the subscriber interface means comprises a means for moving the generated cursor overlay on the displayed menu screens.

6. The set top terminal of claim 1 wherein a display is used and wherein the set top terminal receives program signals, the set top terminal further comprising a means for generating a signal identifying a selected program's location on the received program signal.

7. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data indicative of a subscriber's programming preferences, wherein the set top terminal receives menu details from the television program delivery system, the set top terminal comprising:

- a means for gathering the subscriber specific data indicative of subscriber preferences to be used in selecting programs, wherein the means for gathering subscriber specific data comprises:
 - a first means for storing received menu details;
 - a means for generating menu screens by integrating the program control information with the stored menu details;
 - a display, connected to the generating means, wherein menu screens to elicit subscriber responses are displayed; and
 - a subscriber interface means for entering subscriber responses to displayed menu screens;
- a second means, connected to the gathering means, for storing the subscriber specific data;
- a means for receiving the program control information comprising program description data;
- a program selection means, operably connected to the second storing means and the receiving means, for selecting one or more programs using the subscriber specific data and program control information whereby the selected programs correspond to the subscriber's programming preferences; and
- wherein the display is used to suggest the selected programs to the subscriber.

8. The set top terminal of claim 7 wherein the stored menu details include a cursor overlay and the means for generating menu screens comprises a means for generating the cursor overlay, and wherein the subscriber interface means comprises a means for moving the generated cursor overlay on the displayed menu screens.

9. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data indicative of a subscriber's programming preferences, the set top terminal comprising:

- a means for gathering the subscriber specific data indicative of subscriber preferences to be used in selecting programs;

a means, connected to the gathering means, for storing the subscriber specific data;

a means for receiving the program control information comprising program description data;

a program selection means, operably connected to the storing means and the receiving means, for selecting one or more programs using the subscriber specific data and program control information whereby the selected programs correspond to the subscriber's programming preferences, wherein the program selection means comprises:

- a means for matching the subscriber specific data to a program described by the program control information; and

wherein the set top terminal further comprises a means for tuning to the matched program; and

a means, operably connected to the program selection means, for displaying for suggestion the selected programs to the subscriber.

10. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data indicative of a subscriber's programming preferences, wherein the set top terminal receives program signals, the set top terminal comprising:

a means for gathering the subscriber specific data indicative of subscriber preferences to be used in selecting programs;

a means, connected to the gathering means, for storing the subscriber specific data;

a means for receiving the program control information comprising program description data;

a program selection means, operably connected to the storing means and the receiving means, for selecting one or more programs using the subscriber specific data and program control information whereby the selected programs correspond to the subscriber's programming preferences;

a means, operably connected to the program selection means, for displaying for suggestion the selected programs to the subscriber; and

a means for generating a signal identifying a selected program's location on the received program signal.

11. A method used by a set top terminal for a television program delivery system for suggesting programs to subscribers for display on a television using program control information and subscriber specific data, the method comprising:

gathering subscriber specific data to be used in selecting programs;

storing the gathered subscriber specific data;

receiving program control information to be used in selecting programs;

selecting one or more programs using a subscriber's programming preferences and the received program control information, wherein the subscriber programming preferences are generated from the subscriber specific data; and

suggesting the selected programs to the subscriber.

12. The method of claim 11 wherein a display is used and wherein the set top terminal generates menus based on menu details received over the program television delivery system further comprising the following steps:

storing the received menu details;

generating menu screens using the stored menu details by integrating the received program control information with the stored menu details;

displaying menu screens whereby the menu screens identify the selected programs; and

receiving subscriber responses to the displayed menu screens.

13. A method used by a set top terminal for a television program delivery system for suggesting programs to subscribers for display on a television using program control information and subscriber specific data indicative of a subscriber's programming preferences, wherein the set top terminal generates menus based on menu details received over the program television delivery system, the method comprising the following steps:

storing the received menu details;

gathering subscriber specific data indicative of subscriber preferences to be used in selecting programs;

storing the gathered subscriber specific data;

receiving program control information to be used in selecting programs;

selecting one or more programs using the stored subscriber specific data and received program control information wherein the selected programs correspond to the subscriber's programming preferences;

generating menu screens using the stored menu details by integrating the received program control information and the stored menu details;

displaying menu screens whereby the menu screens identify the selected programs and suggest the selected programs to the subscriber; and

receiving subscriber responses to the menu screens.

14. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing menu screen details and program description data, and a subscriber's programming preferences, by searching program abstracts stored in a database for programs which correlate to key words mapped from one or more subscriber responses to search criteria containing a plurality of selectable entries on one or more menu screens, comprising:

a means for receiving the program control information;

a means for storing the program abstracts in a database;

a memory means, connected to the receiving means, for storing the menu screen details;

means, connected to the memory means for storing menu screen details, for generating menu screens using the stored menu screen details, wherein the menu screens are generated by integrating the program control information with the stored menu screen details, and wherein the menu screens list search criteria comprising the plurality of selectable entries;

a display wherein the generated menu screens are displayed;

a subscriber interface means for entering subscriber responses to the plurality of selectable entries on the menu screens;

a means, connected to the subscriber interface means, for mapping the subscriber responses into the key words;

means, connected to the mapping means, for searching the program abstract database for programs consisting of one or more of the key words;

a program selection means, operably connected to the receiving means and searching means, for selecting one

or more programs, wherein programs are selected using the search of the searching means; and

wherein the display is used to suggest the selected programs to the subscriber.

15. The set top terminal of claim 14 wherein program abstracts are included in the received program control information, and wherein the set top terminal further comprises a means connected to the receiving means, for reprogramming the means for storing the program abstracts to include the received program abstracts.

16. The set top terminal of claim 14 wherein the subscriber interface means comprises a means for interpreting the subscriber responses and a means for storing the subscriber responses.

17. The set top terminal of claim 14 wherein the generated menu screens comprise main menus and submenus and the means for generating menu screens comprises a means for generating submenus whereby selectable entries are listed in the submenus and each submenu corresponds to a search criterion in a main menu.

18. The set top terminal of claim 14 wherein the program selection means comprises:

means for obtaining preferred program indicators from a remote location;

means for assigning a weight number to programs using the preferred program indicators; and

means for analyzing the assigned weight numbers.

19. The set top terminal of claim 18 wherein the means for analyzing the assigned weight numbers further comprises a means for prioritizing programs.

20. The set top terminal of claim 14 wherein the stored menu screen details include a cursor overlay and the means for generating menu screens comprises a means for generating the cursor overlay and wherein the subscriber interface means comprises a means for moving the generated cursor overlay on the displayed menu screens.

21. A method used by a set top terminal for a television program delivery system for suggesting programming to subscribers using program control information containing menu screen details by searching program abstracts for programs which correlate to key words mapped from one or more subscriber responses to search criteria containing a plurality of selectable entries on one or more menu screens displayed on a television, comprising the steps of:

receiving the program control information;

storing the program abstracts in a database;

storing menu screen details;

generating the menu screens wherein the menu screens are generated by integrating the program control information with the stored menu screen details, and wherein the generated menu screens list the search criteria containing the plurality of selectable entries;

displaying the menu screens;

gathering subscriber responses to the plurality of selectable entries on the menu screens;

mapping the subscriber responses into the key words;

searching the stored program abstracts for abstracts comprising one or more of the key words;

selecting one or more of the programs, whereby the programs are selected using the search of the stored program abstracts; and

suggesting the selected programs.

22. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing mood

nu details, and subscriber specific data indicative of a subscriber's programming preferences determined from subscriber responses to a set of mood questions presented on mood menu screens, the set top terminal comprising:

- a means for receiving the program control information containing mood menu details;
- a memory means, connected to the receiving means, for storing the received mood menu details;
- a means, connected to the receiving means and memory means, for generating the mood menu screens by integrating the received program control information with the stored mood menu details;
- a means for displaying one or more of the generated mood menu screens;
- a subscriber interface means for entering subscriber specific data in response to the displayed mood menu screens;
- a program selection means, operably connected to the subscriber interface means and the receiving means, for selecting one or more programs using the subscriber specific data and the program control information whereby the selected programs correspond to the subscriber's programming preferences; and
- a means, operably connected to the program selection means, for suggesting the selected programs to the subscriber.

23. The set top terminal of claim 22 wherein the program selection means comprises:

- means for obtaining preferred program indicators from a remote location; and
- means for assigning a weight number to programs using the preferred program indicators.

24. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing demographic codes created at a remote location and assigned to each television program and demographic data created at a remote location describing subscribers using the set top terminal, comprising:

- a means for receiving the program control information comprising the demographic codes and demographic data;
- a memory means, operably connected to the receiving means, for storing the received demographic data;
- a program selection means, operably connected to the memory means and the receiving means, for selecting one or more programs using the received program control information containing the demographic data and demographic codes; and
- a means, operably connected to the program selection means, for displaying for suggestion the selected program.

25. A set top terminal used by subscribers of a television program delivery system for suggesting programs through the use of program control information and program watched data indicative of a subscriber's most watched programs, the set top terminal comprising:

- a means for receiving program control information;
- a means for gathering the program watched data;
- a memory means for storing the gathered program watched data;
- a program selection means, operably connected to the memory means and the receiving means, for selecting a program using the stored program watched data and the received program control information;

a means, operably connected to the program selection means, for displaying the selected program.

26. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information and channel watched data indicative of a subscriber's favorite channels, the set top terminal comprising:

- a means for gathering the channel watched data;
- a means for receiving the program control information;
- a memory means for storing the gathered channel watched data;
- a processing means, operably connected to the memory means and the receiving means, for determining suggested favorite channels, comprising:
 - a channel selection means for selecting a plurality of channels using the stored channel watched data; and
 - means to generate a signal identifying the selected channels; and

a means, operably connected to the processing means, for displaying a representation of the selected channels.

27. A television program delivery and presentation system for delivering menu selectable programs to a subscriber in a digital format and for suggesting certain of those delivered programs for viewing by the subscriber on a television, using program control information wherein the programs are combined and compressed with the program control information, comprising:

- a means for converting programs to a digital format;
- a means for generating program control information;
- means, connected to the converting means and the generating means, for packaging the digital format programs using the program control information;
- means for combining and compressing the packaged programs and program control information into a composite signal;
- means for transmitting the composite signal;

a set top terminal connected to the television comprising:

- a means for receiving the composite signal;
- a means for creating personal profile information;
- a means, connected to the creating means, for storing the personal profile information;
- a means, connected to the receiving means, for generating menus using the program control information;
- a means for gathering viewer mood information using the generated menus;
- a means, connected to the gathering means and storing means, for selecting at least one program for suggestion to the viewer, comprising:
 - a means for integrating the stored personal profile information and gathered viewer mood information into selection criteria;
 - a means for comparing the selection criteria and the received program control information; and
 - a means for matching the selection criteria with one or more received programs; and
- a means for displaying the suggested program for suggestion to the viewer.

28. A terminal for program suggestion using user preference data concerning user preferences and program control information concerning available programs, comprising:

- a means for gathering the user preference data;
- a means, connected to the gathering means, for storing the gathered user preference data;
- a means for accessing the program control information;
- a means, connected to the storing means and accessing means, for selecting one or more programs using a

subscriber's programming preferences and the program control information, comprising:

a processor, wherein the subscriber programming preferences are generated from the user preference data; and

a means, connected to the selecting means, for suggesting the selected programs to the user.

29. The terminal of claim 28, wherein the terminal further comprises a kiosk, whereby the kiosk comprises means for displaying the selected programs for suggestion to the user.

30. The terminal of claim 28, wherein the terminal is used for video rental and to suggest programs stored on video tape, and wherein the program control information comprises information concerning programs stored on video tape and wherein the means for suggesting comprises a means for indicating a video tape.

31. A terminal for program suggestion using user preference data concerning user preferences and program control information concerning available programs, comprising:

a means for gathering the user preference data;

a means, connected to the gathering means, for storing the gathered user preference data;

a means for accessing the program control information;

a means, connected to the storing means and accessing means, for selecting one or more programs using the user preference data and the program control information, whereby the selected programs correspond to the gathered user preference data; and

a kiosk, wherein the kiosk comprises means, connected to the selecting means, for displaying the selected programs for suggestion to the user.

32. A terminal for program suggestion using user preference data concerning user preferences and program control information concerning available programs, wherein the terminal is used for video rental and to suggest programs stored on video tape, and wherein the program control information comprises information concerning programs stored on video tape, comprising:

a means for gathering the user preference data;

a means, connected to the gathering means, for storing the gathered user preference data;

a means for accessing the program control information;

a means, connected to the storing means and accessing means, for selecting one or more programs using the user preference data and the program control information, whereby the selected programs correspond to the gathered user preference data; and

a means, connected to the selecting means, for suggesting the selected programs to the user, wherein the means for suggesting comprises a means for indicating a video tape.

33. A network controller, adapted for remotely controlling a plurality of set top terminals in a television program delivery system, for suggesting programs to subscribers by making program suggestions using subscriber specific data and program control information received from a remotely located source containing program description data, wherein the suggested programs are transmitted to the set top terminal, the network controller comprising:

means for receiving the program control information containing program description data;

a means for gathering the subscriber specific data from a set top terminal;

a means, connected to the gathering means, for storing the subscriber specific data;

a means, operably connected to the receiving means and the storing means, for suggesting one or more programs using a subscriber's programming preferences and the received program control information, comprising:

a processor, wherein the subscriber programming preferences are generated from the subscriber specific data; and

a means, connected to the suggesting means, for transmitting the suggested programs to the set top terminal for presentation to the subscriber.

34. The network controller of claim 33 wherein key words are used in searching program abstracts to assist in suggesting programs, and wherein the network controller further comprises:

a means for storing program abstracts; and

wherein the means for suggesting comprises a means for searching the stored program abstracts for one or more programs consisting of one or more of the key words.

35. A network controller, adapted for remotely controlling a plurality of set top terminals in a television program delivery system, for suggesting programs to subscribers by making program suggestions using subscriber specific data indicative of a subscriber's programming preferences received from a set top terminal, program control information received from a remotely located source containing program description data, and program abstracts with key words, wherein the suggested programs are transmitted to the set top terminal, the network controller comprising:

a means for receiving the program control information containing program description data;

a means for gathering the subscriber specific data indicative of subscriber preferences from a set top terminal;

a means, connected to the gathering means, for storing the subscriber specific data;

a memory means for storing program abstracts;

a means, operably connected to the receiving means and the storing means, for suggesting one or more programs using the stored subscriber specific data and the received program control information, whereby the suggested programs correspond to the subscriber's programming preferences, wherein key words are used in searching the stored program abstracts to assist in suggesting programs, and wherein the means for suggesting comprises:

a means for searching the stored program abstracts for one or more programs consisting of one or more of the key words; and

a means, connected to the suggesting means, for transmitting the suggested programs to the set top terminal for presentation to the subscriber.

36. A program suggestion system for suggesting programs to subscribers of a television program delivery system by using program control information containing program description data and by searching program abstracts stored in a database at a network controller, the suggested programs resulting from a search of the program abstracts for key words sent to the network controller from a set top terminal, wherein the key words are mapped from one or more subscriber responses to a plurality of selectable entries at the set top terminal, the system comprising:

a set top terminal comprising:

a means for receiving programs;

a means for presenting the plurality of selectable entries to the subscriber;

a subscriber interface means for entering subscriber responses to the plurality of selectable entries; and

a means, connected to the subscriber interface means, for mapping the subscriber responses into the key words; and

a network controller, networked to the set top terminal, comprising:

- a means for receiving the program control information;
- a means for storing the program abstracts in a data base;
- a means for gathering the key words;
- a program selection means, operably connected to the receiving means, gathering means and storing means, for selecting one or more programs for suggestion to the subscriber, comprising:
 - a means for searching the program abstract data base for program abstracts consisting of one or more key words; and
- a means for distributing the selected programs to the set top terminal.

37. A network controller for suggesting programs to subscribers of a television program delivery system by using program control information containing program description data and by searching program abstracts for key words that are mapped from one or more subscriber responses received from a set top terminal, comprising:

- a means for receiving the program control information;
- a means for storing the program abstracts in a data base;
- a means for gathering subscriber responses to a plurality of selectable entries from the set top terminal;
- a means, connected to the gathering means, for mapping the subscriber responses into the key words;
- a means, operably connected to the receiving means, storing means, gathering means and mapping means, for suggesting one or more programs, comprising:
 - a means, connected to the storing and mapping means, for searching the program abstract data base for one or more key words; and
- a means for distributing the suggested programs to the set top terminal.

38. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, by searching program abstracts for programs which correlate to key words mapped from one or more subscriber responses to a plurality of selectable entries presented on a display, comprising:

- a means for receiving the program control information;
- a means for storing the program abstracts in a database;
- a means for presenting the plurality of selectable entries to the subscriber using the display;
- a subscriber interface means for entering subscriber responses to the plurality of selectable entries;
- a means, connected to the subscriber interface means, for mapping the subscriber responses into the key words;
- a means, connected to the mapping means and storing means, for searching the program abstract database for programs consisting of one or more of the key words;
- a program selection means, operably connected to the receiving means and searching means, for selecting one or more programs, wherein programs are selected using the search of the searching means; and
- means, connected to the program selection means, for suggesting the selected programs to the subscriber using the display.

39. The set top terminal of claim 38 wherein program abstracts are included in the received program control

information, and wherein the set top terminal further comprises a means, connected to the receiving means, for reprogramming the means for storing the program abstracts to include the received program abstracts.

40. The set top terminal of claim 38 wherein the program control information further contains menu screen details and the selectable entries are displayed on one or more menu screens by the presenting means, the set top terminal further comprising:

- a memory means, connected to the receiving means, for storing the menu screen details; and
- a means, connected to the memory means and the presenting means, for generating menu screens using the stored menu screen details, wherein the menu screens are generated by integrating the program control information with the stored menu screen details, and wherein the generated menu screens list search criteria comprising the plurality of selectable entries.

41. The set top terminal of claim 40 wherein the generated menu screens comprise main menus and submenus and the means for generating menu screens comprises a means for generating submenus whereby selectable entries are listed in the submenus and each submenu corresponds to a search criterion in a main menu.

42. The set top terminal of claim 40 wherein the stored menu screen details include a cursor overlay and the means for generating menu screens comprises a means for generating the cursor overlay, and wherein the subscriber interface means comprises a means for moving the generated cursor overlay on the displayed menu screens.

43. A method used in a television program delivery system for suggesting programs to subscribers for display on a television using program control information and subscriber specific data, the method comprising:

- gathering subscriber specific data to be used in selecting programs;
- storing the gathered subscriber specific data;
- receiving program control information to be used in selecting programs;
- selecting one or more programs using a subscriber's programming preferences and the received program control information, wherein the subscriber programming preferences are generated from the subscriber specific data; and suggesting the selected programs to the subscriber.

44. A method used in a television program delivery system for suggesting programming to subscribers using program control information containing menu screen details by searching program abstracts for programs which correlate to key words mapped from one or more subscriber responses to search criteria containing a plurality of selectable entries on one or more menu screens displayed on a television, comprising the steps of:

- receiving the program control information;
- storing the program abstracts in a database;
- storing the menu screen details;
- generating the menu screens wherein the menu screens are generated by integrating the received program control information with the stored menu screen details, and wherein the generated menu screens list the search criteria containing the plurality of selectable entries;
- displaying the menu screens;
- gathering subscriber responses to the plurality of selectable entries on the menu screens;

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mapping the gathered subscriber responses into the key words;
 searching the stored program abstracts for abstracts comprising one or more of the key words;
 selecting one or more of the programs, whereby the programs are selected using the search of the stored program abstracts; and
 suggesting the selected programs.

45. A method used in a television program delivery system for suggesting programming to subscribers using program control information and by searching program abstracts for programs which correlate to key words mapped from one or more subscriber responses to a plurality of presented selectable entries, comprising the steps of:

- receiving the program control information;
- storing the program abstracts in a database;
- presenting the plurality of selectable entries;
- gathering subscriber responses to the plurality of selectable entries;
- mapping the gathered subscriber responses into the key words;
- searching the stored program abstracts for abstracts comprising one or more of the key words;
- selecting one or more of the programs, whereby the programs are selected using the search of the stored program abstracts; and
- suggesting the selected programs.

46. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing scheduled program description data, the set top terminal comprising:

- a means for creating personal profile information;
- a means, connected to the creating means, for storing the personal profile information;
- means for receiving the program control information comprising the scheduled program description data;
- a means, connected to the storing means and receiving means, for selecting at least one program for suggestion to the viewer, comprising:
 - a means for transforming the personal profile information into preferred program indicators, wherein a preferred program indicator comprises a program category with each program category having a weighted value;
 - a means for matching the preferred program indicators with the scheduled program description data, wherein each scheduled program is assigned a weighted value based on at least one associated program category;
 - a means for prioritizing the scheduled programs from highest weighted value programs to lowest weighted value programs;
 - a means for indicating one or more programs meeting a predetermined weight related threshold, wherein all other programs are excluded from program suggestion; and
- means, operably connected to the program selection means, for displaying for suggestion the selected programs to the subscriber.

47. The set top terminal of claim 46 further comprising a means for gathering subscriber specific data, wherein the means for creating personal profile information utilizes the gathered subscriber specific data.

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48. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing scheduled program description data, and subscriber specific data, the set top terminal comprising:

- a means for gathering the subscriber specific data, wherein the subscriber specific data comprises subscriber mood data;
- a means for creating personal profile information;
- a means, connected to the gathering means and the creating means, for storing the subscriber mood data and the personal profile information;
- means for receiving the program control information comprising scheduled program description data;
- a means, connected to the storing means and receiving means, for selecting at least one program for suggestion to the viewer, comprising:
 - a means for integrating the personal profile information and subscriber mood data into preferred program indicators, wherein a preferred program indicator comprises a program category with each program category having a weighted value;
 - a means for comparing the preferred program indicators with the scheduled program description data in the received program control information, wherein each scheduled program is assigned a weighted value according to at least one associated program category;
 - a means for prioritizing the scheduled programs from highest weighted program values to lowest weighted program values;
 - a means for indicating one or more programs meeting a predetermined weight threshold, wherein all other programs are excluded from program suggestion; and
- means, operably connected to the program selection means, for displaying for suggestion the selected programs to the subscriber.

49. The set top terminal of claim 48 wherein the subscriber specific data further comprises the subscriber's desired program viewing time frame and desired program length and wherein the means for comparing comprises means for excluding programs for suggestion that are not in the subscriber's desired viewing time frame and desired length.

50. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing scheduled program description data, the set top terminal comprising:

- a means for gathering program watched data;
- a means, connected to the gathering means, for storing the program watched data;
- means for receiving the program control information comprising the scheduled program description data;
- a means, connected to the storing means and receiving means, for selecting at least one program for suggestion to the viewer, comprising:
 - a means for transforming the program watched data into preferred program indicators, wherein a program indicator comprises a program category with each program category having a weighted value;
 - a means for comparing the preferred program indicators with the scheduled program description data, wherein each scheduled program is assigned a

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weighted value based on at least one associated program category;
 a means for prioritizing the scheduled programs from highest weighted value programs to lowest weighted value programs;
 a means for indicating one or more programs meeting a predetermined weight threshold, wherein all other programs are excluded from program suggestion; and
 means, operably connected to the program selection means, for displaying for suggestion the selected programs to the subscriber.

51. An apparatus for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data, the apparatus comprising:

- a means for gathering the subscriber specific data to be used in selecting programs;
- a means, connected to the gathering means, for storing the subscriber specific data;
- a means for receiving the program control information; and
- a program selection means, operably connected to the storing means and the receiving means, for selecting one or more programs using a subscriber's programming preferences and the program control information, comprising:
 - a processor, wherein the subscriber programming preferences are generated from the subscriber specific data.

52. A set top terminal used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data, the set top terminal comprising:

- a means for gathering the subscriber specific data to be used in selecting programs;
- a means, connected to the gathering means, for storing the subscriber specific data;
- means for receiving the program control information containing the program description data;
- program selection means, operably connected to the storing means and the receiving means, for selecting one or more programs using a subscriber's programming preferences and the program control information, comprising:
 - a processor, wherein the subscriber programming preferences are generated from the subscriber specific data;
 - wherein the program selection means resides within a network controller; and
- means, operably connected to the program selection means, for suggesting the selected programs to the subscriber.

53. A method for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data, the method comprising:

- gathering the subscriber specific data to be used in selecting programs;
- storing the subscriber specific data;
- receiving the program control information; and
- selecting one or more programs using a subscriber's programming preferences and the program control information, wherein the subscriber's programming preferences are generated from the subscriber specific data.

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54. An apparatus used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, and subscriber specific data, the apparatus comprising:

- a remote control, wherein the subscriber specific data is obtained to be used in selecting programs;
- a memory, operably connected to the remote control, wherein the subscriber specific data is stored;
- a demodulator, wherein the program control information containing the program description data is received;
- a central processing unit, operably connected to the memory and the demodulator, wherein programs are selected using a subscriber's programming preferences and the program control information, and wherein the subscriber programming preferences are generated from the subscriber specific data; and
- a display, operably connected to the processor, wherein the selected programs are suggested to the subscriber on the display.

55. An apparatus used by subscribers of a television program delivery system for suggesting programs through the use of program control information and program watched data indicative of a subscriber's most watched programs, the apparatus comprising:

- a demodulator, wherein the program control information is received;
- a remote control interface, wherein the program watched data is gathered;
- a memory, wherein the gathered program watched data is stored;
- a processor, operably connected to the memory and the demodulator, wherein a program is selected using the stored program watched data and the received program control information;
- a display, operably connected to the processor, for displaying the selected program.

56. An apparatus used by subscribers of a television program delivery system for suggesting programs to subscribers using program control information containing program description data, by searching program abstracts for programs which correlate to key words mapped from one or more subscriber responses to a plurality of selectable entries presented on a display, the apparatus comprising:

- a demodulator, wherein the program control information is demodulated;
- a memory, connected to the demodulator, wherein the program abstracts are stored;
- a combiner, wherein the plurality of selectable entries are presented to the subscriber using the display;
- a subscriber interface, wherein subscriber responses to the plurality of selectable entries are entered;
- logic circuitry, connected to the subscriber interface, wherein the subscriber responses are mapped into the key words;
- a processor, operably connected to the logic circuitry and the memory, wherein the stored program abstracts are searched for programs consisting of one or more of the key words, and wherein one or more programs are selected using the search; and
- wherein the selected programs are suggested to the subscriber using the display.

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[54] ADVANCED SET TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS

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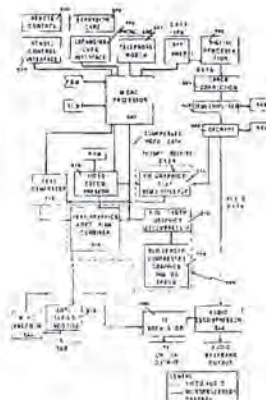
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[57] ABSTRACT

A novel advanced set top terminal capable of digital decompression, menu generation, interactivity and other advanced functional capabilities for use in a television program delivery system is described. The invention relates to methods and apparatus for upgrading existing set top terminals to provide menu generation capability and advanced functional capabilities. The invention is particularly useful in television program delivery systems with hundreds of channels of programming, providing (i) menu driven program selection through the addition of an upgrade module or menu generation card and (ii) advanced functional capabilities using a set of hardware upgrades and/or an expansion card. Specifically, the invention is an upgradeable system that supports advanced set top functionality through the use of internal software, hardware upgrades, an upgrade module and/or expansion cards. The upgraded hardware generally includes a microprocessor, various input/output ports, processing circuitry and memory. The invention results in an upgraded set top terminal that supports: menu generation; picture-on-picture displays; program catalogue services; interactive services; telephone caller identification; digital audio reception; VCR control; HDTV reception; and backyard satellite system interoperability, among other features and capabilities.

35 Claims, 32 Drawing Sheets



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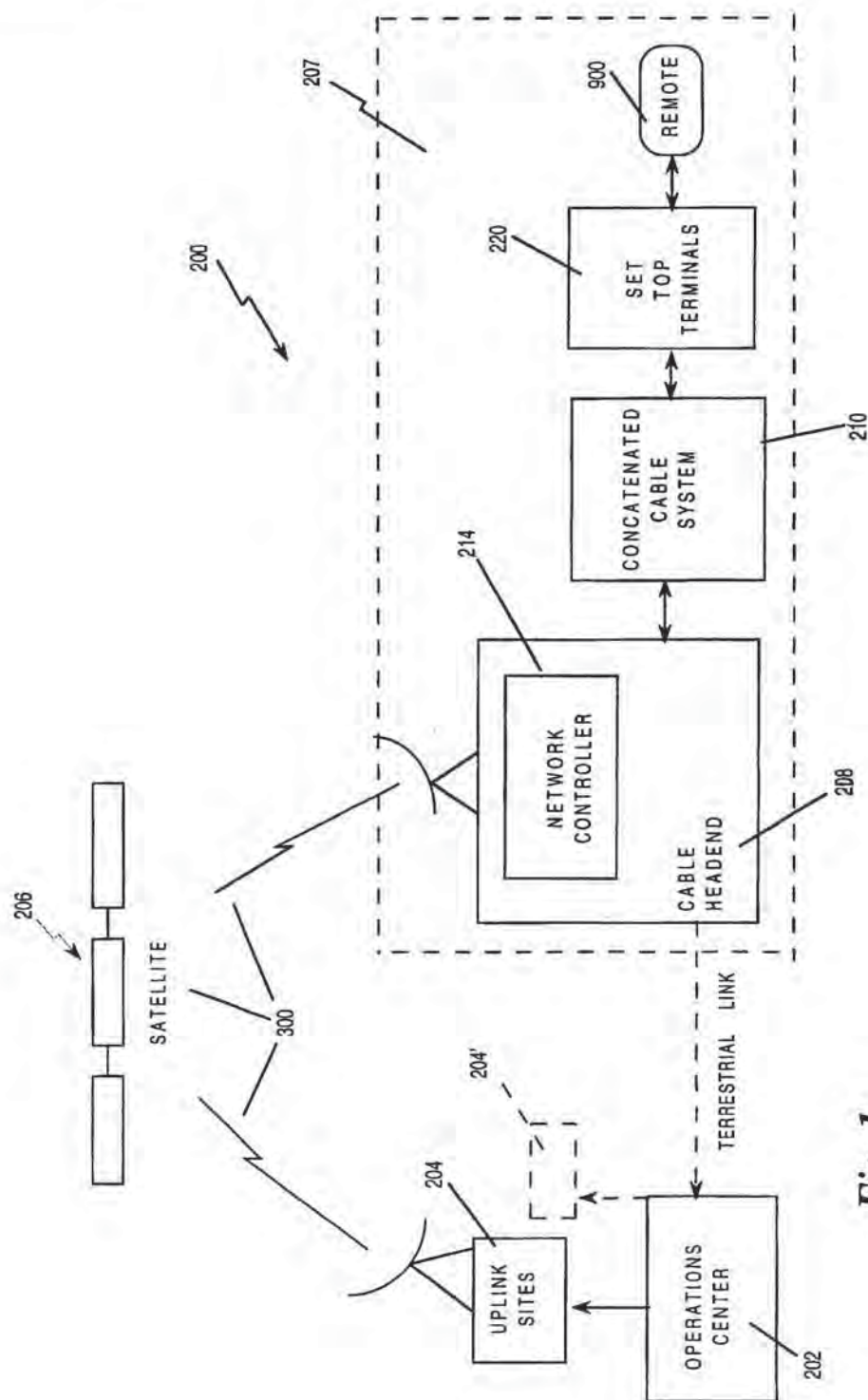


Fig. 1

Fig. 2

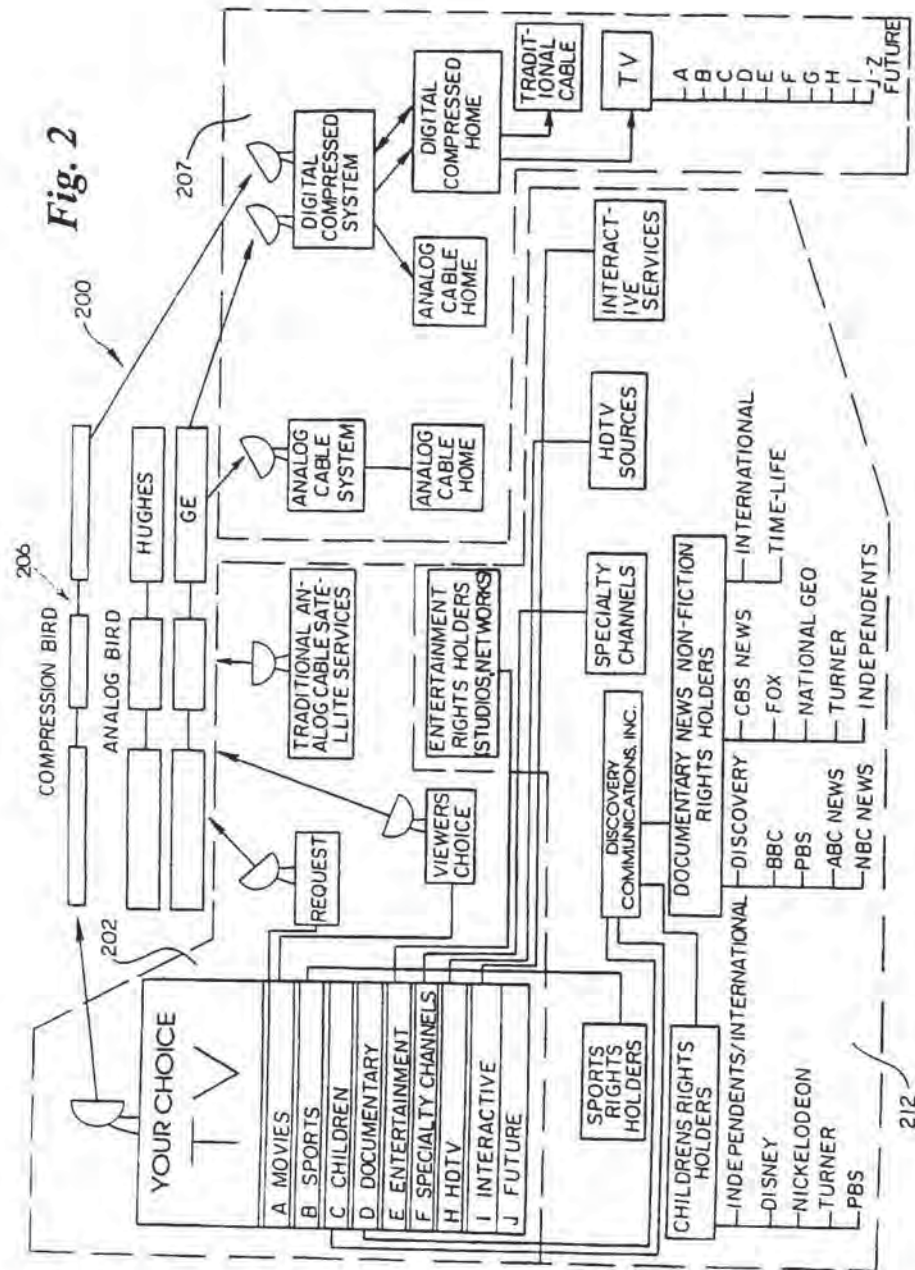
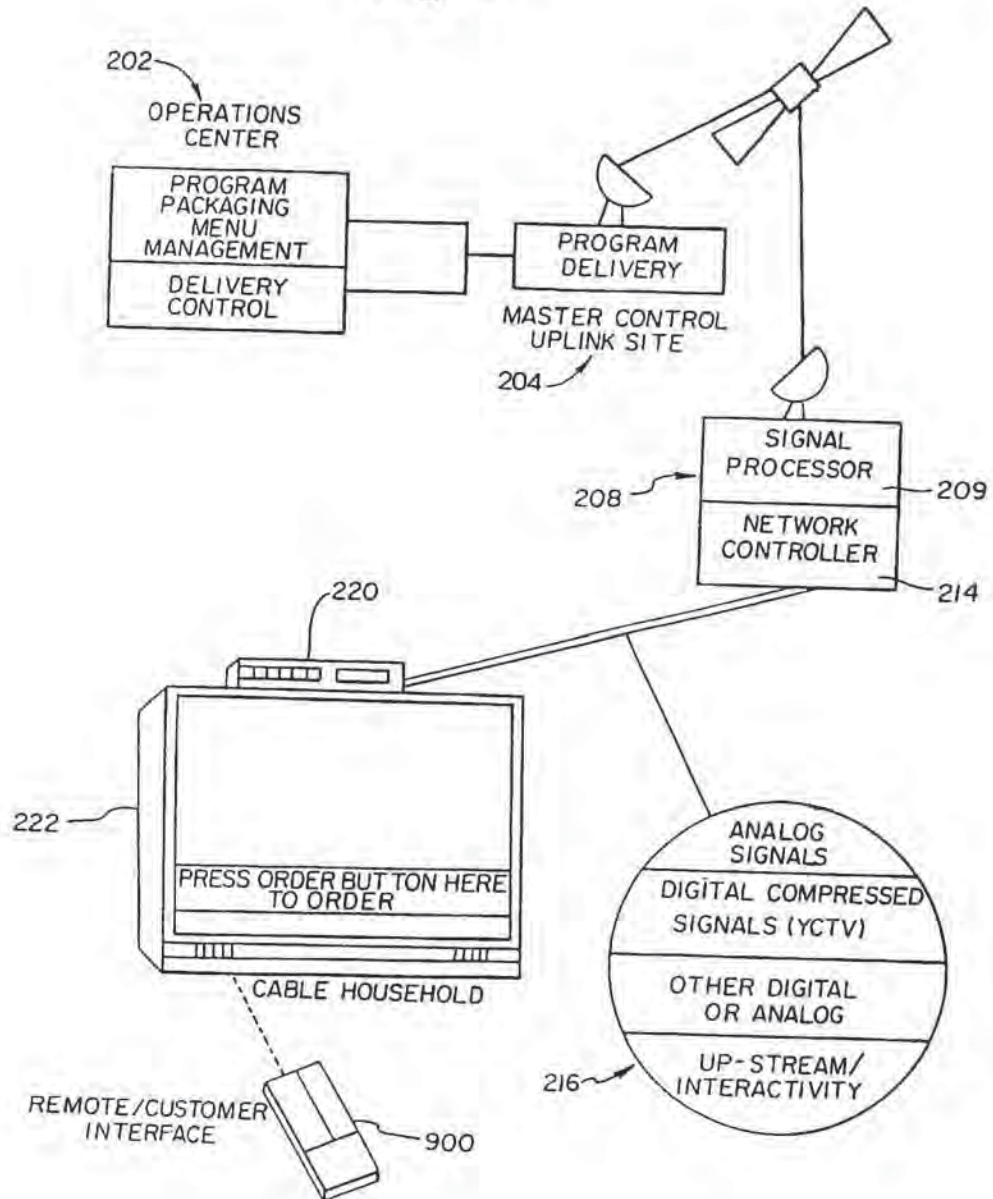


Fig. 3



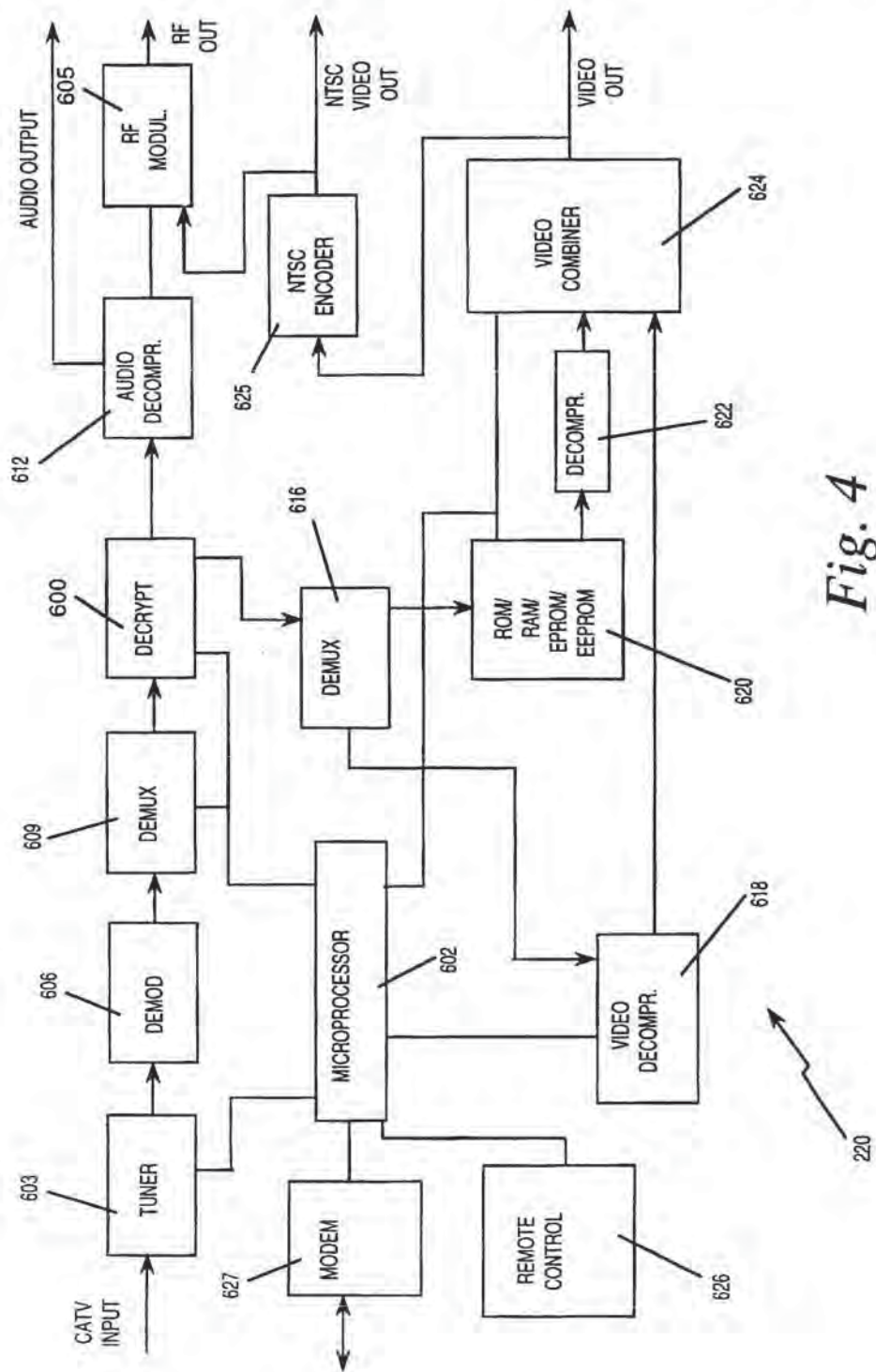


Fig. 4

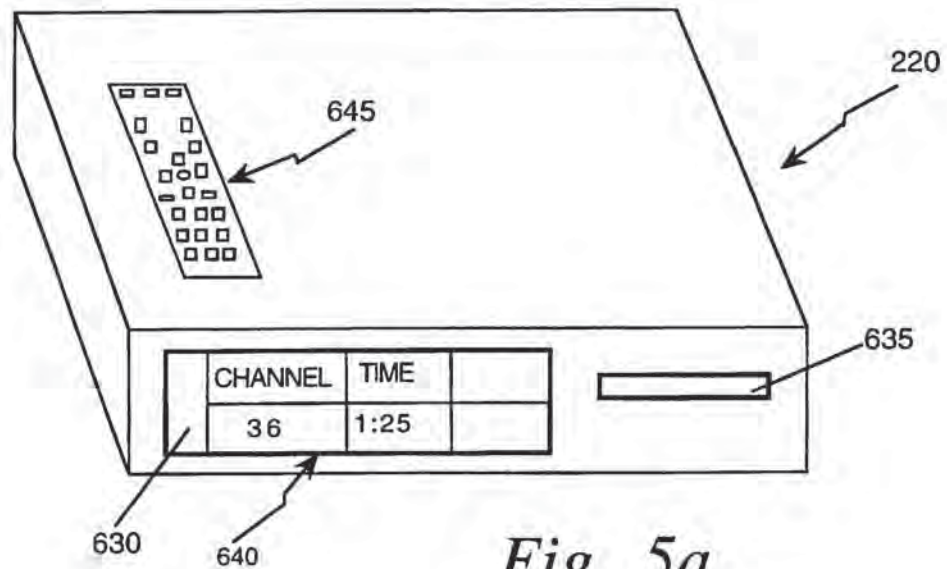


Fig. 5a

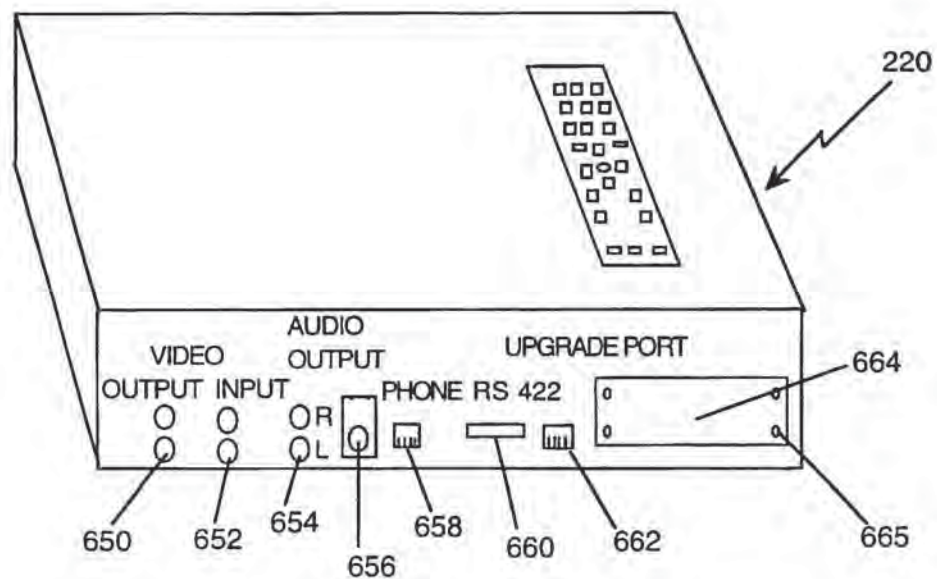


Fig. 5b

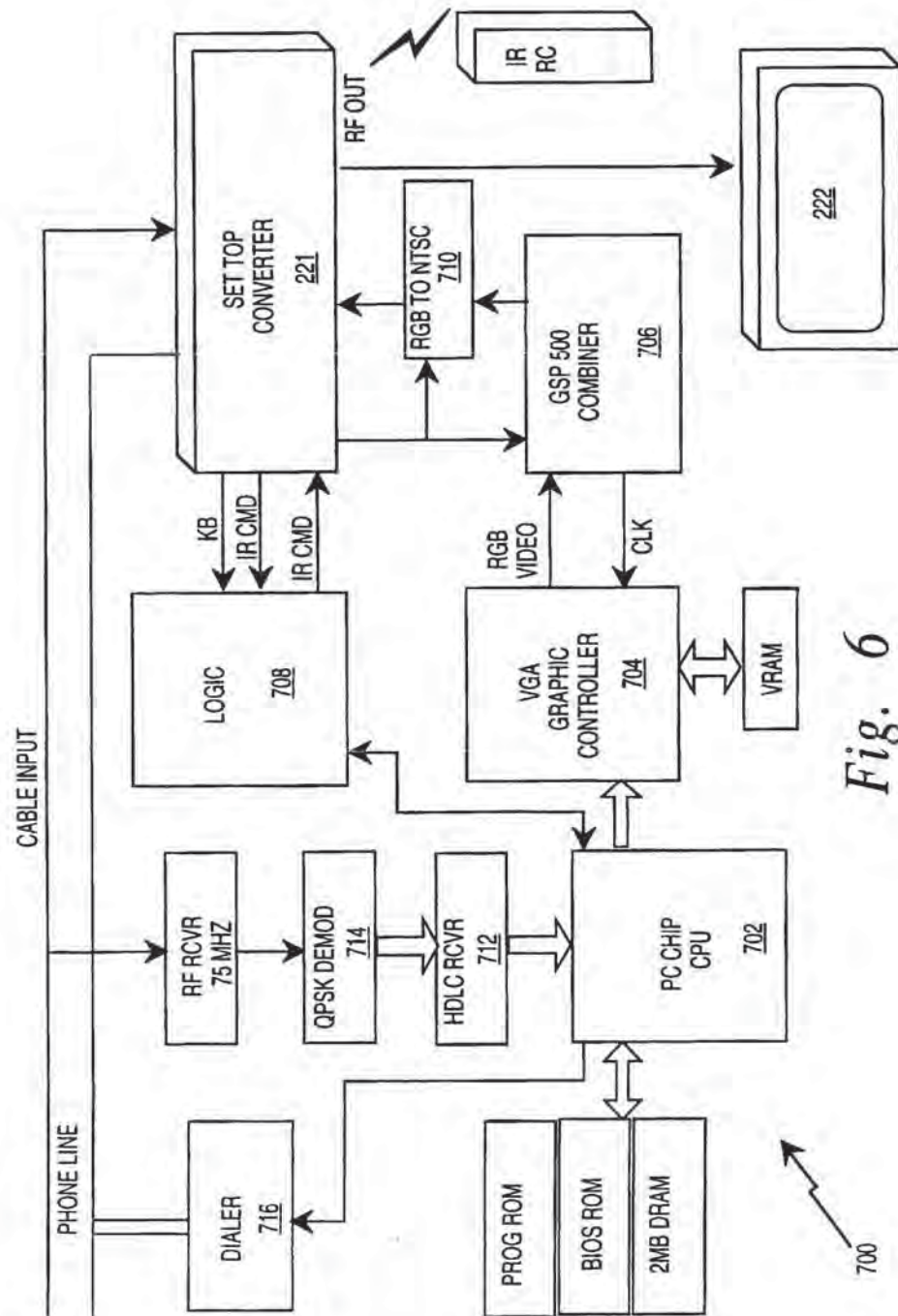


Fig. 6

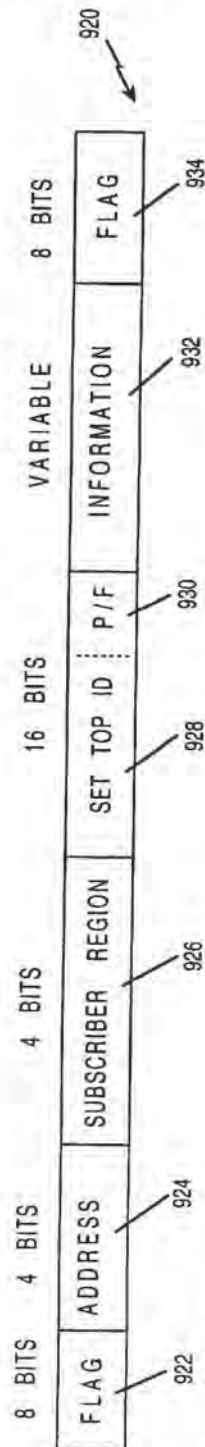


Fig. 7a

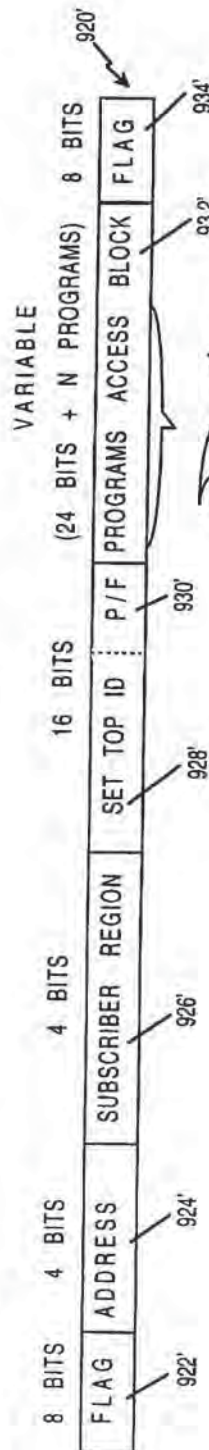
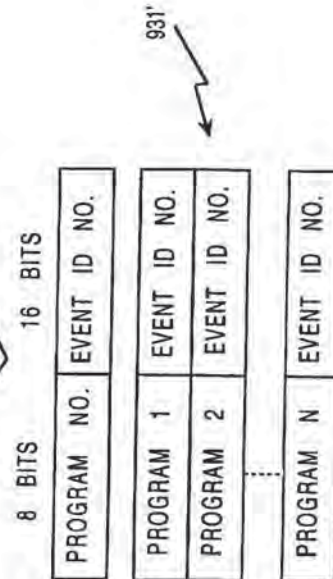


Fig. 7b



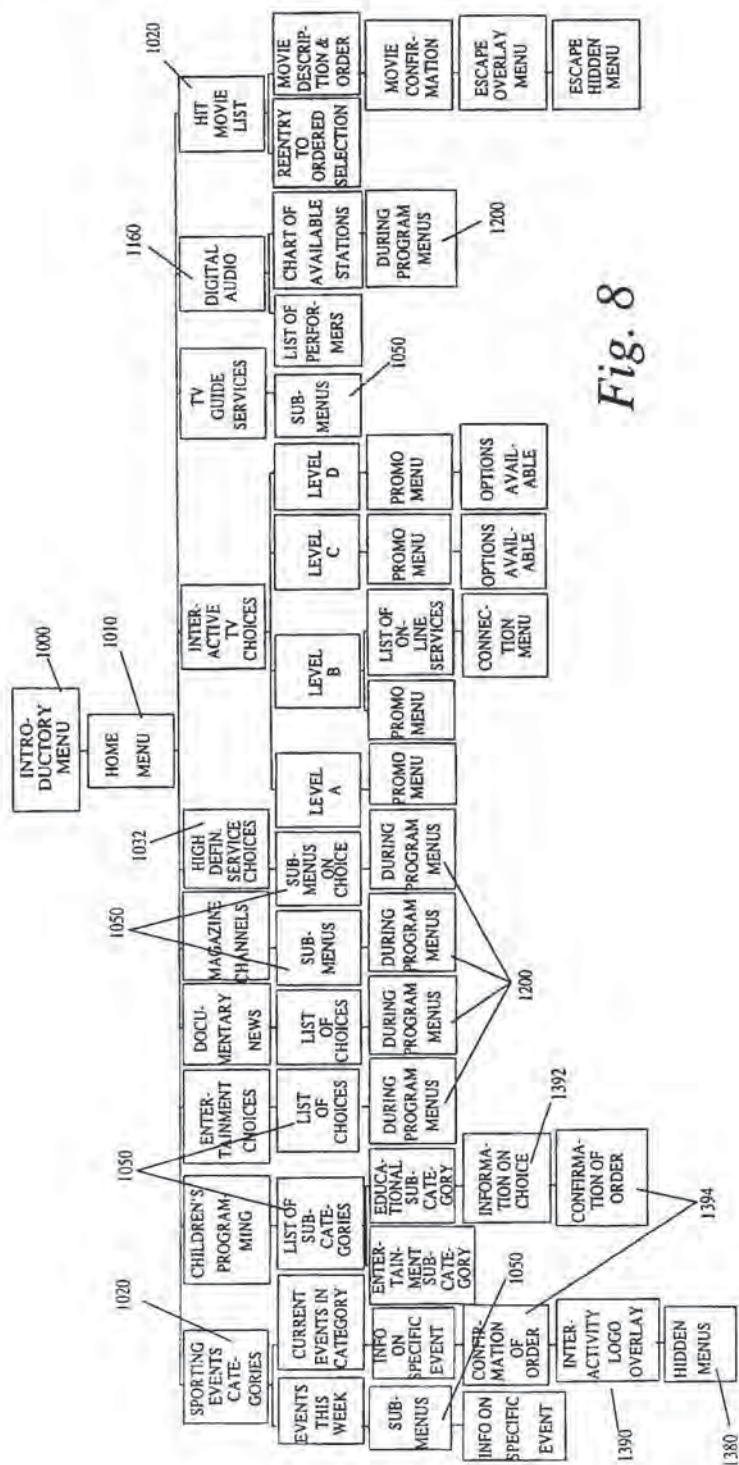


Fig. 8

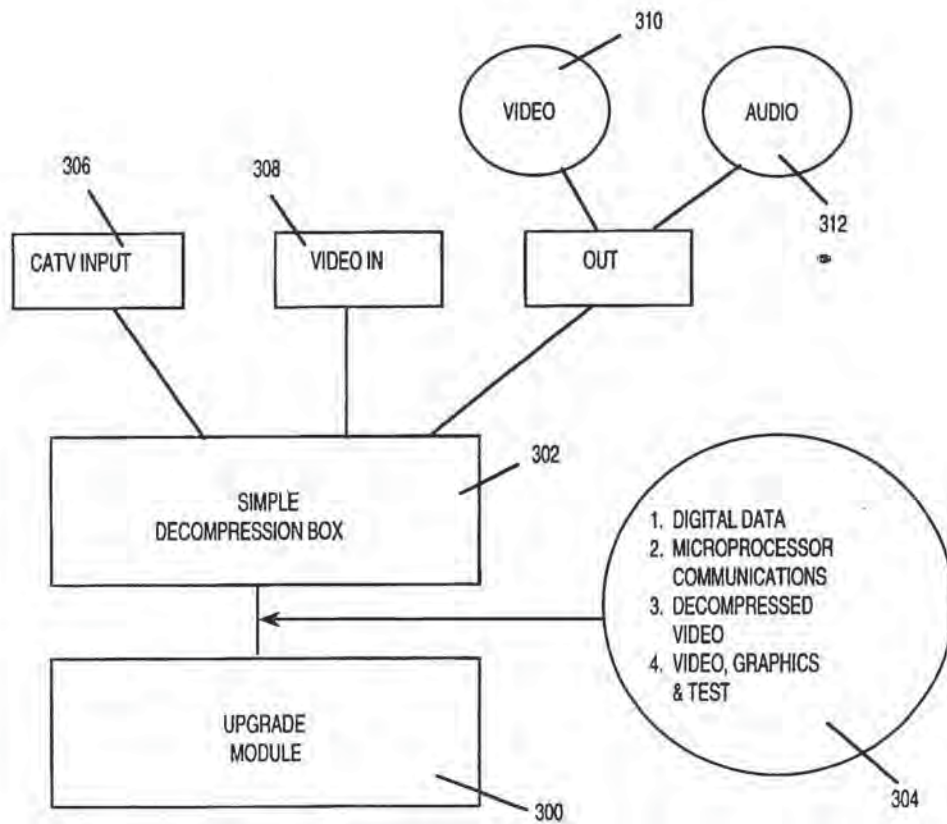


Fig. 9a

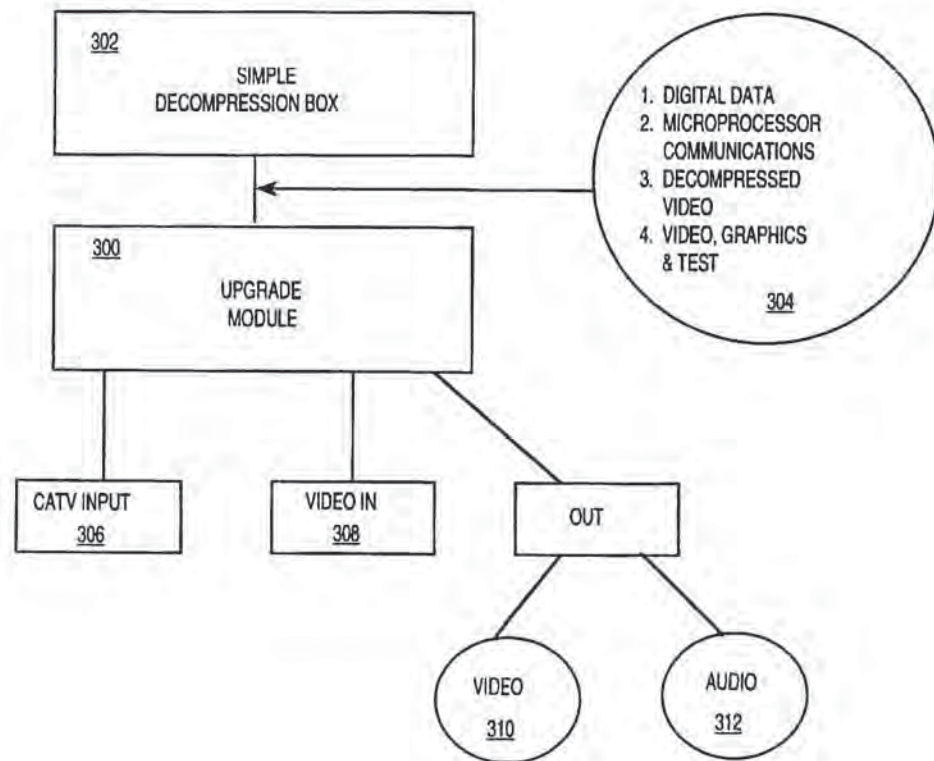


Fig. 9b

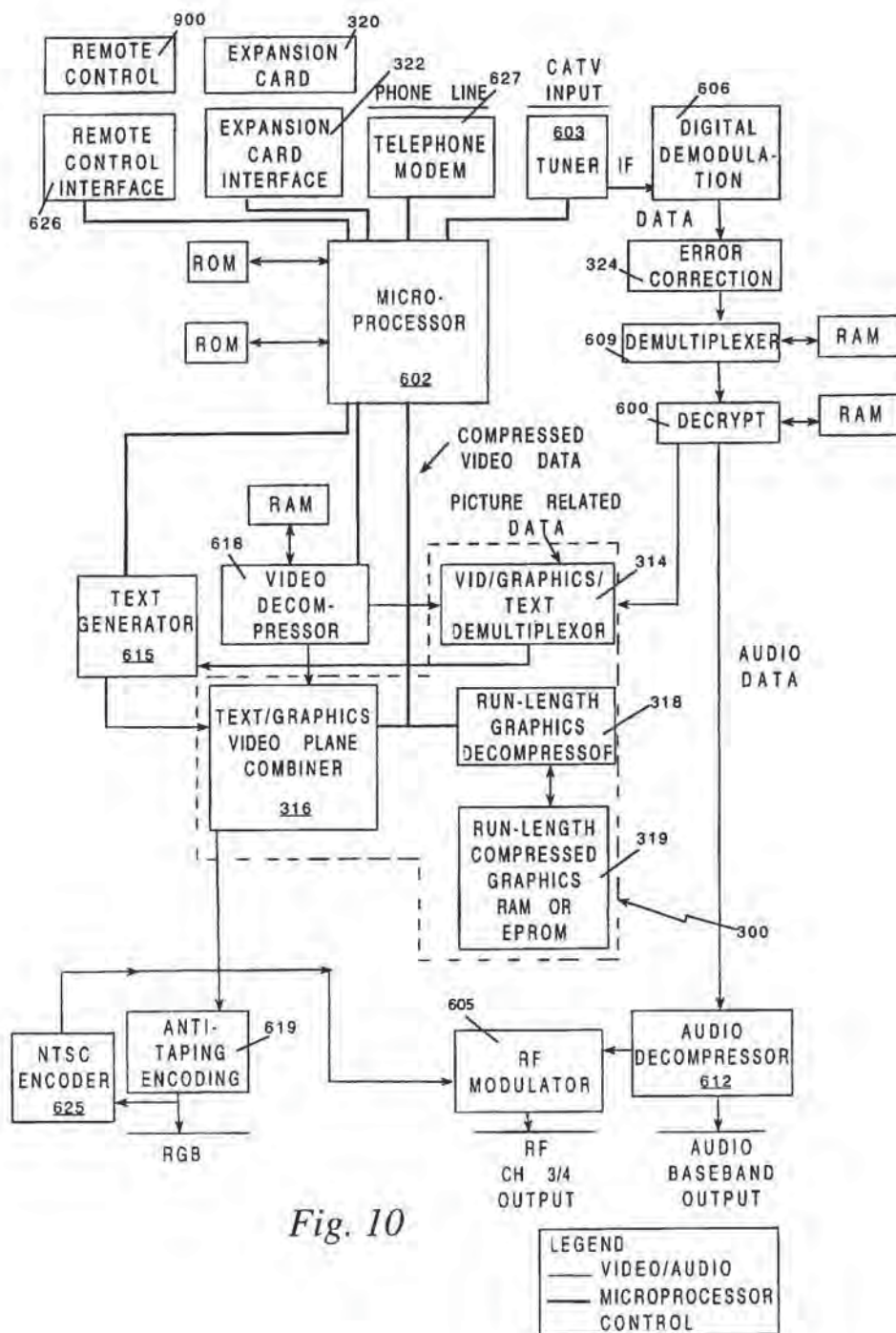
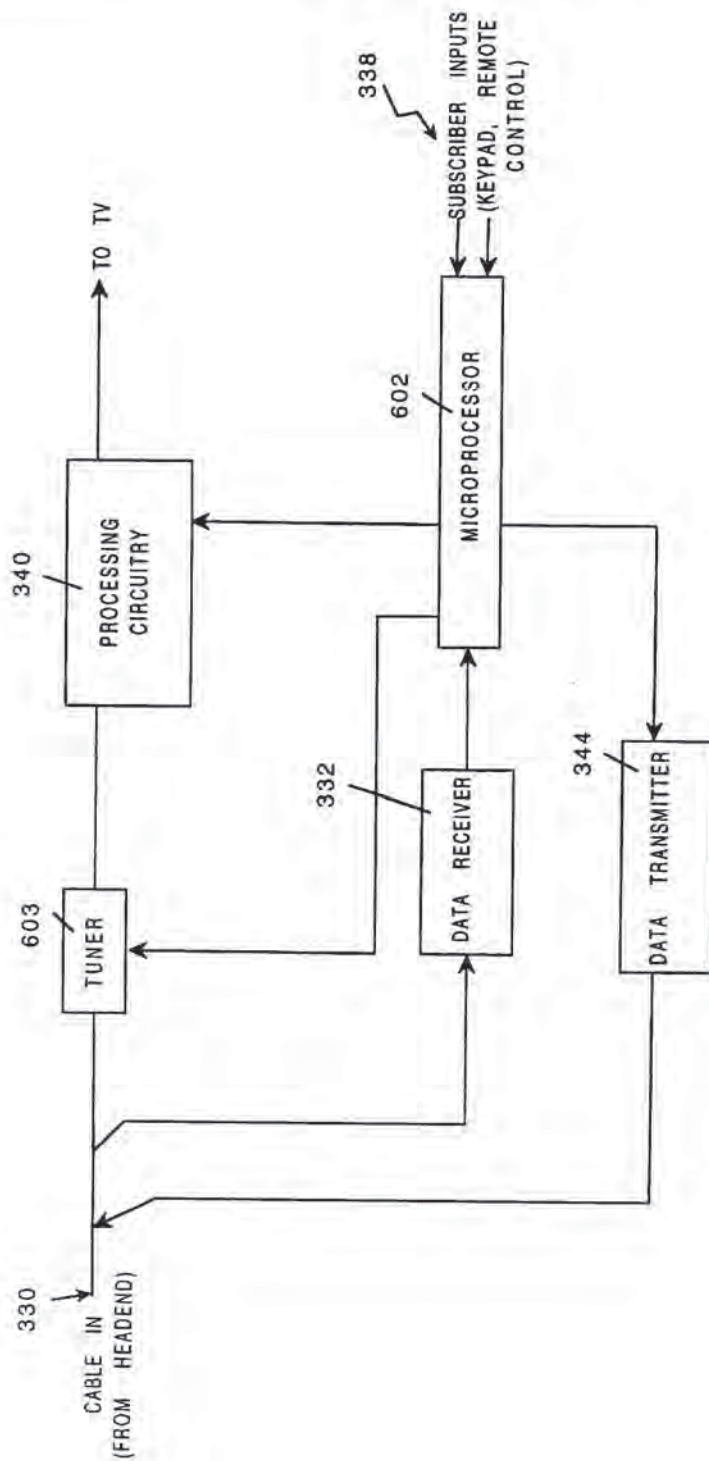


Fig. 10



SET TOP TERMINAL UPSTREAM DATA TRANSMISSION HARDWARE

Fig. 11

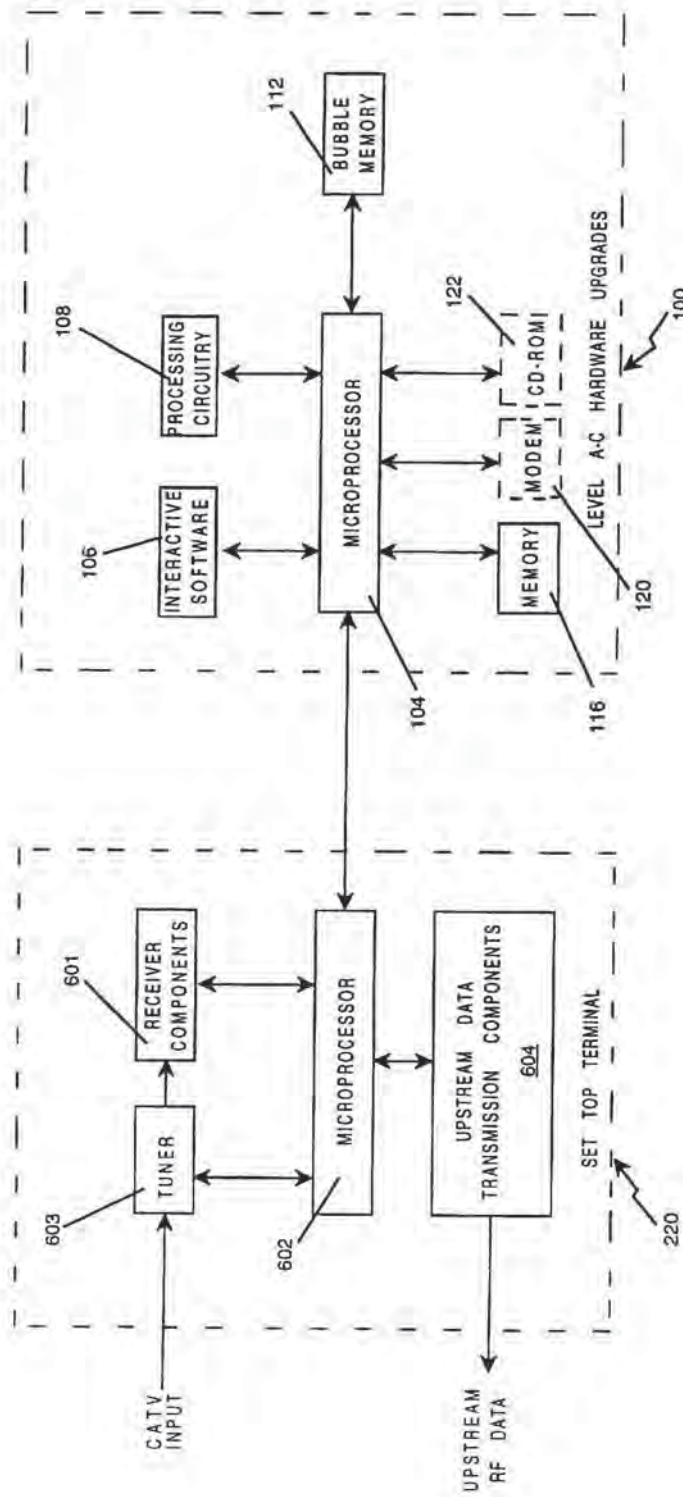


Fig. 12a

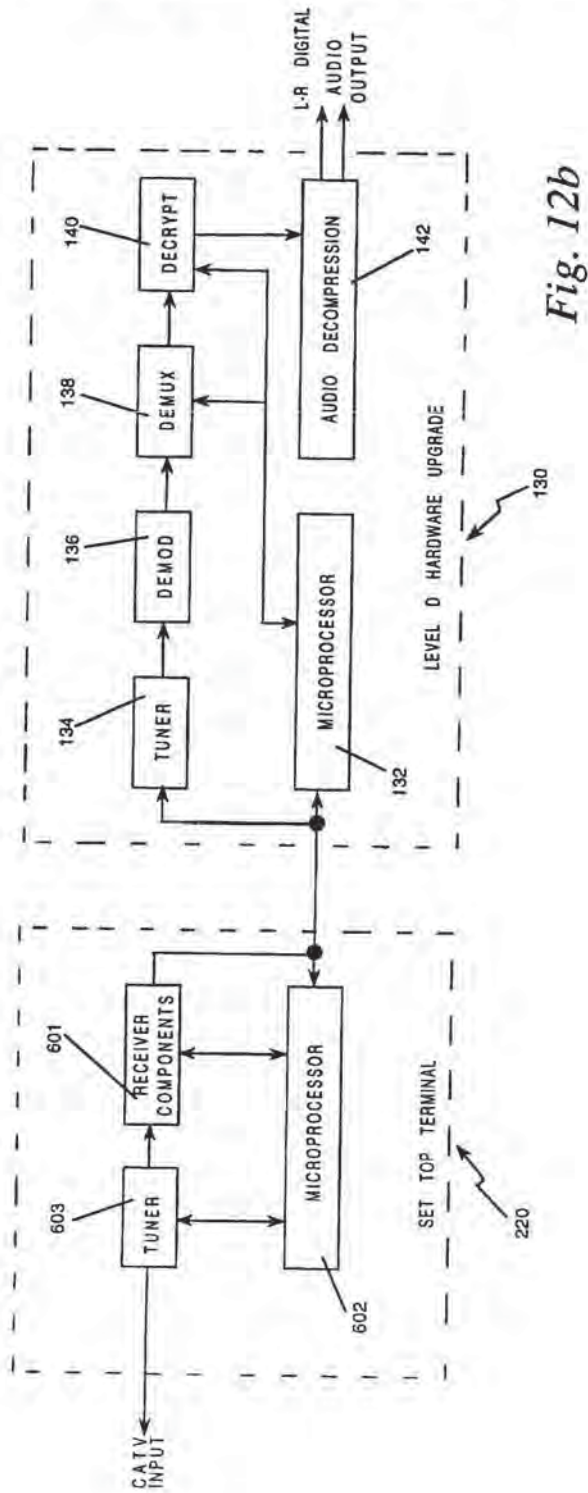


Fig. 13a

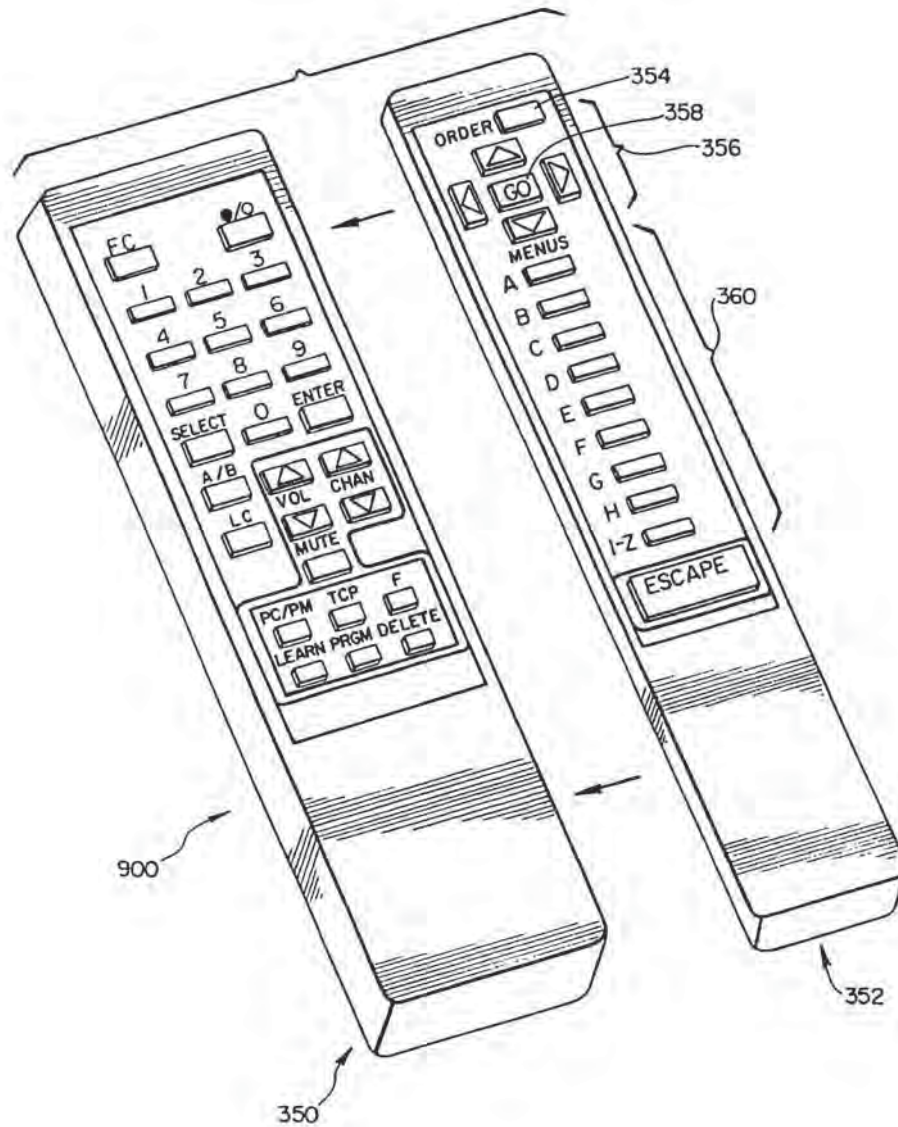
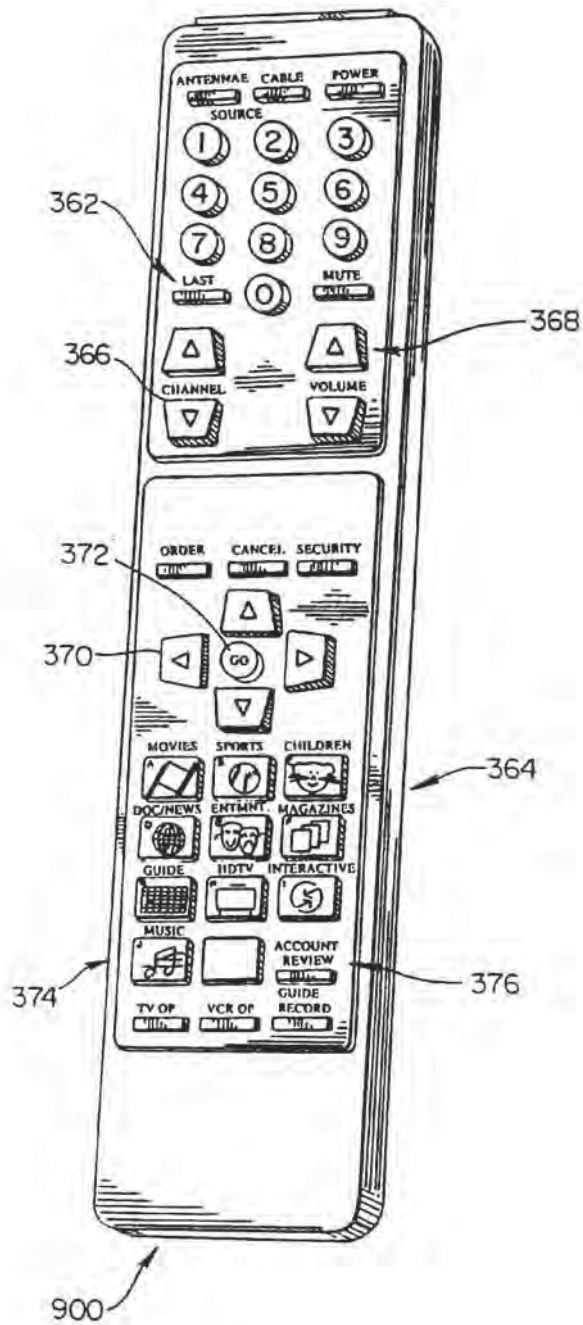


Fig. 13b

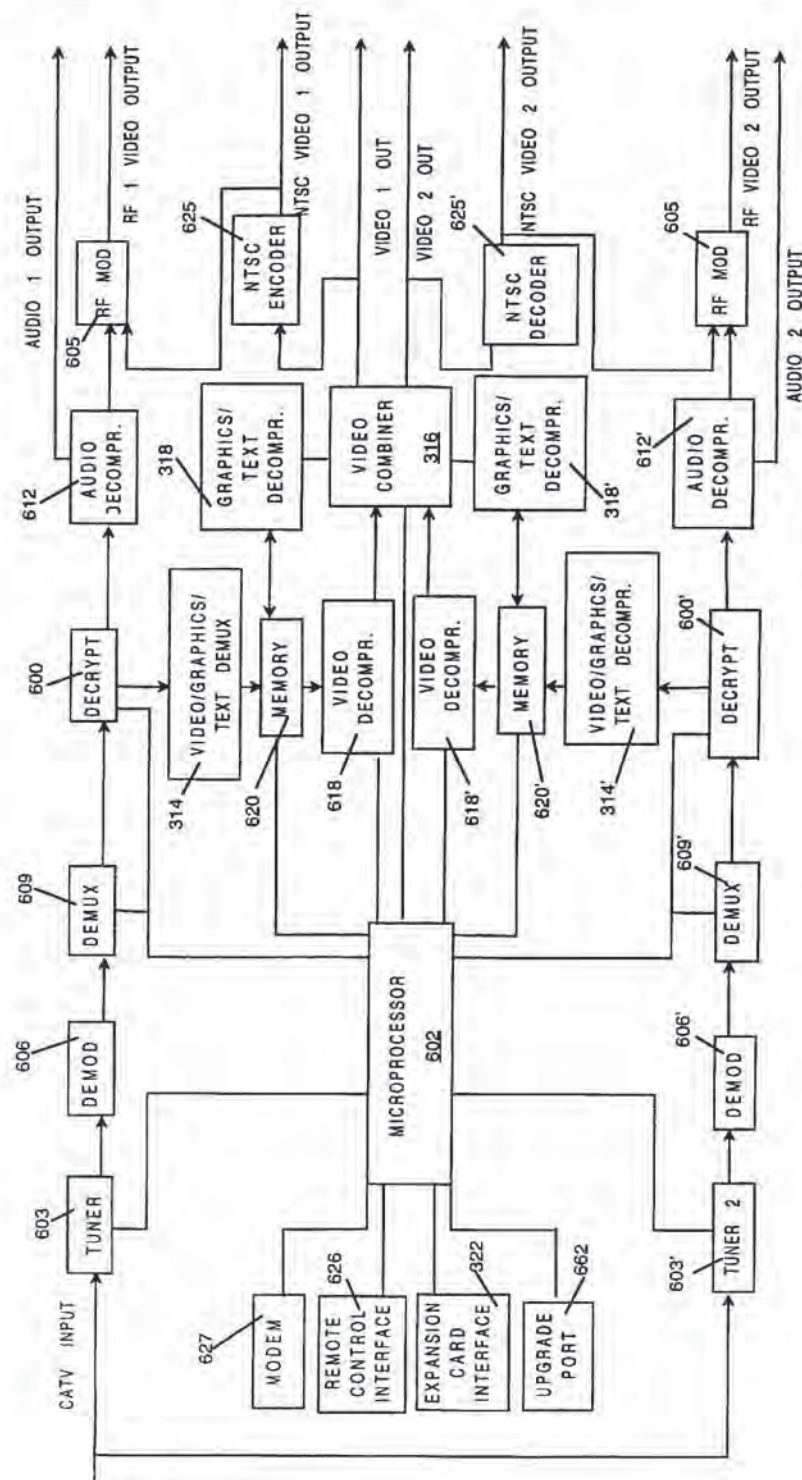


Fig. 14

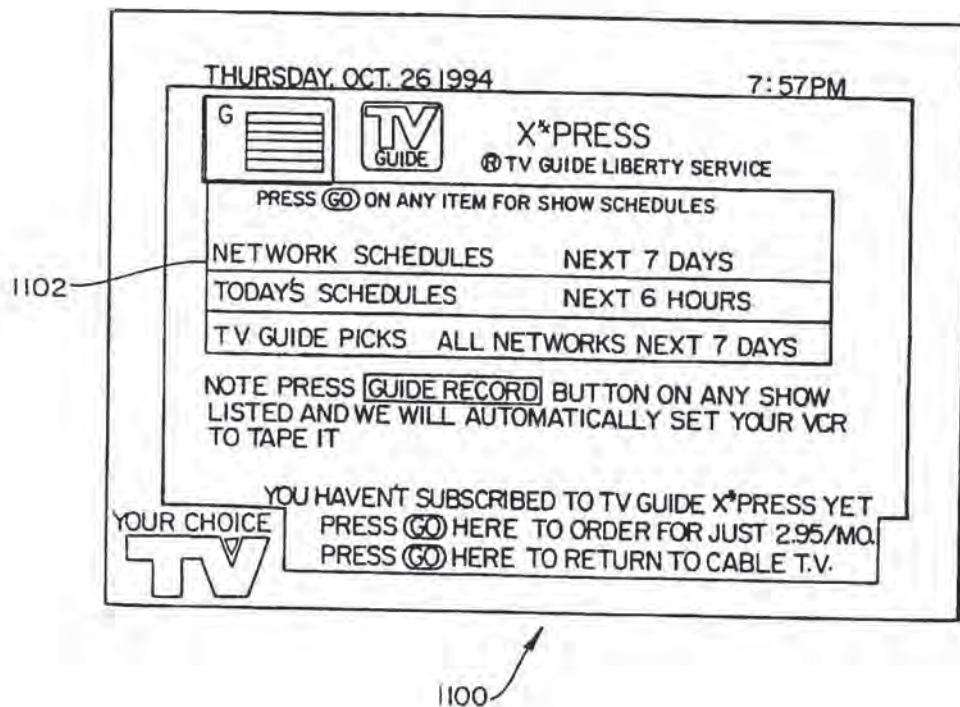
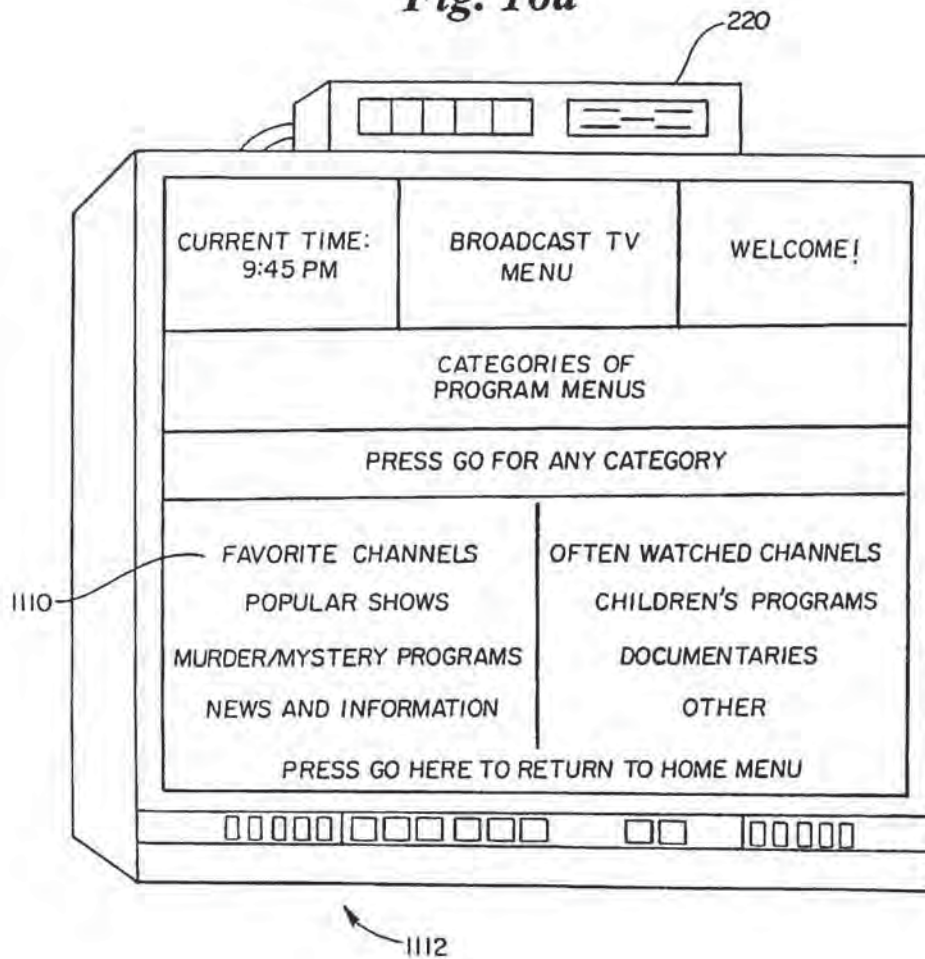
Fig. 15

Fig. 16a



MOOD QUESTION MENUS

1114

LENGTH OF PROGRAM DESIRED

SHORT	30 minutes or less
MEDIUM	30 to 60 minutes
LONG	60 minutes or more

Fig. 16b

1116

TYPE OF PROGRAM DESIRED

SERIOUS
THOUGHTFUL
LIGHT

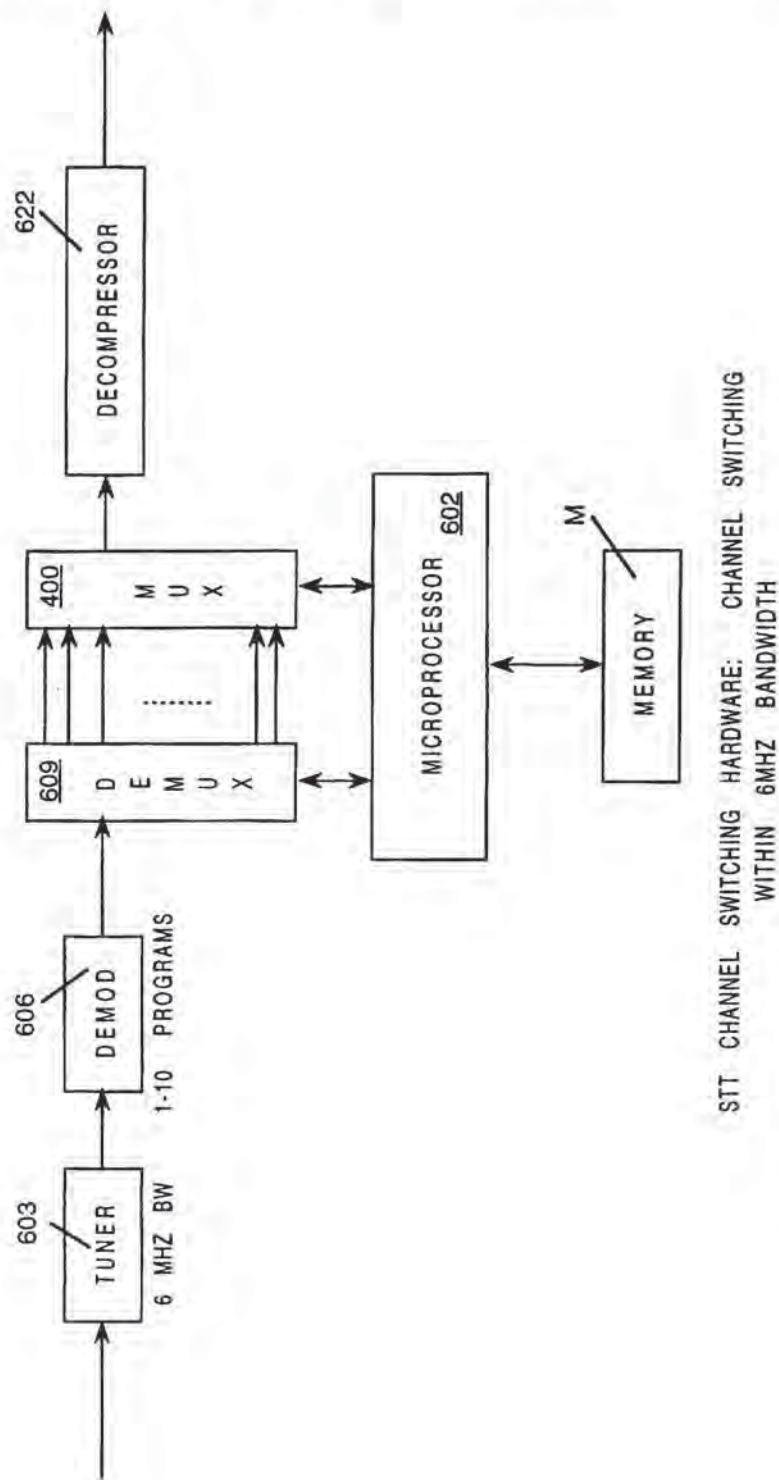
Fig. 16c

1118

DO YOU WISH AN ACTIVE OR PASSIVE PROGRAM?

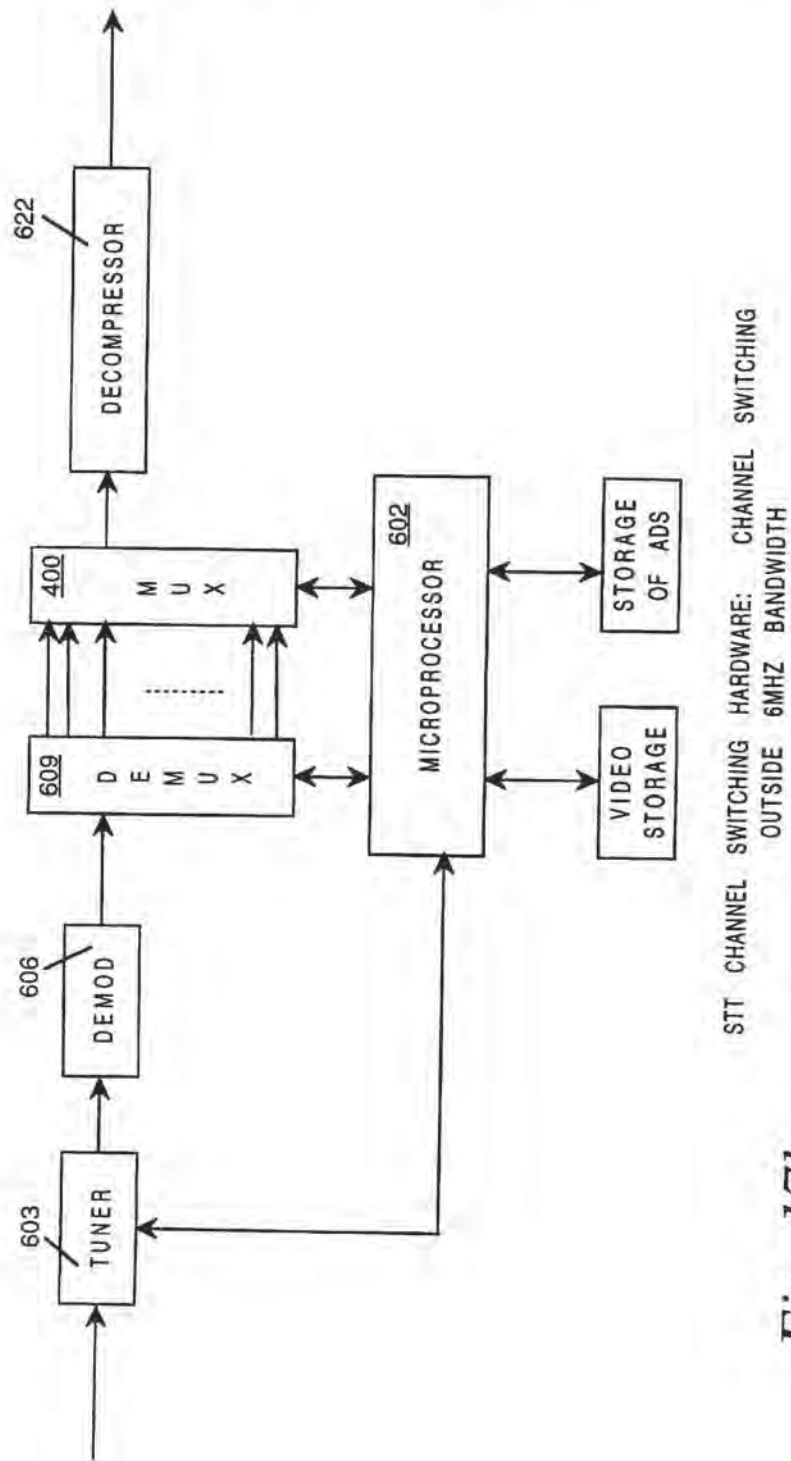
ACTIVE
PASSIVE

Fig. 16d



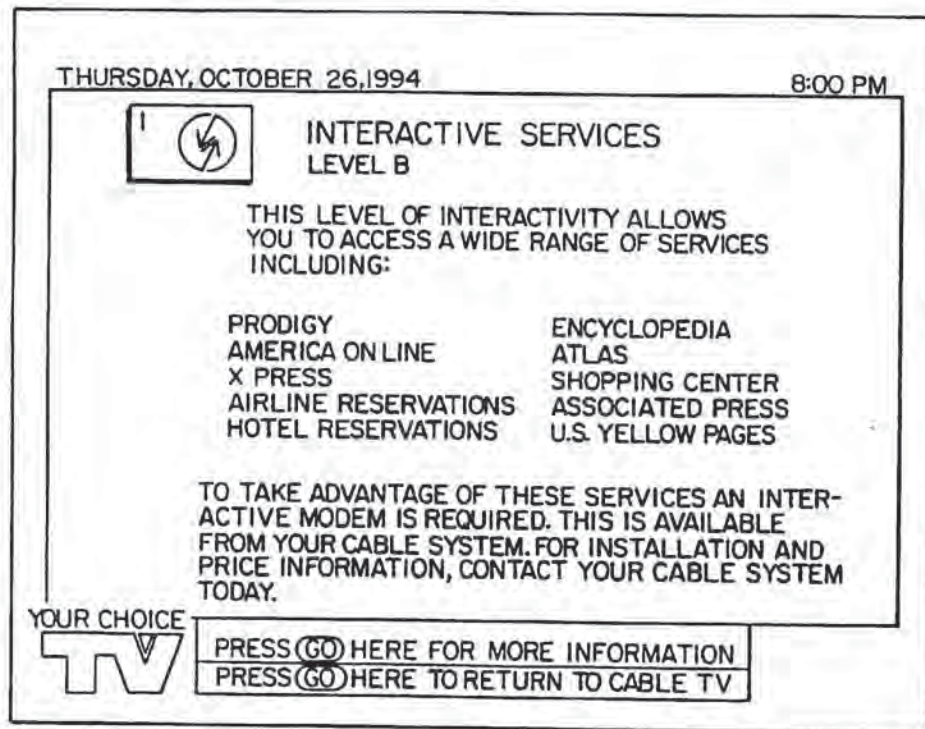
STT CHANNEL SWITCHING HARDWARE: CHANNEL SWITCHING
WITHIN 6MHZ BANDWIDTH

Fig. 17a



STT CHANNEL SWITCHING HARDWARE: CHANNEL SWITCHING
OUTSIDE 6MHZ BANDWIDTH

Fig. 17b

Fig. 18

1120

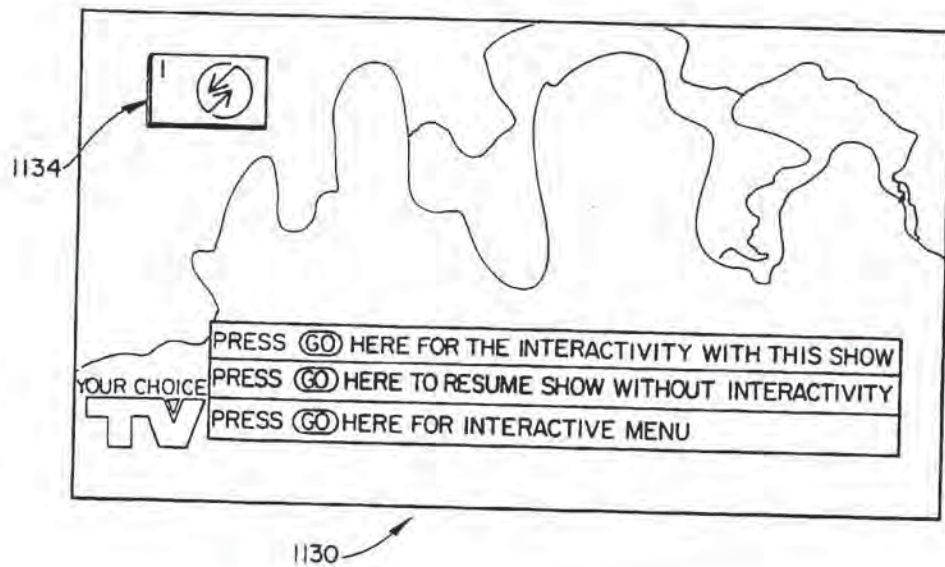
Fig. 19a

Fig. 19b

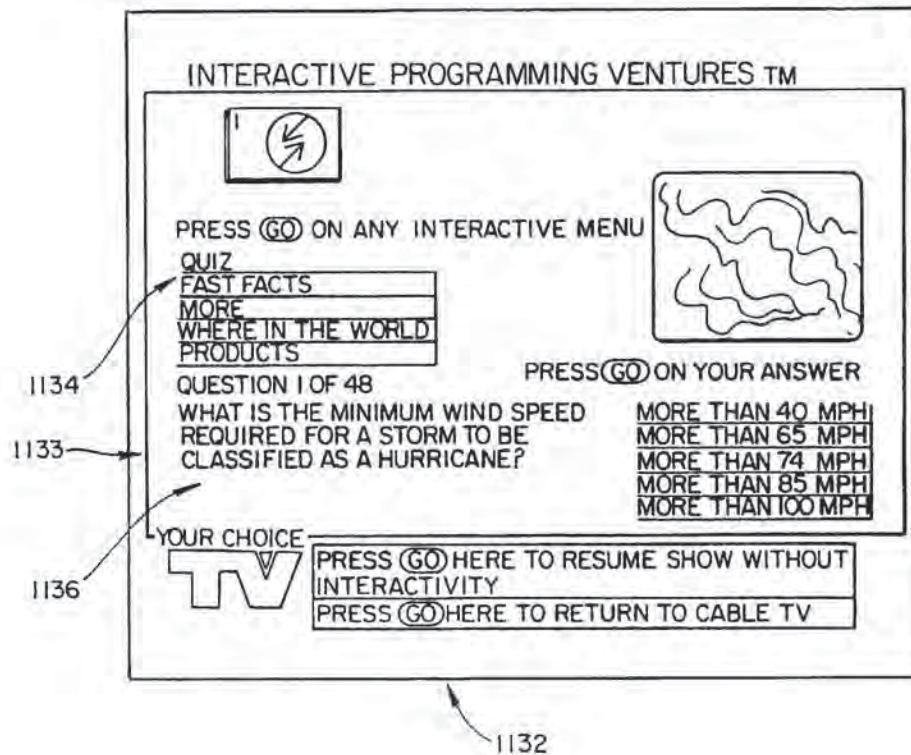
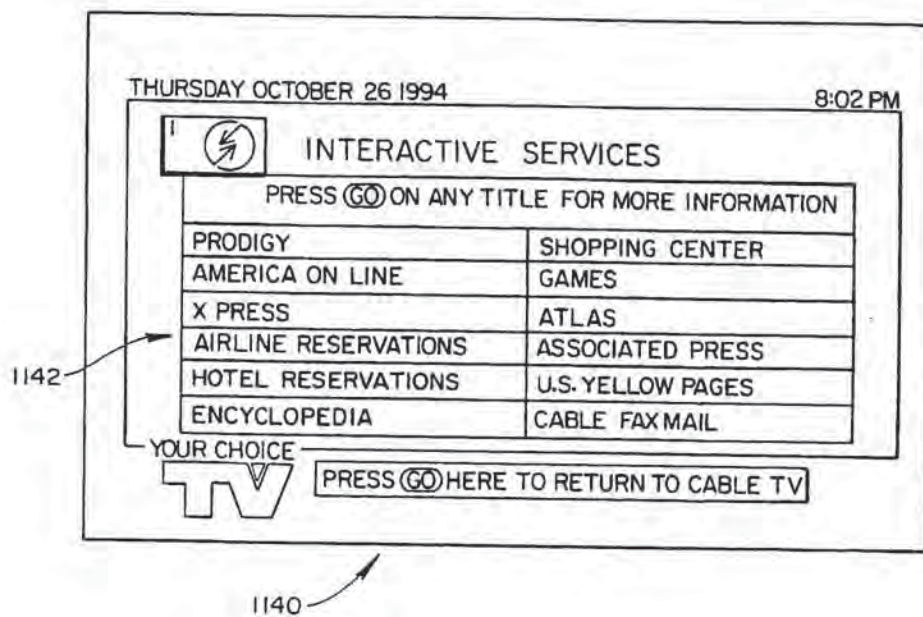


Fig. 20a

8:04 PM

**AIRLINE INFORMATION
AND RESERVATIONS(continued)**

Here are your airline flight options for a morning departure from Phoenix to Dulles.
Press  on Any Flight to Check Availability and Fare

Depart Time	Arrive Time	Airline	Flight No.	Stops	Connecting Through
6:15 AM	1:30 PM	AMERICAN	32	0	
7:30 AM	2:45 PM	AMERICAN	212	0	
8:00 AM	3:07 PM	DELTA	49	0	
10:30 AM	7:15 PM	US AIR	285	1	Chicago
11:25 AM	6:10 PM	UNITED	10	0	
11:45 AM	8:40 PM	UNITED	77	1	Dallas

YOUR CHOICES

Press  Here to Return to Airline Main Menu

Press  Here to Return to Menu

Press  Here to Return to Cable TV

1144

FIG. 20b

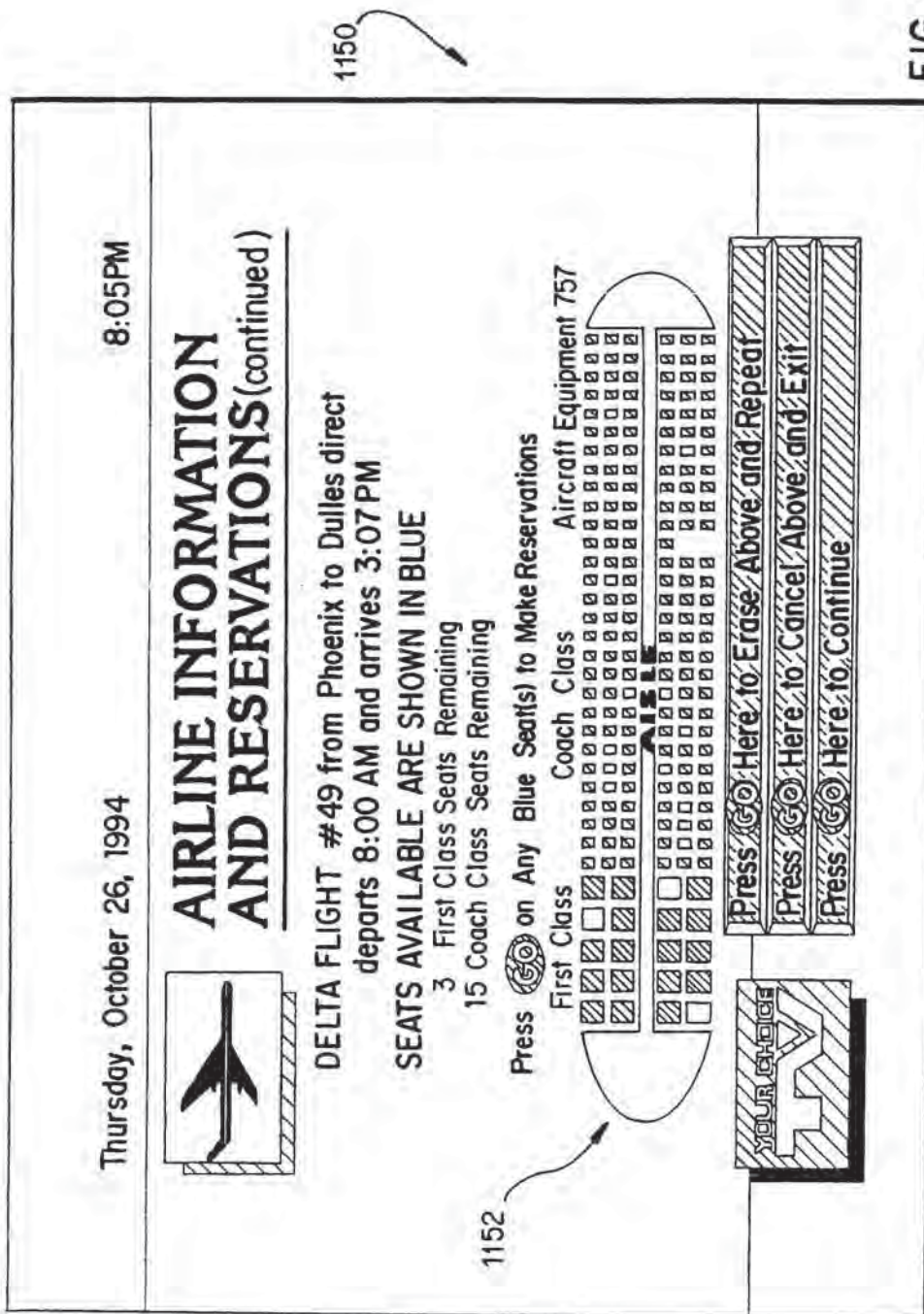


FIG. 20c

Thursday, October 26, 1994

8:06 PM



AIRLINE INFORMATION AND RESERVATIONS(continued)

CREDIT CARD CHARGE

Amount: \$590.00 Delta Flight # 49

One Way: Phoenix to Dulles Date: 11/25/94

Departs: 8:00AM Arrives: 3:07 PM Dinner

American
Express

Visa

Discover

Master
Charge

Enter Your Credit Card Number:

2

1

7

7

3

5

Enter Expiration Date (example 09/97):

Month: 0

9

Year: 9

7

Press  on Credit Card You Want to Use:

YOUR PHONE



Press  Here to Erase Above and Repeat

Press  Here to Cancel Above and Exit

Press  Here to Confirm Above Charge

1156

FIG. 20d

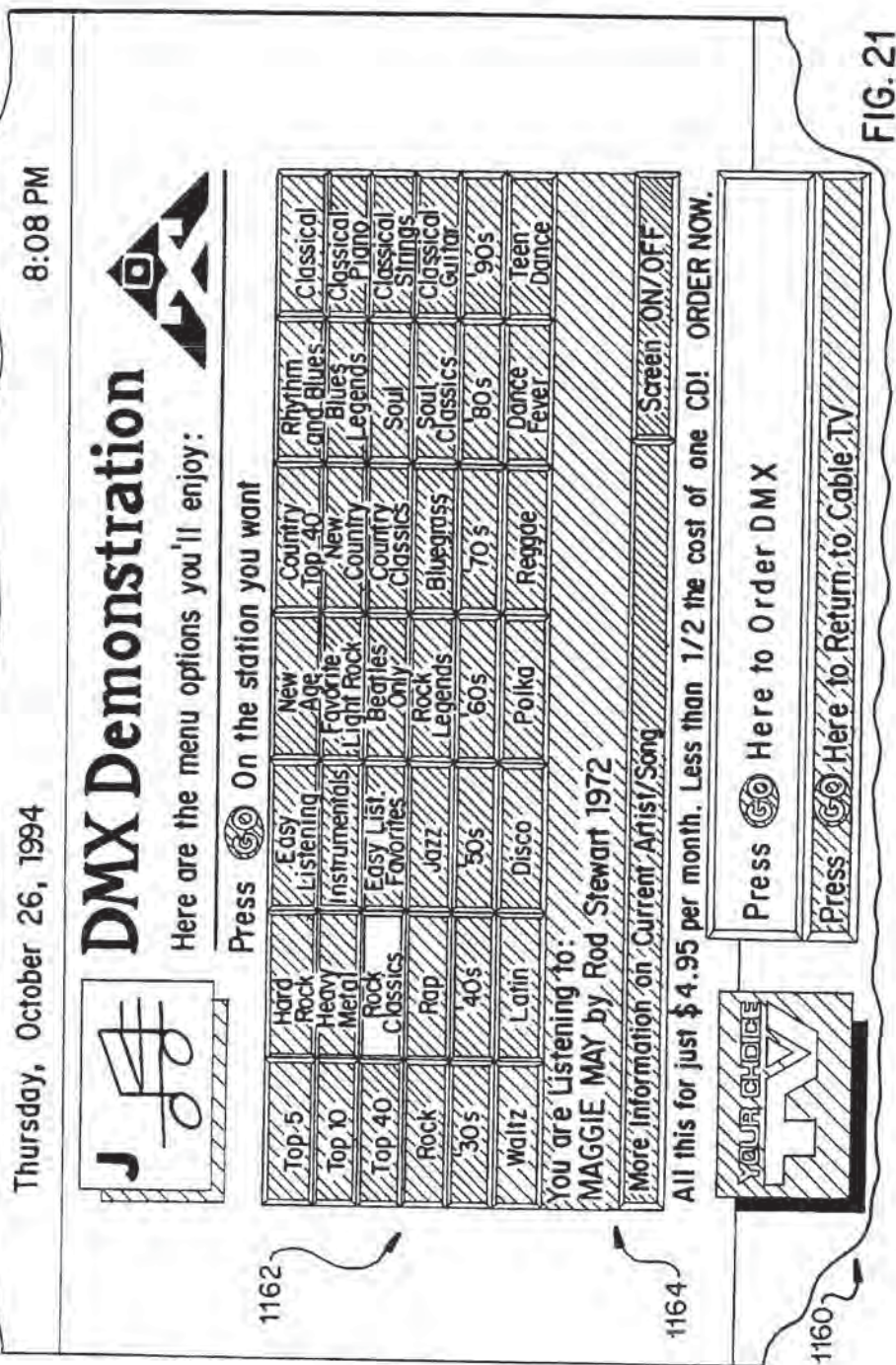
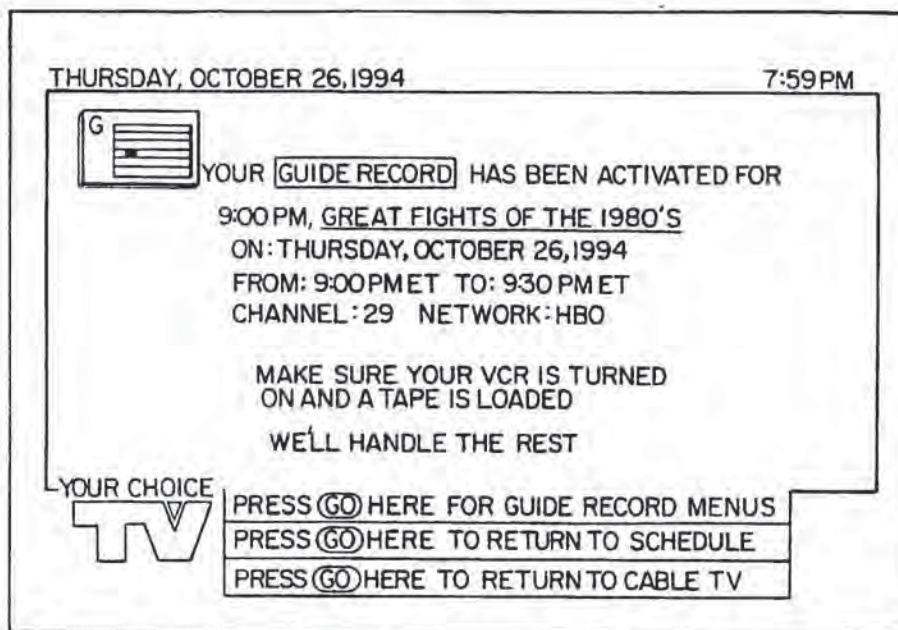
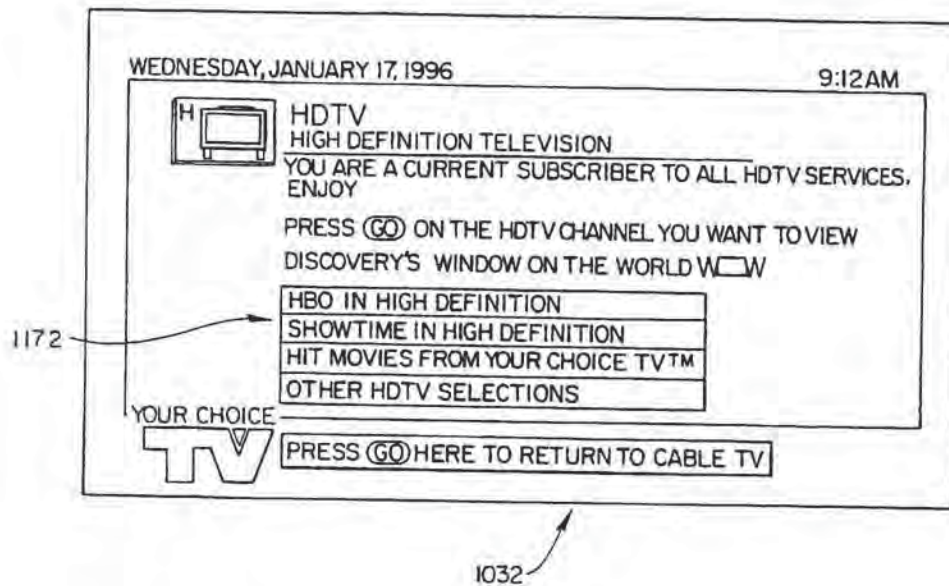


Fig. 22

1170

Fig. 23

ADVANCED SET TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS

RELATED APPLICATIONS

This application is a continuation-in-part of application Ser. No. 07/991,074 filed Dec. 9, 1992 entitled TELEVISION PROGRAM PACKAGING AND DELIVERY SYSTEM WITH MENU DRIVEN SUBSCRIBER ACCESS. The following other continuation-in-part applications, also based on the above-referenced patent application, are incorporated herein by reference:

Ser. No. 08/160,281, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed on Dec. 2, 1993;

Ser. No. 08/160,280, entitled NETWORK CONTROLLER FOR CABLE TELEVISION DELIVERY SYSTEMS, filed on Dec. 2, 1993;

Ser. No. 08/160,282, entitled AN OPERATIONS CENTER FOR A TELEVISION PROGRAM PACKAGING AND DELIVERY SYSTEM, filed on Dec. 2, 1993;

Ser. No. 08/160,193, entitled SET TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed on Dec. 2, 1993;

Ser. No. 08/160,283, entitled DIGITAL CABLE HEAD-END FOR CABLE TELEVISION DELIVERY SYSTEM, filed on Dec. 2, 1993.

TECHNICAL FIELD

The invention relates to television entertainment systems for providing television programming to consumer homes. More particularly, the invention relates to a set top terminal for use with a program delivery system with menu selection of programs.

BACKGROUND OF THE INVENTION

Advances in television entertainment have been primarily driven by breakthroughs in technology. In 1939, advances on Vladimir Zworykin's picture tube provided the stimulus for NBC to begin its first regular broadcasts. In 1975, advances in satellite technology provided consumers with increased programming to homes.

Many of these technology breakthroughs have produced inconvenient systems for consumers. One example is the ubiquitous three remote control home, having a separate and unique remote control for the TV, cable box and VCR. More recently, technology has provided cable users in certain parts of the country with 100 channels of programming. This increased program capacity is beyond the ability of many consumers to use effectively. No method of managing the program choices has been provided to consumers.

Consumers are demanding that future advances in television entertainment, particularly programs and program choices, be presented to the consumer in a user friendly manner. Consumer preferences, instead of technological breakthroughs, will drive the television entertainment market for at least the next 20 years. As computer vendors have experienced a switch from marketing new technology in computer hardware to marketing better usability, interfaces and service, the television entertainment industry will also experience a switch from new technology driving the market to consumer usability driving the market.

Consumers want products incorporating new technology that are useful, and will no longer purchase new technology

for the sake of novelty or status. Technological advances in sophisticated hardware are beginning to surpass the capability of the average consumer to use the new technology. Careful engineering must be done to make entertainment products incorporating new technology useful and desired by consumers.

In order for new television entertainment products to be successful, the products must satisfy consumer demands. TV consumers wish to go from limited viewing choices to a variety of choices, from no control of programming to complete control. Consumers wish to advance from cumbersome and inconvenient television to easy and convenient television and keep costs down. Consumers do not wish to pay for one hundred channels when due to lack of programming information, they seldom, if ever, watch programming on many of these channels.

The concepts of interactive television, high definition television and 300 channel cable systems in consumer homes will not sell if they are not packaged, delivered and presented in a useable fashion to consumers. The problem is that TV programming is not being delivered and presented to consumers in a user friendly manner.

Consumers are already being bombarded with programming options, numerous "free" cable channels, subscription cable channels and pay-per-view choices. Any further increase in TV entertainment choices, without a user friendly presentation and approach, will likely bewilder viewers with a mind-numbing array of choices.

The TV industry has traditionally marketed and sold its programs to consumers in bulk, such as continuous feed broadcast and long-term subscriptions to movie channels. The TV industry is unable to sell its programming in large quantities on a unit per unit basis, such as the ordering of one program. Consumers prefer a unit sales approach because it keeps costs down and allows the consumer to be more selective in their viewing.

In addition, viewership fragmentation, which has already begun, will increase. Programming not presented in a user friendly manner will suffer with a decrease in viewership and revenue. As programming presentation becomes more user friendly, users seek additional features and functional capabilities.

What is needed is a system which can deliver and present television programming through a user friendly interface which allows the consumer to easily select from among the many program choices.

What is needed is a set top converter that provides a user friendly interface for subscribers to access television programs.

What is needed is a set top converter with enhanced functionality.

What is needed is a set top converter that provides users with advanced features and capabilities.

What is needed is a method that allows efficient access to hundreds of television programming options.

What is needed is technology that upgrades the functionality of existing set top converters.

What is needed is hardware that provides an upgrade capability allowing the use of existing set top converter technology in advanced program delivery systems.

What is needed is a set top converter that provides an upstream communications capability between the set top converter and cable headend.

What is needed is a set top converter that provides a capability of generating menus for display.

What is needed is a set top converter that provides a simple way to select a program from a menu.

What is needed is a set top converter that allows users to subscribe on-screen to specialty channels.

What is needed is a set top converter that monitors subscriber viewing choices for statistical purposes.

What is needed is a set top converter that provides sophisticated on-screen television menus which can incorporate still video and moving video.

What is needed is a set top converter that provides a capability of scaling and redirecting video for menus. The present invention is addressed to fulfill these needs.

SUMMARY OF INVENTION

The present invention is a set top converter box or terminal for a television program delivery system. More specifically, the present invention is an advanced set top converter box that acts as a terminal in the viewer home. The set top terminal is a key component of a digital cable television delivery system. The set top terminal is an upgradeable system that provides for the decompression of digital program signals. The preferred set top terminal provides both a menu generation capability as well as a number of advanced features and functional capabilities.

The set top terminal of the present invention may be achieved through a set of hardware upgrades to any of the following embodiments: (1) an existing set top converter upgraded with a circuit card (which has a microprocessor electronically connected to the set top converter); (2) an industry standard decompression converter upgradeable by either an upgrade module or a menu generation card, and (3) a set top converter box capable of both decompression and menu generation. The hardware upgrades provide additional advanced features and functional capabilities to any of these embodiments.

A number of advanced features and functional capabilities are supported by the preferred set top terminal. This set top terminal provides subscribers with a picture-on-picture capability without requiring a special television to support the capability. The set top terminal also supports a TV guide service, which provides subscribers with information on all programming available at its particular subscriber location. The set top terminal further includes the capability of querying viewers to establish, among other things, favorite channel lists, personal profile data and mood information. The set top terminal allows the subscriber to view promotional menus on future programming events.

The set top terminal supports additional capabilities using its hardware upgrades that allow subscribers to use other interactive services, for example, to engage in on-line question and answer sessions, to order and confirm airline tickets, and to access a variety of other data services. The set top terminal makes use of a digital tuner as a hardware upgrade to provide subscribers with a digital audio capability.

The preferred set top terminal may be used to control video tape machines, thereby simplifying the recording of programs. The set top terminal can, in conjunction with the program delivery system, easily support high definition television (HDTV). For subscribers living in remote locations, the set top terminal accommodates backyard satellite systems. In addition to all the features that the set top terminal supports with its current internal programming and upgradeability, additional features may be added or existing features increased through remote reprogramming of the set top terminal 220.

It is an object of the invention to provide a user friendly interface for subscribers to access television programs.

It is an object of the invention to allow users to easily navigate through hundreds of programming choices using on-screen menus.

It is an object of this invention to efficiently access hundreds of television programming options.

It is an object of this invention to upgrade the functionality of existing set top converters.

It is an object of this invention to provide an upgrade capability allowing the use of existing set top converter technology in an advanced program delivery system.

It is an object of this invention to provide an upstream communications capability between the set top converter and cable headend.

It is an object of this invention to provide a set top terminal capable of generating menus for display.

It is an object of this invention to allow users to subscribe on-screen to specialty channels.

It is an object of this invention to monitor subscriber viewing choices for statistical purposes.

It is an object of this invention to provide sophisticated on-screen television menus which can incorporate still video and moving video.

These and other objects and advantages of the invention will become obvious to those skilled in the art upon review of the following description, the attached drawings and appended claims.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram of the primary components of the television delivery system.

FIG. 2 is an overview of the television delivery system operations.

FIG. 3 is a schematic of the operation of the primary components of the system.

FIG. 4 is a block diagram of the hardware components of the set top terminal.

FIG. 5a is a perspective front view of a set top terminal.

FIG. 5b is a perspective rear view of a set top terminal.

FIG. 6 is a schematic of a Turbo card upgrade for a set top terminal.

FIG. 7a is a drawing of a frame format for program control information signal.

FIG. 7b is a drawing of a frame format for a polling response from the set top terminal.

FIG. 8 is a drawing of the basic menus used in the present invention, including the ten major menus represented by icons.

FIG. 9a is a schematic of a basic decompression box with upgrade module and associated connections.

FIG. 9b is a schematic of an alternative embodiment of a simple decompression box with upgrade module and associated connections.

FIG. 10 is a more detailed block diagram of the components of a simple decompression box with upgrade module.

FIG. 11 is a schematic of the set top terminal's upstream data transmission hardware.

FIG. 12a is a schematic showing the components of the Level A, B, and C hardware upgrades.

FIG. 12b is a schematic showing the components of the Level D hardware upgrade.

FIG. 13a is a schematic showing the two parts of a remote control unit.

FIG. 13b is a drawing of the preferred remote control unit.

FIG. 14 is a diagram of the components of a set top terminal having a picture-on-picture capability.

FIG. 15 is a drawing of a menu related to program catalogue services.

FIGS. 16a through 16d are drawings of viewer querying and mood question menus.

FIGS. 17a and 17b are drawings of the set top terminal hardware components that accommodate transparent channel switching.

FIG. 18 is a drawing of an interactive television promotional menu for a set top terminal hardware upgrade.

FIGS. 19a and 19b are drawings of submenus for interactive television services using hardware upgrade Level A.

FIGS. 20a through 20d are drawings of interactive services using hardware upgrade Level B which are related to on-screen airline reservations.

FIG. 21 is a drawing of a menu for digital audio services.

FIG. 22 is a drawing of a menu related to program guide services.

FIG. 23 is a drawing of a menu related to high definition television (HDTV) programming.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A. Television Program Delivery System Description

1. Introduction

FIG. 1 shows the present invention as part of an expanded cable television program delivery system 200 that dramatically increases programming capacity using compressed transmission of television program signals. Developments in digital bandwidth compression technology now allow much greater throughput of television program signals over existing or slightly modified transmission media. The program delivery system 200 shown provides subscribers with a user friendly interface to operate and exploit a six-fold or more increase in current program delivery capability.

Subscribers are able to access an expanded television program package and view selected programs through a menu-driven access scheme that allows each subscriber to select individual programs by sequencing a series of menus. The menus are sequenced by the subscriber using simple alpha-numeric and iconic character access or moving a cursor or highlight bar on the TV screen to access desired programs by simply pressing a single button, rather than recalling from memory and pressing the actual two or more digit numeric number assigned to a selection. Thus, with the press of a single button, the subscriber can advance from one menu to the next. In this fashion, the subscriber can sequence the menus and select a program from any given menu. The programs are grouped by category so that similar program offerings are found on the same menu.

2. Major System Components

In its most basic form, the system uses a program delivery system 200 in conjunction with a conventional concatenated cable television system 210. The program delivery system 200 generally includes (i) at least one operations center 202, where program packaging and control information are created and then assembled in the form of digital data, (ii) a digital compression system, where the digital data is compressed, combined/multiplexed, encoded, and mapped

into digital signals for satellite transmission to the cable headend 208, and (iii) a set of in-home decompressors. The program delivery system 200 transports the digital signals to the cable headend 208 where the signals are transmitted through a concatenated cable television system 220. Within the cable headend 208, the received signals may be decoded, demultiplexed, managed by a local central distribution and switching mechanism, combined and then transmitted to the set top terminal 220 located in each subscriber's home over the cable system 210. Although concatenated cable systems 210 are the most prevalent transmission media to the home, telephone lines, cellular networks, fiber optics, Personal Communication Networks and similar technology for transmitting to the home can be used interchangeably with this program delivery system 200.

The delivery system 200 has a reception region 207 with an in-home decompression capability. This capability is performed by a decompressor housed within a set top terminal 220 in each subscriber's home. The decompressor remains transparent from the subscriber's point of view and allows any of the compressed signals to be demultiplexed and individually extracted from the composite data stream and then individually decompressed upon selection by the subscriber. The decompressed video signals are converted into analog signals for television display. Such analog signals include NTSC formatted signals for use by a standard television. Control signals are likewise extracted and decompressed and then either executed immediately or placed in local storage such as a RAM. Multiple sets of decompression hardware may be used to decompress video and control signals. The set top terminal 220 may then overlay or combine different signals to form the desired display on the subscriber's television. Graphics on video or picture-on-picture are examples of such a display.

Although a single digital compression standard (e.g., MPEG) may be used for both the program delivery system 200 and the concatenated cable system 210, the compression technique used may differ between the two systems. When the compression standards differ between the two media, the signals received by the cable headend 208 must be decompressed before transmission from the headend 208 to the set top terminals 220. Subsequently, the cable headend 208 must recompress and transmit the signals to the set top terminal 220, which would then decompress the signals using a specific decompression algorithm.

The video signals and program control signals received by the set top terminal 220 correspond to specific television programs and menu selections that each subscriber may access through a subscriber interface. The subscriber interface is a device with buttons located on the set top terminal 220 or on a portable remote control 900. In the preferred system embodiment, the subscriber interface is a combined alpha-character, numeric and iconic remote control device 900, which provides direct or menu-driven program access. The preferred subscriber interface also contains cursor movement and go buttons as well as alpha, numeric and iconic buttons. This subscriber interface and menu arrangement enables the subscriber to sequence through menus by choosing from among several menu options that are displayed on the television screen. In addition, a user may bypass several menu screens and immediately choose a program by selecting the appropriate alpha-character, numeric or iconic combinations on the subscriber interface. In the preferred embodiment, the set top terminal 220 generates the menus that are displayed on the television by creating arrays of particular menu templates, and the set top terminal 220 displays a specific menu or submenu option for each available video signal.

3. Operations Center and Digital Compression System

The operations center 202 performs two primary services, packaging television programs and generating the program control information signal. At the operations center 202, television programs are received from external program sources in both analog and digital form. FIG. 2 shows an embodiment of the operations center receiving signals from various external sources 222. Examples of the external program sources are sporting events, children's programs, specialty channels, news or any other program source that can provide audio or visual signals. Once the programs are received from the external program sources, the operations center 202 digitizes (and preferably compresses) any program signals received in analog form. The operations center 202 may also maintain an internal storage of programs. The internally stored programs may be in analog or digital form and stored on permanent or volatile memory sources, including magnetic tape or RAM. Subsequent to receiving programming, the operations center 202 packages the programs into the groups and categories which provide the optimal marketing of the programs to subscribers. For example, the operations center 202 may package the same programs into different categories and menus for weekday, prime-time viewing and Saturday afternoon viewing. Also, the operations center 202 packages the television programs in a manner that enables both the various menus to easily represent the programs and the subscribers to easily access the programs through the menus.

The packaging of the digital signals is typically performed at the operations center 202 by computer assisted packaging equipment (CAP). The CAP system normally includes at least one computer monitor, keyboard, mouse, and standard video editing equipment. A programmer packages the signals by entering certain information into the CAP. This information includes the date, time slot, and program category of the various programs. The programmer and the CAP utilize demographic data and ratings in performing the packaging tasks. After the programmer selects the various programs from a pool of available programs and inputs the requisite information, the programmer, with assistance from the CAP, can select the price and allocate transponder space for the various programs. After the process is complete, the CAP displays draft menus or program schedules that correspond to the entries of the programmer. The CAP may also graphically display allocation of transponder space. The programmer may edit the menus and transponder allocation several times until satisfied with the programming schedule. During the editing, the programmer may direct the exact location of any program name on a menu with simple commands to the CAP.

The packaging process also accounts for any groupings by satellite transponder which are necessary. The operations center 202 may send different groups of programs to different cable headends 208 and/or set top terminals 220. One way the operations center 202 may accomplish this task is to send different program packages to each transponder. Each transponder, or set of transponders, then relays a specific program package to specific cable headends 208 and/or set top terminals 220. The allocation of transponder space is an important task performed by the operations center 202.

The operations center 202 may also "insert" directions for filling local available program time in the packaged signal to enable local cable and television companies to fill the program time with local advertising and/or local programming. Consequently, the local cable headends 208 are not constrained to show only programs transmitted from the operations center 202. New set top converters will incorpo-

rate both digital and analog channels. Therefore, the cable headend 208 may combine analog signals with the digital signals prior to transmitting the program signals to the set top terminals 220.

After the CAP packages the programs, it creates a program control information signal to be delivered with the program package to the cable headend 208 and/or set top terminal 220. The program control information signal contains a description of the contents of the program package, commands to be sent to the cable headend 208 and/or set top terminal 220, and other information relevant to the signal transmission.

In addition to packaging the signal, the operations center 202 employs digital compression techniques to increase existing satellite transponder capacity by at least a 4:1 ratio, resulting in a four-fold increase in program delivery capability. A number of digital compression algorithms currently exist which can achieve the resultant increase in capacity and improved signal quality desired for the system. The algorithms generally use one or more of three basic digital compression techniques: (1) within-frame (intraframe) compression, (2) frame-to-frame (interframe) compression, and (3) within carrier compression. Specifically, in the preferred embodiment, the MPEG 2 compression method is used. After digital compression, the signals are combined (multiplexed) and encoded. The combined signal is subsequently transmitted to various uplink sites 204.

There may be a single uplink site 204 or multiple uplink sites (represented by 204', shown in phantom in FIG. 1) for each operation center 202. The uplink sites 204 may either be located in the same geographical place or may be located remotely from the operations center 202. Once the composite signal is transmitted to the uplink sites 204, the signal may be multiplexed with other signals, modulated, upconverted and amplified for transmission over satellite. Multiple cable headends 208 may receive such transmissions.

In addition to multiple uplinks, the delivery system 200 may also contain multiple operations centers. The preferred method for using multiple operations centers is to designate one of the operations centers as a master operations center and to designate the remaining operations centers as slave operations centers. In this configuration, the master operations center coordinates various functions among the slave operations centers such as synchronization of simultaneous transmissions and distributes the operations workload efficiently.

4. Cable Headend

After the operations center 202 has compressed and encoded the program signals and transmitted the signals to the satellite, the cable headend 208 receives and further processes the signals before they are relayed to each set top terminal 220. Each cable headend site is generally equipped with multiple satellite receiver dishes. Each dish is capable of handling multiple transponder signals from a single satellite and sometimes from multiple satellites.

As an intermediary between the set top terminals 220 and the operations center 202 (or other remote site), the cable headend 208 performs two primary functions. First, the cable headend 208 acts as a distribution center, or signal processor, by relaying the program signal to the set top terminal 220 in each subscriber's home. In addition, the cable headend 208 acts as a network controller 214 by receiving information from each set top terminal 220 and passing such information on to an information gathering site such as the operations center 202.

FIG. 3 shows an embodiment where the cable headend 208 and the subscriber's home are linked by certain com-

munications media 216. In this particular embodiment, analog signals, digitally compressed signals, other digital signals and up-stream/interactivity signals are sent and received over the media 216. The cable headend 208 provides such signaling capabilities in its dual roles as a signal processor 209 and network controller 214.

As a signal processor 209, the cable headend 208 prepares the program signals that are received by the cable headend 208 for transmission to each set top terminal 220. In the preferred system, the signal processor 209 re-routes or demultiplexes and recombines the signals and digital information received from the operations center 202 and allocates different portions of the signal to different frequency ranges. Cable headends 208 which offer different subscribers different program offerings may allocate the program signals from the operations center 202 in various manners to accommodate different viewers. The signal processor 209 may also incorporate local programming and/or local advertisements into the program signal and forward the revised signal to the set top terminals 220. To accommodate this local programming availability, the signal processor 209 must combine the local signal in digital or analog form with the operations center program signals. If the local cable system uses a compression standard that is different than the one used by the operations center 202, the signal processor 209 must also decompress and recompress incoming signals so they may be properly formatted for transmission to the set top terminals 220. This process becomes less important as standards develop (i.e., MPEG 2). In addition, the signal processor 209 performs any necessary signal decryption and/or encryption.

As a network controller 214, the cable headend 208 performs the system control functions for the system. The primary function of the network controller 214 is to manage the configuration of the set top terminals 220 and process signals received from the set top terminals 220. In the preferred embodiment, the network controller 214 monitors, among other things, automatic poll-back responses from the set top terminals 220 remotely located at each subscribers' home. The polling and automatic report-back cycle occurs frequently enough to allow the network controller 224 to maintain accurate account and billing information as well as monitor authorized channel access. In the simplest embodiment, information to be sent to the network controller 224 will be stored in RAM within each subscriber's set top terminal 220 and will be retrieved only upon polling by the network controller 214. Retrieval may, for example, occur on a daily, weekly or monthly basis. The network controller 214 allows the system to maintain complete information on all programs watched using a particular set top terminal 220.

The network controller 214 is also able to respond to the immediate needs of a set top terminal 220 by modifying a program control information signal received from the operations center 202. Therefore, the network controller 214 enables the delivery system to adapt to the specific requirements of individual set top terminals 220 when the requirements cannot be provided to the operations center 202 in advance. In other words, the network controller 224 is able to perform "on the fly programming" changes. With this capability, the network controller 214 can handle sophisticated local programming needs such as, for example, interactive television services, split screen video, and selection of different foreign languages for the same video. In addition, the network controller 214 controls and monitors all compressors and decompressors in the system.

The delivery system 200 and digital compression of the preferred embodiment provides a one-way path from the

operations center 202 to the cable headend 208. Status and billing information is sent from the set top terminal 220 to the network controller 214 at the cable headend 208 and not directly to the operations center 202. Thus, program monitoring and selection control will take place only at the cable headend 208 by the local cable company and its decentralized network controllers 214 (i.e., decentralized relative to the operations center 202, which is central to the program delivery system 200). The local cable company will in turn be in communication with the operations center 202 or a regional control center (not shown) which accumulates return data from the set top terminal 220 for statistics or billing purposes. In alternative system embodiments, the operations center 202 and the statistical and billing sites are collocated. Further, telephone lines with modems are used to transfer information from the set top terminal 220 to the statistical and billing sites.

5. Set Top Terminal

The set top terminal 220 is the portion of the delivery system 200 that resides in the home of a subscriber. The set top terminal 220 is usually located above or below the subscriber's television, but it may be placed anywhere in or near the subscriber's home as long as it is within the range of the subscriber's remote control device 900. In some aspects, the set top terminal 220 may resemble converter boxes already used by many cable systems. For instance, each set top terminal 220 may include a variety of error detection, decryption, and coding techniques such as anti-taping encoding. However, it will become apparent from the discussion below that the set top terminal 220 is able to perform many functions that an ordinary converter box cannot perform.

The set top terminal 220 has a plurality of input and output ports to enable it to communicate with other local and remote devices. The set top terminal 220 has an input port that receives information from the cable headend 208. In addition, the unit has at least two output ports which provide communications from the set top terminal 220 to a television and a VCR. Certain menu selections may cause the set top terminal 220 to send control signals directly to the VCR to automatically program or operate the VCR. Also, the set top terminal 220 contains a phone jack which can be used for maintenance, trouble shooting, reprogramming and additional customer features. The set top terminal 220 may also contain stereo/audio output terminals and a satellite dish input port.

Functionally, the set top terminal 220 is the last component in the delivery system chain. The set top terminal 220 receives compressed program and control signals from the cable headend 208 (or, in some cases, directly from the operations center 202). After the set top terminal 220 receives the individually compressed program and control signals, the signals are demultiplexed, decompressed, converted to analog signals (if necessary) and either placed in local storage (from which the menu template may be created), executed immediately, or sent directly to the television screen.

After processing certain signals received from the cable headend 208, the set top terminal 220 is able to store menu templates for creating menus that are displayed on a subscriber's television by using an array of menu templates. Before a menu can be constructed, menu templates must be created and sent to the set top terminal 220 for storage. A microprocessor uses the control signals received from the operations center 202 or cable headend 208 to generate the menu templates for storage. Each menu template may be

stored in volatile memory in the set top terminal 220. When the set top terminal receives template information it demultiplexes the program control signals received from the cable headend 208 into four primary parts: video, graphics, program logic and text. Each menu template represents a different portion of a whole menu, such as a menu background, television logo, cursor highlight overlay, or other miscellaneous components needed to build a menu. The menu templates may be deleted or altered using control signals received from the operations center 202 or cable headend 208.

Once the menu templates have been stored in memory, the set top terminal 220 can generate the appropriate menus. In the preferred embodiment, the basic menu format information is stored in memory located within the set top terminal 220 so that the microprocessor may locally access the information from the set top terminal instead of from an incoming signal. The microprocessor next generates the appropriate menus from the menu templates and the other menu information stored in memory. The set top terminal 220 then displays specific menus on the subscriber's television screen that correspond to the inputs the subscriber selects.

If the subscriber selects a specific program from a menu, the set top terminal 220 determines on which channel the program is being shown, demultiplexes and extracts the single channel transmitted from the cable headend 208. The set top terminal 220 then decompresses the channel and, if necessary, converts the program signal to an analog NTSC signal to enable the subscriber to view the selected program. The set top terminal 220 can be equipped to decompress more than one program signal, but this would unnecessarily add to the cost of the unit since a subscriber will generally only view one program at a time. However, two or three decompressors may be desirable to provide picture-on-picture capability, control signal decompression, enhanced channel switching or like features.

In addition to menu information, the set top terminal 220 may also store text transmitted from the cable headend 208 or the operations center 202. The text may inform the subscriber about upcoming events, billing and account status, new subscriptions, or other relevant information. The text will be stored in an appropriate memory location depending on the frequency and the duration of the use of the textual message.

Also, optional upgrades are available to enhance the performance of a subscriber's set top terminal 220. These upgrades may consist of a cartridge or computer card (not shown) that is inserted into an expansion slot in the set top terminal 220 or may consist of a feature offered by the cable headend 208 or operations center 202 to which the user may subscribe. Available upgrades may include on line data base services, interactive multi-media services, access to digital radio channels, and other services.

In the simplest embodiment, available converter boxes such as those manufactured by General Instruments or Scientific Atlanta, may be modified and upgraded to perform the functions of a set top terminal 220. The preferred upgrade is a circuit card with a microprocessor which is electronically connected to or inserted into the converter box.

6. Remote Control Device

The primary conduit for communication between the subscriber and the set top terminal 220 is through the subscriber interface, preferably a remote control device 200. Through this interface, the subscriber may select desired

programming through the system's menu-driven scheme or by directly accessing a specific channel by entering the actual channel number. Using the interface, the subscriber can navigate through a series of informative program selection menus. By using menu-driven, iconic or alpha-character access, the subscriber can access desired programs by simply pressing a single button rather than recalling from memory and pressing the actual channel number to make a selection. The subscriber can access regular broadcast and basic cable television stations by using either the numeric keys on the remote control 900 (pressing the corresponding channel number), or one of the menu icon selection options.

In addition to enabling the subscriber to easily interact with the cable system 200, the physical characteristics of the subscriber interface 900 should also add to the user friendliness of the system. The remote control 900 should easily fit in the palm of the user's hand. The buttons of the preferred remote control 900 contain pictorial symbols that are easily identifiable by the subscriber. Also, buttons that perform similar functions may be color coordinated and consist of distinguishing textures to increase the user friendliness of the system.

7. Menu-Driven Program Selection

The menu-driven scheme provides the subscriber with one-step access to all major menus, ranging from hit movies to sport specials to specialty programs. From any of the major menus, the subscriber can in turn access submenus and minor menus by cursor or alpha-character access.

There are two different types of menus utilized by the preferred embodiment, the Program Selection menus and the During Program menus. The first series of menus, Program Selection menus, consists of an Introductory, a Home, Major menus, and Submenus. The second series of menus, During Program menus, consists of two primary types, Hidden menus and the Program Overlay menus. Immediately after the subscriber turns on the set top terminal 220, the Introductory menu welcomes the subscriber to the system. The Introductory menu may display important announcements from the local cable franchise, advertisements from the cable provider, or other types of messages. In addition, the Introductory menu can inform the subscriber if the cable headend 208 has sent a personal message to the subscriber's particular set top terminal 220.

After the Introductory menu has been displayed the subscriber may advance to the next level of menus, namely the Home menu. In the preferred embodiment, after a certain period of time, the cable system will advance the subscriber by default to the Home menu. From the Home menu, the subscriber is able to access all of the programming options. The subscriber may either select a program directly by entering the appropriate channel number from the remote control 900, or the subscriber may sequence through incremental levels of menu options starting from the Home menu. The Home menu lists categories that correspond to the first level of menus called Major menus.

If the subscriber chooses to sequence through subsequent menus, the subscriber will be forwarded to the Major menu that corresponds to the chosen category from the Home menu. The Major menus further refine a subscriber's search and help guide the subscriber to the selection of his choice.

From the Major menus, the subscriber may access several submenus. From each submenu, the subscriber may access other submenus until the subscriber finds a desired television program. Similar to the Major menu, each successive level of Submenus further refines the subscriber's search. The system also enables the subscriber to skip certain menus or

submenus and directly access a specific menu or television program by entering the appropriate commands on the remote control 900.

The During program menus (including Hidden Menus and Program Overlay Menus) are displayed by the set top terminal 220 only after the subscriber has selected a television program. In order to avoid disturbing the subscriber, the set top terminal 220 does not display the Hidden Menus until the subscriber selects the appropriate option to display a Hidden Menu. The Hidden Menus contain options that are relevant to the program selected by the viewer. For example, a Hidden Menu may contain options that enable a subscriber to enter an interactive mode or escape from the selected program.

Program Overlay Menus are similar to Hidden Menus because they occur during a program and are related to the program being viewed. However, the Program Overlay Menus are displayed concurrently with the program selected by the subscriber. Most Program Overlay Menus are small enough on the screen to allow the subscriber to continue viewing the selected program comfortably.

B. Detailed Set Top Terminal Description

The set top terminal 220 receives and manipulates signals from the cable headend 208. The set top terminal 220 is equipped with local computer memory and the capability of interpreting the digitally compressed signal to produce menus for the subscriber. The remote control 900 communicates the subscriber's selections to the set top terminal 220. The subscriber's selections are generally based upon menus or other prompts displayed on the television screen.

It is preferred that the signal reaches the subscriber's home in a compressed format and is decompressed prior to viewing. Included in the delivered program signal is information that enables equipment at the subscriber's home to display menus for choosing particular programs. Depending on the particular embodiment, the television program signal may arrive at the subscriber's home through one or more connections such as coaxial cables, fiber cables, twisted pairs, cellular telephone connections, or personal communications network (PCN) hookups.

The program control information signal is generated by the operations center 202 and provides the network controller 214 with data on the scheduling and description of programs. In an alternate configuration, this data is sent directly to the set top terminal 220 for display to the subscriber. In the preferred embodiment, the program control information signal is stored and modified by the network controller 214 and sent to the set top terminal 220 in the form of a set top terminal control information stream (STTCIS). The set top terminal 220 integrates either the program control information signal or the STTCIS with data stored in the memory of the set top terminal 220 to generate on-screen menus that assist the subscriber in choosing programs for display.

The types of information that can be sent using the program control signal include: number of program categories, names of program categories, what channels are assigned to a specific category (such as specialty channels), names of channels, names of programs on each channel, program start times, length of programs, description of programs, menu assignment for each program, pricing, whether there is a sample video clip for advertisement for the program, and any other program, menu or product information.

With a minimal amount of information being communicated to the set top terminal 220 on a regular basis, the set

top terminal 220 is able to determine the proper menu location for each program and the proper time and channel to activate for the subscriber after a menu selection. The program control information signal and STTCIS can be formatted in a variety of ways and the on-screen menus can be produced using many different methods. For instance, if the program control information signal carries no menu format information, the menu format for creating the menus can be fixed in ROM at the set top terminal 220. In the preferred embodiment, the menu format information is stored at the set top terminal 220 in a temporary memory device such as a RAM or EPROM. New menu format information is sent via the program control information signal or the STTCIS to the set top terminals 200 whenever a change to a menu format is desired.

In the simplest embodiment, the menu formats remain fixed and only the text changes. In this way the program control information signal can be limited to primarily text and a text generator can be employed in the set top terminal 220. Another simple embodiment uses a separate channel full-time (large bandwidth) just for the menu information.

Live video signals may be used in windows of certain menus. These video signals can be transmitted using the program control information signal or STTCIS, or can be taken off channels being transmitted simultaneously with the menu display. Video for menus, promos or demos may be sent to the set top terminal 220 in several formats, including (1) on a dedicated channel, (2) on a regular program channel and scaled to size, or (3) along with the program control information signal. However, in the preferred embodiment, a large number of short promos or demo video is sent using a split screen technique on a dedicated channel. A multiple window technique may be used with the menus to display a description of a program and one or more video frames that assist the subscriber in selecting the program.

FIG. 4 shows the basic hardware components of the set top terminal 220. The set top terminal 220 has a tuner 603, digital demodulator 606, decryptor 600, and demultiplexers 609, 616 as well as audio equipment 612 and a remote control interface 626 for receiving and processing signals from the remote control unit 900. An optional modem 627 allows communication between a microprocessor 602 and the cable headend 208. An NTSC encoder 625 provides a standard NTSC video output.

The microprocessor 602 is capable of executing program instructions stored in memory. These instructions allow a user to access various menus by making selections on the remote control 900.

The manner in which the video is decompressed and the menus are generated from the program control information signal or STTCIS varies depending on the specific embodiment of the invention. Video decompressors 618 and 622 may be used if the video is compressed. The program control information signal may be demultiplexed into its component parts, and a video decompressor 618, graphic decompressor, text generator and video combiner 624 may be used to assist in creating the menus.

In addition to the menu format information that is stored in graphics memory, the set top terminal 220 also stores data, tracking those programs that have been selected for viewing. By gathering this data, the set top terminal 220 can maintain an accurate record of all programs accessed/watched by storing the data in EEPROM or RAM. Subsequently, this data can be transmitted to the cable headend 208, where it can be used in carrying out network control and monitoring functions. Such data transmissions between the set top

terminal 220 and cable headend 208 can be accomplished, for example, through upstream transmission over the cable network or over telephone lines through the use of telephone modems. Where upstream transmission over the cable network is used, the set top terminals 220 can complete data transmissions on a scheduled (e.g., using a polling response or status report to respond to polling requests sent from the cable headend 208) or as-needed (e.g., using a random access technique) basis.

FIG. 5a shows the front panel of the set top terminal 220, which includes an infrared sensor 630 and a series of LED displays 640. The LED displays 640 may indicate with an icon or a letter (e.g. A-K) the major menu currently selected by the set top terminal 220 or the channels selected directly by a user, or menu channel selections (e.g., from 1 to 50). Further displays may include current channel, time, volume level, sleep time, parental lock (security), account balance, use of a hardware upgrade, second channel being recorded by VCR, use of the Level D music hardware upgrade in a separate room, and any other displays useful to a subscriber to indicate the current status of the set top terminal 220. The LEDs 640 may also provide an indication of the digital audio channel currently tuned.

The set top terminal 220 includes a flapped opening 635 on its front that allows the insertion of a magnetic cartridge (or similar portable storage device, including optical disk, ROM, EPROM, etc. not shown). This cartridge opening 635 allows the set top terminal 220 to be upgraded or reprogrammed locally with the use of a magnetic tape cartridge.

On the top or cover of the set top terminal 220 are located pushbutton controls 645. Any function that can be performed on the remote 900 may also be performed at the set top terminal 220 using the duplicative pushbutton controls 645.

FIG. 5b shows the back of the set top terminal 220, which includes a pair of output terminals 650, pair of input terminals 652, pair of stereo/audio output terminals 654, satellite dish input port 656, telephone jack 658 and an RS-422 port 660. In addition, an upgrade port 662 and a cover plate 664 are held in place by a series of sheet metal screws. One of the output terminals 650 is for a television and the other is for a VCR. The set top terminal 220 is equipped to handle incoming signals on one or two cables using the input terminals 652. The phone jack 658 and an RS-232 or RS-422 port 660 are provided for maintenance, trouble shooting, reprogramming and additional customer features. In alternate embodiments, the telephone jack 658 may be used as the primary mode of communication between the cable headend 208 and the set top terminal 220. This connection is possible through the local telephone, cellular telephone or a personal communications network (PCN).

The basic programming of each set top terminal 220 is located on ROM within the set top terminal 220. Random access memory, the magnetic cartridge capability, and the expansion card slot 635 each allow upgrades and changes to be easily made to the set top terminal 220.

In the preferred embodiment, the set top terminal 220 includes a hardware upgrade port 662, in addition to expansion card slots. The hardware upgrade port 662 accommodates a four-wire (or more) connection for: (1) error corrected, decrypted data output of the set top terminal 220, (2) a control interface, (3) decompressed video output, and (4) a video input port. In the preferred embodiment, multiple wires are used to perform each of the four functions. The four sets of wires are combined in a single cable with a single multipin connector.

In the preferred embodiment, multipin connections may be used for the multiwire cable. The multipin connection 662 may range from DB9 to DB25. A variety of small computer systems interface (SCSI) ports may also be provided. Alternatively, four or more ports may be provided instead of the single port depicted.

Another port 662 is used to attach the various hardware upgrades described below to a set top terminal 220. The preferred embodiment has a number of hardware upgrades available for use with a set top terminal 220, including: (1) a Level A interactive unit, (2) a Level B interactive unit, (3) a Level C interactive unit with compact disc capability, (4) a Level D digital radio tuner for separate room use, and (5) a Level E information download unit. Each of these upgrades may be connected to the set top terminal 220 unit through the upgrade port 662 described earlier. The same four wires in a single cable described earlier may be used.

Existing set top converter boxes such as those made by Scientific Atlanta or General Instruments are presently unequipped to handle the menu selection system of the present invention. Thus, hardware modifications are necessary in order to use the menu selection system with existing set top converter technology.

A Turbo Card addition to a set top converter is depicted in FIG. 6. The Turbo Card 700 shown provides the additional functionality needed to utilize the menu system with existing set top converter technology. The primary functions the Turbo Card 700 adds to the set top converter are the interpreting of program control information signs, generating of menus, sequencing of menus, and, ultimately, the ability of the viewer to select a channel through the menu system without entering any channel identifying information. The turbo card also provides a method for a remote location, such as the cable headend 208, to receive information on programs watched and control the operation of the set top converter and Turbo Card 700. The programs watched information and control commands may be passed from the cable headend 208 to the Turbo Card 700 using telephone lines.

The primary components of the Turbo Card 700 are a PC chip CPU 702, a VGA graphic controller 704, a video combiner 706, logic circuitry 708, NTSC encoder 710, a receiver 712, demodulator 714, and a dialer 716. The Turbo Card 700 operates by receiving the program control information signal from the cable headend 208 through the coaxial cable. The logic circuitry 708 of the Turbo Card 700 receives data, infrared commands, and synchronization signals from the set top converter. Menu selections made by the viewer on the remote control 900 are received by the set top converter's IR equipment and passed through to the Turbo Card 700. The Turbo Card 700 interprets the IR signal and determines the program (or menu) the viewer has selected. The Turbo Card 700 modifies the IR command to send the program selection information to the set top converter 221. The modified IR command contains the channel information needed by the set top converter. Using the phone line and dialer 716, the Turbo Card 700 is able to transmit program access information to the cable headend 208.

In the preferred embodiment, program access information, that is what programs the viewer watched, is stored at each set top terminal 220 until it is polled by the network controller 214 using a polling request message format as shown in FIG. 7a. This frame format 920 consists of six fields, namely: (1) a leading flag 922 at the beginning of the message, (2) an address field 924, (3) a subscriber region designation 926, (4) a set top terminal identifier 928

that includes a polling command/response (or P/F) bit 930, (5) an information field 932, and (6) a trailing flag 934 at the end of the message. FIG. 7b shows a response frame format 920' (similar to the frame format 920 end, therefore, commonly numbered with the frame depicted in FIG. 7a, but with the prime indicator added for clarity) for information communicated by the set top terminal 220 to the network controller 214 in response to the polling request of FIG. 7a.

The eight-bit flag sequence 922 that appears at the beginning and end of a frame is used to establish and maintain synchronization. Such a sequence typically consists of a "01111110" bit-stream. The address field 924 designates a 4-bit address for a given set top terminal 220. The subscriber region designation 926 is a 4-bit field that indicates the geographical region in which the subscriber's set top terminal 220 is housed. The set top terminal identifier 928 is a 16-bit field that uniquely identifies each set top terminal 220 with a 15-bit designation followed by an appended P/F bit 930. Although field size is provided by this example, a variety of sizes can be used with the present invention.

The P/F bit 930 is used to command a polling response from the set top terminal 220 addressed, as described below. The response frame format 920' also provides a variable-length information field 932' for other data transmissions, such as information on system updates. The frame format 920' ends with an 8-bit flag (or trailing sag) 934' that is identical in format to the leading flag 922', as set forth above. Other frame formats (e.g., MPEG) will be apparent to one skilled in the art and can be easily adapted for use with the system.

As summarized above, images or programs may be selected for display by sequencing through a series of menus. FIG. 8 is an example of one possible structure for a series of menus. Generally, the sequence of menus is structured with an introductory menu, a home menu, various major menus and a multitude of submenus. The submenus can include promo menus and during program menus. For example, at the home menu portion of the sequence of menus and corresponding software routines, a subscriber may select one of the major menus and start a sequence of menu displays. Alternatively, a subscriber may go directly to a major menu by depressing a menu select button on remote control 900.

At any time during the menu sequence, the subscriber may depress a major menu button to move into another series of menus. In this way, a subscriber may move from major menu to major menu.

The various software subroutines executed by the microprocessor 602 allow a subscriber to sequence the menus, navigating through the various menus of the present invention. A subscriber may sequence back through menus or return to the home menu with a single touch of the home menu button on remote 900.

An introductory menu screen 1000 automatically appears upon power-up and initialization of the set top terminal 220. From this introductory menu screen 1000, the set top terminal software will normally advance the subscriber to the home menu screen 1010. The home menu 1010 is the basic menu that the subscriber will return to in order to make the first level of viewing decisions. When the set top terminal software is displaying the home menu 1010, the subscriber is able to access any television programming option. The software allows programming options to be entered through cursor movement on the screen and directly by button selection on the remote control 900.

In the normal progression through the menu screens, the software will forward the subscriber to a major menu screen

1020 in response to the subscriber's remote control 900 selection or highlighted cursor selection from the home menu screen 1010. The selections displayed on the home menu 1010 are for large categories of programming options.

Following the major menu 1020, the subscriber may navigate through one or more submenu screens 1050 from which the subscriber may choose one particular program for viewing. For most programming selections, the user will proceed from the home menu 1020 to a major menu 1020 and then to one or more submenus 1050. However, for certain programming options or functions of the set top terminal 220, the user may skip one or more menus in the sequence.

The During Program Menus 1200 are submenus enabled by the set top terminal software only after the subscriber has selected a television program. These menus provide the subscriber with additional functionality and/or additional information while viewing a selected program. The During Program Menus 1200 sequence can be further subdivided into at least two types of menus, Hidden Menus 1380 and Program Overlay Menus 1390.

To avoid disturbing a subscriber during viewing of a program, the Hidden Menus 1380 are not shown to the subscriber but instead "reside" at the set top terminal 220 microprocessor 602. The microprocessor 602 awaits a button entry either from the remote control 900 or set top terminal 220 buttons before executing or displaying any Hidden Menu 1380 options. The set top terminal software provides the subscriber with additional functions such as entering an interactive mode or escaping from a selected program through use of Hidden Menus 1380.

Program Overlay Menus 1390 are similar to Hidden Menus 1380. However, the Program Overlay Menus 1390 are overlaid onto portions of the displayed video and not hidden. The software for the Program Overlay Menus 1390 allows the subscriber to continue to watch the selected television program with audio but places graphical information on a portion of the television screen. Most Program Overlay Menus 1390 are graphically generated to cover small portions of video. Some Overlays 1390 which are by their nature more important than the program being viewed will overlay onto greater portions of the video. Examples of types of overlay menus 1390 include Notification Menus 1392 and Confirmation Menus 1394. In the preferred embodiment, the software for the Program Overlay Menus 1390 controls the reduction or scales down the (entire) programs video and redirects the video to a portion of the screen.

Submenus provide the cost of viewing the program and the program's length in hours and minutes. From the submenus, the subscriber is given at least three options: (1) to purchase a program, (2) to return to the previous menu, and (3) to press "go" and return to regular TV. The subscriber may also be given other options such as previewing the program.

Using an on-screen menu approach to program selection, there is nearly an unlimited number of menus that can be shown to the subscriber. The memory capability of the set top terminal 220 and the quantity of information that is sent using the program control information signal are the only limits on the number of menus and amount of information that can be displayed to the subscriber. The approach of using a series of menus in a simple tree sequence as both easy for the subscriber to use and simply implemented by the set top terminal 220 and remote control device 900 with cursor movement. A user interface software programmer

will find many obvious variations from the preferred embodiment described.

The set top terminal 220 generates and creates menus using, in part, information stored in its graphics memory. A background graphics file 800 will store menu backgrounds and a logo graphics file will store any necessary logos. A menu display and cursor graphics file will store menu display blocks and cursor highlight overlays as well as any other miscellaneous files needed to build the menus. Using this method of storing menus, the menus can be changed by reprogramming the graphics memory of the set top terminal 220 through instructions from either the network controller 214 or operations center 202.

The microprocessor 602 performs the steps required to create a menu using stored information. The microprocessor 602 fetches a background file, logo file, menu display and cursor file in most instances. The microprocessor 602 fetches text from long-term, intermediate-term, or short-term storage depending on where the text is stored. Using a video combiner (or like device), the stored information is combined with video and the entire image is sent to the television screen for display.

In the preferred embodiment, a graphics controller is used to assist the set top terminal 220 in generating menus. Menu generation by the set top terminal 220 begins with the building of a major menu screen, which includes background graphics for that major menu. The background graphics may include an upper sash across the top of the screen and a lower sash across the bottom of the screen. The background graphics may be generated from the background graphics file 800 in the memory files of the graphics memory (preferably EEPROM). In addition, logo graphics may be generated. Such graphics typically include an icon window, a cable company logo, a channel company logo, and two "go" buttons.

Preferably, the text for each major menu is generated separately by a text generator in the set top terminal 220. Those portions of the text that generally remain the same for a period of weeks or months may be stored in EEPROM or other local storage. Text which changes on a regular basis, such as the movie titles (or other program selections), is transmitted to the set top terminal 220 by either the operations center 202 or the network controller 214 of the cable headend 208. In this manner, the cable headend 208 may change the program selections available on any major menu 1020 by modifying the program control information signal sent by the operations center 202 and transmitting any changes using the STTCIS.

Day, date and time information are added to each major menu. This information is sent from the operations center 202, the cable headend 208 (signal processor 209 or network controller 224), the uplink site, or generated by the set top terminal 220 internally.

The creation and display of program description submenus is performed by the set top terminal 220 in a manner similar to that described above. Each submenu may be created in parts and combined before being sent to the television screen. Preferably, background graphics and upper and lower sashes are used. Likewise, a video window and half-strip window can be generated from information in storage on the EEPROM.

In addition to graphics and text, some submenus include windows that show video. Such video may be still or moving

pictures. Still pictures may be stored in a compressed format (such as JPEG) at the set top terminal 220. Video stills may be transmitted by the operations center 202 through the program control information signal from time to time.

Moving video picture is obtained directly from a current video feed as described above. Depending on video window size, this may require manipulation of the video signal, including scaling down the size of the video and redirecting the video to the portion of the menu screen which is within the video window of the menu. Alternatively, the video may be obtained from a split screen channel. Such a method involves the use of split screen video techniques to send multiple video clips on a single channel at a given time. The set top terminal 220 would scale the picture, if necessary, and redirect it to the correct position on the screen using known scaling and positioning techniques. Additional circuitry may be required in the set top terminal 220 to perform adequate scaling and repositioning.

To avoid the need for redirecting video into the portion of the screen which houses the video window, masking and menu graphics may be used to cover the portions of the channel video that are not needed. This masking technique allows the split screen video to remain in the same portion of the screen that it is transmitted by the operations center 202. The masking is then adjusted to cover the undesired portions of the screen. These masks are stored in the background graphics file similarly to other background files for menus.

The split screen video technique may also be used for promoting television programming. Since a great number of short video clips may be sent continuously, full or partial screen promotionals (or informationals) may be provided to the subscriber. With this large quantity of promotional video, the subscriber is given the opportunity to "graze" through new movie or television programming selections. The subscriber simply grazes from promotional video to promotional video until the desired television program is discovered.

C. Detailed Description of Advanced Set Top Terminal

1. Overview

The present invention relates to advances in the set top terminal 220 described above. In particular, the present invention may be achieved through a set of hardware upgrades or additions to the following embodiments: (1) an existing set top converter (not shown) upgraded with a Turbo Card 700 or the like; (2) an industry standard digital decompression converter box (as shown in FIGS. 9a and 9b below) upgradeable by either an upgrade module or a menu generation card, or (3) a set top terminal 220 capable of both decompression and menu generation. The set of hardware upgrades described below can be used to provide additional advanced features and functional capabilities to any of these embodiments.

Table A shows several exemplary hardware configurations that may be used to achieve the goals of the present invention. In particular, Table A shows four columns of set top converter technology, which may be modified to produce the various set top capabilities shown in the three rows of the table

TABLE A

	Existing Analog Set Top Converter	Set Top Converter With Digital Decompression Capability	Set Top Converter With Digital Decompression and Menu Generation Capabilities	Advanced Set Top Terminal
Decompression Capability	N/A	Built-In	Built-In	Built-In
Menu Generation Capability	Turbo Card	Upgrade Module or Menu Generation Card	Built-In	Built-In
Advanced Features	Level A-C Hardware Upgrades or Expansion Card	Level A-E Hardware Upgrades or Expansion Card	Level A-E Hardware Upgrades or Expansion Card	Built-In

The table shows the various inherent functional capabilities of each set top converter, and how each may be modified or upgraded, if necessary, to achieve the objectives of the present invention. From left to right, the columns of the table span the various alternatives for balancing those capabilities that may be built into set top converters or terminals, on the one hand, and those capabilities that can be provided through, for example, an upgrade module, expansion card or hardware upgrade of the present invention, on the other. This balance allows a designer or manufacturer of set top converters to choose between adding advanced functionality to an existing converter box or, instead, producing a converter with additional built-in features that increase cost and complexity of the converter or terminal.

The first column of Table A shows how an existing analog set top converter can be modified to provide menu generation capability through the use of the Turbo Card. In addition to the Turbo Card, such an existing analog set top converter may be further modified to provide any of the advanced features described below through the use of the Level A, Level B and Level C hardware upgrades or an expansion card. Such existing set top converter boxes are currently manufactured by Scientific Atlanta and General Instruments, among others. These converter boxes have been designed for use with analog waveforms and, as a result, digital decompression capabilities are not applicable.

The second column of Table A shows a set top converter with digital decompression capability. This converter is a simple decompression box which may eventually become the industry standard. The simple decompression boxes may be modified to provide the enhanced functionality of the present invention. For example, a simple decompression box may be modified to produce menu generation capability through the use of an upgrade module or menu generation card. In addition, other advanced features may be added to a simple decompression box through modifications that include any of the Level A through E hardware upgrades or an expansion card. Each of these modifications are described below.

The third column of Table A shows a set top converter that has built-in digital decompression and menu generation capabilities. Thus, in order to achieve the enhanced functionality of the present invention, other advanced features may be provided through hardware modification. Such modification may be accomplished through the use of any of the Level A through E hardware upgrades or the expansion card, as explained below.

The fourth column of Table A shows an advanced set top terminal having decompression, menu generation, and advanced functional capabilities. Each of these capabilities are built in to the terminal itself. In this way, achieving the enhanced performance of the set top terminal in accordance with the present invention would require no hardware modification.

In the preferred embodiment, the advanced set top terminal 220 of the present invention has the capability, among other things, of receiving tiered programming from the network controller. Tiered programming allows different users to view different video even though the subscribers are "tuned" to the same channel. For example, the network controller 214 may know the demographics of its subscribers through a database, by "learning" from prior subscriber choices, from an interactive selection, or from other means. Using the demographics information, the network controller 224 may target commercials to the correct audience by showing different commercials to subscribers with different demographics. Even though subscribers will believe they are "tuned" to one channel, each subscriber will be switched to a different channel for the tiered video. Alternatively, subscribers may be offered an option of several commercials from which to choose.

To accommodate foreign speaking subscribers, multiple audio channels for television programming may be provided. In this way, the subscriber may be shown menus of programs available in the subscriber's native language. The function of choosing the correct audio to correspond to the selected language may be handled by either the set top terminal 220 or the network controller 214 depending upon the configuration. Local programming in several languages or additional audio channels for a foreign language translation of a popular television program may be provided by the network controller 214. Using a picture-on-picture feature, sign language may be similarly made available to certain set top terminals 220 for the deaf. Also, a text overlay may easily be produced on the lower part of the screen for the deaf.

Typically, each video signal is received at the set top terminal 220 along with four audio channels. Two of these audio channels will preferably be used for left and right stereo audio reception of the video signal being displayed. The remaining two audio signals may be used for alternative languages. For example, where a video signal is received by the set top terminal 220, two of the audio channels will provide the stereo audio signals for that video in English, with the other two audio channels providing mono audio signals in French and Spanish. In this way, each video signal received at the set top terminal 220 can accommodate at least two foreign languages. Where stereo audio channels are not desired, the audio channels in English can be set to a single signal, providing mono audio reception, and increasing the multiple language audio channel capability to three foreign languages.

In other embodiments, the network controller 214 can act as a central computer and provide intra-set top terminal interactive games, inter-set top terminal interactive games, computer bulletin board type services, message services

(Electronic mail) etc. For example, a subscriber may play war games with five (anonymous) fellow subscribers each in their own home each operating a separate tank. The network controller 224 gathers the players via set top terminal 220 communications and acts as the referee. A bulletin board or message system can be set up to discuss a particular program such as "Twin Peaks Whodunit" for enthusiasts. These interactive features are further described below with the interactive services level B menu and the set top terminal hardware upgrade Level B interactive unit.

In order to achieve the required throughput of video and audio information for the system, digital compression is techniques for video are employed. As a result, the set top terminal 220 typically must decompress any digitally compressed program signals that it receives. Methods of decompression are a function of the compression technique used in the program delivery system.

There are three basic digital compression techniques: within-frame (intraframe), frame-to-frame (interframe), and within-carrier compression. Various compression methods may be used with these techniques. Such methods of compression, which include vector quantization and discrete cosine transform methodologies, are known to those skilled in the art.

Several standard digital formats representing both digitizing standards and compression standards have also been developed. For example, JPEG (joint photographic experts group) is a standard for single picture digitization. Motion picture digitization may be represented by standards such as MPEG or MPEG 2 (motion picture engineering group specification). In addition to these standards, other proprietary standards have been developed. Although MPEG and MPEG 2 for motion pictures are preferred in the present invention, any reliable digital format with compression may be used.

Various hybrids of the above compression techniques and methods have been developed by several companies including AT&T, Compression Labs, Inc., General Instruments, Scientific-Atlanta, Philips, and Zenith. Any of the compression techniques developed by these companies, as well as other techniques known to those skilled in the art, may be used with the present invention.

2. Advanced Set Top Terminal Major Components and Upgrades

a. Decompression Box with Upgrade Module

The preferred program delivery system uses digitally compressed signals and, as a result, the preferred subscriber equipment configuration must be capable of decompressing and processing such digitally compressed signals. FIG. 9a diagrams the basic interplay between an upgrade module 300 and a simple decompression box 302. The upgrade module 300 can be connected to the decompression box 302 through a port similar to the upgrade port 662 described above (FIG. 5b). The simple decompression box 302 shown is preferably a future industry standard decompression box capable of communicating with an upgrade module 300 to enhance functionality.

The upgrade module 300 provides menu generation capability to the simple decompression box 302. The microprocessor of the simple decompression box 302 communicates with the microprocessor in the upgrade module 300 to provide the full functionality of a set top terminal 220.

In the preferred embodiment, multipin connections may be used for a multiwire cable connecting the simple decompression box 302 with the upgrade module 300. The multipin connection may range from DB9 to DB25. A SCSI, or

small computer systems interface, port (not shown) may also be provided. Alternatively, four or more ports may be provided instead of the single port depicted. If a port is not provided, the upgrade module may, alternatively, be hardwired to the simple decompression box 302.

As represented generally at 304, the digital data set of output wires of the simple decompression box 302 will preferably output error corrected and decrypted data to the upgrade module 300. The second set of wires, providing the interface connection, allows the microprocessor in the upgrade module 300 to communicate with the microprocessor of the simple decompression box 302. In this manner, the video circuitry of the upgrade module 300 and the simple decompression box 302 may maintain synchronization. The third set of wires, providing the decompressed video output, provide the upgrade module 300 with a decompressed video signal to manipulate. The fourth set of wires, comprising the video input set, allows the simple decompression box 302 to accept a video signal that is a combined text, graphics, and video signal.

FIG. 9a further shows the CATV input 306, video input 308, and video and audio outputs 310, 312, as part of the simple decompression box 302. This embodiment reduces the component cost of upgrade module 300, and thus, is preferred. The upgrade module 300 may simply be a cartridge (not shown) insertable into the simple decompression box 302. Alternatively, as shown in commonly numbered FIG. 9b, the CATV input 306, video input 308 and video and audio outputs 310, 312 may be included as part of the upgrade module 300. In this embodiment, the simple decompression box 302 is primarily used for decompressing the video.

Referring to FIG. 10, the upgrade module 300 preferably includes the following circuitry: a video graphics and text demultiplexer 314; a text and graphics video plane combiner 316; a run length graphics decompressor 318; and, a run length compressed graphics memory 319 (nonvolatile RAM, ROM, EPROM, or EEPROM). By means of communications through the multiwire connection between the upgrade module 300 and the simple decompression box 302, compressed video and control signals may be demultiplexed by the demultiplexer 314 within the upgrade module 300. The run length graphics decompressor 318, through communications with the run length compressed graphics RAM 319, permits decompression of the input compressed video signal. The text and graphics video plane combiner 316 allows demultiplexed and decompressed signals to be output, through the simple decompression box 302, to a subscriber's television 222 showing both video and overlay menus with text.

An example of a component that can be used for the combiner 316 is an IC GENLOCK Signal Processor GSP500, manufactured by Integrated Circuit Systems, Inc., located at 2626 Van Buren Avenue, P.O. Box 968, Valley Forge, Pa. 19482, (215) 666-1900. The combiner 316 performs several functions, including interpreting the demultiplexed text and graphics, integrating the interpreted text and the interpreted graphics to produce a menu generation signal which carries data required for display of the promotional menus or the program catalogue, and sending the menu generation signal to be output through the expansion card interface to the set top converter for display of the program catalogue, the promotional menus, and the promotional videos, text, and graphics.

FIG. 10 shows the elements of a simple decompression box 302 (numbered commonly with the elements of the set top terminal 220 depicted in FIG. 4) with the upgrade

module 300 described above. Generated menus and video are combined in the combiner 316 and output to an antitaping encoder 619. Any method of antitaping encoding known by those skilled in the art may be used with the present invention.

FIG. 10 also depicts an expansion card 320 and an expansion card interface 322 for receiving the card 320. In addition, error correction circuitry 324 is shown receiving the demodulated signal, prior to demultiplexing the signal.

The enhanced functionality of the upgrade module 300 may alternatively be included on the expansion card 320. In this embodiment, the upgrade module 300 becomes an internal component of the simple decompression box 302 and internally upgrades the box 302 to include menu generation capability without using an external upgrade module 300. Other variations in the upgrade module 300 configuration are also possible.

b. Upstream Data Transmission Hardware

FIG. 11 shows a preferred set top terminal 220 that includes a data receiver 332 and a data transmitter 344. The data transmitter 344 provides upstream data communications capability between the set top terminal 220 and the cable headend 208. Upstream data transmissions are accomplished using the polling system described with reference to FIGS. 7a and 7b above, and, in particular, using a data transmitter 344. Both receiver 332 and transmitter 344 may be built into the set top terminal 220 itself or added through an upgrade module 300. Regardless of the specific hardware configuration, the set top terminal's data transmission capabilities may be accomplished using the hardware shown in FIG. 11.

FIG. 11 shows RF signals, depicted at 330, being received at by a data receiver 332 and tuner 603 working in unison. Both of these devices are interfaced with the microprocessor 602, which receives inputs, depicted at 338, from the subscriber, either through the set top terminal's keypad 645 or remote control unit 900. All cable signals intended for reception on the subscriber's TV are accessed by the tuner 603 and subsequently processed by the processing circuitry 340. This processing circuitry 340 typically includes additional components for descrambling, demodulation, volume control and remodulation on a Channel 3 or 4 TV carrier.

Data targeted to individual set top terminals 220 is received by the data receiver 332 according to each set top terminal's specific address or ID (e.g. set top ID 928, 928'). In this way, each addressable set top terminal 220 only receives its own data. The data receiver 332 may receive set top terminal specific data in the information field of the program control information signal frame, described with reference to FIG. 7a or on a separate data carrier located at a convenient frequency in the incoming spectrum.

Any received data includes information regarding channels and programs available for selection. The subscriber may enter a series of commands using the keypad 645 or remote control 900 in order to choose a channel or program. Upon receipt of such commands, the set top terminal's microprocessor 602 instructs the tuner 603 to tune to the proper frequency of the channel or program desired and subsequently instructs the processing circuitry 340 to begin descrambling of this channel or program.

Upon selection of a channel or program, the microprocessor 602 stores any selection information in local memory for later data transmission back to the cable headend 208. Typically, the data transmitter 344 operates in the return frequency band between 5 and 30 MHz. In an alternative embodiment, the frequency band of 10 to 15 MHz may be used. Regardless, however, of the frequency band used, the

data transmitter 344 sends information to the cable headend 208 or network controller 214 in the information field of the frame described with reference to FIG. 7b. Those skilled in the art will recognize that a number of variations and combinations of the above-described set top terminal 220 hardware components may be used to accomplish upstream data transmissions.

c. Hardware Upgrades

In order to enhance a set top terminal's 220 functionality, the following hardware upgrades may be used: (1) a Level A interactive unit, (2) a Level B interactive unit, (3) a Level C interactive unit with compact disc capability, (4) a Level D digital radio tuner for separate room use, and (5) a Level E information download unit. Each of these upgrades is connected to the set top terminal 220 unit through the upgrade port 662 described earlier.

Level A, B and C hardware upgrades have similar hardware components. FIG. 12a diagrams the basic components of the Level A, B and C hardware upgrades, indicated generally at 100. The figure diagrams the interaction between the hardware upgrades 100 and the set top terminal's 220 basic components. As seen in the figure, CATV input signals are received by the set top terminal 220 using a tuner 603 and various receiver components described above (but denoted generally at 601 in FIGS. 12a and 12b). The set top terminal's microprocessor coordinates all CATV signal reception and also interacts with various upstream data transmission components 604, which have been described above.

The Level A, B and C hardware upgrades 100 each include a microprocessor 104, interactive software 106, processing circuitry 108, bubble memory 112, and a long-term memory device 116. In addition to these basic components, the Level B hardware upgrade makes use of an additional telephone modem 120, while the Level C hardware upgrade makes use of an additional CD-ROM storage device 122.

Along with their basic components, the Level A, B and C hardware upgrades 100 each use their own interactive software 106. This software may be used to provide the enhanced functional capabilities described below. The Level A, B and C hardware upgrades also make use of processing circuitry 108, which allows the set top terminal 220 to pass the subscriber's interactive input to the Level A, B and C hardware upgrades 100 for interpretation. These commands are passed through the interface linking the set top terminal's microprocessor with the microprocessor of the Level A, B and C hardware upgrades 100. In this way, subscriber inputs, entered through the set top terminal keypad or remote control, can be transferred to any of the hardware upgrades for processing and responses generated therein can then be sent back to the set top terminal 220 for display. In the preferred embodiment the IR commands are transferred from set top terminal to hardware upgrade.

The Level A, B and C hardware upgrades 100 also include a long-term memory component or device 116 that allows each hardware upgrade to internally store data used with each interactive service. Such data may include, for example, customized menu templates used by the individual interactive services. In addition, the Level A, B and C hardware upgrades include a bubble memory 112 for the temporary storage of, for example, interactive questions and responses used in each particular interactive service.

The Level A interactive unit allows the subscriber to access interactive services offering additional information about programs such as quizzes, geographical facts, etc. This information may be received by the set top terminal 220 in

several data formats, including using the vertical blanking interval (VBI) or the program control information signal. The Level A interactive unit enables the subscriber to engage in textual interactivity with the current television program using overlay menus. Some examples are quizzes, fast facts, more info, where in the world, products, etc. all of which provide the subscriber with an interactive question and answer capability. Although the Level A interactive capability can easily be built into the set top terminal 220, such an embodiment increases the cost of the basic set top terminal 220.

The Level B interactive unit provides the user with access to online data base services for applications such as home shopping, airline reservations, news, financial services, classified advertising, home banking, and interactive teletext services. For example, with this upgrade, a user will be able to reserve plane tickets or buy consumer electronics. The primary feature of this upgrade unit is that it allows actual transactions using two-way communications over modem with outside services. This added two-way communications capability may be with the cable headend 208 or, alternatively, over cellular networks, PCN or other communications media.

The Level C interactive unit employs a high volume local storage capacity, including compact disc or other random access digital data formats (e.g., CD-ROM 122). This unit allows use of interactive multi-media applications. Such applications include, for example, computer games, multi-media educational software, encyclopedias, other reference volumes (e.g. Shakespeare library), etc. In the preferred embodiment, many of these applications will interact with live programming providing additional information and interactivity to the basic program feed. For example, a viewer watching a show set in a foreign country may be able to retrieve additional information, maps, economic data, as well as other information about that country that are stored on the compact disc. In the Level C applications, the upgrade hardware may closely monitor the television broadcast through additional data channels (e.g., vertical blanking interval, or other digital data encoded within live video) providing context sensitive interactivity.

FIG. 12b diagrams the interaction between the set top terminal 220 and the Level D hardware upgrade, indicated generally at 130. As shown in the figure, the CATV signals are input to the set top terminal 220 through its tuner 603 and receiver components 601. As described above, the microprocessor 602 coordinates all cable television signal reception by the set top terminal 220. The Level D hardware upgrade 130 makes use of a microprocessor 132, a tuner 134, a demodulator 136, a demultiplexer 138, a decryptor 140 and an audio decompressor 142.

As shown in the figure, the set top terminal 220 and the Level D hardware upgrade 130 interact through the interface linking the respective devices. The set top terminal's microprocessor 602 instructs received signals to be transferred to the Level D hardware upgrade 130 for further processing. These received signals are input to the Level D hardware upgrade, passed through the signal path comprising the tuner 134 and other digital audio reception components (i.e., demodulator 136, demultiplexer 138, decryptor 140 and audio decompressor 142). Through the use of the hardware as configured in FIG. 12b, the subscriber can select a digital audio program for listening. The subscriber can accomplish such selection through a subscriber interface (not shown), which may exist at the set top terminal 220 or, alternatively, at the Level D hardware upgrade.

The Level D hardware upgrade allows the subscriber separate access to the digital radio channels while other

programming (not necessarily radio) is being viewed on the television. Typically, this upgrade would be used for digital radio usage in a separate room from that of the television. The upgrade has a separate tuner, decompressor, and visual display. In the preferred embodiment a second remote control (which is preferably a scaled-down version of the set top terminal remote control, described below) is provided to access the digital audio system. This remote is equipped with a display.

The Level E hardware upgrade allows the subscriber to download large volumes of information from the operations center 202 or cable headend 208. The Level E hardware upgrade will enable subscribers to download data, such as books and magazines, to local storage. Primarily, the Level E hardware upgrade is an additional local storage unit (e.g., hard disk, floppy, optical disk or magnetic cartridge). Preferably, a small portable reader, called "EveryBook™", is also provided with the upgrade to enable downloaded text to be read without the use of a TV. The portable reader is equipped with a screen.

The downloadable information may be text or video supplied by the operations center 202 or cable headend 208. With this upgrade, books may be downloaded and read anywhere with the portable reader. Using this upgrade, video may be downloaded and stored in compressed form for later decompression. The video would be decompressed only at the time of viewing. Important text that the public desires immediate access may be made available through this system. Text such as the President's speech, a new law, or a recent abortion decision rendered by the Supreme Court may be made immediately available.

Using a more sophisticated port, such as the SCSI port, multiple hardware upgrade units may be connected, or "daisy-chained" together, to operate simultaneously. Although these upgrade units are described separately, the units may be combined or built into the set top terminal 220. Those skilled in the art will recognize variations on such combinations of and additions to the set top terminal hardware.

40 d. Expansion Card Slot

In order to provide the greatest flexibility possible and prevent a set top terminal 220 from becoming outdated during the terminal's useful life, additional electronic expansion card slots have been built into the preferred embodiment. The expansion slots 665 (depicted in phantom in FIG. 5b) are covered by the metal plate cover 664 as shown in FIG. 5b. It is anticipated that additional memory or capabilities may be needed for certain customer features and also to update the system as the cable delivery system's capabilities increase.

In addition to providing an additional memory capability, the expansion card slot provides an easy method to upgrade the set top terminal hardware. In particular, expansion cards can be used to internally provide any of the Level A through E hardware upgrade features described above. Such embodiments, however, use the upstream data transmission hardware, also described above (or built-in modem).

Functionally, the expansion card (not shown) may be inserted into an expansion card slot 665, causing a connector on the expansion card to electrically link with a card connector on the set top terminal 220. Preferably, the frame of the set top terminal has a shelf or rack position to hold the expansion card. The card connector on the set top terminal 220 may simply be an electrical connection to the set top terminal's microprocessor and/or memory device or devices. Alternatively, the interface between the expansion card and the set top terminal 220 may be an electrical bus that allows

the memory resources of the set top terminal 220 to be directly expanded. In this case, the expansion card itself contains a memory device or devices that expand the amount of program information or data that the set top terminal 220 may access. Such memory devices include RAM, ROM, EPROM or EEPROM. In addition, the interface may be a "mailbox," which resides in the set top terminal 220 as a single memory location. This embodiment facilitates the transfer of data between the set top terminal 220 and the expansion card in either serial or parallel format. Such transfers are coordinated and controlled by the set top terminal's microprocessor 602.

The use of expansion cards lowers the cost of the set top terminal 220 itself, while also increasing its potential functionality. Thus, an expansion card may include enhanced functional capabilities described as part of the upgrade module discussion above and be designed to accommodate any hardware upgrade compatible with the set top terminal 220.

3. Remote Control and Subscriber Access of Set Top Terminal

The subscriber can access programs televised by the system through the set top terminal 220 using a remote control 900. FIG. 13a shows a two-section remote control 900 that accommodates such access. To reduce costs and make the set top terminal 220 as user friendly as possible, a standard television remote control 350, such as a Jerrold RC 650 remote control or the like, may be augmented by adding a new section 352 that provides the additional digital menu access and ordering functions. FIG. 13a depicts the addition of menu access and cursor movement control to the remote control 900.

The remote control 900 has an ordering button 354 and four-way cursor movement 356 that includes a "go" button 358 and menu access buttons 360. The preferred remote control 900 operates using infrared (IR) signals, with the signals being received by the Infrared (IR) sensor 630 on the front of the set top terminal 220.

In the simplest embodiment, the remote 900, may be built with only cursor movement and a go button. In more sophisticated embodiments, the remote control 900 may be provided with buttons that are programmable to perform specific functions for a series of entries. An intelligent or smart remote control 900 would increase both the cost and capability of the set top terminal 220 system. Using the augmented remote control 900 depicted in FIG. 13a, a subscriber can navigate the program menu system of the set top terminal 220.

FIG. 13b shows an alternative and preferred embodiment of the remote control 900 for use in the present invention. Standard television receiver remote control switches or buttons 362 may be used, including volume control, channel select, power and signal source buttons, as well as other menu buttons 364, including cursor movement, cursor select, menu select, and pay television buttons arranged longitudinally on the remote control 900, as opposed to the width-wise separation, as shown in FIG. 13a. The color of the buttons or the surrounding background may differ between the standard television remote control buttons 362 and the menu buttons 264 to differentiate visually between these two groups of buttons.

The width and depth of the remote control unit 900 are considerably less than the length to allow the remote control unit 900 to fit easily within a user's palm. The remote control unit 900 preferably has its center of mass balanced substantially near the longitudinal middle. This balance allows a user's thumb to naturally be placed in substantially the

middle portion of the remote control unit 900, when it is picked up by a user.

Since the center of mass of the remote control unit 900 is placed substantially near the longitudinal middle of the remote control unit 900 (thereby having a user's thumb naturally fall in this same center region), the standard remote buttons 362 and menu access switches or buttons 364 most frequently accessed and depressed by a user are placed in the central region of the remote control unit 900 within easy reach of the user's thumb. Channel and volume increment and decrement buttons 366 are placed near this center of mass and longitudinal center line. The channel buttons 366 are preferably beveled in opposing directions to allow a user to feel for and press a desired button without looking down at remote 900. Similarly, the volume buttons 368 are preferably beveled in opposing directions for the same reason. Additionally, the channel buttons 366 could have a surface texture different from those of the volume buttons 368 to allow even easier differentiation.

Also placed in the longitudinal center, within easy reach of a user's thumb, are cursor movement buttons 370 and a "go" button 372. The "go" button 372 selects an option corresponding to the placement of the cursor. As opposed to buttons, a joystick may be used with a selection on the stick, or a trackball, depressible for selecting a desired choice. The cursor buttons 370 are placed ninety degrees apart, with the "go" button 372 placed within the center of the cursor movement buttons 370, as shown in FIG. 13b. The cursor movement buttons 370 are preferably beveled inwardly toward the "go" button 372 and the "go" button 372 is recessed below the level of the cursor movement buttons 370 so that it is not accidentally pressed while depressing the cursor movement buttons 370. In addition to the beveling on the cursor movement buttons 370, these buttons may also have a surface texture to allow a user to feel for and select the appropriate button without looking down at the remote 900 and directional arrows could be raised or recessed on the surface of the cursor movement buttons 373 for this same purpose.

Menu select buttons 374 are placed near buttons 370 as shown in FIG. 13b. Menu select buttons 374 are preferably the largest buttons on the remote control unit 900. Menu select buttons 374 preferably have icons or other graphics imprinted on their top surface or adjacent to corresponding buttons. For example, a button for the sports major menu may contain a baseball icon. The icons represent the programming available on the particular major menu selected by the menu select buttons 374. The icons may also be raised above the level of the menu select buttons to provide a textured surface. This textured surface would allow a user to select an appropriate menu button 374 by feel, without looking at the remote control unit 900. The icons would require substantial differences in texture, while still providing a meaningful graphic related to the associated menu.

As shown in FIG. 13b, labels and icons are provided for the following major menus: movies, sports, children's programming, documentary/news, entertainment, magazines, programming guide, HDTV (high definition television), interactive TV, music, and an additional button 376 for further programming. Menu select buttons 374 may also be labeled A through J for the above programs, with the last button for all additional major menus labeled K-Z.

Although the remote control unit 900 is described with a variety of channel selection buttons, nearly all buttons from a standard remote control (section 362 buttons) could be eliminated. The present invention would allow a subscriber to use a remote control unit 900 containing only menu select

buttons 374 and/or cursor movement and select buttons, 370, 374, respectively.

As used herein, "button" is contemplated to include all manner of switches or touch sensitive circuitry to activate a particular function in the remote control unit 900. Additionally, although the remote control unit 900 communicates with the set top box by means of infrared transmission, other forms of communication are contemplated, including ultra-sound, radio frequency and other electromagnetic frequency communication.

4. Advanced Features and Functional Capabilities

a. Overview

In the preferred embodiment, the set top terminal 220 will include features that are now being adopted in the industry, including parental controls and locks, electronic diagnostics and error detection, muting, on-screen volume control, sleep timer, recall of last selection, etc. Each of these features has a corresponding menu (or overlay menu) that allows on-screen customizing and activation of the feature.

The preferred set top terminal 220 also supports a number of advanced features and functional capabilities. This set top terminal 220 provides subscribers with a picture-on-picture capability without requiring a special television to support the capability. The set top terminal 220 also supports a program catalogue Service, which provides subscribers with information on all programming available at its particular subscriber location. The set top terminal 220 further includes the capability of querying viewers to establish, among other things, favorite channel lists, personal profile data and mood information. The set top terminal 220 allows the subscriber to view promotional menus on future programming events.

The set top terminal 220 supports additional capabilities using its hardware upgrades that allow subscribers to use other interactive services, for example, to engage in on-line question and answer sessions, to order and confirm airline tickets, and to access a variety of other data services. The set top terminal 220 makes use of a digital tuner as a hardware upgrade to provide subscribers with a digital audio capability.

The preferred set top terminal 220 may be used to control video tape machines, thereby simplifying the recording of programs. The set top terminal 220 can, in conjunction with the program delivery system, easily support high definition television (HDTV). For subscribers living in remote locations, the set top terminal 220 accommodates backyard satellite systems.

In addition to the features that the set top terminal 220 supports with its current internal programming and upgradeability, additional features may be added or existing features increased through remote reprogramming of the set top terminal 220. Utilizing the resident operating system on the read only memory (ROM), the cable headend 208 is able to reprogram the random access memory (RAM) of the set top terminal 220. With this capability, the cable headend 208 can remotely upgrade software on the set top terminals 220.

Reprogramming will occur by using the program control information signal, with the appropriate signals sent over this signal. In an alternative embodiment, one channel is dedicated for the special programming needs. When reprogramming is to occur, the cable head end will send an interruption sequence on the program control information channel that informs the set top terminal 220 that reprogramming information is to follow.

b. Picture-On-Picture Capability

Although the preferred embodiment of the present invention decompresses one channel at a time for the viewer, users who desire a picture-on-picture capability can be provided

with a set top terminal 220 have upgraded hardware components that allow two channels to be tuned and decompressed at any given time. Once two signals are available, the picture-on-picture capability can be made fully available in the set top terminal 220, without requiring a special television.

FIG. 14 diagrams one embodiment for implementing the picture-on-picture capability. Such implementation necessarily requires the use of two tuners 603, 603' and two decompressors 618, 618' so that two separate video programs may be displayed simultaneously on the subscriber's television screen. As shown in the figure, the CATV input signal is received by the set top terminal 220 and input into two separate tuners. These tuners will each tune to a separate television program, both of which will be simultaneously displayed on the subscriber's television. The two television programs are extracted from the CATV input signal by the two parallel signals paths depicted in FIG. 14.

Each signal path is substantially identical (therefore the components thereof are commonly numbered, with callout numbers of the components of one path carrying the prime indicator) and thus, only one path will be described. Each signal path shown includes a tuner 603, a demodulator 606, a demultiplexor 609, a decryptor 600 and various decompression devices. As the respective signals pass through these devices, the microprocessor 602 coordinates the signal processing to produce a decrypted program signal. The decrypted program signal is further partitioned between audio, on the one hand, and video, graphics and text on the other. The audio signals extracted are passed to an audio decompressor 612, which further processes the audio for output to the subscriber's television.

The embodiment diagramed in FIG. 14 shows only single audio channels for each video channel tuned by the individual tuners. As described above, the number of audio channels will typically include four audio signals corresponding to a single video channel. At least two of these audio signals may be used for stereo television play. Although the subscriber can view two separate video pictures simultaneously through the picture-on-picture capability, the subscriber's television can only accommodate a single audio signal at a time (or two audio signals for stereo audio reception). Thus, the set top terminal hardware shown in FIG. 14 must also include a switch (not shown), which accommodates the simple switching between each audio signal or signals that correspond to one video picture or another. Such an audio switch, which is a component well known in the art, allows the subscriber to listen to the audio of one picture or the other. The video, graphics and text portion of the program signal are routed through another demultiplexor 314, which, in turn, separates all video, graphics and text of the signals. These signal parts are stored in a memory device 620 within the set top terminal 220. This memory device may be a ROM, RAM, EPROM, or EEPROM.

The microprocessor 602 initiates and coordinates further decompression of the video, graphics and text for each of the program signals. Once these signal parts are decompressed within the set top terminal 220, these components are passed to a video combiner 316. The video combiner correlates and combines the video, graphics and text of the two program signals. The video combiner outputs these two signals for display on the subscriber's television. These signals may also pass through an NTSC encoder 625 to produce analog NTSC video waveforms, which may likewise be displayed on the subscriber's television. Such display necessarily requires that each signal pass through a modulator 605 in

order to be input into a television. In this way, two separate RF video outputs are produced. Each video signal produced by the RF modulators has its own corresponding audio outputs produced by each audio decompressor.

Each video signal (and its corresponding audio signal) produced by the two tuner configuration can be simultaneously displayed on the subscriber's television, which has a picture-on-picture capability, or, alternatively, the set top terminal 220 itself can create the picture-on-picture image for display. Such display involves the scaling and repositioning of one of the video (and audio) signals so that both pictures produced can be viewed simultaneously. In so doing, the subscriber's television can display one of the pictures as a full screen display, with the other picture being displayed as a scaled and repositioned display overlaid on the full screen display. To implement such a technique, the set top terminal 220 must include the hardware components necessary to produce a picture-on-picture capability, including hardware capable of scaling, repositioning and overlaying images. Such an advanced set top terminal 220 allows the subscriber to make use of a picture-on-picture capability even though the subscriber's television cannot alone produce such a result.

c. Program Catalogue Service

Referring to FIG. 15 and to FIG. 8, in the preferred embodiment of the present invention, program catalogue menu 1100 listing programs available on network schedules, will be available as a major menu of the type shown as 1020. In the preferred embodiment, the major program catalogue menu 1100 would offer submenus, such as network schedules for the next seven days, today's network schedules for the next six hours, and TV program catalogue picks for the next seven days.

In order for the set top terminal 220 to provide a program catalogue service, the set top terminal 220 must receive information on all programming available at its particular subscriber location. This information will be sent to each set top terminal 220 as part of the program control information signal or STTCIS. The program control information signal would include, among other things, all programming scheduled for the next 7 days. This programming information would, for example, include the name of each program, the type of program, the program start time, the length of the program, the date the program will be shown, a brief description of the program and whether or not the program is closed-captioned, among other information.

All programming information sent to the set top terminal 220 for use with the program catalogue service will be stored in the set top terminal's internal memory. Upon selection of the program catalogue service by the subscriber, the microprocessor accesses the memory device during its menu generation and creation process. In this way, the programming information will be combined with the program catalogue menu or submenu template to produce the Program catalogue service. The program catalogue service may involve the use of more than one menu, especially where the network scheduling information covers time frames longer than a few days.

If the particular set top terminal 220 has been subscribed to the program catalogue service, the subscriber may proceed to a submenu showing schedules of programs. If the subscriber chooses the network schedule submenu 1102, he is offered a list of network schedules to choose from. If a subscriber were to choose, for instance, HBO, an HBO-specific submenu (not shown) would appear and allow a subscriber to choose a date of interest to see what programs are available on that particular date.

d. Querying Viewer

To support a variety of services, the set top terminal 220 is capable of querying the viewer and recording viewer responses. For example, in order for the set top terminal 220 to establish a favorite channel list as shown at 1100 in FIG. 16a depicting the broadcast TV menu 1112, menus querying the subscriber and allowing the subscriber to input his selection of eight favorite channels is displayed.

After querying the subscriber for a list of popular shows the terminal displays a submenu allowing the subscriber to choose one of the subscriber's favorite or popular shows for viewing. Although various embodiments of menus are possible, the goals of each are the same—to eliminate or augment printed guides to television programs. In an alternative embodiment, a program viewing suggestion feature is available as an additional feature. This feature gives the indecisive or lazy viewer suggestions as to which programs the viewer should watch. The set top terminal 220 uses a matching algorithm to accomplish this program suggestion feature. This program suggestion feature is described in detail in co-pending patent application Ser. No. 08/160,281, entitled, REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, incorporated herein by reference.

In order for the set top terminal 220 to make decisions on which programs the subscriber should watch, the terminal must create a personal profile for the particular viewer. From the data in the particular viewer's personal profile and the television program information available in the program control information signal, the set top terminal 220 is able to select a group of programs which the particular viewer is most likely to watch.

In order for this feature to operate, a personal profile for each viewer can be gathered by the set top terminal 220 and stored in a memory file. The personal profile consists of demographic information that may be gathered in a number of ways. The set top terminal 220 builds the personal profile for each viewer and stores the information in a memory file by viewer name. To build a personal profile in the preferred system, the viewer answers a series of questions presented on a series of menu screens. These personal profile screens request the viewer to input information such as name, sex, age, place of birth, place of lower school education, employment type, level of education, amount of television program viewing per week, and the number of shows in particular categories that the viewer watches in a given week such as, sports, movies, documentaries, sitcoms, etc. Any demographic information which will assist the set top terminal 220 in targeting advertisements to the viewer or suggesting programs may be used.

Once a personal profile has been created (in a particular set top terminal 220), it can be indefinitely stored in non-volatile memory. A selection at the home menu screen 1010 (FIG. 8) activates the program selection feature. Following activation of the feature, the set top terminal 220 will present the viewer with a series of brief questions to determine the viewer's mood at that particular time, as shown in FIG. 16b. For example, the first mood question screen 1114 may ask the viewer to select whether the viewer desires a short (30 minute), medium (30-60 minute), or long (60 plus minute) program selection. The second mood question screen 1116 requests the viewer to select between a serious program, a thoughtful program, or a light program, as shown in FIG. 16c. And the third mood question screen 1118 requests whether the user desires a passive program or an active program, as shown in FIG. 16d. The viewer makes a

selection in each question menu, utilizing the cursor movement keys and "go" button on the remote control unit 900.

After the viewer has responded to the mood question menus which determine his mood, the set top terminal 220 uses the personal profile information and mood information to find the best programming matches for the viewer. The set top terminal 220 displays an offering of several suggested programs to the viewer. With its program selection feature, the set top terminal 220 can intelligently assist the specific viewer in selecting a television program.

The personal profile information may also be used in targeting advertisements. In the preferred embodiment, the network controller 214 can target specific advertisements to individual cable distribution network nodes or, alternatively, to individual subscribers. In order to accomplish the advertisement targeting capability, the network controller 214 transmits packages of advertisements to the cable distribution network nodes or subscribers for eventual display on the set top terminal 220. When the video that the subscriber is watching nears a break for a commercial, a specific advertisement or set of advertisements is specifically targeted to a particular set top terminal 220 based on the personal profile information described above. Although the network controller 214 is the component in the program delivery system which provides this targeting capability, the set top terminal 220 accommodates transparent channel switches to display the targeted advertisement. In this way, although the subscriber thinks that the set top terminal 220 is tuned to a specific channel, an advertisement from another channel is displayed on the subscriber's television.

The hardware required to accommodate such transparent channel switching capabilities are shown in FIGS. 17a and 17b. FIG. 17a shows the set top terminal hardware components which accommodate channel switching within a single 6 MHz channel bandwidth. These components include a tuner 603, a demodulator 606, a demultiplexer 609, a multiplexer 400, a decompressor 622, a microprocessor 602, and local memory M. The tuner 603 operates by tuning to a specific 6 MHz bandwidth which includes the displayed video and a number of channels carrying advertisements. The demodulator 606 processes these signals and sends them to the demultiplexer 609, which converts the received signal into separate program and advertisement signals. During this processing, the microprocessor 602 coordinates the demultiplexing of the programming signals. Once the video signal pauses for a commercial break, the microprocessor 602 instructs the multiplexer 400 to select the advertisement or advertisements for decompression and subsequent display on the subscriber's television. This hardware configuration allows the set top terminal 220 to switch between channels within the 6 MHz bandwidth and display various advertisements for viewing, regardless of the video currently being watched by the subscriber.

Where a targeted advertisement falls outside the tuned 6 MHz bandwidth containing the video that the subscriber is currently watching, the hardware configuration shown in FIG. 17b is used. In this configuration, the microprocessor 602 instructs the tuner 603 to retune to another 6 MHz channel bandwidth, as represented by bi-directional arrow A.

Working together, the microprocessor 602 and tuner 603 allow targeted advertisements, which have been transmitted in another 6 MHz bandwidth, to be tuned with minimal acquisition time and delay. In particular, this configuration allows the set top terminal 220 to tune outside a given 6 MHz bandwidth (to another 6 MHz bandwidth) in order to select a targeted advertisement for display. This alternative

embodiment may require the use of a full screen mask in order to minimize any annoying screen rolling during the tuning process. The masking is intended to cover any glitches which would otherwise be displayed during the acquisition time (e.g., 0.5 seconds) for retuning to another 6 MHz channel bandwidth.

Where the acquisition time or delay becomes unreasonable, an alternative embodiment (not depicted) can include the use of two tuners similar to the configuration used above for the picture-on-picture capability. This alternative configuration using two tuners trades an increased cost for lower acquisition times. Those skilled in the art will recognize a number of other configurations of set top terminal hardware that will accommodate a transparent channel switching feature. A more detailed description of target advertising and channel switching is provided in patent application Ser. No. 08/160,280, entitled, NETWORK CONTROLLER FOR CABLE TELEVISION DELIVERY SYSTEM, incorporated herein by reference.

e. Promotional Menus

FIG. 18 depicts the use of a promotional menu 1120 used to sell subscriptions to services in the system 200. This promotional menu is tailored to Level B interactive services which include a variety of on-line type services such as Prodigy, Yellow Pages, Airline Reservations, etc. A similar menu is used for Level A interactive services that offers subscribers additional information about programs such as quizzes, geographical facts, etc. Such information may be received by the set top terminal 220 in several data formats, including in the vertical blanking interval (VBI) and in the program control information signal.

Other promotion menus similar to menu 1120 may be used for the Level C interactive services. The Level C interactive services utilize local storage such as CD technology (e.g., 122) to offer an enormous range of multi-media experiences. The Level C Interactive services require a hardware upgrade as described earlier. Specially adopted CD-I and CD-ROM 122 units are used for this service.

Typically, promotional menus may be generated when a subscriber selects a nonexistent channel, creating a virtual channel. Such virtual channels do not require any additional bandwidth since these channels do not carry any of the data required to create a promotional menu. Instead, when the subscriber selects a channel that does not exist (e.g., Channel 166), a virtual channel is created using data sent to the set top terminal in a number of ways. For example, the data may be sent in the vertical blanking interval (VBI) of another channel, out-of-band, or with the menu information sent from the headend 208 in the set top terminal control information stream (STTCIS). The data will be used to create graphics stored locally at the set top terminal 220 as an NTSC video signal which may be displayed on the subscriber's television. In this way, a promotional menu may be drawn and a virtual channel is created. This capability simply provides the set top terminal 220 with the ability to display a promotional menu or graphics display whenever a nonexistent channel is selected by the subscriber.

f. Other Interactive Services

FIGS. 19a and 19b show menus (1130 and 1132, respectively) that are available using the interactive Level A services. Referring to FIG. 19a, when interactive Levels A services are available for a television program, the system will display an interactive logo 1134 consisting of the letter "I" and two arrows with semicircular tails. In the preferred embodiment, the set top terminal 220 will place the interactive logo on the television screen as an overlay menu. In the preferred embodiment, the set top terminal 220 will

detect that there is data or information available about a television program which can be displayed to a subscriber using the interactive service. When the set top terminal 220 senses that there is interactive information available, it will generate the interactive logo overlay menu 1134 and place it on the television screen. For example, the set top terminal 220 will detect that information on a television program is being sent in the vertical blanking interval (VBI) and generate an interactive logo overlay menu 1134 which will appear on the subscriber's television screen for approximately fifteen seconds during each ten minute interval of programming. Similarly, the set top terminal 220 can sense that the programming has closed caption information available and place a closed caption logo on the screen.

Referring to FIG. 19b, when the subscriber sees the interactive logo 1134 on the television screen, the subscriber is made aware of the fact that interactive services are available in conjunction with his television program. If the subscriber presses the interactive remote control button, another overlay menu 1133 will be generated by the set top terminal 220 and placed on the screen. This overlay menu 1133 is shown in FIG. 19b being overlaid on an interactive television program. From this menu 1133, the subscriber may select a variety of different types of textual interactivity with the current television program, as at 1134, including quizzes, fast facts, more info, where in the world, products, etc. At any time during the interactive submenus, the user may return to the television program without interactive features.

Another submenu 1136 gives additional information related to the television program to the viewer in textual form in the lower half of the screen. In FIG. 19b, the submenu 1136 shows the available interactive options for the subcategory "quiz." In this interactive subcategory, the user is presented with questions and a series of possible answers. If the subscriber desires, the subscriber selects one of the answers to the quiz question. After the selection, the set top terminal 220 sequences to another menu. The set top terminal 220 sequences to the interactive quiz answers submenu which informs the subscriber whether the correct answer was or was not chosen. Subsequently, another submenu would show correctly or incorrectly answered quiz question.

FIG. 20a is an example of a submenu for Level B interactive services. From this menu screen 1141, any of a number of on-line data services could be accessed. One service, the airline reservations selection 1142, has been chosen by the subscriber on this menu.

In selecting airline reservations, the subscriber encounters a sequence of menus as for any on-line data service. Referring to FIG. 20b, the subscriber is typically shown a submenu, such as submenu 1144, for the data service offering various options. In each of these submenus related to a data service, the subscriber is able to exit, returning to the home menu 1010 or regular cable TV.

FIG. 20b, the airline information and reservation submenu 1144, allows a subscriber to view six available flights. A subscriber may select one of the flights to check on its availability. Another similar submenu allows a subscriber to enter the month, day and year for the availability date desired. In this submenu, the subscriber is offered the option of correcting any errors in the entered information.

FIG. 20c is another airline submenu 1150 that allows a subscriber to view remaining seats available on a flight, enabling the selection of a seat assignment. This interactive submenu 1150 is an example of how information may be graphically shown to a subscriber using a portion of the

menu and different coloring schemes. In this interactive menu, the lower half of the screen 1152 shows the passenger compartment of an airplane with all the seat locations graphically represented by square blocks. By coloring the available seat locations in blue and the unavailable seat locations in a different color, the menu can present a great deal of information in a limited amount of space. This graphic presentation of information for the interactive on-line data services is an important method of visually displaying large amounts of information to the subscriber.

Referring to FIG. 20d, another submenu 1156 allows the subscriber to choose a one-way or round-trip ticket, to confirm reservations and to charge an airline ticket by credit card, choosing the appropriate strip menu on the lower part of the screen. In this particular menu 1156, the subscriber is charging a round-trip plane ticket on a credit card. The subscriber simply needs to enter the credit card number, expiration date, and credit card type to charge an airline ticket. Other submenus may process the subscriber's credit card charge for the airline ticket, confirm the subscriber's airline ticket purchase, and pass this information to the location where the ticket is printed.

Using the methods and hardware described, a variety of interactive services are possible. Those skilled in the art will recognize that such interactive services may be accommodated by the preferred set top terminal 220.

g. Caller ID

Using the capability of the set top terminal and a connected modem, the set top terminal is able to perform the function of caller ID. The caller ID function of the set top terminal assists the viewer in a manner similar to the caller ID function provided by telephone companies. However, the set top terminal is able to use the television as its display means to communicate to the viewer information about incoming telephone calls. Also, the strong local processing capability of the set top terminal allows the caller ID function to be much more user friendly and convenient.

If the set top terminal senses that a viewer is using the system and watching television, then the caller ID feature would automatically be activated. When the caller ID function is active, the set top terminal software will monitor incoming telephone calls to the viewer through the modem. After the set top terminal senses that the phone is ringing, signals are received on the tip and ring lines of the telephone, the system will immediately look for incoming telephone data identifying the telephone number from which the telephone call was initiated.

Upon receiving the telephone number from which the call was initiated, the preferred embodiment of the caller ID compares the telephone number with a list of telephone numbers stored in memory. The list of telephone numbers stored in memory is cross referenced to a list of names, other textual data or graphics. When the set top terminal finds a match between the telephone number and a number stored in memory, the corresponding text or graphics are displayed on the television screen. For example, "GRANDMA" and a "smiley face" graphic can be flashed across the television screen using an overlay menu.

In this manner the viewer may see the name (and identifying icon graphics) of the person placing the call and can decide whether to activate an automatic telephone message recording system or answer the telephone call. After generating an overlay menu, the set top terminal software awaits an IR command signifying a viewer response. With the simple depression of a button on the remote control, the viewer can instruct the set top terminal to send an activation signal to the automatic telephone message system (through

a set top terminal port). Thus, the viewer can continue to watch a program and know the identity of a caller without taking his or her eyes off the television. If a dumb telephone message system is used, the viewer can simply allow the telephone to ring the requisite number of rings until the telephone answering machine normally activates and answers the call.

In an alternative embodiment, having no stored telephone numbers, the set top terminal may just flash the incoming telephone number on the screen using an overlay menu. In a more sophisticated embodiment, a microphone is provided in the set top terminal or remote control unit. Using the television's speakers, a remote control, and a microphone, the viewer is able to answer the telephone using the keys of the remote control without taking his or her eyes off the television screen.

h. Digital Audio Capability

Referring to FIG. 21, the digital audio feature of the invention allows a subscriber to listen to CD quality audio selections through the subscriber's stereo (not shown). This can be accomplished by running cables directly from the set top terminal 220 (which may include a Level D hardware upgrade) to the subscriber's amplifier/stereo system. Alternatively, the subscriber may listen to audio selections through the subscriber's television system.

In the preferred embodiment, the digital audio feature uses a Level D hardware upgrade as a digital radio tuner. This Level D hardware upgrade enables a subscriber to use the program delivery system's digital audio signaling capability. Digital audio transmissions require much less bandwidth than that used for the transmission of a digital video signals. Thus, hundreds of digital audio programs are delivered to each set top terminal 220 in limited segments of bandwidth.

Where digital audio programs are delivered to the set top terminal 220, the Level D upgrade (shown in FIG. 13b) provides the subscriber with the means to select a given digital audio program for listening. The Level D hardware upgrade makes use of a tuner 603 that is separate from the tuner 603 used by the set top terminal 220 for video display. The digital audio signal is received at the set top terminal 220 over the CATV transmission media. The set top terminal 220, in turn, routes the digital audio signal to the components of the Level D hardware upgrade. These components may include: a tuner 603, demodulator 606, demultiplexer 609, decryptor, decompressor 622, remote control interface and microprocessor 602.

The Level D hardware upgrade will use its tuner 603 to tune to the specific digital audio program selected by the subscriber and subsequently demodulate, demultiplex and decrypt the digital audio signal. Upon completion of this processing, the digital audio signal will be decompressed to produce a processed digital audio signal ready to be output to the subscriber's stereo or directly to speakers.

The Level D hardware upgrade includes ports for the digital audio signal output, which provide the necessary connections for transmission of the signal from the Level D hardware upgrade to the subscriber's stereo. In addition, the Level D hardware upgrade includes a small LED display that can show the channel number of the program selected, date and time, among other display fields.

The Level D hardware upgrade can be physically located in a different room from that of the television and set top terminal 220. Thus, the Level D hardware upgrade will have its own remote control device (not shown), albeit with less available options and keys than the set top terminal's remote control 900 described above. This Level D hardware

upgrade remote control is more limited than the set top terminal's remote control 900 since the Level D remote control will be used exclusively for digital audio program selection. This limited remote control, nevertheless, includes a small LED or LCD display that is used to display the channel number of the digital audio program selected. Alternatively, the set top terminal's remote control may be programmed for use with the Level D hardware upgrade so that an additional remote control is not required to use the digital audio feature.

Using either remote control embodiment, the subscriber accesses the Level D hardware upgrade to select a digital audio program. The remote control sends an IR command signal to the Level D hardware upgrade, instructing the unit's microprocessor 602 to initiate the selection of a given program. The desired program is processed (i.e., tuned, demultiplexed, decrypted and decompressed) as described above and transmitted to the subscriber's stereo for listening.

The selection of a digital audio program does not necessarily require interaction with the subscriber's television. Instead, all communications required to select a digital audio program may occur between a remote control and the Level D hardware upgrade. As a result, the subscriber's television need not be turned on for the digital audio capability to operate.

Alternatively, the Level D hardware upgrade can be co-located with the set top terminal 220 and the subscriber can select a digital audio program through a menu displayed on the subscriber's television. In this embodiment, the subscriber would use the set top terminal remote control to access a digital audio program selection menu.

In an alternative embodiment the set top terminal 220 includes all the features of the Level D upgrade and, therefore, no upgrade is necessary. Those skilled in the art will recognize other alternatives that allow digital audio reception.

FIG. 21 is a major menu 1160 displaying the digital audio program choices which are available for subscribers who have paid the monthly fee. In a chart format 1162, the major menu shows the top five, ten, and forty songs available in six different categories of music. Below the chart, the system is able to provide a text message 1164 describing the particulars of the audio program selected. Using the same logos and menu format, the system can provide a text description enticing the subscriber to pay the monthly fee and join the service. For example, one menu may allow the user to test the system with a free demonstration. Another menu allows the subscriber to request additional promotional information about the system. Such menus may be used throughout the menu system. From any of the menu screens for the digital audio feature, the subscriber may return to regular cable TV with the press of a single button.

i. VCR Control

Referring to FIG. 22, the advanced system of the set top terminal 220 is used to control video tape machines and simplify recording programs using a Guide Record feature. The set top terminal 220 has a separate output 650 for a VCR. Control signals are transmitted through the VCR output of the set top terminal 220 and input to the VCR to allow the VCR to be automatically controlled by the set top terminal 220. Using the set top terminal 220, certain programs are selected by a subscriber from menus, and the VCR will be automatically activated to record the selected program.

In order to accommodate the VCR control feature, the set top terminal 220 sends instructions or control signals to the

VCR. Such control signals are initiated by the set top terminal's microprocessor 602 and passed to the VCR either using a separate connection or as part of the video signals processed for display on the subscriber's television. These control signals are sent directly from the advanced set top terminal 220 to the VCR, instructing the VCR when to begin and end taping of a particular program.

The microprocessor 602 coordinates the dissemination of control signals sent to the VCR, storing the content of such signals in local memory. Upon nearing the time for the program to be displayed, the microprocessor 602 activates the menu generation software to display a notification menu or screen, noting the subscriber that the program is nearing the time for display. This reminder will also request the subscriber to check whether a tape has been inserted into the VCR itself.

The subscriber can initiate the VCR control feature by accessing a VCR control submenu, which requests whether the subscriber wishes to record a program selected for future viewing. In this way the subscriber interactively enters such information on the menu screen or display using any of the hardware described above that accommodates subscriber interactive response capabilities.

In the preferred embodiment, the subscriber will use a movie library in conjunction with his VCR or other video taping machinery. The movie library is a menu selectable list of available movies. In that way, a subscriber may tape movies which are shown at inconvenient start times for later viewing. By enabling the proper features of the set top terminal 220, a subscriber can have the terminal activate the television and the VCR and perform all the functions necessary to tape a movie.

After the VCR control feature is initiated, a menu screen confirms the movie selection, start date and start time and informs the subscriber that the VCR will be automatically turned on. During this submenu, the user may return to the movie library major menu, or regular TV or cancel the movie library order by pressing the escape button. This menu shows that the subscriber has chosen to return to regular TV. The subscriber's VCR or other video taping equipment must be connected to the set top terminal 220 for the automatic taping feature to operate.

Following a program choice, a program description submenu is placed on the television screen. In addition, from this program description submenu, the viewer may choose to record the selected program on his VCR using the guide record feature. If the guide record feature is chosen, the guide record submenu 1170 shown in FIG. 22 provides the subscriber with further instructions. In order for the set top terminal 220 to perform the guide record functions and operate the VCR, control signals are sent from the set top terminal 220 to the VCR via the video connection 650 or through a separate connection between the set top terminal 220 and the VCR. The VCR is capable of interpreting these control signals from the set top terminal 220 and performing the desired function (such as, activating the record feature). In the preferred embodiment, the VCR control signals are sent with the video signal and output from the output 650, as described above. Alternatively, a separate connection between the set top terminal 220 and VCR may be used.

j. HDTV Capability

The set top terminal 220 and program delivery system of the preferred embodiment can easily support high definition television (HDTV). The combination of digital video, compression and no restricted bandwidth limitation per channel makes the preferred system ideal for HDTV. The greater information flow of HDTV causes no problems for the

system. The menu selection system of the preferred embodiment is a user friendly manner of presenting HDTV programming to the subscriber.

FIG. 23 shows the integration of HDTV services into the menu-driven program delivery system. If the subscriber selects the major menu for HDTV 1032, the subscriber will receive either a description of the service with a suggestion to order the system, or a text note that the subscription is current and a listing of the currently available program selections in HDTV. If the subscriber has not paid to join the particular service, HDTV, the subscriber may be allowed to join one of the programs in progress for a limited time as a demo to entice the subscriber to order.

If a subscriber has paid the HDTV fees, the subscriber proceeds as in any other major menu screen. This particular major menu shows an example of how a follow-on or second screen may exist for the same menu. In this particular case, a second screen exists for the major menu HDTV 1032. The subscriber may access the second screen by selecting the last menu display block 1172 "Other HDTV Selections" in the lower part of the screen. Following this selection, the subscriber will be given a second screen of program selections. In this manner, any menu can have multiple screens with many program choices. This type of screen pagination on one menu allows the operations center 202 packager to avoid categorizing program selections within that same menu. In an alternative embodiment, the options available to the subscriber may be scrolled on one menu screen with the text within the menu display blocks changing as the subscriber scrolls up or scrolls down. Many variations of this HDTV example can be used with the described system.

k. Backyard System

In an alternative configuration, in areas without cable services where subscribers use backyard satellite systems (TV RO) to receive packaged television services, the set top terminal 220 will include the appropriate hardware to allow connection to the satellite 206 reception equipment through port 656. In this configuration, the menu system within the set top terminal 220 will be programmed directly from the operations center 202. Additionally, an upstream communication mechanism must be in place at the subscriber's home (i.e. modem) to communicate information to the operations center.

The hardware components that allow the set top terminal 220 to operate in a backyard system typically will not be included within the set top terminal shell itself. Instead, any such components accommodating the set top terminal's interoperability with a backyard program delivery system will typically reside outside the subscriber's home. As a result, the set top terminal 220 will operate as described above, notwithstanding any change in program delivery transmission media.

The terms and descriptions used herein are set forth by way of illustration only and are not meant as limitations. Those skilled in the art will recognize that numerous variations are possible within the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. An upgrade module for enhancing the functionality of a decompression box for use in a cable television program delivery system, the enhanced functionality using a control information stream that provides the decompression box with menu generation capability, the decompression box initially having the capability to produce decompressed video, the upgrade module comprising:

an interface means for providing an electronic connection to the decompression box so that the control information stream may be received from the decompression box;

- a means, connected to the interface means, for demultiplexing the control information stream into graphics and text;
 - a means, connected to the demultiplexing means, for combining the text and graphics to produce a menu generation signal; and
 - a means, connected to the combining means and interface means, for transferring the menu generation signal to the interface means for output to the decompression box, whereby the menu generation signal is processed for display.
2. The upgrade module of claim 1 further comprising a graphics decompressor, connected to the demultiplexing means, for decompressing the graphics to produce decompressed graphics that may be used to generate menus.
3. The upgrade module of claim 1 for further providing the decompression box with a program catalogue that provides the subscriber with program schedules and descriptions, the decompression box providing the upgrade module with video signals, wherein the interface means comprises a means for receiving the video signals from the decompression box and wherein the combining means comprises:
- a means for interpreting the text and graphics;
 - a means, connected to the interpreting means, for integrating the interpreted text and the interpreted graphics to produce the menu generation signal, whereby the menu generation signal carries data required for display of the program catalogue; and
 - a means for sending the menu generation signal to the transfer means, whereby the menu generation signal is output to the decompression box for display of the program catalogue.
4. The upgrade module of claim 1 for further enabling the decompression box to use promotional menus that provide the subscriber with promotional videos, text and graphics showing future events available for menu driven program selection, the decompression box providing the upgrade module with video signals, wherein the interface means comprises a means for receiving video signals from the decompression box, and wherein the combining means comprises:
- a means for interpreting the text and graphics;
 - a means, connected to the interpreting means, for integrating the received video signals, the interpreted text and the interpreted graphics to produce the menu generation signal, whereby the menu generation signal carries data required for display of the promotional menus; and
 - a means for sending the menu generation signal to the transfer means, whereby the menu generation signal is output to the decompression box for display of the promotional menus and the promotional videos, and text and graphics.
5. The upgrade module of claim 1, wherein the menu generation capability makes use of graphics and text stored locally within the upgrade module, and wherein the upgrade module further comprises a memory means for storing the graphics and text for use with the menu generation signal, so that the menus can be generated.
6. The upgrade module of claim 1, wherein the interface means comprises at least one cable connector adapted for use with an upgrade port on the decompression box.
7. The upgrade module of claim 1, wherein the decompression box has an expansion card slot, and wherein the interface means comprises at least one card connector for use with the expansion card slot.

8. The upgrade module of claim 1 for further providing the decompression box with a telephone caller identification message, the decompression box having a port adapted to receive telephone signals from a telephone line, wherein the upgrade module further comprises:
- a connection means for providing an electronic connection to the decompression box for receiving the telephone signals;
 - a means, connected to the connection means, for processing the received telephone signals to produce text messages and graphics icons; and
 - a means, connected to the processing means, for sending the text messages and graphics icons to the combining means to produce the menu generation signal, whereby the text messages and graphics icons are used to form the menu generation signal that is transferred to the decompression box for display of the caller identification message.
9. The upgrade module of claim 1 for further providing the decompression box with video cassette recorder control capability that uses recording menus presenting selection options to a subscriber and video cassette recorder control signals sent to the decompression box, the video cassette recorder control signals corresponding to the selection options chosen by the subscriber, the upgrade module further comprising:
- a means for generating the recording menus;
 - a means for interpreting the selection options chosen by the subscriber and received from the decompression box through the interface means;
 - a means for generating the video cassette recorder control signals based on the interpreted selection options chosen by the subscriber; and
 - a means for transmitting the video cassette recorder control signals to the decompression box for instructing the video cassette recorder in recording of programs.
10. An upgradeable set top converter for use in a cable television program delivery system, the set top converter having video decompression capability and adapted to accept a menu generation card, the set top converter upgradeable for enhanced functionality that provides the set top converter with menu generation capability using a control information stream received from a remote location, the upgradeable set top converter comprising:
- a means for receiving the control information stream from the remote location; and
 - an expansion card interface means, connected to the receiving means, for accepting the menu generation card, whereby the menu generation card is external to the set top converter and upgrades the set top converter for menu generation capability.
11. The upgradeable set top converter of claim 10 wherein the expansion card interface means comprises means for transferring the control information stream from the set top converter to the menu generation card, and wherein the menu generation card creates a menu generation signal using the control information stream.
12. An upgraded set top converter for use in a cable television program delivery system, the set top converter upgraded for enhanced functionality that provides the set top converter with menu generation capability using a control information stream received from a remote location, the upgraded set top converter comprising:
- an expansion card interface means for providing an electronic connection; and

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a menu generation card, electronically connected to the expansion card interface means, comprising a means for processing the control information stream to produce a menu generation signal, whereby the menu generation signal is output through the expansion card interface means to be processed for display.

13. The upgraded set top converter of claim 12, wherein the menu generation card further comprises means for demultiplexing the control information stream into more than one signal component including graphics and text; and means for combining the demultiplexed text and graphics to produce the menu generation signal.

14. The upgraded set top converter of claim 13 with the enhanced functionality further providing the set top converter with a program catalogue that provides the subscriber with program schedules and descriptions corresponding to video signals, wherein the interface means comprises a means for receiving the video signals, and wherein the combining means comprises:

a means for interpreting the demultiplexed text and graphics;

a means, connected to the interpreting means, for integrating the interpreted text and the interpreted graphics to produce the menu generation signal, whereby the menu generation signal carries data required for display of the program catalogue; and

whereby the menu generation signal is output through the expansion card interface means to the set top converter for display of the program catalogue.

15. The upgraded set top converter of claim 13 for further enabling the set top converter to use promotional menus that provide the subscriber with promotional video signals, text and graphics showing future events available for menu driven program selection, wherein the expansion card interface means comprises a means for receiving the promotional video signals, and wherein the combining means comprises:

a means for interpreting the demultiplexed text and graphics;

a means, connected to the interpreting means, for integrating promotional video signals, the interpreted text and the interpreted graphics to produce the menu generation signal, whereby the menu generation signal carries data required for display of the promotional menus; and

whereby the menu generation signal is output to the set top converter for display of one of the promotional menus.

16. The upgraded set top converter of claim 13, wherein the demultiplexed graphics are compressed and wherein the menu generation card further comprises means for decompressing the demultiplexed graphics.

17. The upgraded set top converter of claim 12 for further providing the set top converter with a telephone caller identification message, the set top converter having a port adapted to receive telephone signals from a telephone line, wherein the expansion card interface means further comprises:

a connection means for providing the electronic connection to the set top converter, whereby the telephone signals are received from the set top converter; and

wherein the menu generation card further comprises:

a means for processing the telephone signals to produce text messages and graphics icons; and

a means for sending the text messages and graphics icons to the combining means to produce the menu generation signal, whereby the text messages and

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graphics icons are used to form the menu generation signal that is transferred to the set top converter for display of the caller identification message.

18. The upgraded set top converter of claim 12 for further providing the set top converter with video cassette recorder control capability that uses recording menus presenting selection options to a subscriber and video cassette recorder control signals sent to the set top converter, the video cassette recorder control signals corresponding to the selection options chosen by the subscriber, wherein the menu generation card further comprises:

a means for generating the recording menus;

a means for interpreting the selection options chosen by the subscriber and received from the set top converter through the expansion card interface means;

a means for generating the video cassette recorder control signals based on the interpreted selection options chosen by the subscriber; and

a means, connected to the generating means, for transmitting the video cassette recorder control signals to the set top converter for instructing the video cassette recorder in recording of programs.

19. An advanced set top terminal with digital decompression and menu generation capabilities for use with a television program delivery system having digitally compressed program signals and a control information stream carrying menu content information, each set top terminal stores menu content information used to generate menu displays, the advanced set top terminal comprising:

a means for storing the menu content information;

a means for receiving the digitally compressed program signals and the control information stream;

a first signal processing means, connected to the receiving means and storing means, for processing the control information stream to produce processed control information, whereby the processed control information is used to update the stored menu content information to produce updated menu content information;

a means, connected to the storing means, for generating the menu displays using the updated menu content information, whereby the menu displays produce subscriber options for selection of other menus and television programs;

a means, electronically connected to the generating means, for selecting the other menus and the television programs;

a means, electronically connected to the selecting means, for tuning to one of the digitally compressed television programs signals to produce a tuned television program signal; and

a second signal processing means, connected to the tuning means, for processing the tuned television program signal to produce a video signal and audio signal for television display and listening.

20. The advanced set top terminal of claim 19, wherein the second signal processing means comprises:

a means for demodulating the tuned television program signal to produce a demodulated program signal;

a means, connected to the demodulating means, for demultiplexing the demodulated program signal to produce video signal components and audio signal components;

a video decompressing means, connected to the demultiplexing means, for decompressing the video signal components to produce decompressed video signal components;

an audio decompressing means, connected to the demultiplexing means, for decompressing the audio signal components to produce decompressed audio signal components;

- a means, connected to the video decompressing means, for combining the decompressed video signal components with the stored menu content information for television display of the video signal; and
- a means, connected to the audio decompressing means, for producing the audio signal from the decompressed audio signal components.

21. The advanced set top terminal of claim 20 that has a picture-on-picture capability using multiple tuners, wherein the tuning means comprises more than one tuner so that the multiple tuners can produce multiple television program signals which will be overlayed over one another.

22. The advanced set top terminal of claim 19 having a program catalogue service that provides the subscriber with program schedules and descriptions, the program schedules and descriptions created from text and graphics, the text and graphics derived from the control information stream, wherein the advanced set top terminal further comprises:

- a means, connected to the storing means, for interpreting the text and graphics;
- a means for integrating the interpreted text and the interpreted graphics to produce a menu generation signal, whereby the menu generation signal carries data required for display of the program catalogue; and
- a means for outputting the menu generation signal for display.

23. The advanced set top terminal of claim 20 having a promotional menu display capability that provides subscribers with promotional videos, text and graphics showing future events available for menu driven program selection, wherein text and graphics are derived from the control information stream, and wherein the advanced set top terminal further comprises:

- a means, connected to the storing means, for interpreting the text and graphics;
- a means for integrating the interpreted text, the interpreted graphics and the decompressed video to produce a menu generation signal, whereby the menu generation signal carries data required for display of the promotional videos; and
- a means for outputting the menu generation signal for display.

24. The advanced set top terminal of claim 19 capable of operating with interactive services conducted from a cable headend or other remote location, the interactive services requiring entry of interactive subscriber inputs and use of interactive programming instructions, wherein the selection means comprises:

- a subscriber interface means for entry of the interactive subscriber inputs;
- a means for storing the interactive programming instructions;
- a means, connected to the storing means, for accessing the stored interactive programming instructions;
- a microprocessing means, connected to the accessing means for executing the stored interactive programming instructions to produce interactive signals; and
- an upstream data transmission means, connected to the microprocessor means, for transmitting the produced interactive signals to the cable headend.

25. The advanced set top terminal of claim 19 having a caller identification function capable of displaying a caller

identification message using a menu generation signal, wherein the advanced set top terminal further comprises:

- a means for receiving telephone signals;
- a means, connected to the receiving means, for processing the telephone signals to produce text messages and graphics icons using the menu content information;
- a means, connected to the processing means, for combining the text messages and graphics icons to produce the menu generation signal carrying the caller identification message for television display; and
- a means, connected to the combining means, for preparing the menu generation signal for television display.

26. The advanced set top terminal of claim 19 capable of processing high definition television signals, wherein the second signal processing means comprises:

- a means for interpreting the high definition television signals; and
- a means for preparing the interpreted high definition television signals for television display.

27. The advanced set top terminal of claim 19 capable of receiving the control information stream through a satellite system, the means for receiving the digitally compressed program signals and the control information stream is comprised of the satellite system, wherein the satellite system is electronically connected to the first signal processing means.

28. A method for enhancing the functionality of a decompression box for use in a television program delivery system, the enhanced functionality using a control information stream that provides the decompression box with menu generation capability, the decompression box initially having the capability to produce decompressed video, the method comprising the steps of:

- providing an electronic connection to the decompression box so that the control information stream containing graphics, text and menu generation information may be received from the decompression box;
- demultiplexing the received control information stream into graphics, text, and menu generation information;
- combining portions of the text and graphics information, to produce a menu generation signal, wherein the menu generation information is used in the combining step; and
- transferring the produced menu generation signal to the decompression box, whereby the transferred menu generation signal is processed for display.

29. A method for upgrading a set top converter for use in a television program delivery system, the set top converter having video decompression capability and an expansion card slot adapted to receive a menu generation card, the set top converter upgradeable for enhanced functionality that provides the set top converter with menu generation capability using a control information stream received from a remote location, the method comprising the steps of:

- providing an electronic connection to the set top converter for receiving the control information stream;
- demultiplexing the control information stream into graphics and text, whereby the control information stream is received from the set top converter;
- decompressing the graphics to produce decompressed graphics that may be used to generate menus; and
- connecting the menu generation card to the set top converter; and
- using the menu generation card to combine the text and decompressed graphics to produce a menu generation

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signal, whereby the menu generation signal is output to the set top converter to be processed for display.

30. The method of claim 29, wherein a satellite system is used at a subscriber location, and wherein the step of providing an electronic connection to the set top converter further comprises the steps of:

receiving the control information stream from the remote location using the satellite system; and

providing the control information stream from the satellite system to the set top converter, wherein the satellite system is electronically connected to the set top converter.

31. A method for enhancing the functionality of a cable-ready television for use in a cable television program delivery system, the cable-ready television having an electronic interface that accommodates the enhanced functionality using a control information stream, the enhanced functionality providing the cable-ready television with menu generation capability, the method comprising the steps of:

receiving the control information stream from the cable-ready television through the electronic interface;

demultiplexing the control information stream into graphics, text and menu generation information that includes information on program packaging and menu content;

combining the graphics, text and menu generation information to produce a menu generation signal; and

transferring the menu generation signal to the cable-ready television through the electronic interface, whereby the menu generation signal is processed for display.

32. An apparatus for enhancing the functionality of a set top converter for use in a television program delivery system, wherein the apparatus uses a control information stream received from a remote location to provide the set top converter with menu generation capability, the set top converter having the capability to produce decompressed video, comprising:

an interface means for providing an electronic connection to the set top converter so that the control information stream may be received by the apparatus from the set top converter;

a means, connected to the interface means, for demultiplexing the control information stream into graphics and text; and

a means, connected to the demultiplexing means, for combining the text and graphics to produce a menu generation signal,

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whereby the menu generation signal is processed by the set top converter for display.

33. The apparatus of claim 32, capable of receiving the control information stream through a satellite system, the apparatus further comprising:

a satellite system, wherein the satellite system receives the control information stream from the remote location and sends the control information stream to the set top converter, and wherein the satellite system is electronically connected to the set top converter.

34. An upgrade module for enhancing the functionality of a decompression box for use in a television program delivery system, the enhanced functionality using a control information stream that provides the decompression box with menu generation capability, the decompression box initially having the capability to decompress video, the upgrade module comprising:

an electronic connection to the decompression box, whereby the control information stream may be received from the decompression box;

a demultiplexer, wherein the control information stream is demultiplexed into graphics and text;

a combiner, electronically connected to the demultiplexer, wherein the combiner uses the demultiplexed graphics and text to produce a menu generation signal; and

a microprocessor, electronically connected to the combiner, wherein the microprocessor causes the menu generation signal to be transferred to the decompression box to be processed for display.

35. An upgraded set top converter for use in a television program delivery system, the set top converter upgraded for enhanced functionality that provides the set top converter with menu generation capability using a control information stream received from a remote location, the upgraded set top converter comprising:

an expansion card interface, wherein the control information stream is received from the remote location and wherein the expansion card interface can accept a card; and

a menu generation card, electronically connected to the expansion card interface, and comprising:

a combiner, whereby a menu generation signal is produced by the combiner and output through the expansion card interface to be processed for display of a menu.

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EXAMINER INITIAL	
<i>ml</i>	Stavros Christodoulakis and Stephen Graham, "Browsing Within Time-Driven Multimedia Documents," publication of the Institute for Computer Research, University of Waterloo, Waterloo, Ontario, Canada, July 1988, pp. 219-227.
<i>ml</i>	Caitlin Bestler, "Flexible Data Structures and Interface Rituals for Rapid Development of OSD Applications," 42nd Annual Convention and Exposition of the NCTA, San Francisco, CA, June 6-9, 1993, pp. 223-236.

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Browsing Within Time-Driven Multimedia Documents

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Abstract

We present the software design and the interfaces of an interactive browser for time-driven multimedia objects. Time-driven multimedia objects may have as their main resource voice or animation sequences. Several important application environments such as training systems, home entertainment systems, do-it-yourself manuals may involve time-driven multimedia objects and they may be implemented with such browsing interfaces. Such applications may be implemented using easy to replicate optical disks such as CD-ROMs, and distributed to a large user community.

1 Introduction

The interest in multimedia information systems is increasing very rapidly. New, truly interactive multimedia applications are envisioned with very large markets. Many of these application environments such as training systems, education systems, home entertainment systems, advertising catalogues, do-it-yourself manuals, have a need for a very dynamic presentation which may combine sound with images or animation in a complex multimedia object.

The storage space and performance requirements of such applications are by no means trivial. However, some of the major hardware difficulties for the development of such applications have been alleviated with the appearance in the market of inexpensive, removable, easy to replicate archival devices based on optical disk technology, as well as the appearance of inexpensive work stations with several mips of CPU power and high resolution bit-mapped displays. There remain however, very important software problems related to the software design and performance of such applications [8,3,2].

One very important problem in this environment is to provide appropriate browsing and navigation interfaces for diverse applications. These interfaces should support means for fast man-machine communication and information transfer. A high degree of interactivity built in the application software is a good means for increasing the man-machine communication bandwidth. The system software should provide the basic functionality for building interactive applications [6].

There has been research in the past for providing powerful browsing interfaces in a computerized document-like application environment. These browsing interfaces in MINOS, for example, provide menu options for navigating to next page, previous page, a page with a given number, a page where a text pattern or an image appears, to the beginning of a chapter, follow hypertext links, etc. [8]. Thus structural and content information is exploited to provide an automation of the browsing activity within what is basically a paper-form document, while striving at the same time for increased functionality and man-machine communication speed.

We would like to provide good browsing capabilities for other types of objects which are not heavily text based or document-like. We loosely call these generic objects (and applications) *time-driven*. Time-driven objects may

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PART I

ITEM 1. BUSINESS

General

StarSight Telecast, Inc. (the "Company") was founded in 1986 to design and market an easy-to-use and accurate method of identifying, selecting and recording television programming. The Company has developed a patented on-screen interactive television program guide and VCR control service marketed under the StarSight® brand name. Customers can currently subscribe to the StarSight service directly from the Company, for use with StarSight-capable televisions, VCRs, TVCRs, satellite integrated receiver descramblers ("satellite receivers") and stand alone StarSight receivers. StarSight capability is currently available to consumers in limited quantities of cable converters, televisions, VCRs, TVCRs, satellite receivers and stand alone StarSight receivers. The Company also anticipates that customers will be able to subscribe to the StarSight service through service providers such as their local cable operators or local telephone companies ("telco"). StarSight's Electronic Program Guide ("EPG") offers the following primary features:

Program Schedules. StarSight's EPG enables customers to conveniently view (i) up to seven days of up-to-date television program schedule information covering substantially all of the numerous available channels and (ii) information about programs in progress as the viewer changes from one channel to another, even during commercials.

Program Selection. The StarSight EPG enables customers to easily select a desired program by the program's title or by the program's theme, as well as by the traditional method of selection by channel number.

One Button Recording. With the touch of a button on a remote control, the StarSight EPG enables customers to record a current or future television program or series of related programs (for example, a soap opera or miniseries) by selecting the program title to be recorded.

Customized Channel Set-Up. StarSight's EPG enables customers to set the order of channels by preference and to delete never or infrequently watched channels from the program schedule information.

The Company is subject to all of the risks and expenses inherent in the establishment of a new business enterprise. For the Company to achieve commercial success, it must successfully market the StarSight service to potential customers and it must obtain adequate financing to fulfill its marketing plan. There can be no assurance that StarSight's EPG and service will achieve market acceptance. The Company believes that the availability of StarSight-capable televisions, VCRs, TVCRs, satellite receivers, cable and telco converters and stand alone StarSight receivers in the market place combined with a focused marketing program is essential to the Company's future success.

Market Overview

The Company believes that there is a significant market opportunity for an easy-to-use, on-screen, interactive television guide such as StarSight's EPG. Based upon industry studies, the Company estimates that in 1995, 95.8 million households in the United States owned at least one television and 76.6 million households in the United States owned a VCR. The Company further

estimates, based upon industry studies, that approximately 59.7 million households in the United States (representing approximately 64% of all television households) subscribe to a cable service and 4% have C-band satellite programming access. Based on industry trade publications, as of November 1995, the Company estimates that there were 47 channels available to the average cable subscriber. Cable operators are also providing consumers with increasingly wide choices of pay-per-view movies and other pay-per-view programming. The Company estimates that in this environment cable television viewers may presently choose from approximately 7,500 programs in a week depending on geographic area and channel capacity. In addition, several cable operators have announced their intention to expand channel capacity in the future.

The Company believes that the increase in the number of channels is being accompanied by a proliferation of viewing choices as the libraries of films and syndicated programs available for broadcast grow and television stations demonstrate an increasing willingness to embrace twenty-four hour programming schedules. Consequently, the number of weekly programs available for television viewers may increase significantly. Currently available program schedule guides consist primarily of printed guides such as TV Guide, local cable television guides and local newspaper and advertising guides. Based upon industry studies, the Company estimates that approximately 74% of households owning televisions obtain television schedule information from printed program guides. Based upon published data, the Company estimates that more than 14 million customers use TV Guide, an example of such printed program guides. In addition to such printed guides, on-screen scrolling program guides are available on most cable networks.

The Company believes that the traditional sources of program schedule information will become increasingly inconvenient as the number and the diversity of programming choices increase. Printed schedule guides, generally produced in one-week intervals, cannot be updated to reflect changes in program scheduling which occur after such guides are printed and distributed to television viewers and are thus inherently susceptible to inaccuracies. In addition, the volume of information which can be presented in printed guides is constrained by space, format and cost limitations. The majority of currently commercially available on-screen program guides generally present schedule information in a non-interactive scrolling format. Such non-interactive program guides typically provide users with only a few hours of current programming information, and viewers must wait for such guides to scroll to the desired channel. In addition, in order to display the currently available on-screen scrolling guides, a cable operator must dedicate a channel which could otherwise be used to broadcast commercial programming. Both printed and scrolling programming guides generally organize and present information only by air time and channel number rather than program title or program theme. See "Competition."

The Company believes that the recent and expected future growth in the number of television channels, along with the proliferation of viewing choices, has created a need for an easy to use, cost effective and accurate method of identifying, selecting and recording television programs. The Company believes that as consumer needs for improved television schedule information grow, the need for accurate and convenient methods of program selection and recording will also grow.

Business Strategy

The Company offers the easy-to-use StarSight interactive program guide which: (i) meets the existing demand for accurate and up-to-date television program schedule information, (ii) can accommodate the anticipated proliferation of viewing choices, (iii) enables customers to record a program or series of programs with the touch of one button, and (iv) allows customers to set the order of channels by preference and to delete never or infrequently watched channels. The integration of StarSight formatted program information into both the broadcast data stream and the StarSight-capable hardware that receives StarSight data gives it the ability to display program information on the television screen, to tune to desired programs by highlighting the title of the program and to program the VCR at the touch of one button. The Company believes that StarSight's on-screen interactive format, extensive television/VCR functionality and ability to search for and select programs by title or theme, as well as by channel number, make it easier to use and more convenient than both printed and on-screen scrolling guides. The Company's business strategy segments the market for the StarSight EPG into three distinct distribution channels: consumer electronics, service providers, such as cable or telco, and licensing StarSight intellectual property for non-StarSight-capable products ("Licensing"). The Company believes this strategy will maximize both demand for the StarSight EPG and facilitate its delivery to a large and diverse base of customers. The Company intends to provide customers in the consumer electronics and service provider distribution channels with as many StarSight-capable hardware choices as possible by broadly licensing its proprietary technology to hardware manufacturers across the consumer electronics and service provider distribution channels. In the Licensing distribution channel, the Company intends to license its intellectual property for non-StarSight-capable products which provide guide features based on the Company's proprietary technology and patented inventions.

The Company intends to penetrate the three target distribution channels by entering into strategic relationships with major marketing and distribution partners and with prominent manufacturers presently providing hardware across the targeted distribution channels.

In the consumer electronics distribution channel, the Company has entered into license agreements with Thomson Consumer Electronics (RCA, GE, ProScan) ("Thomson"), Zenith Electronics Corporation ("Zenith"), Sony Electronics, Inc. ("Sony"), Mitsubishi Consumer Electronics America, Inc. ("Mitsubishi"), Toshiba America Consumer Products, Inc. ("Toshiba"), Matsushita Television Company (Panasonic, Qasar) ("Matsushita"), Philips Consumer Electronics Company (Magnavox) ("Philips"), Sharp Electronics Corporation ("Sharp"), Samsung Electronics America, Inc. ("Samsung"), LG Electronics U.S.A., Inc. ("GoldStar"), and Daewoo Electronics Corp. of America ("Daewoo"), for the incorporation of StarSight-enabling technology into televisions, VCRs and TVCRs. In addition, the Company has entered into agreements with Uniden America ("Uniden") and NextWave Communications ("NextWave") for the marketing and distribution of StarSight-capable satellite receivers to C-band satellite service customers.

On March 8, 1996, the Company finalized a series of strategic and financial agreements with Thomson's parent company, THOMSON multimedia S.A. ("THOMSON") which included an equity investment by THOMSON of approximately \$25 million. This relationship includes commitments by THOMSON for the manufacture and promotion of StarSight-capable consumer electronic products across a broad range of products. The commitments by THOMSON are driven in part by strategic and financial incentives available to THOMSON which increase with the manufacture of higher unit volumes of StarSight-capable products. The Company has also manufactured a limited number of stand alone StarSight receivers, so that cable and telco customers and over-the-air broadcast viewers without StarSight-capable hardware can subscribe to the StarSight service from the service provider or directly

from the Company. In addition, the Company has entered into an agreement with Philips to use the Magnavox® brand name for the stand alone StarSight receiver. Under this agreement, Philips has agreed to provide sales, marketing, distribution and credit services to assist in the distribution of the stand alone StarSight receiver. See "Manufacturing."

In certain instances, the Company's licensed consumer electronics manufacturers have experienced significant delays in the development and commercial release of StarSight-capable hardware and, although certain manufacturers have indicated their intention to make such equipment available to their customers in 1996, there can be no assurance that significant volumes of StarSight-capable hardware will become available to customers. Further delays in the availability of StarSight-capable hardware will have an adverse effect on the Company's business. See "Manufacturing."

With respect to the service provider distribution channel, the Company currently has agreements with Viacom Cable, KBLCOM Incorporated ("KBLCOM"), Providence Journal Company ("Providence Journal"), Cox Communications Inc. ("Cox"), Bell Atlantic Video Services Company ("Bell Atlantic"), and GTE Communication Systems Corporation for the marketing and distribution of the StarSight service to their customers. Viacom Cable is currently distributing the StarSight service to a portion of its cable customers in Castro Valley, California (the "Castro Valley Launch"). This deployment was done in conjunction with a test of Viacom Cable's fiber optic upgrade of cable service to its customers in Castro Valley. Recent consolidation in the cable industry has affected the execution of StarSight's marketing and distribution strategy with Viacom Cable, KBLCOM, Providence Journal and Bell Atlantic. See "Sales and Marketing." The Company has entered into license agreements with General Instrument Corp. ("General Instrument"), Scientific-Atlanta, Inc. ("Scientific Atlanta") and Zenith for the incorporation of StarSight-cabling technology into cable converters to be manufactured by them for sale to cable system operators that offer StarSight to their customers. In 1995, the Company brought an arbitration action against Scientific-Atlanta concerning Scientific-Atlanta's alleged delay in the deployment of StarSight-capable converters and its development of a competing electronic program guide allegedly using the Company's technology in violation of its licensing agreement with the Company. In apparent response to the arbitration action, Scientific-Atlanta filed a lawsuit in February 1996 against the Company and Philips alleging that the Company's stand alone StarSight receiver infringes on three U.S. patents owned by Scientific-Atlanta. See "Legal Proceedings."

As a part of the Company's strategy in licensing, the Company has entered into licensing agreements with Thomson, Sony, Toshiba and Panasonic for use of the Company's intellectual property in certain non-StarSight-capable digital satellite system ("DSS") equipment manufactured by them. The Company intends to continue to actively explore additional opportunities to license its intellectual property for non-StarSight-capable products where appropriate. See "Sales and Marketing."

The Company is also planning to develop new technologies intended to enable it to offer additional customer information services complementary to StarSight's EPG, such as news, weather, sports and other information. When available, the Company intends to offer such information services to the installed base of StarSight customers, thus broadening and diversifying the Company's potential sources of subscription revenue.

StarSight EPG

StarSight's EPG offers several program schedule, selection and recording functions. Since there is not yet a significant market for StarSight's EPG, there can be no assurance that an acceptable level of consumer demand will be achieved. If significant demand does not develop or is low due to lack of market acceptance, technological change, competition or other factors, the Company's business would be materially adversely affected.

Program Scheduler. StarSight's EPG provides an up-to-date and accurate on-screen program schedule, listing all programs by title. The database for this television schedule information is comprised of program data purchased by the Company from data providers which provide similar information to newspapers and other printed television listings. Unlike printed listings, however, the Company's database is updated daily for program schedule changes. Unlike currently available on-screen scrolling guides, the StarSight EPG provides customers with 24 hours per day of schedule information for up to seven days of programming. The Company believes that this will keep the StarSight service more accurate, up-to-date and informative than any other currently available printed or on-screen scrolling guide. StarSight offers the following program schedule features.

Program Selection by Grazing. The StarSight EPG allows viewers to obtain information on programs in progress while changing channels or "grazing," even during commercials. As the viewer switches from channel to channel, a brief description of the program then airing appears on the screen. The StarSight EPG displays the program title, the broadcast time remaining, a brief description of the program and theme. With the touch of a button, the viewer is able to receive a more detailed description of the program in progress.

Program Selection by Browning. The StarSight browsing feature allows the viewer to continue to watch and listen to the current television program while "browsing" through the program titles and descriptions for other programs in progress.

On-Screen TV Program Listings. At the touch of a button, StarSight's EPG provides the TV viewer with an on-screen localized program schedule displayed in a "grid" or "column" format similar to that of traditional TV schedules. The grid guide includes TV schedule information for up to seven days in advance for virtually every channel on the viewer's television. The viewer is able to change the information on the screen to see what is on the other channels and to see what is on later in that seven day period. A menu bar at the bottom of the screen shows the highlighted program's channel number and network and also displays the current time and date. StarSight's program schedule automatically opens to the current time and date whenever it is activated.

Grid Guide Pop-up Information. While viewing the grid guide, the StarSight EPG allows the viewer to find out detailed information for any program within the StarSight program schedule simply by pressing a button. A pop-up screen gives the viewer a description of the selected program title, broadcast date and time, duration and program theme.

Program Guide By Channel. The StarSight EPG allows the viewer to see a listing of all the programs on a particular channel. For example, a customer can view all of the programming for Channel 4 on a given day. The user is able to change the information on the screen to see what will air later in the day or in that seven day period on Channel 4.

Program Selection. StarSight's EPG offers a variety of methods for customers to select a television program from the on-screen schedule. Customers are able to choose and tune to a program by its title, as well as by the traditional method of selection by channel number. This process eliminates the significance of channel numbers and the confusion consumers face in selecting programs by network or station channel numbers that are often reallocated by cable operators or assigned to non-corresponding channel numbers in cable channel line-ups. Customers also are able to select and view program titles and descriptions for up to the following seven days from a list of displayed themes, such as movies, sports and educational programs. The following describes the steps a viewer might go through using the StarSight EPG to select a television program by theme.

Step 1. A customer is able to choose programs according to a favorite viewing category, such as sports, movies or comedy. For example, a viewer interested in watching sports would highlight the "Sports" theme from the on-screen theme display list.

Step 2. After the viewer has selected "Sports," a list of subcategories pops-up and the viewer then is able to select from a list of sports. For example, a list of "Sports" sub-themes includes "All Sports," "Football," "Basketball," "Soccer" and "Golf."

Step 3. After the viewer has selected the desired theme, an up-to-seven-day chronological display of those programs falling into that subcategory appears. The list shows the channel, day, start time, title and duration of the relevant programs. The viewer would select a desired program, for example, "New York Knicks at Orlando Magic," from the list of "Sports-Basketball," then press a button to obtain additional information regarding this program.

Step 4. If the desired program is in progress, the viewer can then press a single button and tune the television to that program. Alternatively, the viewer can choose to activate or set the VCR to record the program.

One Button Recording. Once the customer has chosen the desired program by its title, the StarSight EPG enables the customer to record the program by touching one button. The customer has the choice of recording the program once for just that episode, daily for each day's episode for shows like soap operas or talk shows, or weekly for programs that are on once each week.

Recordings. This feature provides the customer with a screen that indicates which programs the customer has selected to be recorded. It shows the channel, the day, the time, the program title and the length of each show to be recorded.

Series To Be Recorded. This screen displays programs selected to be recorded daily and weekly. It shows the channel, the days, the time, the program title and the length of each show to be recorded.

Customized Channel Set-up. The StarSight EPG allows customers to set the order of channels by preference and to delete never or infrequently watched channels from the program schedule information. This enables StarSight customers to customize the program schedule information to reflect their viewing preferences and reduce the time spent grazing through the program schedule. Deleted channels may be reselected if the viewer so desires. StarSight's EPG also allows a customer to arrange

the line-up of channels in the program schedule in order of preference. For example, the viewer can choose CNN, Comedy Central and Nickelodeon, in that order, to be at the top of the line-up.

The Company has priced the cost to customers at \$4.99 per month before promotional discounts when offered directly by the Company and potentially less than that if offered by cable and telco operators as part of a package to their customers. These subscription rates are currently being offered with various free trial periods and are subject to a one-time activation fee. The determination of such pricing depends on a number of factors, including the amounts which customers are currently paying for printed guides, the willingness of customers to pay for special cable services or programs, the monthly price the market can be expected to support and any effect the Cable Television and Consumer Protection Act of 1992 ("1992 Cable Act") and/or the Telecommunications Act of 1996 ("1996 Telecommunications Act") has or may have on the pricing of subscription services by cable and telco operators. See "Government Regulation." The Company's pricing structure also takes into account information derived from market research, including data which have been gathered by market research firms commissioned by the Company to conduct qualitative and quantitative research, including national consumer focus groups. Data have been gathered from potential consumers regarding their responses to various proposed pricing levels for the subscription service, activation fees and the cost of acquiring StarSight-capable hardware. The Company analyzes this data, as well as the market response to the current pricing, to determine the appropriate pricing levels, manner and frequency of billing and subscriber incentive programs to attempt to maximize subscriber penetration and revenues.

Sales and Marketing

The Company targets the consumer electronics and service provider channels for the distribution of the StarSight service to customers. In the consumer electronics distribution channel, the Company markets the StarSight service directly to customers who have purchased televisions, VCRs, TVCRs, satellite receivers or stand alone StarSight receivers into which the Company's enabling technology has been incorporated and who do not subscribe through an affiliated cable or telco system offering the StarSight service or who choose to receive StarSight's EPG directly from the Company. In the service provider distribution channel, the Company intends to market StarSight's EPG through cable and telco operators who offer the StarSight service to their own customers together with other cable and telco services.

Over time the Company anticipates that the marketing and promotion of the StarSight service across the consumer electronics and service provider distribution channels will become the most significant operating expense incurred to support the StarSight service. The Company expects to expend a portion of its resources in connection with a comprehensive marketing campaign focused on strengthening consumer recognition of the StarSight EPG. As currently contemplated, the Company's marketing efforts will include public relations efforts, trade show and industry awareness programs, newspaper and other printed advertising. The Company intends to promote StarSight's EPG using its own marketing resources along with those of affiliated cable operators and manufacturers of StarSight-capable hardware. The Company currently expects that cooperative marketing expenditures with the manufacturers and distributors of StarSight-capable products could enhance recognition among potential subscribers. Since there is no existing market for the StarSight service, there can be no assurance that an acceptable level of consumer demand will be achieved. If demand does not develop or is low due to lack of market acceptance, technological change, competition or other factors, the Company's business would be materially adversely affected.

Consumer Electronics. For the consumer electronics distribution channel, the Company is marketing StarSight's EPG directly to the owners of StarSight-capable televisions, VCRs, TVCRs and a

limited number of stand alone StarSight receivers. Annually there are 26 million new televisions and 13 million new VCRs sold in the United States. The Company has entered into license agreements with Thomson (RCA, GE and ProScan brands), Zenith, Sony, Mitsubishi, Toshiba, Matsushita (Panasonic and Quasar brands), Philips (Magnavox and Philips brands), Sharp, Samsung, GoldStar, and Daewoo for the incorporation of StarSight-enabling technology into televisions, VCRs and TVCRs. The current consumer electronics manufacturing partners produce approximately 70% of all televisions, VCRs and TVCRs sold in the United States. The first StarSight-capable televisions were introduced into the consumer marketplace in late 1994. The first StarSight-capable VCRs became available in the second half of 1995. To date only limited quantities of StarSight-capable televisions and VCRs have been introduced into the consumer electronics channel. There can be no assurance that the Company's agreements with third party manufacturers will result in the availability of sufficient quantities of StarSight-capable televisions and VCRs to allow the Company to achieve significant penetration of the consumer electronics distribution channel. The Company has also manufactured a limited number of stand alone StarSight receivers. The Company has entered into an agreement with Philips to use the Magnavox brand name for the stand alone StarSight receiver. Under this agreement, Philips has agreed to provide sales, marketing, distribution and credit services to assist in the distribution of the stand alone StarSight receiver. Philips began limited distribution of the stand alone StarSight receiver in March 1995. See Note 6 to Financial Statements.

In March 1996, the Company entered into a series of strategic and financial agreements with THOMSON, pursuant to which THOMSON has agreed to aggressively promote and incorporate StarSight into selected product lines in return for a share of the Company's revenues received in connection with the Company's consumer electronics business. The commitments by THOMSON are driven, in part, by strategic and financial incentives available to THOMSON which increase with the manufacture of higher unit volumes of StarSight-capable products. Adverse market conditions or a lack of wide ranging consumer acceptance could negatively impact the level at which THOMSON promotes and incorporates StarSight's EPG into Thomson's selected product lines.

Customers who have C-band satellite receivers are able to receive the StarSight service via StarSight-capable satellite receivers marketed by StarSight licensees. The Company has a license agreement with Uniden pursuant to which Uniden began offering StarSight-capable satellite receivers in late calendar 1994. The Company also has a license agreement with NextWave for the marketing and distribution of StarSight-capable satellite receivers to C-band satellite service customers. Presently 4% of all television households have satellite (C-band) programming access. This current market represents a smaller opportunity for the Company than cable and telco systems. However, with the introduction in the fall of 1994 of the GM Hughes' Electronics digital satellite system ("DSS"), called DirecTV, and Thomson's RCA receivers, direct broadcast satellite ("DBS") was launched into the satellite market. The Company believes that DBS technology represents additional opportunities for StarSight's EPG. See "Licensing" below. In the future, the Company intends to enter into relationships with additional manufacturers of satellite equipment to incorporate the StarSight technology into both C-band and KuBand satellite receiver products. To address the C-band satellite market, the Company has agreements with PBS, Viacom and with Trinity Broadcasting Network to include the StarSight program schedule data on the vertical blanking interval of their satellite transmission signals.

The Company's consumer electronics distribution channel marketing strategy includes joint efforts with television, VCR and TVCR manufacturers to promote the StarSight EPG through in-store advertising, as well as through package insert advertising targeted at first-time buyers. In addition, the Company provides marketing and sales incentive programs for retailers to promote StarSight-capable consumer electronics products. The Company receives the greatest revenue per subscriber from the

distribution of the StarSight service in this market channel but also incurs all billing, technical support, marketing and other distribution costs.

Service Providers. The Company believes that the most efficient method of reaching a large number of potential customers is to market the StarSight service primarily through a relatively small number of service providers such as the major cable and telco operators. The Company's service provider distribution strategy requires that cable and telco operators order new StarSight-capable converters from converter manufacturers for distribution to new customers and, in the case of cable, to existing customers as replacements for obsolete or nonfunctioning converters or, alternatively, for distribution to existing and new customers as such cable and telco operators build, rebuild or upgrade their systems. The Company believes that delays in the availability of converters incorporating new analog and digital technology have caused cable operators to defer purchases of new converters. As a result, the deployment of StarSight-capable converters has been delayed. The Company has also arranged for the manufacture of a limited number of stand alone StarSight receivers for use in conjunction with existing converters, pending their replacement with StarSight-capable converters. Although the Company has previously entered into agreements with Viacom Cable, KBLCOM, Providence Journal and Cox regarding the marketing of the StarSight service to their respective cable subscribers and Viacom Cable has deployed the StarSight service in connection with its Castro Valley Launch, recent consolidation in the cable industry has affected the distribution of the StarSight service by those cable operators. In particular, Time Warner has completed the purchase of KBLCOM and Continental Cable has finalized the acquisition of Providence Journal's cable operation, Colony Cable. In addition, in July 1995, Viacom announced an agreement to split off Viacom Cable subject to certain conditions, all of which have not yet been met. The unstated or uncertain commitment of the new or future operators of these cable systems to offer the StarSight service has contributed to delays in the execution of the Company's strategy for cable distribution. There can be no assurance that the Company's agreements and arrangements with cable operators will result in the successful marketing of StarSight's HPG to cable customers or in the commercial acceptance and viability of the StarSight service. In addition, there can be no assurance that the Company will be able to enter into discussions or affiliation agreements with a sufficient number of significant cable and telco operators to achieve commercial acceptance. Finally, there can be no assurance that the Company's current or potential future agreements with third party manufacturers will result in the availability of sufficient quantities of StarSight-capable converters to allow the Company to achieve significant penetration of the service provider distribution channel. The Company currently has pending an arbitration action against a converter box manufacturer as a result of alleged delays the Company has experienced in the availability of that manufacturer's StarSight-capable converter box. See "Legal Proceedings."

Given the large number of customers that can be reached through a single service provider, the Company is directing its StarSight marketing efforts to complement the marketing efforts of service providers. Currently, on a limited basis, service provider customers pay subscription fees directly to service providers which in turn pay a portion of such fees to the Company. Because of the delays in the availability of StarSight converters, the Company has only recently begun to negotiate the split of subscription fees with certain initial cable and telco operators, and the Company expects that service providers will assume significant responsibility for billing, marketing and distribution efforts, and therefore the resulting revenue per subscriber received by the Company through the service provider distribution channel will in general be lower than when the Company markets the StarSight service directly to subscribers through the consumer electronics distribution channel. The Company currently anticipates that service provider customers will have the option of subscribing to the StarSight service as either a single "premium" service separate from other services offered by a cable or telco operator or as part of a "tier" of services which are sold as a package. A portion of the Company's subscriber base may also consist of service provider customers who are offered the StarSight EPG as part of the "basic"

service provided to all subscribers on that system. The Company and the service provider will each receive a varying portion of the subscriber revenue generated by the StarSight service depending, in part, on the relative amounts of billing, technical support, marketing and other distribution efforts of each party and, in part, on whether the subscriber is paying for the StarSight service as a premium, tier or basic service. To the extent that the service provider undertakes the billing, technical support, marketing and other distribution efforts, the Company expects to receive a smaller portion of the revenue per subscriber. The Company expects that it will receive a larger portion of the revenue per subscriber in cases where a service provider offers the StarSight service as a premium service and a smaller portion of the revenue per subscriber when the service is offered as part of a basic or tier service. However, inclusion of StarSight's EPG as part of the basic or tier service will still be a desirable marketing method due to the larger number of customers involved. Finally, the Company expects that it will receive a smaller portion of the revenue per subscriber as the percentage of StarSight customers in a particular cable or telco system increases.

For the Castro Valley Launch, Viacom Cable has deployed the StarSight EPG to a portion of its customer base in connection with the test of its fiber optic upgrade of cable service to the customers in its Castro Valley System. As previously discussed, Viacom has announced that it intends to complete the split off of its cable systems. The Company is currently analyzing the potential effects such split off may have on the distribution of StarSight in Castro Valley and in other systems operated by Viacom Cable.

On October 28, 1994, the Company and Bell Atlantic entered into a strategic agreement pursuant to which the Company granted Bell Atlantic the right to distribute StarSight on an exclusive basis to homes having access to video dialtone ("VDT") provided by Bell Atlantic companies. Subsequent to this agreement Bell Atlantic, in conjunction with Nynex and Pacific Telesis, formed TeleTV. This joint venture between the three companies was established to provide programming services to their customers via MMDS (a microwave transmission technology) currently in development. In addition, the 1996 Telecommunications Act abolishes the Federal Communications Commission ("FCC") rules on VDT but allows existing VDT systems to continue to exist. It also establishes a new regulatory regime called "Open Video System" ("OVS") for telcos and other entities entering the video marketplace, which is meant to replace VDT. See "Government Regulations." As a result, it is unclear as to the intention of Bell Atlantic to deploy the VDT format or the replacement OVS format and, correspondingly, there can be no assurance that the StarSight service will be implemented by Bell Atlantic.

In February 1996, the Company entered into a License of Services Agreement with GTE Communication Systems Corporation ("GTE"), under which the Company has licensed GTE the ability to sell the StarSight service to the subscribers of GTE's VDT systems, cable television systems, or any other GTE multichannel systems, where technically feasible in exchange for certain license fees to be paid by GTE to the Company. Although the recent passage of the 1996 Telecommunications Act may allow GTE to enter the video services market sooner, there is no assurance that GTE will decide to deploy the StarSight EPG in some or all of its systems or when such systems may be built. See "Government Regulations." In addition, adverse market conditions in general may have a negative impact on the extent to which GTE deploys the StarSight EPG.

Licensing. The Company's strategy for the licensing of its intellectual property resulted in licensing agreements with Thomson and Sony in 1995. The agreements provide for the licensing of certain of the Company's intellectual property rights which are incorporated in certain non-StarSight-capable DSS equipment manufactured and distributed by Thomson and Sony. In January 1996 the Company entered into similar licensing agreements with Toshiba and Matsushita (Panasonic) for certain non-StarSight-capable DSS equipment to be manufactured and distributed by them. Such agreements generally require the periodic payment of per unit royalties to the Company based on units manufactured.

In addition to the revenue opportunity that licensing provides, there are minimal operating expenses associated with the acquisition and maintenance of such agreements. The Company intends to continue to actively explore additional opportunities to license the Company's intellectual property for non-StarSight-capable products where appropriate.

Manufacturing

The Company believes that securing the availability of StarSight-capable hardware is crucial to the widespread commercial distribution of the StarSight EPG. The Company's manufacturing strategy calls for third-party manufacturers to incorporate the StarSight technology into cable and telco converters, televisions, VCRs, TVCRs and satellite receivers produced by such manufacturers. The Company will not manufacture such hardware itself. Given the Company's limited size and resources, the large size of the potential market for the StarSight EPG and the advantages of employing the resources and expertise of experienced manufacturers, the Company believes that manufacturing by third parties represents the optimal strategy for maximizing the availability of StarSight-capable consumer electronics products.

To date, the Company has entered into a number of manufacturing arrangements and continues to have discussions with other companies regarding the incorporation of StarSight into consumer electronics products. The Company has license agreements for televisions, TVCRs and/or VCRs with Thomson (RCA, GE and ProScan brands), Zenith, Sony, Mitsubishi, Toshiba, Matsushita (Panasonic and Qamar brands), Philips (Magnavox and Philips brands), Sharp, Samsung, GoldStar, and Daewoo. In order to provide incentive for manufacturers of consumer electronics products to manufacture StarSight-capable products, the Company has agreed in initial manufacturing agreements to waive licensing and royalty fees for deploying StarSight charged to such manufacturers and, in some cases, to reimburse such manufacturers for a portion of the cost of modifying their products to accept StarSight technology. For the manufacture of StarSight-capable converters, the Company has agreements with General Instrument, Scientific-Atlanta and Zenith. The Company currently has a pending arbitration action and lawsuit involving Scientific-Atlanta. See "Legal Proceedings."

Initially, the Company will not charge manufacturers a license fee for manufacturing StarSight-capable products. The Company's recent agreements with consumer electronics manufacturers do not require the Company to reimburse the manufacturer for a portion of the cost to incorporate StarSight technology into their products. Ultimately, the Company hopes that increased sales and market penetration will allow it to negotiate manufacturing agreements that allow the Company to charge license fees for the StarSight technology to contracting manufacturers for StarSight-capable consumer electronic products. There can be no assurance that the availability of converters, televisions, VCRs and TVCRs incorporating the Company's proprietary technology will allow StarSight's EPG to achieve market acceptance or that the manufacturing entities will devote manufacturing or distribution resources adequate to achieve such market acceptance. In addition, there can be no assurance that such manufacturers will in fact incorporate the StarSight EPG into their products, that these manufacturing agreements will not be terminated and, if terminated, that the Company would be able to negotiate alternative manufacturing relationships on commercially acceptable terms.

The Company has manufactured a limited number of stand alone StarSight receivers. Although the Company's primary strategy is to avoid entering the hardware manufacturing business, the availability of a stand alone StarSight receiver provides customer access to the StarSight service while the availability of StarSight-capable converters, televisions, VCRs and TVCRs is limited, and thereafter until such time as an individual consumer is in the market to purchase a new television, VCR or TVCR. The stand alone StarSight receiver became available to consumers in limited quantities in March 1995. The

Company has entered into an agreement with Philips to use the Magnavox brand name for the stand alone StarSight receiver. Under the agreement, Philips has agreed to provide sales, marketing, credit and distribution services to assist in the distribution of the stand alone StarSight receiver. See Note 6 to Financial Statements.

The incorporation of the StarSight EPG into converters, televisions, VCRs, TVCRs, satellite receivers, and stand alone StarSight receivers requires a chip set currently comprised of three separate integrated circuits embodying different portions of the StarSight technology. The Company has arranged with certain integrated circuit manufacturers for the design and manufacture of the integrated circuits which are sold to consumer electronics manufacturers that have agreed to incorporate the StarSight EPG into their products. The three integrated circuits are produced by two separate integrated circuit manufacturers and are available only from those manufacturers. The three integrated circuits are manufactured by Zilog, Inc. ("Zilog") and Motorola, Inc. As part of a plan to lower the cost of incorporating StarSight technology into consumer electronics products, the Company has entered in an agreement with Zilog and now has StarSight technology incorporated into Zilog's new Z89300 digital television controller series. Although the Company believes that alternative sources of such components are available, qualification of such alternative sources would require significant lead time. The Company's inability to provide for sufficient quantities of such integrated circuits could delay the incorporation of the StarSight EPG into StarSight-capable products, which would have a materially adverse effect on the Company's business. In particular, development efforts with manufacturers of StarSight-capable hardware have progressed more slowly than anticipated due in part to delays in the development of the integrated chip set required for the incorporation of the StarSight EPG into equipment. In addition, there can be no assurance that the Company will continue to be successful in its efforts to incorporate its technology in such integrated circuits or that the manufacturers of converters, televisions, VCRs, TVCRs and satellite receivers will be successful in incorporating the integrated circuits into their products. Furthermore, there can be no assurance that the integrated circuit manufacturers will successfully produce sufficient volumes of integrated circuits to ensure the timely availability of StarSight-capable products in commercial quantities or that such integrated circuits will be made available on commercially reasonable terms. A failure in any one of the steps leading to the successful incorporation of the StarSight technology into such StarSight-capable products would have a material adverse effect on the Company's business.

Currently manufacturers incorporating the StarSight technology into StarSight-capable products use the StarSight-capable integrated circuits for their initial product offering in order to minimize time to market. The Company's engineering personnel are available to meet with each manufacturer's development team either at the Company's or the manufacturer's location to provide development assistance regarding the use of the StarSight chip set as part of the technology transfer to the manufacturer. The agreement with Zilog provides for Zilog to design and manufacture cell based display integrated circuits for use by product manufacturers to incorporate the StarSight system. Zilog has enhanced its Z89300 family of digital television controllers to incorporate the StarSight technology. Zilog has designed an integrated circuit for further integration of various components of the StarSight hardware. The Company expects that the Zilog custom integrated circuits will reduce the cost of including the StarSight EPG in televisions and VCRs. To date, the Company has not charged any fee or royalty for the use of the chip set by a manufacturer. The Company will retain the right to approve the manner in which the StarSight technology is incorporated in the manufacturer's product in order to maintain a consistent look and feel for the StarSight consumer interface.

StarSight Delivery System

The StarSight delivery system consists of a program schedule database, a transmission network and order processing and customer support.

Program Schedule Database. The Company purchases television program schedule data and cable television channel line-up information in an electronic format from data providers that provide similar information to newspapers and other printed listings. The data is processed at the Company's computer facility in Fremont, California to include subscriber authorization information, which allows a customer's StarSight-capable hardware to receive only that portion of the program schedule data which corresponds to the customer's geographic area, method of reception (cable, broadcast or satellite) and system configuration. The program schedule data is then distributed over the transmission network to StarSight-capable hardware in customers' homes. Pursuant to an agreement with the Company, TVDT is the initial provider of program schedule data for the StarSight EPG, which data is delivered on a daily basis. As a result, StarSight's EPG will contain more accurate program schedule information than printed guides, since the latter cannot incorporate new or changed information once they have gone to press. TVDT currently updates schedule data 4-6 times per 24-hour period based on receiving program change information from programming sources. TVDT has also developed and implemented procedures for cable system channel line-up collection and maintenance which allows the Company to stay informed of changes by cable operators in such line-ups and to adjust the delivered schedule information accordingly.

Transmission Network. The transmission network for the StarSight service functions as follows: program schedule data and channel line-up information is delivered by TVDT via leased data line from the TVDT Data Center in Glens Falls, New York to the StarSight network support computer in Fremont, California. Using computer workstations, the Company's employees modify the TVDT data for use in the StarSight EPG, add authorization information and transmit the data via a leased data circuit to the PBS Network Control Center in Alexandria, Virginia. Such authorization information provides the security mechanism for the StarSight data transmissions by allowing only authorized subscribers to receive the service.

Under television standards mandated by the National Television Standards Committee, American television pictures are comprised of 525 horizontal lines which are scanned across the television screen to create a visible image. The first 21 of these lines are known as the vertical blanking interval ("VBI"). Since the VBI is generally not visible on properly functioning television screens, each of these lines can carry separate signals to be used for purposes other than viewing, such as data for on-screen program schedules. Pursuant to a network service and joint development agreement between the Company and National Datacast, Inc. ("NDI"), a subsidiary of PBS, PBS inserts the program schedule data into its VBI at its Network Control Center and then transmits it via satellite to approximately 168 participating master PBS stations across the country. Under this agreement, the Company is committed to pay a monthly fee based on the number of designated market areas. If services are provided nationwide and subscriptions exceed a certain level, these fees may increase to a maximum of \$7.0 million per year prior to adjustments for inflation and based upon the level of usage.

These participating master PBS stations are equipped with a StarSight provided "station node", a network computer which receives the nationwide feed of schedule and authorization information and filters out information that is not applicable to that station's geographic coverage area so as to minimize the time needed to send schedule information to subscribers and maximize the number of subscribers to be supported. These master PBS stations forward this information to an additional 100 PBS stations

bringing coverage to approximately 268 full power PBS stations across the country, representing approximately 98% of all United States television households. In addition, Viacom has agreed to use reasonable efforts to carry the StarSight-embedded VBI signal on certain of the cable program networks, over-the-air broadcast television stations and analog satellite-delivered services owned and operated by Viacom, although the Company currently is not using the VBI signal on Viacom's over-the-air broadcast stations. The Company also has an agreement with Trinity Broadcasting Network to insert the StarSight program schedule into the VBI at its uplink facility in Tustin, California for satellite delivery of StarSight program data to customers with StarSight-capable satellite receivers.

After it is processed through the station nodes, the StarSight data is transmitted on the VBI to StarSight customers who receive the signal via local cable system operators, satellite broadcast and over-the-air broadcast. Customers receive the information on StarSight-capable cable converters, televisions, VCRs, satellite receivers or stand alone StarSight receivers. This hardware receives and descrambles the data and gives customers on-screen access to the StarSight EPG.

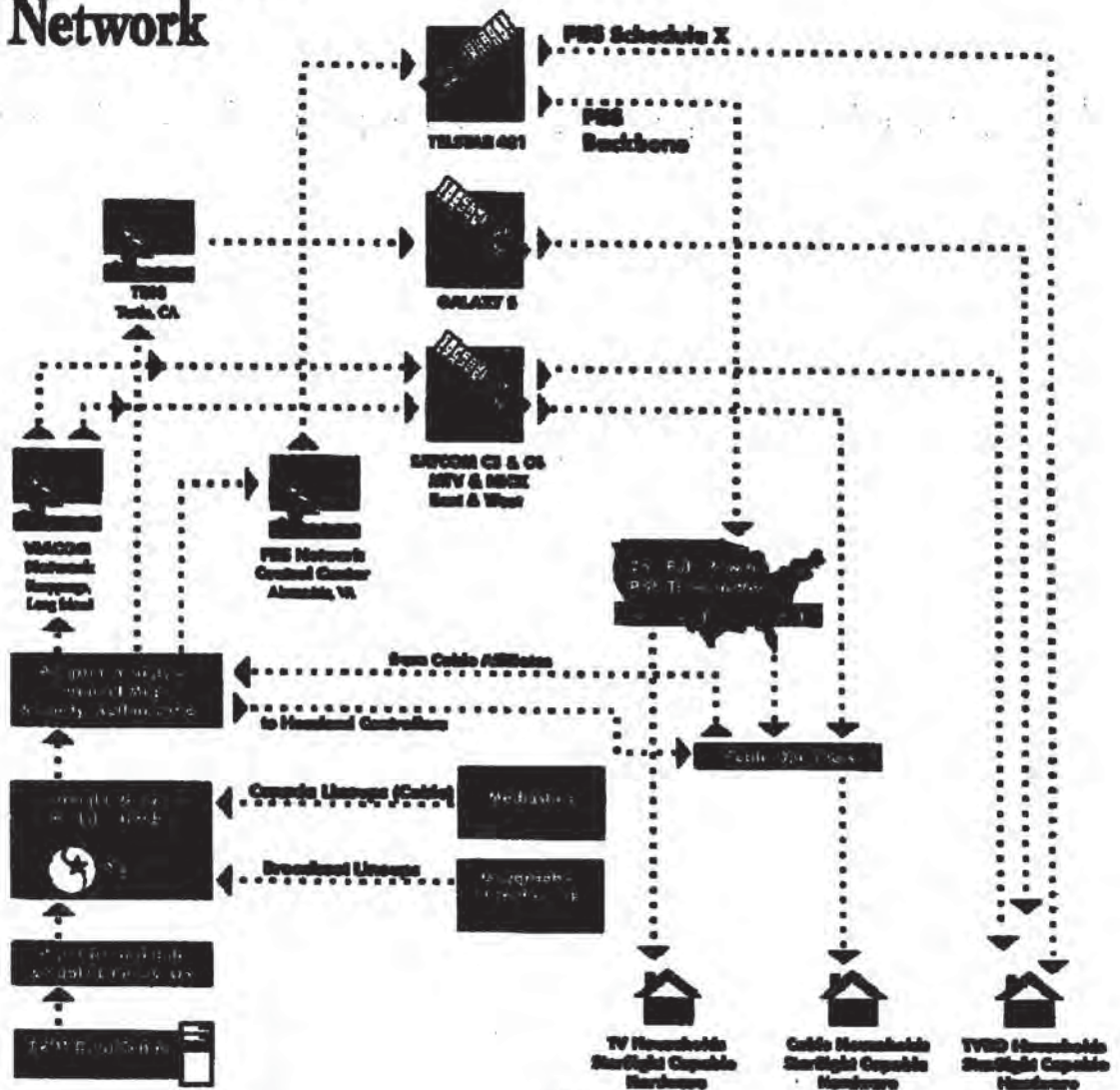
Local cable system operators are currently required under federal law to include PBS programming in their channel line-up although this requirement is under judicial challenge. Cable operators which choose not to carry StarSight might remove the VBI containing the StarSight program schedule data from their signal transmissions. In addition, other interference within the transmission of StarSight program schedule data could occur. The Company is aware of a limited number of instances where StarSight data has not been passed on to customers. Although StarSight customers can nevertheless receive the StarSight service through the VBI contained in the over-the-air broadcast transmissions of PBS, the removal of the StarSight program schedule data transmitted over cable systems makes it more difficult for cable customers to receive the StarSight service and thereby could limit the Company's penetration of the cable market. Increased costs or delays associated with finding alternative means to distribute the StarSight EPG to a potentially large number of cable subscribers could have a material adverse effect on the Company's business. There can be no assurance, however, that VBI problems which affect the transmission of StarSight data will not occur nor that the Company will not be required to re-engineer the StarSight EPG to eliminate such problems.

In the case of satellite delivery of the StarSight service to customers with StarSight-capable satellite receivers, the insertion of the StarSight program schedule data into the VBI is at the PBS Network Control Center in Alexandria, Virginia and at the Trinity Broadcasting Network uplink facility in Tustin, California. From there, the StarSight data is transmitted via satellite dish directly to receiving dishes at the homes of customers.

Order Processing and Customer Support. For the Company's direct, consumer electronics customers, a third-party service provider bills customers, coordinates authorizations with the Company and manages customer payments. Technical questions from customers and order taking services are performed by the Company. See "Strategic Relationships—Customer Billing." In the case of customers receiving the StarSight EPG through the service provider distribution channel, the service provider, rather than the Company, will perform the required billing functions associated with the service. As a result, such service providers will receive a portion of the revenue received from such customers to cover the costs of fulfilling such billing functions. The Company has developed an "in-house" technical support group responsible for maintaining customer satisfaction in those cases where technical expertise is sought by customers. When the order is taken by the Company, regardless of whether the customer receives the StarSight EPG through the consumer electronics or service provider distribution channel, the Company maintains control over the customer authorization process by means of a conditional access security chip contained in the StarSight-capable hardware.

The following chart illustrates the transmission of StarSight program schedule data across the consumer electronics (including satellite) and service provider (i.e., cable) delivery systems to various StarSight-capable hardware devices. The StarSight data network signal is now available in more than 98% of all United States television households.

StarSight Transmission Network



Strategic Relationships

Relationship with Viacom

General. In September 1991, Viacom and the Company entered into a Series C Preferred Stock Purchase Agreement (the "Stock Agreement") pursuant to which Viacom purchased shares of the Company's Preferred Stock. In connection with this transaction, the Company, Viacom and Michael Faber, Patrick Young, Scott Wilson and Jeremiah Milbank (Messrs. Faber, Young, Wilson and Milbank being hereinafter referred to as the "Principal Shareholders") entered into a Corporate Partnership Agreement (the "Partnership Agreement") pursuant to which the Company granted to Viacom certain Warrants to purchase additional shares of capital stock of the Company and certain rights with respect to Viacom's equity ownership. In April 1993, the Company entered into a network service agreement with Viacom Cable (the "Network Service Agreement"). In November 1994, the Company entered into a service agreement with Viacom Cable (the "Service Agreement"). The following is a summary of the rights and obligations of the parties under the Stock Agreement, the Partnership Agreement, the Network Service Agreement and the Service Agreement.

Right of First Refusal/Top-Up Right. Pursuant to the terms of the Stock Agreement, the Company granted to Viacom a right of first refusal to purchase all or part of any new securities issued by the Company, other than certain issuances by the Company. This right of first refusal terminates at such time as Viacom holds less than 3,173,508 shares of Common Stock of the Company. Additionally, pursuant to the terms of the Partnership Agreement, in the event the Company or any shareholder of the Company engages or proposes to engage in a transaction that would result in a new shareholder of the Company holding greater than 25% of the Company's outstanding capital stock, on an as-defined fully diluted basis ("25% Shareholder"), Viacom has the right to purchase, at the fair market value of the Common Stock as determined by the average of the closing prices for a share of Common Stock of the Company on the ten consecutive trading days preceding the date of exercise, additional shares of Preferred Stock to enable it to maintain up to a 1.4:1 ratio between its percentage ownership of the Company, on an as-defined fully diluted basis, and that of the new 25% Shareholder, provided that Viacom may not, pursuant to this right, increase its percentage ownership to greater than 51% of the Company's outstanding capital stock on an as-defined fully diluted basis (the "Top-Up Right"). Viacom at its option may elect to purchase a like number of shares of Common Stock at the same price if Preferred Stock is not available; in such case, the Company will continue to use its best efforts to make Preferred Stock available to Viacom and exchange the Common Stock for such Preferred Stock if and when such Preferred Stock becomes available on a share for share basis. In connection with the THOMSON investment of approximately \$25,000,000 in the Company, Viacom agreed that THOMSON may acquire greater than 25% of the Company's outstanding capital stock without initiating Viacom's Top-Up Right. The Top-Up Right expires at such time as Viacom holds less than 3,173,508 shares of Common Stock of the Company.

Special Registration Right. Viacom has the right, in certain circumstances, to require the Company on not more than one occasion, to file a registration statement under the Securities Act at the Company's expense with respect to the shares of Common Stock held by Viacom. This registration right is in addition to registration rights granted to Viacom which are equivalent, and expire concurrent with, to the registration rights held by certain other shareholders of the Company.

Co-Sale Rights. Pursuant to the terms of the Partnership Agreement, Viacom and the Principal Shareholders have granted each other the right, in the event that one or more of the other parties proposes to sell at any time in the future shares of capital stock representing at least 25% of the Company on an as-defined fully diluted basis, to participate on a pro rata basis in such sale. Viacom also has a right of first refusal in the event of a sale or transfer of shares of Common Stock by the Principal Shareholders.

Board Representation. In the event that, pursuant to the Articles of Incorporation of the Company and California law, Viacom should hold an insufficient number of shares of the Common Stock to elect its nominee to the Board of Directors, the Company and the Principal Shareholders have agreed to take such action as may be necessary to nominate and elect Viacom's designated representative until such time as Viacom holds less than 3,173,508 shares of Common Stock of the Company. Mr. Edward D. Horowitz, Senior Vice President Technology-Viacom Inc., Chairman and Chief Executive Officer of Viacom Interactive Media, and Mr. John W. Goddard, President of Viacom Cable, currently serve as Directors on the Company's Board in this capacity. Mr. Thomas E. Dosley, Deputy Chairman, Executive Vice President, Corporate Development and Communications of Viacom Inc., also serves on the Company's Board of Directors as a representative of Spelling Entertainment, Inc. ("Spelling") by virtue of Viacom's majority interest in Spelling. Viacom currently intends to sell its interest in Spelling, but it is uncertain whether Viacom will retain the Company's Common Stock owned by Spelling and Spelling's right to designate one representative to the Company's Board of Directors pursuant to the Stock Purchase Agreement between the Company and Spelling.

Network Service Agreement. The Company entered into a five-year Network Service Agreement with Viacom, pursuant to which Viacom agreed to use reasonable efforts to insert the StarSight signal into the VBI of each of a number of Viacom's network services, including Nickelodeon, MTV, VH-1, Showtime, The Movie Channel, analog satellite-delivered services and Viacom's owned and operated over-the-air broadcast television stations. The Company currently is not transmitting the StarSight signal on the VBI of Viacom's broadcast television stations.

Viacom Cable Services Agreement. The Company has entered into an agreement with Viacom Cable to make StarSight available to its subscriber base in the upgraded fiber-optic cable system in Castro Valley. As previously discussed, Viacom has announced an agreement to split off Viacom Cable subject to certain conditions. The Company is currently analyzing the potential effects such split off may have on the Company's agreement with Viacom Cable.

Relationship with THOMSON multimedia S.A.

General. On March 8, 1996, THOMSON purchased 3,333,333 shares of the Company's Common Stock at \$7.50 per share for a total of approximately \$25,000,000 pursuant to a Securities Purchase Agreement (the "Stock Agreement") entered into between THOMSON and the Company in February 1996. In connection with this transaction, the Company granted certain Warrants to THOMSON to purchase additional shares of capital stock of the Company. See Note 18 of Notes to Financial Statements. In addition, the Company and THOMSON entered into a Right of First Refusal Agreement (the "Rights Agreement") pursuant to which the Company granted to THOMSON certain rights with respect to THOMSON's equity ownership. Also in connection with this transaction, the Company, Viacom and THOMSON entered into a Shareholders Agreement (the "Shareholders Agreement") with respect to the election of directors as described below. The Company and THOMSON also entered into a Strategic Cooperation Agreement (the "Cooperation Agreement") pursuant to which THOMSON has agreed to incorporate the Company's technology into a significant portion of THOMSON's suitable products (namely, high end TVs, VCRs and/or TVCRs) in exchange for a share of the Company's revenues derived from the Company's consumer electronics business, among other things. The following is a summary of the rights and obligations of the parties under the Stock Agreement, the Rights Agreement and the Cooperation Agreement.

Right of First Refusal. Pursuant to the terms of the Rights Agreement, the Company granted to THOMSON a right of first refusal to purchase all or part of any new securities issued by the Company, other than certain issuances by the Company. This right of first refusal expires at such time as THOMSON holds less than 3,173,508 shares of Common Stock of the Company.

Special Registration Right. THOMSON has the right, in certain circumstances, to require the Company on not more than one occasion, to file a registration statement under the Securities Act at the Company's expense with respect to the shares of Common Stock held by THOMSON. This registration right is in addition to registration rights granted to THOMSON which are equivalent to, and expire concurrent with, the registration rights held by certain other shareholders of the Company.

Board Representation. Under the Shareholders Agreement, the Company has agreed to nominate, and Viacom has agreed to vote the shares held by Viacom in favor of, the election of two representatives of THOMSON to the Company's Board of Directors for so long as THOMSON holds in excess of 10% of the outstanding shares of Common Stock of the Company. Under the terms of the Shareholders Agreement, THOMSON has agreed to vote the shares held by THOMSON for the election of two representatives of Viacom to the Company's Board of Directors for so long as Viacom holds in excess of 3,173,508 shares of Common Stock of the Company. Mr. James E. Meyer, Senior Vice President, Product Management, Thomson Consumer Electronics, Inc., and Mr. Jacques Thibon, General Manager, Strategic Alliances, Corporate Business Development, THOMSON multimedias S.A., currently serve as Directors on the Company's Board in this capacity.

Cooperation Agreement. The Company has entered into a ten-year Strategic Cooperation Agreement with THOMSON, with THOMSON having the option to extend the term for an additional five years, pursuant to which the parties have agreed to jointly develop a program to incorporate and aggressively promote the Company's technology and related services throughout a range of selected consumer electronics products distributed by THOMSON in North America. In consideration of THOMSON's commitment to incorporate the Company's technology into THOMSON's suitable products, the Company has agreed to, among other things, pay THOMSON a certain percentage of the Company's revenues derived from the Company's consumer electronics business. In addition, the parties have agreed to each contribute specific dollar advertising commitments to the promotion of their brand identities and services over the next two years. See Note 18 to Financial Statements.

Patents, Trademarks, Copyrights and Proprietary Information

As part of its business strategy, the Company has aggressively pursued a strong patent portfolio to protect its technology. In the United States, the Company currently holds six issued patents. In addition, the Company has a number of U.S. and foreign patent applications pending. The Company pursues foreign patent protection in those countries that present market and licensing opportunities for the StarSight EPG, and currently has three issued foreign patents.

Because the Company has copyright rights and has obtained patents covering many of the features of the StarSight product and service, the Company believes that competitors will have difficulty producing and marketing a commercially desirable scheduling service with program schedule, program selection, one button recording and channel set-up functions similar to the StarSight EPG without infringing on the Company's intellectual property. The Company believes that several of its competitors are currently offering or propose to offer competitive products which may violate the Company's intellectual property. The Company considers its patents and other intellectual property to be important to the success of its business and believes that its patent strategy enhances its competitive position. The Company plans to vigorously enforce its patents and to protect its trade secrets and other know-how to the full extent of the law. The Company could incur substantial cost in prosecuting patent infringement suits against competitors, and there can be no assurance that the Company would be successful in such actions. See "Legal Proceedings" and "Management's Discussion and Analysis of Financial Condition and Results of Operations." In addition, there can be no assurance that the Company's patents or patent applications will be adequate to ensure the Company's competitive position or that competitors will not be able to produce non-infringing competitive products and services.

The following is a summary of the Company's issued U.S. patents:

TV Schedule. This patent, granted in the United States in 1987, covers a wide variety of program schedule and selection features, relating to: (i) controlling a television tuner to tune by program title, (ii) providing of program description and title upon each channel change (program selection by grazing), (iii) sorting of program schedule information by theme (program selection by theme), (iv) the continuous update of program schedules (on-screen TV program listings), (v) the display of time remaining in a given program (program pop-up information), (vi) the linking of programs in a series (series to be recorded), (vii) the control of the program recorder through the supply of broadcast information and serial recording demands, and (viii) the use of menus and menu selection for recording and the update of a recording calendar from a stored database of pending recordings as schedule changes occur (one button recording). In December 1991, a potential competitor of the Company requested that the United States Patent and Trademark Office (PTO) conduct a reexamination of this patent, claiming that the patent was invalid. In response to this request, the Company introduced to the PTO all prior art of which it was aware. After the reexamination process was completed, the PTO upheld the validity of the patent.

VCR Scheduling. This patent, granted in the United States in 1990, covers certain features relating to StarSight playback indexing and the interactive consumer information service currently under development. Some of the features covered by this patent include recording and indexing broadcast information where the recording device stores and indexes by program title and allowing interactive selection and recording of supplemental broadcast information pertaining to the primary broadcast upon user response to an on-screen cue. A re-examination of this patent was also requested in March 1992 by a potential competitor claiming that the patent was invalid. After review, the PTO upheld the validity of this patent.

Automatic Unattended Recording of Cable Television Programs. This patent was granted in the United States in 1992. The patent covers primarily the recording features of the StarSight EPG when a cable decoder box is present as well as certain other features related to future services currently under development. This patent covers features that, either through schedules installed in a recording device or implemented in an external device, control the cable decoder in a variety of ways, including automatically changing the cable decoder channel to the requested channel at the time of recording.

Background TV Schedule Guide. This patent was granted in the United States in 1994. This patent covers TV schedule guide features relating to operational characteristics as the guide is moved between foreground and background modes of operation.

TV Schedule Guide (Channel Ordering). This patent was granted in the United States in 1995. The patent relates to an interactive television schedule display system providing for irregular cursor movement over an irregular grid of television schedule information and configured to allow the user to select the order in which TV channels are listed on the Grid.

TV Schedule Grid (Program Note Overlay). This patent was granted in the United States in 1995. This patent, related to the channel ordering patent described above, includes the TV schedule display system with the irregular cursor movement combined with the ability to display program note overlays describing a cursor selected program.

The Company has an exclusive patent license agreement with Personalized Media Communications ("PMC") in the field of Program Schedule Navigation and Navigation Information for a series of patents including PMC's six issued and other pending patent applications. Under the agreement, the two companies will jointly complete development work and apply for patents. In consideration for the license agreement, the Company paid a license fee consisting of a one-time payment of \$500,000 in March 1994 and monthly installments of \$25,000 over a three year period. See Note 4 to Financial Statements. In addition, the Company will pay all costs, including all patent office fees and attorneys' fees, associated with filing and prosecution, and

grant to PMC 20,000 shares of Common Stock of the Company for each of the patents for which the Company elects to receive an exclusive license under the agreement.

While the Company has obtained patents covering many of the features of the StarSight EPG, competitors or other third parties may assert claims that the StarSight EPG infringes patents or rights of such third parties. Litigation may be necessary to defend the Company against such claims. The resolution of such claims would generally involve complex legal and factual questions and would consequently be highly uncertain. In particular, any litigation involving such claims would entail considerable cost to the Company and the diversion of the efforts of management. See "Legal Proceedings" and "Management's Discussion and Analysis of Financial Condition and Results of Operations." In the event of an adverse determination in any such litigation, the Company could be required to expend significant resources to develop non-infringing technology or to obtain licenses with respect to the use of the infringing technology. There can be no assurance that the Company would be successful in such development or that third-party licenses would be available on acceptable terms. In the event that a third party were to make a successful claim against the Company or its customers, or that the Company were unable to obtain a license with respect to such third-party technology on commercially reasonable terms, the commercialization of the StarSight EPG or other product services could be delayed or foreclosed and the Company's business would be materially adversely affected.

The Company enters into confidentiality agreements with its full-time employees and consultants that prohibit the disclosure of confidential information to anyone outside the Company both during and subsequent to employment. Such agreements also require disclosure to the Company of ideas, discoveries or inventions relating to or resulting from the employee's work for the Company and assignment to the Company of all proprietary rights to such ideas, discoveries or inventions. The Company also relies on trade secrets and proprietary know-how that it seeks to protect, in part, through the non-disclosure agreements with its employees and consultants and by requiring similar agreements in connection with its manufacturing and other strategic relationships. There can be no assurance that these agreements will be not be breached, that the Company would have adequate remedies for any breach or that the Company's trade secrets will not otherwise become known or be independently developed by competitors.

Competition

The market for delivery of television program schedule information is highly competitive. To compete successfully in this market, a company must produce and provide product services which are relatively low in cost and easy for consumers to use. There are a number of companies with substantially greater financial, sales and marketing resources than the Company that produce and market television schedule information in various formats which compete or will compete with the StarSight EPG. These alternative formats currently include printed television schedules, on-screen, passive (non-interactive) scrolling program guides, interactive program guides and other interactive electronic scheduling products or services that will compete more directly with StarSight's EPG.

Printed television schedule competitors of the Company include TV Guide, local cable television guides and local newspaper guides, all of which have a significant presence in the market place resulting from their familiarity to television viewers, their broad base of distribution and their presentation of feature articles and entertainment news. The Company believes that the StarSight EPG will compete effectively with printed program guides on the basis of accuracy and timeliness of program schedule information, the ability to accommodate ever increasing viewer choices, the ability to present program information by broadcast time, by title or by theme as well as by channel, the convenience of on-screen presentation, the ability to interact with the television, VCR, or other StarSight device, and ease of use. The Company believes that the StarSight EPG will compete effectively on the basis of price with printed program guides offered for sale, such as TV Guide, and on the basis of enhanced features with printed program guides distributed for free. While the Company believes the StarSight EPG will compete effectively with respect to these factors, the established market presence of printed

program guides gives them a competitive advantage. In addition, there can be no assurance that publishers of printed guides will not be able to produce publications in the future that meet growing consumer demands.

The Company also competes with companies producing passive electronic program guides for the cable market such as that offered by Prevue Networks, Inc. ("Prevue"), a United Video Satellite Group Company ("United Video") and a guide by TV Guide On-Screen. The Company believes that the StarSight EPG will compete effectively with passive electronic program guides on the basis of accuracy and timeliness of program schedule information, convenience to the user, the ability to interact with the television, VCR, or other StarSight device, and profitability to the cable operator. Although such guides are typically offered as a part of the basic cable service, the Company believes the StarSight EPG will compete effectively based on its enhanced features. However, there can be no assurance that existing or planned electronic guide companies will not develop and market interactive electronic program guides that offer features similar to StarSight's EPG.

Several companies, such as United Video and TV Guide in collaboration with Liberty Media Corporation and Tele-Communications, Inc., have announced their intentions to market electronic program guides in converters which appear to be very similar to the StarSight EPG. United Video has announced its intention to offer several levels of interactive services including Prevue Express which will work in concert with the Prevue Channel and provide user control of the scroll and Prevue Express Plus which will include features such as direct tune, one touch record reminders, sorting by genre and browse features and up to seven days of listings. United Video has also announced its intention to offer Prevue Express Plus Video which will add the display of video clips upon request by the customer. Finally, United Video has announced that it plans to offer Quickvue which will deliver data directly into converters and offer 30 minutes to two hours of program information, as well as varying amounts of program descriptions and days of listings, depending on the capabilities of the converter box. TV Guide has announced the future availability of TV Guide On-Screen, an electronic program guide which, as announced, will allow users to browse through updated program information, select listings by subject, channel, pay-per-view and other special promotional categories and with the push of a button on their remote control to tune to the appropriate channel and turn the VCR on and off to record the selected program at the right times. TV Guide On-Screen will provide listings in a menu format as the data will be accessed via a remote control unit. TV Guide On-Screen has indicated in its public announcements that its service will be available to consumers and will run on the Scientific-Atlanta 8600x Home Communications Terminal, the General Instrument DigiCable Series converter box and the General Instrument CPT2200 converter box. Many of such companies have significantly greater resources than the Company to devote to the development and commercialization of such products. If developed and commercialized as currently described, such products would present a significant competitive challenge to the Company.

In 1995, VideoGuide, Inc. ("VideoGuide") introduced a stand alone set-top box with an on-screen guide allowing users to display one week of television program information. Additional features include direct tuning of converters and televisions, automated VCR recording and remote control consolidation. VideoGuide also offers news, sports and weather information services with its product. VideoGuide delivers the data to the end user via the BellSouth Mobile Comm paging company. Customers subscribe directly from VideoGuide to receive the service. Because VideoGuide uses the same retail distribution for the sale of its stand alone boxes as the Company, it is possible that this could impact the sale of the Company's stand alone StarSight receiver. National distribution of the VideoGuide product began in September 1995.

Discovery Communications, Inc. ("Discovery") has announced a product designed to allow a subscriber to select and retrieve programs from a library of popular television programs. As announced, this product involves a process for locating and transmitting programming from an archive. Although the Company believes that such product is more similar to pay-per-view than to interactive program schedule services, there can be no assurance that Discovery will not expand such product to provide interactive access to program schedule information.

An additional product which may present a competitive challenge to the StarSight EPG is VCR Plus. VCR Plus, which is produced by Gemstar International Group Limited ("Gemstar"), is a product designed to simplify VCR programming. VCR Plus works in conjunction with printed program guides that include code numbers adjacent to certain shows in their program listings. VCR Plus only competes with the VCR control functions of StarSight's EPG, it does not contain on-screen program schedule information or program selection capabilities. With respect to VCR control functions, the Company believes that the StarSight EPG will compete effectively with this product on the basis of convenience of on-screen presentation of program information. The VCR Plus system requires codes printed in the newspaper to utilize the service. Introduction of IndexPlus VCRs occurred in late 1995. This technology utilizes Extended Data Services ("EDS"), program information carried by broadcast and cable networks, to provide on-screen index of programs taped in video cassette.

In November, 1995 Gemstar has announced that it had entered into an alliance with News Corporation's TV Guide to deliver a new interactive electronic program guide to consumers. TV Guide Plus+ is intended to be incorporated into television sets and VCRs. TV Guide Plus+ is an interactive on-screen guide with listings for television programs up to 48 hours in advance. As announced, the product integrates the video picture into the program listing, allowing the viewer to watch a television program even when accessing program listings. Additionally, the product offers the users the ability to display program information by theme. TV Guide Plus+ will also incorporate Gemstar's VCR Plus+ recording technology, allowing simplified VCR recording. Products incorporating the TV Guide Plus+ feature are scheduled for retail launch in 1996.

Viewers who receive television programming via satellite have access to a subscription service called SuperGuide offered by Satellite Service Company. SuperGuide provides satellite subscribers with on-screen program schedule information. Using a remote control, SuperGuide subscribers can tune to shows by program title and can also call up brief text descriptions of programs. SuperGuide automatically updates program listings daily storing up to 12 days of schedules for 60 channels. SuperGuide presents a competitive service to the StarSight service in the satellite distribution channel and would present an additional competitive challenge if extended to other distribution channels.

Manufacturers of converters have indicated that the next generation of converters will be able to provide an interactive guide which would provide some features similar to those to StarSight's EPG. Final features and delivery schedule of these products are unclear at this time and, therefore the competitive effect on the StarSight EPG is currently unknown. Many of these companies have significantly greater resources than the Company to devote to the development and commercialization of such products. If developed and commercialized as currently described, such products would present a significant competitive challenge to the Company.

The personal computing industry has made strides in the areas of multimedia and has begun announcing products that resemble televisions. Included in the functionality of these products are interactive electronic program guides that offer potential competition to the Company. Companies such as Gateway 2000 have announced their intention to offer PCTVs using an interactive program guide developed by Harman Interactive Group, a subsidiary of Harman International Corporation. While there is no evidence the such a product will ever be successfully introduced, it is possible that this emerging category will give birth to a new wave of interactive program guide companies that will compete directly with the Company.

Although the Company believes that its competitive position is strong with respect to known competitors, there may be competitors with significant competitive strengths which are not known to the Company or discussed herein. Such potential competitors may include larger, more established companies in both the interactive multimedia services and interactive television fields that could enter the on-screen program guide delivery market. There can be no assurance that the StarSight EPG will achieve market acceptance or that it will be able to compete successfully with such known or unknown competitors, some of which may possess substantially greater financial, sales and marketing resources than those of the Company.

Engineering and Development

As of February 29, 1996, the Company employed a staff of 21 full-time engineering and development professionals. The Company currently concentrates its development efforts on completing or acquiring hardware and software to: (i) enable customer support personnel to efficiently access customer authorization and network status data, (ii) improve on aspects of the PBS data network, (iii) make available alternate data delivery technologies to various service providers such as cable and telco operators, (iv) integrate the StarSight EPG into televisions, VCRs, TVCRs and other applicable consumer electronics products, (v) reduce the cost to consumer electronic manufacturers for incorporation of the StarSight EPG into TVs, VCRs, TVCRs and other consumer electronics products, and (vi) integrate StarSight's EPG in converters for the cable and telco industry, including the development of advanced analog and digital applications of StarSight technology.

Rapid technological developments are expected to occur in the interactive television services industry. The Company believes that its success will depend upon its ability to develop, market and introduce products which meet changing user needs and which successfully anticipate or respond to technological changes on a cost effective and timely basis. There can be no assurance that technological changes or other significant changes in the television industry will not render the Company's products and services obsolete or that the Company will be able to keep pace with technological developments. Many of the Company's present and potential future competitors have, or may have, substantially greater resources than the Company to devote to further technological and new product developments.

Government Regulation

The cable television and telco industries are subject to extensive regulations by federal, state and local agencies. These regulations, while not directly affecting the Company, do affect cable operators and telcos, upon which the Company will significantly rely for the marketing and distribution of the StarSight service to potential customers. As such, these regulations may adversely affect the Company's business. In October 1992, Congress enacted the 1992 Cable Act which provides a significant regulatory framework for the operation of cable television systems. The 1992 Cable Act introduced substantial rate regulation for certain services and equipment provided by most cable systems in the United States. Pursuant to the 1992 Cable Act, the FCC adopted regulations with respect to rates charged for certain cable services and for equipment to receive those services. The FCC also imposed new regulations under the 1992 Cable Act in the areas of customer service, technical standards, rates for leased access channels and disposition of a customer's home wiring. In addition, the FCC also imposed new regulations in the area of compatibility of cable equipment with other consumer electronic equipment such as "cable ready" televisions and VCRs.

In January 1996, Congress passed the 1996 Telecommunications Act which substantially amends, but does not replace the Communications Act of 1934. The 1996 Telecommunications Act, among other things, sets forth rules for the development of competitive markets in telecommunications, deregulates certain cable rates, enables telcos and other common carriers to provide video programming to subscribers, abolishes the FCC's video dialtone ("VDT") regulations (although allows existing VDT systems to continue to exist), and directs the FCC to require TV set manufacturers to install "V-chips" in TV sets to allow users to block the reception of objectionable programming. With respect to telcos and other entities entering the video marketplace, the 1996 Telecommunications Act establishes a regulatory regime called "Open Video Systems" ("OVS"), which is meant to replace VDT. The Act directs the FCC to prescribe regulations to prohibit OVS operators from discriminating against unaffiliated video programming providers with regard to program selection material provided to subscribers, and specifically to prohibit them from omitting unaffiliated video programming services carried on the system from any navigational device, guide or menu.

Depending on the outcome of the Company's business strategy in the cable and telco distribution channels and the availability of StarSight-capable converters through third party licensed manufacturers, the Company anticipates that it will derive a significant portion of its customer revenue from the distribution of the StarSight service through cable and telco operators. The extent to which the effects of the 1992 Cable Act on cable operators and the regulatory requirements for telcos may be somewhat lessened under the 1996 Telecommunications Act will depend to a significant degree on the final form and implementation of the regulations to be adopted by the FCC. To the extent that the 1992 Cable Act and the 1996 Telecommunications Act and regulations adopted thereunder adversely affect cable operators and/or telcos and the manner in which they can market the StarSight EPG, such regulations could also adversely affect the Company's business. It is uncertain the extent to which the 1996 Telecommunications Act will increase the number of service providers in a market and what effect the Act will have on the Company's business strategy in the cable and telco distribution channels or on the adoption and distribution of the StarSight EPG.

Employees

As of February 29, 1996, the Company employed 104 individuals, of whom 21 were engaged directly in engineering and development activities and 43 in sales and administrative positions and 40 in operations and customer service. The Company believes that it has been successful to date in attracting and retaining qualified personnel. The Company believes that its future success will depend in part on its continued ability to recruit, retain and motivate qualified management, sales, marketing and technical personnel. The Company's operating results would be adversely affected if the Company were unable to attract, assimilate or retain these personnel. None of the Company's employees is represented by a labor union. The Company has not experienced any work stoppages and considers its relations with its employees to be good.

The Company has experienced and expects to continue to experience significant growth in the number of employees, consultants and subcontractors necessary to support the Company's business operations. This growth has placed and will continue to place a substantial strain on the Company's management, operational, financial and accounting resources. The need to support the Company's engineering and development and proposed marketing efforts will require the Company to increase the number of employees, consultants and subcontractors, which in turn will require a substantial amount of training and other resources. The Company's need to manage growth effectively will also require it to continue to implement and improve its operational, financial and management information systems and to motivate and manage its employees and consultants. The Company's failure to manage growth effectively would have a material adverse effect on the Company's business.

ITEM 2. PROPERTIES

The Company leases approximately 60,000 square feet in Fremont, California pursuant to leases that expire in March 1997. The Company believes that its existing office space will serve its foreseeable needs through the end of 1996, and believes that sufficient additional space will be available to it at that time, either in its current building or at another location.

ITEM 3. LEGAL PROCEEDINGS

In October 1993, the Company filed suit in the District Court for the Northern District of California, San Jose Division, against Gemstar and Michael R. Levine ("Levine") seeking: (1) a preliminary and permanent injunction and treble damages for Gemstar's willful infringement of one of the Company's patents (United States Patent No. 5,151,789, the "789 patent"); (2) a declaration that the Company does not infringe any claim of United States Patent No. 4,908,713 (the "713 patent") and/or that any such claim is invalid and/or unenforceable; (3) a preliminary and permanent injunction and treble damages for Gemstar's violation of certain antitrust laws; and

(4) monetary and exemplary damages for Gemstar's tortious business activities. Gemstar and Levine counterclaimed on January 4, 1994 for a preliminary and permanent injunction and treble damages for the Company's alleged infringement of the '713 patent claims and for a declaration of noninfringement, invalidity, and/or unenforceability of the claims of the Company's '789 patent. In addition, on December 8, 1993 Gemstar and Levine moved to dismiss the Company's antitrust claim and the Company's declaratory relief claim to the extent it sought a declaration of the unenforceability of the '713 patent due to Levine's alleged inequitable conduct during the prosecution of the '713 patent. Pursuant to a court order, the Company's antitrust claim was dismissed with prejudice. In addition, the case has been phased to permit resolution of validity and infringement issues, in August 1996, prior to resolving all other disputed issues.

In November 1993, Gemstar filed an action against the Company in the District Court for the Central District of California seeking: (1) a preliminary and permanent injunction and treble damages for the Company's alleged violation of certain federal and state antitrust laws; (2) for monetary and exemplary damages for the Company's allegedly tortious business activities; and (3) for a declaration of the noninfringement, invalidity, and/or unenforceability of the claims of three of the Company's patents (United States Patent Nos. 5,151,789, 4,706,121, and 4,977,455). In May, 1994, the Central District action was ordered to be transferred to the Northern District of California, San Jose Division, to be consolidated with the above mentioned litigation for discovery and pre-trial purposes. In addition, pursuant to a court order, Gemstar's declaratory relief claims against the Company's United States Patent Nos. 4,706,121 (the "121 patent") and 4,977,455 (the "455 patent") were dismissed. Discovery is proceeding in this case and trial date has not yet been set.

In October 1994, SuperGuide Corporation ("SuperGuide") and Gemstar filed a further lawsuit against the Company in the District Court for the Northern District of California, San Jose Division. In this action, SuperGuide and Gemstar are seeking, among other things, preliminary and permanent injunctions and treble damages for the alleged willful infringement by the Company of one or more claims of United States Patent Nos. 4,751,578 (the "578 patent") and 5,038,211 (the "211 patent"). On December 8, 1994, the Company filed counterclaims seeking, among other things, a declaration that the Company does not infringe any such claims of the '578 and '211 patents, and/or that such claims are invalid and/or unenforceable. On May 5, 1995, SuperGuide amended its complaint to add a count asserting that the Company's '121 patent is invalid and/or unenforceable and is not infringed upon by SuperGuide. The Company filed a motion to dismiss SuperGuide's causes of action with respect to the '121 patent for lack of subject matter jurisdiction (based on no case or controversy); on August 8, 1995, the Company's motion was granted. This lawsuit also has been consolidated with the above mentioned cases for discovery and pre-trial purposes. Discovery is proceeding in this case and a trial date has not yet been set.

In October 1993, United Video and its Trakker, Inc. subsidiary brought suit against the Company in the United States District Court for the Northern District of Oklahoma, seeking a declaratory judgment that its interactive program guide products do not infringe any of the Company's '121, '455 or '789 patents. The Company counterclaimed based on United Video's infringement of the '121 patent, and requested damages for past infringement, for declaratory and injunctive relief to halt future infringement, for exemplary damages based on the willful nature of United Video's infringement, and reimbursement of its attorney fees. United Video subsequently expanded the litigation by requesting similar declarations with respect to all of the Company's pending patent applications and its later-acquired PMC patents, but subsequently amended its complaint to limit the patents in suit to just the three patents identified above plus five PMC patents which are licensed to the Company. See "Patents, Trademarks, Copyrights and Proprietary Information." The Company moved to defer consideration of all non-'121 patent issues pending resolution of the parties' dispute concerning the '121 patent, and the court granted this motion. During 1994, the parties began discovery and United Video brought a series of eight summary judgment motions, all of which were denied. It also amended its complaint to add various additional defense theories and federal antitrust claims; similar to the non-'121 patent issues, litigation of the antitrust claims has been deferred pending resolution of the '121 patent infringement claims. Discovery as to the '121 patent claims is complete and the '121 infringement trial, previously set for November 6, 1995, was re-set

for January 29, 1996. In December 1995, the Company moved to include its recently issued United States Patent Nos. 5,479,266 (the "266 patent") and 5,479,268 (the "268 patent"), and asked the court to postpone the January 29, 1996 trial date for a limited period of time so as to hear the '121, '266 and '268 infringement issues at the same time. United Video opposed the Company's motion for a continuance, but did not object to the addition of the '266 and '268 patents but argued that they should not be heard with the '121 patent issues. Pursuant to a court order, the January 29, 1996 trial date has been postponed to May 8, 1996, and is expected to cover the '121 patent issues only. It has recently come to the Company's attention that the United Video product "Prevue Express Plus," which United Video had been demonstrating at various trade shows, was actually a computer simulation and not an actual product ready for delivery to customers. To date, it is unclear as to whether or not United Video has a completed product available for sale. Hence, the Company recently filed a motion to dismiss United Video's declaratory judgment action. The court is expected to rule on the Company's motion some time before the court trial date.

In October 1992, the Company and Scientific Atlanta entered into a license agreement under which Scientific Atlanta received, among other things, the rights to the '121, '455 and '789 patents for the purpose of developing converters that would accommodate the Company's electronic program guide system. On April 13, 1995, the Company served an arbitration demand on Scientific Atlanta alleging breach of the license agreement, unfair competition, breach of the covenant of good faith and fair dealing, intentional misrepresentation and interference with prospective economic advantage. The arbitration hearing is set for April 8, 1996. In February 1996, Scientific Atlanta filed a complaint against the Company and Philips Electronics North America Corporation ("Philips") for patent infringement. The lawsuit alleges that the manufacture, sale and use of the Company's CB 1500 receives infringes Scientific Atlanta's U.S. Patent Numbers 4,991,011, 5,477,262 and 5,247,364, and seeks damages in an unspecified amount, injunctive relief and recovery of costs and attorneys fees. The Company has certain indemnification obligations under an Agreement dated October 27, 1994 between the Company and Philips, including defending Philips in this case.

The Company intends to vigorously defend the allegations against it and to actively pursue its claims against each party. The outcome of these lawsuits cannot presently be determined. Management believes, based upon the advice of counsel, that the ultimate resolution of these matters will not have a material adverse effect on the Company's financial statements taken as a whole.

ITEM 4. SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS

Not Applicable.

EXECUTIVE OFFICERS OF THE REGISTRANT

The executive officers of the Company and their ages are as follows:

Name	Position
Larry W. Wangberg	53 President, Chief Executive Officer and Director
Martin W. Henkel	49 Executive Vice President, Chief Financial Officer and Director
Brian L. Klosterman	38 Senior Vice President, Marketing

Mr. Wangberg has served as the Company's President and Chief Executive Officer since February 1995 and has served on the Board of Directors of the Company since May 1993. From 1983 to February 1995, Mr. Wangberg served as President and Chief Executive Officer of Times Mirror Cable Television, Inc., a provider of broadband-based network and cable broadcast services. Mr. Wangberg simultaneously served as Senior Vice President of the parent The Times Mirror Company, a major information provider. Mr. Wangberg is the immediate past chairman of the National Cable Television Association (NCTA).

Mr. Henkel has served as Executive Vice President since December 1994 and as Chief Financial Officer since January 1992. From January 1992 to December 1994, Mr. Henkel served as Vice President, Operations. He became a director of the Company in July 1992. From 1989 to January 1992, Mr. Henkel served as Vice President of Operations and Chief Financial Officer of Phylon Communications, Inc., an integrated circuit design and hardware manufacturing company. From 1987 to 1989, Mr. Henkel was President of Martin Henkel Consulting, a financial and administrative consulting firm. From 1985 to 1987, Mr. Henkel was Corporate Controller of Telcom General Corporation. Mr. Henkel was a divisional Controller at Apple Computer, Inc. from 1982 to 1985.

Mr. Klosterman joined the Company in March 1993 as Senior Vice President, Consumer Electronics Marketing. Prior to joining the Company, Mr. Klosterman served as a Vice President at Sony Corporation of America from 1988 to February 1993, responsible for the supervision of marketing functions and personnel. From 1985 to 1988, Mr. Klosterman served in various positions with Thomson Consumer Electronics, Inc., including his last position as Manager of Television Marketing.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY AND RELATED STOCKHOLDER MATTERS

The Company's Common Stock is quoted on the Nasdaq National Market under the symbol "SGHT." The following table indicates the quarterly high and low sale prices per share of the Common Stock of the Company as reported on the Nasdaq National Market for the period from January 1, 1994 through December 31, 1995:

	High	Low
Quarter ended March 31, 1994	\$19.25	\$10.25
Quarter ended June 30, 1994	15.25	11.00
Quarter ended September 30, 1994	15.75	12.00
Quarter ended December 31, 1994	14.50	7.75
Quarter ended March 31, 1995	9.75	5.50
Quarter ended June 30, 1995	7.75	4.63
Quarter ended September 30, 1995	6.00	3.25
Quarter ended December 31, 1995	6.88	2.25

As of March 22, 1996, there were 379 holders of record of the Company's Common Stock.

The Company has never declared or paid cash dividends and currently intends to retain any future earnings for use in the development and operation of its business. Accordingly, the Company does not expect to pay cash dividends in the foreseeable future.

ITEM 6: SELECTED FINANCIAL DATA

Statement of Operations Data:	Twelve Months ended December 31, 1995	Six Months ended December 31, 1994	Twelve Months ended June 30,			
	1995	1994	1994	1993	1992	1991
	(in thousands, except per share amounts)					
Revenues	\$1,913	\$70	\$ -	\$ -	\$ -	\$ -
Cost of Goods Sold	676	-	-	-	-	-
Inventory reserves and write-offs	4,931	1,430	-	-	-	-
Gross Profit	(3,694)	(1,389)	-	-	-	-
Costs and expenses:						
General and administrative	12,728	9,945	8,228	3,767	1,765	668
Engineering and development	3,539	2,128	6,863	3,131	1,863	801
Marketing	6,823	4,325	4,478	2,044	382	230
Network services and other expenses	5,570	3,292	2,692	913	514	235
Total costs and expenses	28,660	19,691	22,261	9,855	4,174	1,968
Interest income, net	574	810	1,076	168	130	112
Loss before cumulative effect of accounting change	(31,780)	(20,264)	(20,933)	(9,687)	(4,034)	(1,851)
Cumulative effect of accounting change	-	(1,172)	-	-	-	-
Net loss	\$ (31,780)	\$ (21,435)	\$ (20,933)	\$ (9,687)	\$ (4,034)	\$ (1,851)
Loss per common share:						
Loss before cumulative effect of accounting change	\$(1.50)	\$(0.97)	\$(1.00)	\$(0.70)	\$(0.29)	\$(0.14)
Cumulative effect of accounting change	-	(0.05)	-	-	-	-
Net loss	\$(1.50)	\$(1.02)	\$(1.00)	\$(0.70)	\$(0.29)	\$(0.14)
Number of shares used for calculation of net loss per common share	21,169,768	20,799,445	19,082,779	13,763,473	13,735,743	13,731,579
Balance Sheet Data:	December 31, 1995	1994	1994	June 30, 1993	1992	1991
Cash and cash equivalents	\$8,787	\$10,141	\$24,087	\$25,898	\$4,195	\$741
Short-term investments	-	16,940	13,883	-	-	372
Working capital	3,914	23,939	36,422	23,908	3,122	963
Long-term investments	-	5,004	10,034	-	-	-
Total assets	16,333	40,831	56,695	28,837	5,175	1,461
Long-term debt less payables	74	363	502	64	85	-
Accumulated deficit	(90,686)	(58,906)	(37,473)	(16,918)	(7,231)	(3,208)
Total shareholders' equity	8,343	34,179	52,768	25,366	3,987	1,271



IW 7572045



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

March 11, 2016

THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE
RECORDS OF THIS OFFICE OF THE FILE WRAPPER AND CONTENTS
OF:

APPLICATION NUMBER: 08/119,367

FILING DATE: September 09, 1993

PATENT NUMBER: 6,418,556

ISSUE DATE: July 09, 2002

By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office



P. R. GRANT
Certifying Officer

PART (6) OF (7) PART(S)

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Any forward looking statements contained in the following discussion or elsewhere in this document involve risks and uncertainties which may cause actual results to differ materially from those discussed. A wide range of factors could contribute to those differences, including those discussed in this document.

Overview

The Company was incorporated in May 1986. Since inception, the Company has devoted substantially all of its resources toward the development and commercial introduction of a patented on-screen interactive television program guide and VCR control service marketed under the StarSight brand name. The Company generates revenue from subscription sales of the StarSight service to customers, either through service providers, such as cable operators and local telephone companies ("telcos"), or directly from the Company. The Company also generates revenues through licensing the Company's intellectual property for non-StarSight capable products. The Company has been unprofitable since its inception and expects to incur substantial losses for the foreseeable future. As of December 31, 1995, the Company had accumulated a deficit of \$90,686,000. During 1995, the Company was no longer considered a development stage company.

The Company has entered into technology development and licensing agreements with key manufacturers for the manufacture of StarSight-capable cable and telco converter boxes, televisions, VCRs, TVCRs, satellite receivers and stand alone StarSight receivers. These manufacturers include THOMSON (RCA, GE and ProScan brands), Zenith, Sony, Mitsubishi, Toshiba, Matsushita (Panasonic and Quasar brands), Philips (Magnavox and Philips brands), Sharp, Samsung, GoldStar, Daewoo, General Instrument, Scientific-Atlanta, Uviden and NextWave and the Company is currently engaged in negotiations with additional manufacturers for similar agreements. The Company devotes significant management time and efforts to identify, negotiate and enter into additional such relationships, as well as time and efforts of engineering personnel to customize the Company's technology for incorporation in the hardware offered by such manufacturers. The Company continues to actively explore opportunities to license the Company's intellectual property for non-StarSight-capable products where appropriate. In addition, the Company spends significant management time directed toward the marketing and promotion of the StarSight service, including customer support and operational issues.

In September 1994, the Board of Directors approved a change to the Company's operating fiscal year from a fiscal year ending June 30 to a fiscal year ending December 31 beginning January 1, 1995. Accordingly, the accompanying financial statements are for the twelve months ended December 31, 1995 ("Fiscal 1995"), the six months ended December 31, 1994, the twelve months ended June 30, 1994 ("Fiscal 1994") and the twelve months ended June 30, 1993 ("Fiscal 1993").

On March 8, 1996, the Company and THOMSON finalized agreements to form a long-term strategic relationship to aggressively incorporate and promote StarSight technology and related services in selected THOMSON product lines. The key terms and conditions of these agreements follow:

- The Company sold 3,333,333 shares of its Common Stock to THOMSON at \$7.50 per share or \$25,000,000 in total.
- The Company granted THOMSON a warrant to purchase 2,000,000 shares of the Company's Common Stock as follows: up to 1,000,000 shares at \$7.50 per share on or prior to February 1,

1998 and up to the balance of the shares at \$10.00 per share on or prior to February 1, 1999. In addition, THOMSON has the right to purchase on or prior to September 18, 1996 any additional shares at 85% of market value, as defined in the warrant, which will increase THOMSON's aggregate percentage ownership of the Company to 16.5% of the Company's issued and outstanding Common Stock. The total number of shares purchasable by THOMSON under the warrant is limited to 19.6% of the Company's issued and outstanding Common Stock.

- THOMSON will put StarSight capability into a significant portion of THOMSON's suitable consumer electronic products over the 10 year life of the agreement.
- The Company will pay THOMSON a per subscriber fee for new subscribers using a THOMSON StarSight capable product. Fees under this agreement are limited to certain annual maximums through the year 2000.
- The Company will pay THOMSON a percentage of all subscription fees derived from THOMSON StarSight capable products. Fees under this agreement begin after the achievement of an agreed-upon minimum of THOMSON StarSight capable products manufactured or procured by THOMSON. In addition, the Company will pay THOMSON a percentage of all revenues related to consumer electronics products whether or not the subscriber is using a THOMSON StarSight capable product. Such fees under this agreement begin after the achievement of an agreed-upon minimum of THOMSON StarSight capable products manufactured or procured by THOMSON. This agreement expires in 2010.
- The Company and THOMSON each agree to contribute significant specific dollar advertising commitments in each year 1997 and 1998 for advertising and promotion of THOMSON StarSight capable products.

Results of Operations

Revenues for Fiscal 1995 and the six months ended December 31, 1994 were \$1,913,000 and \$70,000, respectively. Revenues in Fiscal 1995 consist of subscription revenues and license fees. As a result of incurring significant expenses in its development and operating activities without generating significant revenues, the Company has incurred significant losses. The Company's net loss increased from \$9,687,000 in Fiscal 1993 to \$20,555,000 in Fiscal 1994 and to \$21,433,000 for the six months ended December 31, 1994. The net loss increased to \$31,780,000 for the twelve months ended December 31, 1995.

The Company has entered into an agreement with a third party manufacturer (the "Manufacturer") for the manufacture of as many as 100,000 stand alone StarSight receivers ("Receivers") on a subcontract basis. In connection with this agreement, the Company will provide the Manufacturer certain raw materials to complete the manufacture of the Receivers. At December 31, 1994, the Company had recorded an inventory valuation allowance of \$1,450,000 related to this agreement covering approximately 25,000 Receivers which the Company had committed to purchase. Such inventory valuation allowance represented the Company's estimate of the excess of cost over net realizable value on work-in-process and finished products inventories to reflect the anticipated sales price of the Company's stand alone StarSight receiver at the time.

During the first quarter of 1995, the Company committed to purchase another 10,000 Receivers and recorded an additional inventory valuation allowance of \$930,000. In September 1995 the Company

canceled its commitment to purchase the remaining 65,000 Receivers from the Manufacturer. Such cancellation did not result in any additional cost or liability to the Company. However, in September 1995, as a result of the completion of this agreement with the Manufacturer and a significant reduction in the anticipated sales price of the Receivers, the Company recorded an additional lower of cost or market inventory valuation allowance of \$2,340,000. In addition, the Company expensed \$960,000 of excess work-in-process inventories originally acquired for use in the manufacture of the remaining 65,000 receivers. In the fourth quarter of 1995, the Company recorded an additional lower of cost or market inventory valuation allowance of \$701,000. As a result, the total 1995 inventory reserve and write-off was \$4,931,000.

General and administrative expense primarily consists of salaries and benefits of management and administrative personnel in the corporate, finance, personnel, legal and facilities departments, professional and consulting fees and general corporate expenditures. In Fiscal 1995, general and administrative expense was \$12,728,000. The increase in Fiscal 1995 when compared to the six months ended December 31, 1994 was primarily due to twelve months of activity, as well as legal expenses of \$2,880,000 related to the Company's patent litigation, \$668,000 in expenses in connection with the hiring of the Company's new President and Chief Executive Officer and \$700,000 in executive bonuses. General and administrative expense increased to \$9,946,000 for the six months ended December 31, 1994. The increase in general and administrative expense was primarily due to legal expenses of \$1,644,000 related to the Company's patent litigation and \$3,117,000 for manufacturer reimbursements pursuant to an agreement to reimburse a manufacturer for specific incremental manufacturing costs of incorporating StarSight technology into certain StarSight-capable products. General and administrative expense increased from \$3,767,000 in Fiscal 1993 to \$8,228,000 in Fiscal 1994. The increase in general and administrative expense between Fiscal 1993 and Fiscal 1994 relates primarily to the overall scale-up of operations for the development and introduction of the StarSight service. The primary expenses associated with the scale-up of operations were the hiring of management and administrative personnel and the incurring of professional and consulting fees. The Company incurred these expenses in developing strategic relationships, supporting its engineering and development efforts, supporting its patent position and continued overall growth in the Company's size and operations.

The Company is a party to several lawsuits regarding infringement of patents owned by the Company. The Company expects to incur additional legal and other costs in future periods related to the enforcement of the Company's patents involved in the current and potential future lawsuits. No estimate of the total amount of such additional legal costs can be made at this time. The outcome of these lawsuits cannot presently be determined. Management believes, based on the advice of counsel, that the ultimate resolution of these matters will not have a material adverse effect on the Company's financial statements taken as a whole. See Note 4 to Financial Statements.

Effective July 1, 1994, the Company changed its method of accounting to expense legal costs incurred in connection with the aforementioned patent infringement litigation. Previously all such legal costs were capitalized and amortized over the remaining useful lives of the related patents. The Company believes that this change in method is preferable because it conforms to the predominant industry practice. The cumulative effect at July 1, 1994 of adopting this accounting change was an increase in the Company's net loss for the six months ended December 31, 1994 of \$1,172,000 (\$0.06 per share).

For Fiscal 1995, engineering and development expense increased from the six months ended December 31, 1994 to \$3,539,000 representing 12 months of activity. Engineering and development expense decreased to \$2,128,000 for the six months ended December 31, 1994 compared to \$6,843,000

in Fiscal 1994. A portion of this pro rata decrease is attributable to the gradual shifting of the Company's focus from early development and engineering efforts to preparation for manufacturing and commercial operations. Engineering and development expense is composed primarily of personnel costs in the areas of product design and development. Engineering efforts include development of the broadcast network architecture and supporting software and the design of the StarSight-enabling technology incorporated within cable and telco converters, televisions, VCRs, satellite receivers and stand alone StarSight receivers. Engineering and development expense increased from \$3,131,000 in Fiscal 1993 to \$6,843,000 in Fiscal 1994. The increases in engineering and development expense between Fiscal 1993 and Fiscal 1994 were attributable primarily to the hiring of additional engineering personnel in connection with the customization of the Company's proprietary technology and the design and development of StarSight-capable products by key manufacturers. In addition, during Fiscal 1994, the Company expended approximately \$1,322,000 in connection with an exclusive patent license agreement with another company. See Note 4 to Financial Statements.

Marketing expense consists primarily of salaries for sales and marketing personnel, fees paid to consultants, market research costs and trade show and industry awareness costs. For Fiscal 1995, marketing expense increased to \$6,823,000 compared to \$4,325,000 for the six months ended December 31, 1994. The increase represents 12 months of activity with no significant variances. The Company expects that marketing expense will increase substantially in the future as the StarSight EPG is introduced in more products and at higher volumes. In addition to the reasons noted below, the Company incurred \$1,915,000 in advertising expense during the six months ended December 31, 1994. Marketing expenses increased from \$2,044,000 in Fiscal 1993 and to \$4,478,000 in Fiscal 1994. The primary items contributing to the increases in marketing expense was the hiring of additional marketing personnel and increased product awareness expenditures as the StarSight service approached commercial introduction.

Network services and other expenses consist primarily of the combined cost of purchasing television scheduling data from a television data supplier (TVDT) and broadcasting that data over the data distribution network operated by PBS. The Company's contracts with these service providers have a base fee and a per customer monthly cost with annual maximums on the cost. The combined cost for the purchase and broadcast of the television scheduling data through these contracts is limited to \$8,115,000 per year (for each year in which the contracts overlap) subject to annual adjustments related to changes in the consumer price index. In addition, network and other expenses include operating expenses related to subscription order processing and customer support and manufacturing operations related to the development and manufacture of the Company's stand alone StarSight receiver. Network services and other expenses increased to \$3,292,000 for the six months ended December 31, 1994 and to \$5,570,000 in Fiscal 1995. The increase was primarily attributable to an increase in fees paid to PBS as use of its data distribution network for the StarSight service increased and costs related to the establishment of our order processing and customer support infrastructure as StarSight's EPG was commercially launched. Network services and other expenses increased from \$913,000 in Fiscal 1993 to \$2,682,000 in Fiscal 1994. The increases were primarily attributable to an increase in fees paid to PBS and others, as use of the data distribution network for the StarSight EPG increased.

Interest income was \$607,000 for Fiscal 1995 and \$833,000 for the six months ended December 31, 1994. Interest income increased from \$182,000 in Fiscal 1993 to \$1,695,000 in Fiscal 1994. The large increase beginning in Fiscal 1994 resulted from interest income relating to investment of the proceeds of the Company's initial public offering completed in August 1993. The decrease in interest income is attributable to a decrease in the Company's cash and cash equivalents, short-term investment and long-term investment balances during Fiscal 1995 and the six months ended December 31, 1994.

In the third quarter of 1995, the Company took steps to reduce operating expenses by concentrating on business development efforts which are believed to be most cost effective. Such expense reductions were a result of on-going efforts to determine which programs in each functional area are most productive. There can be no assurance that the Company will ever be able to achieve revenues in excess of expenses. The Company expects to incur substantial losses and substantial negative cash flow from operating activities in the foreseeable future. The Company is dependent on sales of StarSight products and services in order to minimize negative cash flow from operations. Management believes that the availability in the market place of StarSight capable televisions, VCRs, satellite receivers and stand-alone StarSight receivers, combined with a focused marketing program, is essential to the Company's 1996 cash flow. However, because of its limited commercial operating history, the Company is subject to all of the risks and expenses inherent in the establishment of a new business enterprise. To address these risks and expenses, the Company must, among other things, respond to competitive developments, attract, retain and motivate qualified personnel and support the expense of marketing a new service based upon innovative technology. In addition, the Company must successfully launch the commercial distribution of its products and services, obtain adequate financing to fulfill its marketing plan and successfully market its products and services to potential subscribers.

Liquidity and Capital Resources

The Company has financed its operations through private placements of equity securities to individual investors and those corporations with which the Company has strategic relationships. These private placements have yielded a total of approximately \$52,500,000 through December 31, 1995. In addition, the Company completed its initial public offering in August 1993, raising approximately \$42,300,000, net of issuance costs. In the last quarter of Fiscal 1995, the Company completed a private placement with certain existing shareholders for \$5,000,000 (\$7.50 per share). See Note 11 to Financial Statements. In addition, the Company received \$2,000,000 in connection with a licensing agreement with THOMSON for use of the Company's intellectual property in certain digital satellite property in certain digital satellite equipment manufactured by THOMSON. See Note 8 to Financial Statements.

As of December 31, 1995, the Company had an accumulated deficit of \$90,686,000. Negative cash flow from operations was \$27,608,000 for Fiscal 1995 compared to \$17,092,000 for the six months ended December 31, 1994. The Company's negative cash flow from operations increased from \$7,788,000 in Fiscal 1993 to \$19,717,000 in Fiscal 1994. Only limited revenues have been generated to date. There can be no assurance that the Company will be able to achieve revenues in excess of expenses. The Company expects to incur substantial negative cash flow from operating activities for the foreseeable future.

The Company anticipates expending a significant portion of its cash resources for sales and marketing, expanding public awareness and other expenses associated with the delivery of StarSight to customers. The Company anticipates expending additional cash resources to provide incentives for manufacturers to incorporate the StarSight EPG into StarSight-capable products manufactured by them. For a description of other future commitments of the Company, see Note 9 to Financial Statements.

Through December 31, 1995, the Company expensed approximately \$5,700,000 in legal and other costs in connection with patent infringement litigation (see Note 4 to Financial Statements), of which approximately \$2,900,000 was expensed in Fiscal 1995. The Company expects to incur additional legal costs in future periods related to the enforcement of the Company's patents involved in the current and potential future suits. No estimate of the total amount of such additional legal costs can be made at this time.

The Company is dependent on 1996 sales of the StarSight service to minimize negative cash flow from operations. The Company believes that the availability of StarSight-capable TVs, VCRs, TVCRs, satellite receivers and stand alone StarSight receivers in the market place combined with a focused marketing program is essential to the Company's 1996 cash flow.

At December 31, 1995, the Company had cash and cash equivalents of \$8,787,000. On March 8, 1996, the Company completed a series of strategic and financial agreements with THOMSON which included the sale of 3,333,333 shares of the Company's Common Stock for approximately \$25,000,000 (\$7.50 per share). The net proceeds to the Company, after deducting placement fees and other costs, were approximately \$24,625,000. For a further discussion of the series of strategic and financial agreements with THOMSON, see Note 18 to Financial Statements.

The Company may seek additional investments from its current or new strategic investors. In addition, the Company may consider issuance of other debt or security securities. To the extent the Company raises additional cash by issuing equity securities, ownership dilution to the existing shareholders of the Company will result. Debt or equity financing may not be available when needed or on terms acceptable to the Company.

The Company's future cash requirements will depend on many factors, including: (i) the rate at which manufacturers of televisions, VCRs, TVCRs, satellite receivers and cable and telco converter boxes incorporate the Company's proprietary technology into new hardware products manufactured and marketed by them, (ii) the rate at which customers subscribe to the StarSight service, (iii) the rate at which cable operators introduce and market StarSight's EPG to their customers, (iv) the level of marketing required to increase subscribers and to attain a competitive position in the market place, and (v) the rate at which the Company invests in engineering and development and patent protection with respect to existing and future technology.

The Company believes that its existing cash and cash equivalents, combined with the recent sale of the Company's Common Stock to THOMSON on March 8, 1996 for approximately \$25,000,000, will be sufficient to sustain the Company's current level of operations and meet its financial obligations through the end of 1996.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The Company's financial statements and the independent auditors' report appear on pages F-1 through F-22 of this Report.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

PART III

ITEM 10. DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT

The information required by this item concerning the Company's directors is incorporated by reference from the section captioned "Election of Directors" contained in the Company's Proxy Statement related to the Annual Meeting of Shareholders to be held May 16, 1996, to be filed by the Company with the Securities and Exchange Commission within 120 days of the end of the Company's fiscal year pursuant to General Instruction G(3) of Form 10-K (the "Proxy Statement"). The information required by this item concerning executive officers is set forth in Part I of this Report. The information required by this item concerning compliance with Section 16(a) of the Exchange Act is incorporated by reference from the section captioned "Compliance with Section 16(a) of the Exchange Act" contained in the Proxy Statement.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference from the section captioned "Executive Compensation and Other Matters" contained in the Proxy Statement.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The information required by this item is incorporated by reference from the section captioned "Record Date and Principal Share Ownership" contained in the Proxy Statement.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

The information required by this item is incorporated by reference from the sections captioned "Compensation Committee Interlocks and Insider Participation" and "Certain Transactions With Management" contained in the Proxy Statement.

PART IV

ITEM 14. EXHIBITS, FINANCIAL STATEMENT SCHEDULES AND REPORTS ON FORM 8-K.

(a)(1) Financial Statements

The following financial statements are filed as part of this Report:

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(a)(2) Financial Statement Schedules

All financial statement schedules are omitted because they are not applicable or the required information is shown in the Financial Statements or Notes thereto.

(a)(3) Exhibits

3.1 ¹	Restated Articles of Incorporation of Registrant.
3.2 ²	Bylaws of Registrant, as amended.
10.1 ¹	1989 Stock Incentive Program, as amended, and forms of agreements thereunder.
10.2 ¹	Employee Stock Purchase Plan and forms of agreements thereunder.
10.3 ²	Lease Agreement between Registrant and Shapell Industries of Northern California dated as of January 8, 1992.
10.4 ²	Form of Indemnification Agreements between Registrant and its officers and directors.
10.5 ¹	Corporate Partnership Agreement dated as of September 12, 1991, as amended, between Registrant and Viacom International Inc.
10.6 ¹⁺²	Agreement dated as of January 31, 1991, between Registrant and Tribune Media Services, Inc., as amended.
10.7 ¹⁺²	Memorandum of Understanding dated May 28, 1993 between Registrant and Mitsubishi Electric Corporation.
10.8 ¹⁺²	Manufacturing Agreement dated as of June 1, 1991 between Registrant and Zenith Electronics Corporation.

- 10.9⁺⁺² Network Service and Joint Development Agreement dated as of October 11, 1989, as amended, between Registrant and National Datacast, Inc.
- 10.10⁺⁺² License Agreement dated as of March 5, 1993 between Registrant and TV/COM International.
- 10.11⁺⁺² Terms of Affiliation Agreement dated as of January 24, 1993 between Registrant and KBLCOM Incorporated.
- 10.12⁺⁺² License and Technical Assistance Agreement dated as of March 1, 1991 between Registrant and Video Control Technology, Inc.
- 10.13⁺⁺² License and Technical Assistance Agreement dated as of October 1, 1992 between Registrant and Scientific-Atlanta, Inc.
- 10.14⁺⁺² License and Technical Assistance Agreement dated as of October 1, 1992 between Registrant and General Instrument Corp.
- 10.15⁺⁺² License and Technical Assistance Agreement dated as of December 1, 1992 between Registrant and Goldstar Co., Ltd.
- 10.16⁺⁺² Subscriber Billing Service Agreement dated as of December 23, 1992 between Registrant and First Data Resources, Inc.
- 10.17⁺⁺² HTVRO Distribution Agreement dated as of April 30, 1993 between Registrant and Showtime Satellite Networks, Inc.
- 10.18⁺⁺² Letter Agreement dated as of May 27, 1993 between Registrant and Lifetime Television.
- 10.19⁺⁺² Agreement dated as of October 30, 1992 between Registrant and TV Data Technologies, Inc.
- 10.20² Terms of Warrant Issuance Agreement between Registrant and Providence Journal Company.
- 10.21² Terms of Warrant Issuance Agreement dated as of May 18, 1993 between Registrant and Times Mirror Cable Television Inc.
- 10.22² Manufacturing Agreement dated as of May 28, 1993 between Registrant and FCI Limited.
- 10.23² Assignment Agreement dated as of May 9, 1989 between Registrant and Patrick Young.
- 10.24² Employment Agreement between Registrant and Michael W. Faber dated as of December 1, 1994.
- 10.25² Employment Agreement between Registrant and John H. Roop dated as of December 1, 1993.
- 10.26² Employment and Consulting Agreement between Registrant and Patrick Young dated as of August 1, 1992.
- 10.27² Warrants issued by Registrant to Tribune Company, dated January 22, 1992.
- 10.28² Warrants issued by Registrant to KBL Ventures, Inc. dated February 3, 1993.
- 10.29² Warrants issued by Registrant to Providence Journal Company dated May 7, 1993.
- 10.30² Warrants issued by Registrant to Times Mirror Cable Television dated May 18, 1993.
- 10.31² Consulting Agreement between Registrant and Willard Block dated December 1, 1993.
- 10.32² Consulting Agreement between Registrant and John F. Doyle dated December 1, 1993.
- 10.33² License and Technical Assistance Agreement dated as of November 26, 1993 between Registrant and Samsung Electronics Co. Ltd.

- 10.34**¹ Network Service Agreement dated as of April 30, 1993 between Registrant and Viacom International Inc.
- 10.35² Terms of Warrant Issuance Agreement dated as of June 18, 1993 between Registrant and Cox Communications, Inc.
- 10.36**² Terms of Affiliation Agreement dated as of June 18, 1993 between Registrant and Cox Communications, Inc.
- 10.37² Warrants issued by Registrant to Cox Communications, Inc. dated June 18, 1993.
- 10.38³ Employment Agreement between the Registrant and John B. Burns III dated as of December 1, 1993.
- 10.39³ Employment Agreement between Registrant and Martin W. Henkel dated as of December 1, 1994.
- 10.40**⁴ License and Technical Assistance Agreement dated as of October 28, 1993 between Registrant and Uniden American Corporation.
- 10.41**⁴ License and Technical Assistance Agreement dated as of November 5, 1993 between Registrant and Philips Consumer Electronics Company.
- 10.42**⁵ License and Technical Assistance Agreement dated as of January 31, 1994 between Registrant and Mitsubishi Electric Corporation.
- 10.43**⁶ License and Technical Assistance Agreement dated as of May 12, 1994 between Registrant and Thomson Consumer Electronics.
- 10.44**⁷ License and Technical Assistance Agreement dated as of August 12, 1994 between Registrant and Sony Corporation.
- 10.45**⁷ License and Technical Assistance Agreement dated as of September 23, 1994 between Registrant and Matsushita Electric Corporation of America.
- 10.46⁷ Strategic Agreement dated October 28, 1994 between Registrant and Bell Atlantic Video Services Company.
- 10.47**⁸ License and Technical Assistance Agreement dated as of December 7, 1994 between Registrant and Daewoo Electronics Company, Ltd.
- 10.48**⁸ License and Technical Assistance Agreement dated as of February 13, 1995 between Registrant and Sharp Corporation.
- 10.49**⁸ License and Technical Assistance Agreement dated as of February 26, 1995 between Registrant and Goldstar Co., Limited.
- 10.50⁸ Network Service Agreement between Registrant and Trinity Broadcasting Network dated August 16, 1994.
- 10.51⁸ License and Technical Assistance Agreement between Registrant and NextWave Communications Corporation dated March 15, 1995.
- 10.52⁹ Employment Agreement between Registrant and Larry W. Wangberg dated February 2, 1995.
- 10.53⁹ Employment Agreement between Registrant and John R. Roop dated December 1, 1994.
- 10.54**⁹ Service Agreement between Registrant and Viacom Cable dated November 10, 1994.
- 10.55**⁹ Agreement between Registrant and Philips Consumer Electronics Company dated October 27, 1994.
- 10.56**¹⁰ Agreement between Registrant and Toshiba America Consumer Products Inc. dated May 23, 1995.
- 10.57** Strategic Cooperation Agreement dated February 21, 1996, between StarSight Telecast, Inc. and THOMSON multimedia S.A.
- 10.58 Securities Purchase Agreement dated as of February 19, 1996 between THOMSON multimedia S.A. and StarSight Telecast, Inc.

- 10.59 StarSight Telecast, Inc. Common Stock Purchase Warrant to Purchase 2,000,000 Plus a Variable Amount of Shares of Common Stock, granted to THOMSON multimedia S.A.
- 10.60 Shareholders Agreement dated February 19, 1996 among THOMSON multimedia S.A., StarSight Telecast, Inc., and PVI Transmission, Inc.
- 10.61 Right of First Refusal Agreement dated February 19, 1996 between StarSight Telecast, Inc. and THOMSON multimedia S.A.
- 10.62 Amendment No. Two To Corporate Partnership Agreement, dated November 20, 1995 among StarSight Telecast, Inc., Michael W. Faber, Patrick Young, Milbank Wilson Capital Partners, and PVI Transmission Inc. (as successor to Viacom International, Inc.)
- 10.63 Amendment No. Three to Corporate Partnership Agreement, dated February 19, 1996 among PVI Transmission Inc. (as successor to Viacom International, Inc.), StarSight Telecast, Inc., Scott Wilson, Jeremiah Milbank, Michael W Faber, and Patrick Young.
- 11.1 Statement regarding computation of per share earnings.
- 23.1 Consent of Independent Auditors.
- 24.1 Power of Attorney (See Pages 42).

Confidential treatment has been granted or requested with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

- 1 Incorporated by reference to Item 14 "Exhibits, Financial Statement Schedules and Reports on Form 8-K" of the Company's Annual Report on Form 10-K for the fiscal year ended June 30, 1993.
- 2 Incorporated by reference to the Registration Statement on Form S-1 (File No. 33-64138) as declared effective by the Securities and Exchange Commission July 29, 1993.
- 3 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 1993.
- 4 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended December 31, 1993.
- 5 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 1994.
- 6 Incorporated by reference to Item 14 "Exhibits, Financial Statement Schedules and Reports on Form 8-K" of the Company's Annual Report on Form 10-K for the fiscal year ended June 30, 1994.
- 7 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 1994.
- 8 Incorporated by reference to Item 14 "Exhibits, Financial Statement Schedules and Reports on Form 8-K" of the Company's Transition Report on Form 10-K for the transition period from July 1, 1994 to December 31, 1994.
- 9 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 1995.
- 10 Incorporated by reference to Item 6 "Exhibits and Reports on Form 8-K" of the Company's Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 1995.

(b) *Reports on Form 8-K.* The Company did not file any reports on Form 8-K during the last quarter of the fiscal year ended December 31, 1995.

(c) *Exhibits.* See Item 14(a)(3) above.

(d) *Financial Statement Schedules.* See Item 14(a)(2) above.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

STARSIGHT TELECAST, INC.

By: /s/ LARRY W. WANGBERG
President, Chief Executive Officer and
Director

Date: March 29, 1996

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Michael W. Faber, Larry W. Wangberg and Martin W. Henkel, and each of them, his true and lawful attorneys-in-fact and agents, each with full power of substitution and resubstitution, to sign any and all amendments (including post-effective amendments) to this Annual Report on Form 10-K and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or their substitutes or substitutes, or any of them, shall do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ MICHAEL W. FABER</u> Michael W. Faber	Chairman of the Board of Directors	March 29, 1996
<u>/s/ LARRY W. WANGBERG</u> Larry W. Wangberg	President, Chief Executive Officer and Director (Principal Executive Officer)	March 29, 1996
<u>/s/ MARTIN W. HENKEL</u> Martin W. Henkel	Executive Vice President, Chief Financial Officer and Director (Principal Financial and Accounting Officer)	March 29, 1996

/s/ DONN M. DAVIS
Donn M. Davis

Director

March 29, 1996

/s/ JAMES B. MEYER
James B. Meyer

Director

March 29, 1996

/s/ JACK C. CLIFFORD
Jack C. Clifford

Director

March 29, 1996

At: M. Dalvi

Director

March 29, 1996

/s/ JOHN F. DOYLE
John F. Doyle

Director

March 29, 1996

/s/ JOHN W. GODDARD
John W. Goddard

Director

March 29, 1996

/s/ EDWARD D. HOROWITZ
Edward D. Horowitz

Director

March 29, 1996

/s/ THOMAS E. DOOLEY
Thomas E. Dooley

Director

March 29, 1996

/s/ JACQUES THIBON
Jacques Thibon

Director

March 29, 1996

STARSIGHT TELECAST, INC.

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INDEPENDENT AUDITORS' REPORT

**To the Shareholders and Board of Directors
StarSight Telecast, Inc.**

We have audited the accompanying balance sheets of StarSight Telecast, Inc. (the "Company") as of December 31, 1995 and 1994, and the related statements of operations, shareholders' equity and of cash flows for the twelve months ended December 31, 1995, six months ended December 31, 1994, and twelve months ended June 30, 1994 and 1993. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, such financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 1995 and 1994, and the results of its operations and its cash flows for the twelve months ended December 31, 1995, the six months ended December 31, 1994, and the twelve months ended June 30, 1994 and 1993 in conformity with generally accepted accounting principles.

As discussed in Note 3 to the financial statements, effective July 1, 1994 the Company changed its method of accounting for legal costs incurred in connection with patent infringement litigation.

March 15, 1996

STARSIGHT TELECAST, INC.

BALANCE SHEETS, DECEMBER 31, 1995 AND 1994 (In thousands, except share data)

	December 31, 1995	December 31, 1994
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	\$ 8,787	\$ 10,141
Short-term investments held to maturity	-	16,940
Accounts receivable	2,192	307
Inventories	441	2,253
Other	<u>410</u>	<u>387</u>
Total current assets	11,830	30,228
LONG-TERM INVESTMENTS HELD TO MATURITY	-	5,004
FURNITURE, FIXTURES AND EQUIPMENT, Net	1,637	2,621
PATENTS AND LICENSES, net of accumulated amortization of \$595 and \$341	<u>2,866</u>	<u>2,978</u>
TOTAL ASSETS	\$ 16,333	\$ 40,831
LIABILITIES AND SHAREHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Accounts payable	\$ 1,578	\$ 2,330
Accrued liabilities	3,068	3,498
Deferred revenue	2,992	196
License fee payable	<u>286</u>	<u>220</u>
Total current liabilities	7,916	6,289
LONG-TERM LICENSE FEE PAYABLE	74	363
COMMITMENTS AND CONTINGENCIES		
SHAREHOLDERS' EQUITY:		
Common stock, no par value; authorized 30,000,000 shares; issued and outstanding, 21,902,018 and 20,995,786 shares, respectively	99,400	94,069
Unearned compensation	(371)	(984)
Accumulated deficit	<u>(90,686)</u>	<u>(58,906)</u>
Total shareholders' equity	<u>8,343</u>	<u>34,179</u>
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	\$ 16,333	\$ 40,831

See notes to financial statements.

STARSIGHT TELECAST, INC.

STATEMENTS OF OPERATIONS

TWELVE MONTHS ENDED DECEMBER 31, 1985, SIX MONTHS ENDED DECEMBER 31, 1984 AND TWELVE MONTHS ENDED JUNE 30, 1984 AND 1983 (in thousands, except share data)

	Twelve Months Ended December 31, 1985	Six Months Ended December 31, 1984	Twelve Months Ended June 30, 1984 1983	
REVENUES	\$ 1,923	\$ 70	\$ -	\$ -
COST OF GOODS SOLD	676	-	-	-
INVENTORY RESERVES AND WRITE-OFFS	4,931	1,430	-	-
GROSS PROFIT	(3,690)	(1,360)	-	-
COSTS AND EXPENSES:				
General and administrative	12,728	9,946	8,228	3,767
Engineering and development	3,539	2,128	6,843	3,131
Marketing	6,823	4,325	4,478	2,044
Network services and other expenses	5,579	3,292	2,682	913
Total costs and expenses	28,669	19,691	22,231	9,855
OPERATING LOSS	(32,359)	(21,071)	(22,231)	(9,855)
INTEREST EXPENSE	(33)	(23)	(19)	(14)
INTEREST INCOME	607	833	1,405	882
LOSS BEFORE CUMULATIVE EFFECT OF ACCOUNTING CHANGE	(31,785)	(20,261)	(20,845)	(9,087)
CUMULATIVE EFFECT OF ACCOUNTING CHANGE	-	(1,170)	-	-
NET LOSS	\$ (31,785)	\$ (21,431)	\$ (20,845)	\$ (9,087)
LOSS PER COMMON SHARE				
LOSS BEFORE CUMULATIVE EFFECT OF ACCOUNTING CHANGE	\$ (1.50)	\$ (0.97)	\$ (1.08)	\$ (0.70)
CUMULATIVE EFFECT OF ACCOUNTING CHANGE	-	(0.09)	-	-
NET LOSS	\$ (1.50)	\$ (1.06)	\$ (1.08)	\$ (0.70)
NUMBER OF SHARES USED FOR CALCULATION OF NET LOSS PER COMMON SHARE	21,163,768	20,219,445	19,082,792	13,762,425

See notes to financial statements.

STARRIGHT TELECAST, INC.

STATEMENTS OF SHAREHOLDERS' EQUITY
TWELVE MONTHS ENDED DECEMBER 31, 1993, SIX MONTHS ENDED DECEMBER 31, 1994
AND TWELVE MONTHS ENDED JUNE 30, 1994 AND 1993 (in thousands, except share data)

	Convertible Preferred Stock		Common Stock		Unearned Compensation	Accumulated Deficit	Total
	Shares	Amount	Shares	Amount			
BALANCE, JUNE 30, 1992	3,978,124	\$ 10,834	7,771,521	\$ 1,100	\$ (715)	\$ (7,231)	\$ 3,987
Issuance of common stock for cash - Net (\$1.77 per share)			24,153	19	(1,971)		19
Compensation stock option grants							
Exercise of preferred stock for cash - Net:							
Series C (\$3.75 per share)	180,030	675					675
Series D (\$1.50 per share)	4,000,666	29,574					29,574
Amortization of unearned compensation					798	(9,687)	798
Net loss						(16,918)	(16,918)
BALANCE, JUNE 30, 1993	8,158,820	41,073	7,795,674	3,099	(1,888)	(16,918)	25,366
Issuance of common stock for cash - Initial Public Offering - Net (\$11.00 per share)			3,105,000	42,334			42,334
Conversion of convertible preferred stock into common stock	(8,158,820)	(41,073)	8,158,820	41,073			4,688
Exercise of warrant for cash (\$3.625 per share)			833,333	4,688			273
Amortization of unearned compensation					273		273
Exercise of stock options for cash			574,578	479			479
Issuance of common stock for cash			15,819	183			183
Net loss						(20,545)	(20,545)
BALANCE, JUNE 30, 1994	-	\$ -	20,482,624	\$ 91,856	\$ (1,615)	\$ (37,673)	\$ 52,768

(Continued)

STARLIGHT TELECAST, INC.

STATEMENTS OF SHAREHOLDERS' EQUITY TWELVE MONTHS ENDED DECEMBER 31, 1994, SIX MONTHS ENDED DECEMBER 31, 1994 AND TWELVE MONTHS ENDED JUNE 30, 1994 AND 1993 (in thousands, except share data)

	Convertible Preferred Stock		Common Stock		Unearned Compensation	Accumulated Deficit	Total
	Shares	Amount	Shares	Amount			
BALANCE, JUNE 30, 1994	-	\$ -	20,462,404	\$91,856	\$ (1,615)	\$ (37,473)	\$52,768
Exercise of warrant for cash (\$7.50 per share)			229,624	1,722			1,722
Exercise of stock options for cash			246,288	377			377
Issuance of common stock for cash			17,250	114			114
Amortization of unearned compensation					631		631
Net loss						(21,433)	(21,433)
BALANCE, DECEMBER 31, 1994			20,995,766	\$94,069	(904)	(58,906)	\$4,179
Issuance of common stock for cash (\$7.50 per share)			666,666	5,000			5,000
Exercise of stock options for cash			218,929	243			243
Issuance of common stock for cash			20,635	98			98
Amortization of unearned compensation					613		613
Net loss						(31,780)	(31,780)
BALANCE, DECEMBER 31, 1993		\$ -	21,902,016	\$99,400	\$ (371)	\$ (29,680)	\$ 6,944

See notes to financial statements.

STARSIGHT TELECAST, INC.

STATEMENTS OF CASH FLOWS **TWELVE MONTHS ENDED DECEMBER 31, 1986, SIX MONTHS ENDED DECEMBER 31, 1984** **AND TWELVE MONTHS ENDED JUNE 30, 1984 AND 1983 (in thousands)**

	Twelve Months Ended December 31, 1986	Six Months Ended December 31, 1984	Twelve Months Ended June 30, 1984	1983
CASH FLOWS FROM OPERATING ACTIVITIES:				
Net loss	\$ (31,780)	\$ (21,433)	\$ (28,355)	\$ (9,687)
Adjustments to reconcile net loss to net cash used in operating activities:				
Cumulative effect of accounting change	-	1,172	-	-
Accumulation of unearned compensation	613	681	273	798
Depreciation and amortization	1,823	936	1,016	350
Inventory valuation reserve	3,649	1,458	-	-
Changes in assets and liabilities:				
Accounts payable and accrued liabilities	1,832	2,872	537	1,512
Accounts receivable, inventories and other assets	(3,545)	(2,720)	(988)	(761)
Net cash used in operating activities	(27,620)	(17,082)	(19,717)	(7,788)
CASH FLOWS FROM INVESTING ACTIVITIES:				
Acquisitions of furniture, fixtures and equipment	(385)	(849)	(2,528)	(689)
Purchases of long-term investments	-	-	(18,034)	-
Maturities of long-term investments	-	3,030	-	-
Sales of long-term investments held to maturity	5,004	-	-	-
Purchases of short-term investments	-	(11,868)	(19,712)	-
Maturities of short-term investments	16,940	8,811	5,829	-
Additions to patents and licenses	(162)	(36)	(3,834)	(242)
Net cash provided by (used in) investing activities	21,217	1,088	(30,289)	(631)
CASH FLOWS FROM FINANCING ACTIVITIES:				
Proceeds from the issuance of common stock, net	5,000	-	42,334	19
Proceeds from the issuance of preferred stock, net	-	-	-	30,249
Proceeds from exercises of warrants and options for common stock	331	2,213	3,350	-
Proceeds from notes payable	-	-	822	-
Repayment of notes payable	(289)	(147)	(103)	(28)
Net cash provided by financing activities	5,042	2,066	46,403	30,249
INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	(1,354)	(13,946)	(1,683)	21,521
CASH AND CASH EQUIVALENTS:				
Beginning of period	18,141	24,087	25,680	4,108
End of period	\$ 8,787	\$ 10,141	\$ 24,087	\$ 25,680
OTHER CASH FLOW INFORMATION -				
Interest paid	\$ 33	\$ 28	\$ 19	\$ 14
NONCASH INVESTING AND FINANCING ACTIVITIES - Conversion of convertible preferred stock into common stock - see Note 12	\$ -	\$ -	\$ 41,783	\$ -

See notes to financial statements.

STARSIGHT TELECAST, INC.

NOTES TO FINANCIAL STATEMENTS

1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

General - StarSight Telecast, Inc. (the "Company") was incorporated on May 12, 1986 under the laws of the State of California. The Company markets a patented on-screen interactive television program guide and VCR control service under the StarSight® brand name into three distinct distribution channels: consumer electronics, service providers, such as cable or telco, and licensing the Company's intellectual property for non-StarSight-capable products. During 1995, the Company was no longer considered a development stage company.

Change in Fiscal Year - In September 1994, the Company changed its fiscal year from one ending on June 30 to one ending on December 31 and, accordingly, the Company adopted a December 31 or calendar year-end beginning on January 1, 1995. Accordingly, the accompanying statements of operations, shareholders' equity and cash flows include the transition fiscal period for the six months from July 1, 1994 to December 31, 1994.

Revenue Recognition - Subscription revenues are recognized as earned over the period of service. Activation fees are recognized in the period in which a subscription is activated. License revenues are recognized as earned based upon licensee sales units. Revenues from sales of stand alone StarSight receivers are recognized when the related subscription is activated. Deferred revenue results from cash advances and collections and billed receivables for which revenue has not been recognized.

Cash and Cash Equivalents - The Company considers cash investments with a maturity of three months or less at the time of purchase to be cash equivalents.

Investments - The Company holds investments in U.S. Treasury backed securities with maximum maturities of less than three years. Under SFAS No. 115, *Accounting for Certain Investments and Debt and Equity Securities* through September 6, 1993, the Company's short-term and long-term investments were classified as held to maturity and reported at amortized cost. Effective September 7, 1993 the Company reclassified its short-term and long-term investments as available for sale; such investments are reported at market value with the net unrealized gain or loss included in shareholders' equity.

Fair Value of Financial Investments - The Company believes the carrying amount of its financial investments, which consists primarily of cash and investments, receivables and payables, approximates fair value due to the short-term maturity of these instruments.

Inventories consist primarily of stand alone StarSight receivers ("Receivers") and are stated at the lower of cost or market. Cost is determined principally by the first-in, first-out method. Market is based on net realizable value for raw materials, work-in-process and finished products inventories.

Furniture, Fixtures and Equipment - The Company records furniture, fixtures and equipment at cost. Depreciation is computed on the straight-line method over estimated useful lives ranging from two to five years.

Income Taxes - The Company accounts for income taxes under SFAS No. 109, *Accounting for Income Taxes*, which requires the use of the asset and liability method.

Unearned Compensation - Unearned compensation related to the Company's stock option plan is calculated based on the difference between the estimated market value of the common stock at the date the stock option was granted and the option exercise price. Generally, employee stock options vest ratably over 48 months from the date of grant. Accordingly, amortization of unearned compensation resulted in charges to operations of \$613,000, \$631,000, \$273,000 and \$798,000 for the twelve months ended December 31, 1995, the six months ended December 31, 1994 and the twelve months ended June 30, 1994 and 1993, respectively.

Net Loss Per Share - The net loss per share for the twelve months ended December 31, 1995, the six months ended December 31, 1994 and for the twelve months ended June 30, 1994 is based on the weighted average number of shares of common stock outstanding during the period. No effect has been given to unexercised stock options and warrants because the effect would be antidilutive. For the twelve months ended June 30, 1993, all common stock, convertible preferred stock, stock options and warrants issued within one year prior to the Company's July 1993 initial public offering have been treated as outstanding since inception in accordance with the rules of the Securities and Exchange Commission.

Use of Estimates - The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. Actual results could differ from those estimates.

New Accounting Standards - The Company is required to adopt Statement of Financial Accounting Standards (SFAS) No. 123, "Accounting for Stock-Based Compensation" in Fiscal 1996. SFAS No. 123 establishes accounting and disclosure requirements using a fair value based method of accounting for stock based employee compensation plans. Under SFAS No. 123, the Company may either adopt the new fair value based accounting method or continue the intrinsic value based method and provide pro forma disclosures of net income and earnings per share as if the accounting provisions of SFAS No. 123 had been adopted. The Company plans to adopt only the disclosure requirements of SFAS No. 123, therefore, such adoption will have no effect on the Company's net earnings or cash flows.

The Company is required to adopt SFAS No. 121, "Accounting for the Impairment of Long-Lived Assets and Long-Lived Assets to be Disposed Of" in 1996. SFAS No. 121 establishes recognition and measurement criteria for impairment losses whenever events or changes in circumstances indicate that the carrying value of assets may not be recoverable. The Company does not expect the adoption of SFAS No. 121 to have a material effect on its financial statements.

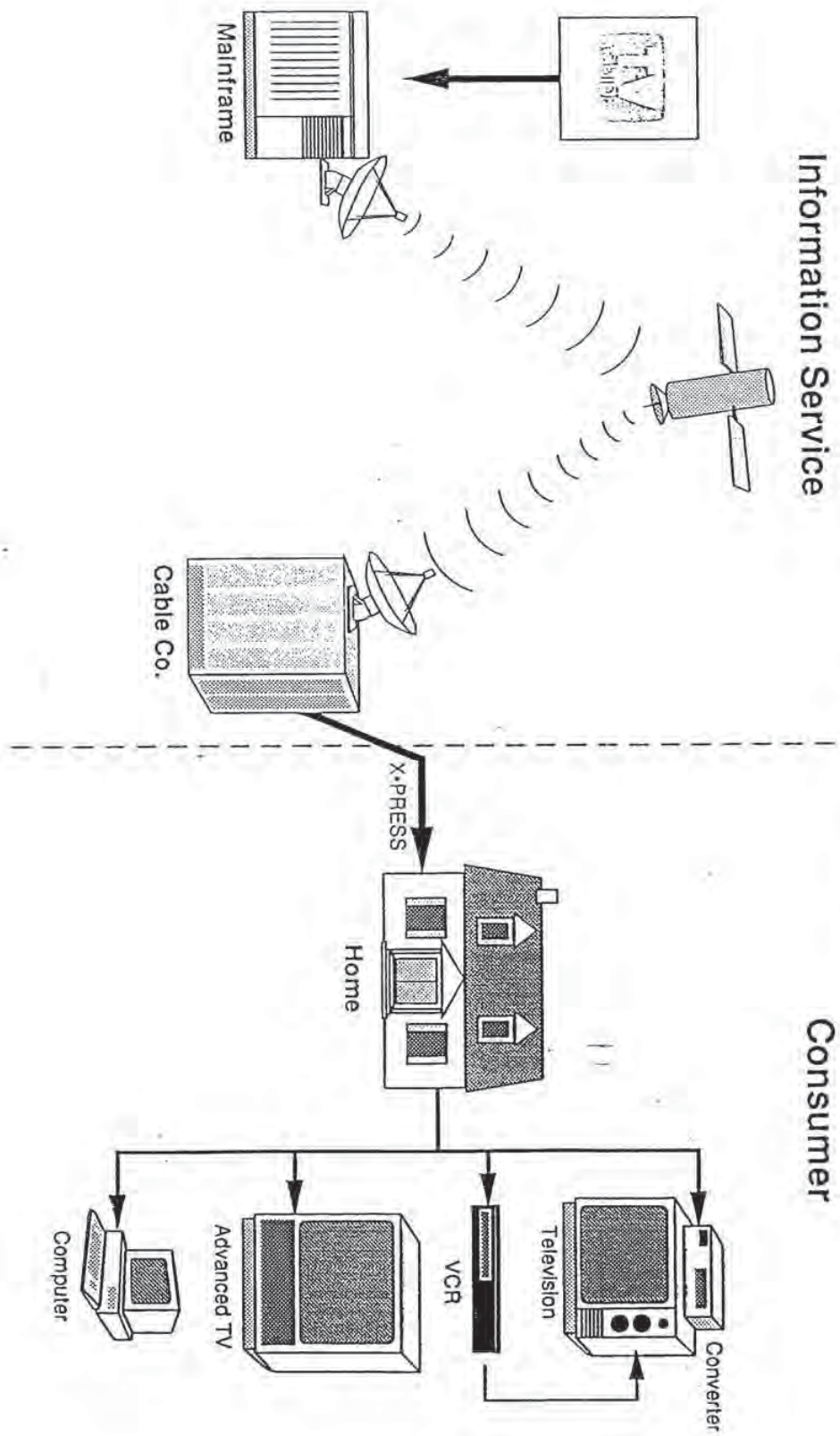
Reclassifications - Certain reclassifications have been made to prior period amounts to conform with the 1995 presentation.

2. RESULTS OF OPERATIONS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 1995 AND MANAGEMENT PLANS FOR 1996

Revenues for the twelve months ended December 31, 1995 were \$1,913,000. As a result of incurring significant expenses in its development and operating activities without generating significant revenues, the Company has incurred significant losses and negative cash flows from operating activities. Net loss for the twelve months ended December 31, 1995, six months ended December 31, 1994 and the twelve months ended June 30, 1994 was \$31,780,000, \$21,433,000 and \$20,555,000, respectively, and net cash used in operating activities for the twelve months ended December 31, 1995, the six months ended

ON
SCREEN
Interactive Electronic Program Guide

TECHNOLOGY OVERVIEW for TV Guide On Screen



Select from the full-screen menu...



for complete program listings...



and Pay Per View choices.



Now that you've put so much time, energy and money into providing your customers with so many channels to choose from, give them a television information source that they know and trust.

TV Guide...now on TV.

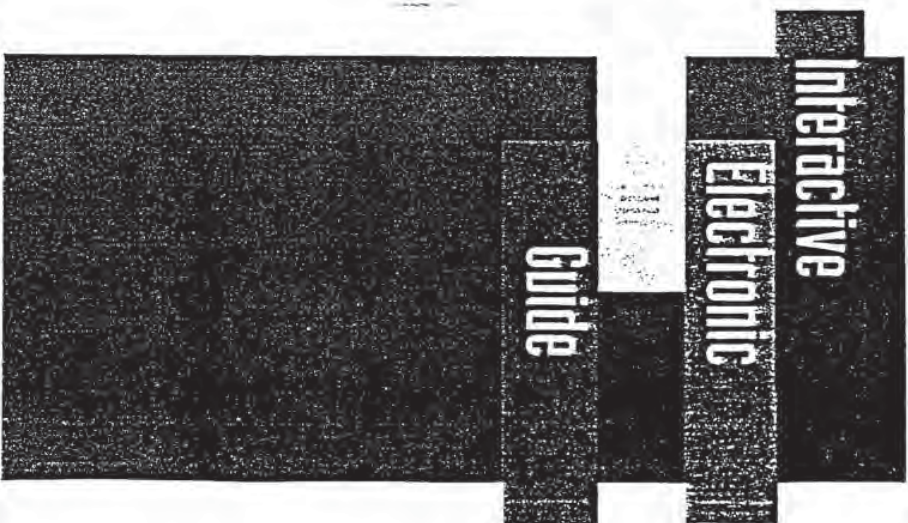
For more information, contact

Brian Margolis

Electronic Program Guide Director

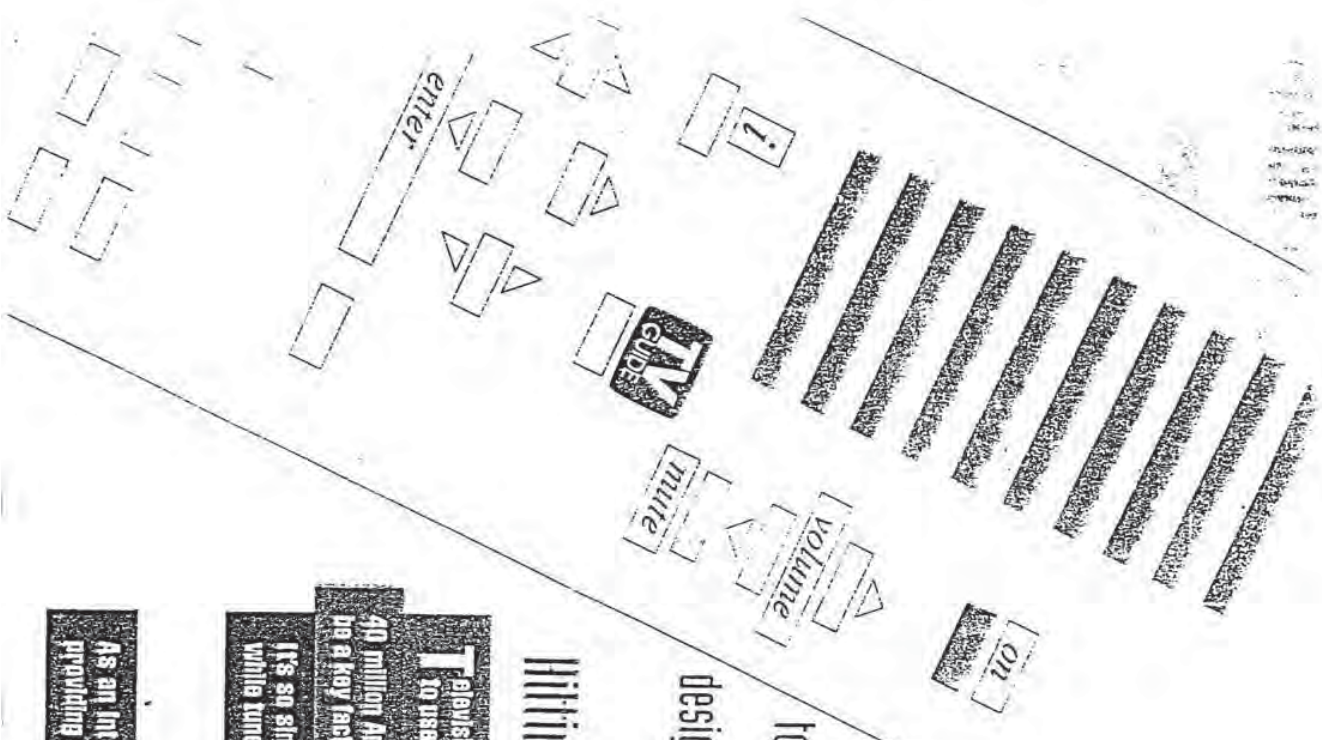
212.819.3712

TV Guide On Screen



TV Guide
SCREEN
More than a remote possibility

More than
a remote possibility



Turn On TV Guide

In response to the needs of both the consumer and the cable industry, TV Guide and Liberty Media have joined forces to develop an interactive electronic television program guide designed to set the industry standard.

Hitting the Right Buttons

Television viewers love their remotes. TV Guide On Screen capitalizes on this fact by being as easy to use as flipping through channels on a remote.

40 million Americans trust TV Guide weekly as the authority on television, and this solid relationship will be a key factor in helping usher cable viewers into the world of interactivity.

It's so simple to use that TV Guide On Screen allows cable viewers to easily access program listings while tuned to any channel.

As an interactive system, TV Guide On Screen is a great marketing tool for cable operators by providing a new medium to promote Pay Per View and other services.

TV Guide On Screen

What is it?

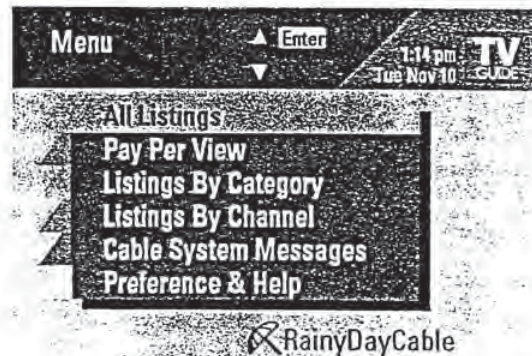
TV Guide and Liberty Media, through its affiliates X*PRESS Information Services, Ltd. and StarNet, Inc., are proud to introduce a new venture combining the country's most credible program information database with the advanced technologies of a major information distributor in the cable industry.

Simply stated, TV Guide On Screen is an interactive, easy-to-use electronic program guide which *adds value to the viewer's current cable package.*

This entry-level service will effectively whet the viewer's appetite for, and acceptance of, new premium services which *provide additional revenue opportunities* to the cable operator.

With TV Guide On Screen, viewers will be able to access two days' worth of program information while tuned to *any* channel, 24 hours a day. Easily accessed through a hand-held remote and cable converter box, TV Guide On Screen offers a consumer-friendly way to keep viewers informed of not only what's on, but also what else is available, *enhancing both real and perceived values of the services offered.*

While TV Guide On Screen has been developed as an entry-level service, to be included as part of every cable operator's package of program offerings, TV Guide plans to expand this electronic guide by providing subscription-based services which will personalize the viewer's preferences. Features will include TV Guide's unrivaled collection of program descriptions, evaluations and reviews; plus, a variety of other enhancements, including simplified VCR programming.



TV Guide On Screen

How entry-level service works

Viewers access information in three ways

FLIPPING CHANNELS Viewer flips through channels by pressing directional arrows. Program overlay automatically appears on lower portion of screen displaying the channel number, program title, length of program, current time and date.



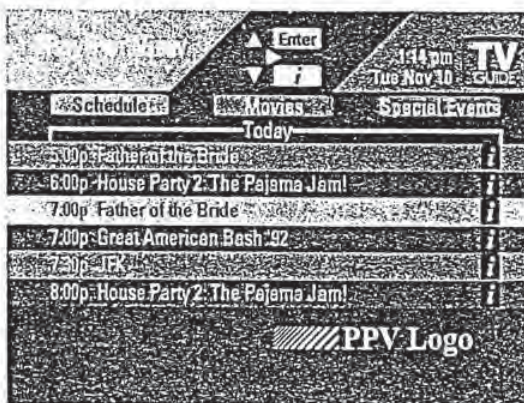
BROWSE Viewer can remain on one channel and "browse" through program listings of other channels and time periods by first pressing the TV Guide button then pressing the up/down arrows to scan through channels and the left/right arrows to scan through time slots.



SELECTING FROM THE MENU Pressing the TV Guide button a second time takes the viewer into the full-screen menu. Items on the menu are accessed by using the directional arrows and pressing the enter key in the highlighted section.

Menu Options

- Listings by Category: movies, sports, news-documentaries, childrens' shows
- Listings by Channel: full schedule of any selected channel over a two-day period
- Pay Per View Listings & Descriptions



TV Guide On Screen

Benefits to your system

ENHANCES REAL AND PERCEIVED VALUE OF CABLE Cable subscribers will have control of their viewing environment, and viewer-friendly cable enhances the value of cable.

ENHANCES CREDIBILITY OF SYSTEM After almost 40 years, TV Guide has established itself as *the* listings source among viewers in terms of comprehensiveness and accuracy. This overall perception of credibility will be naturally passed on to your system.

INCORPORATES LISTINGS SPECIFIC TO YOUR SYSTEM Includes Pay Per View channels.

PROVIDES TIMELY PROGRAMMING INFORMATION Lists programs every half hour, two days out allowing for more accurate, timely program information updated at least once a day.

REINFORCES PAY PER VIEW BUY Full-screen menu offers Pay Per View option where the viewer can get a description of specific programming on the detail screen followed by an ordering screen including dates, times and specific ordering instructions.

ALLOWS FOR MARKETING OF CABLE CHANNELS THAT OFTEN GO UNNOTICED

OFFERS FUTURE MARKETING POTENTIAL Once cable viewers have been conditioned to accept this relatively simple level of interactivity, a more advanced form of TV Guide On Screen will be made available on a premium basis.



TV Guide On Screen

Future opportunities as a premium service

Once cable subscribers have become comfortable using the interactive electronic medium, TV Guide will introduce an advanced premium service. Features under consideration include:

EXTENDED COVERAGE At least 7 days of listings information

FULL TV GUIDE LISTINGS INFORMATION Including plot descriptions, cast, credits, movie evaluations and ratings

ENHANCED SEARCHING CAPABILITY Viewer will be able to search by program titles and key words (i.e., program types, actors, directors, sports teams, etc.)

PERSONALIZATION Built-in viewer profiles of family members will enable them to get quick access to information about their favorite types of programs

VCR PROGRAMMING CAPABILITY Simplified recording

TV GUIDE SPECIAL FEATURES News, reviews, commentary, inside info, previews of coming attractions and viewing advice from the editors



TV Guide On Screen

Why TV Guide over others?

- Over 40 million readers trust TV Guide as their weekly listings source — 77% of whom are cable subscribers. This solid relationship will be instrumental in helping guide cable viewers into the world of interactivity.
- TV Guide has an unrivaled database of comprehensive listings information that is continually updated for accuracy.
- After almost 40 years, TV Guide has established one of the strongest consumer brand identities, giving it a large and loyal following.
- In print, TV Guide will actively support and help market its electronic program guide services.
- TV Guide understands the unique needs and interests of TV viewers. This knowledge will play a critical role in developing and refining electronic program guide services.
- Both TV Guide and Liberty Media are well-positioned to establish the TV Guide On Screen electronic program guide as the national standard — essential in enlisting the cooperation of the consumer electronics manufacturers — and are working closely with CableLabs to that end.





REV. 9/00
For Other Than A Small Entity

SS

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AUG 03 2001

Technology Center 2600

Docket No. UV-133

#261-
#67
AVF
8-4-01

Applicants : Bennington et al.
Application No. : 08/119,367
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM SCHEDULE
SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Lee, M.

Commissioner for Patents
Washington, D.C. 20231

New York, New York
July 23, 2001

TRANSMITTAL LETTER

Sir:

Transmitted herewith: [] a Preliminary Amendment;
[X] a Reply to Office Action; [] a Supplemental Amendment;
[] a substitute Specification; [] a Declaration; [] a
Supplemental Declaration; [] a Power of Attorney; [] an
Associate Power of Attorney; [] formal drawings; [X] Petition
Under 37 C.F.R. § 1.136(a) for Extension of Time (five month);
to be filed in the above-identified patent application.

FEE FOR ADDITIONAL CLAIMS

[X] A fee for additional claims is not required.

[] A fee for additional claims is required.

The additional fee has been calculated as shown below:

CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL FEES
TOTAL CLAIMS	-	* =	X \$ 18 =	\$
INDEPENDENT CLAIMS	-	** =	X \$ 80 =	\$
FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM			+ \$270 =	\$

* If less than 20, insert 20. TOTAL \$

** If less than 3, insert 3.

[] A check in the amount of \$_____ in payment of the filing fee is transmitted herewith.

[X] The Director is hereby authorized to charge payment of any additional filing fees required under 37 C.F.R. § 1.16, in connection with the paper(s) transmitted herewith, or credit any overpayment of same, to deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.

[] Please charge \$_____ to Deposit Account No. 06-1075 in payment of the filing fee. A duplicate copy of this transmittal letter is transmitted herewith.

EXTENSION FEE

[X] The following extension is applicable to the Response filed herewith; [] \$110.00 extension fee for response within first month pursuant to 37 C.F.R. § 1.136(a); [] \$390.00 extension fee for response within second month pursuant to 37 C.F.R. § 1.136(a); [] \$890.00 extension fee for response within third month pursuant to 37 C.F.R. § 1.136(a); [] \$1,390.00 extension fee for response within fourth month pursuant to 37 C.F.R.

\$ 1.136(a); [X] \$1,890.00 within fifth month pursuant to 37 C.F.R. § 1.136(a).

[X] A check in the amount of [] \$110.00; [] \$390.00; [] \$890.00; [] \$1,390.00; [X] \$1,890.00 in payment of the extension fee is transmitted herewith.

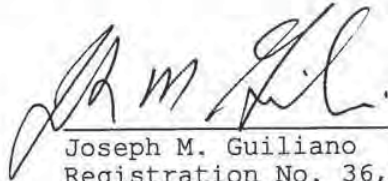
[X] The Director is hereby authorized to charge payment of any additional fees required under 37 C.F.R. § 1.17 in connection with the paper(s) transmitted herewith, or to credit any overpayment of same, to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.

[] Please charge the [] \$110.00; [] \$390.00; [] \$890.00; [] \$1,390.00; [] \$1,890.00; extension fee to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.

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COMMISSIONER FOR
PATENTS
WASHINGTON, D.C. 20231 on

July 23, 2001
Recipient's Name

Guillermo J. Corb
Signature of Person Signing



Joseph M. Guiliano
Registration No. 36,539
Attorney for Applicants

FISH & NEAVE
Customer No. 1473
1251 Avenue of the Americas
New York, New York 10020-1104
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65/M
J. Douglas
8/24/01
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AUG 23 2001
Technology Center 2600

Docket No. 08/119,367

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Bennington et al.
Application No.: 08/119,367
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM SCHEDULE
SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Lee, M.

Commissioner For Patents
Washington, D.C. 20231

New York, New York
July 23, 2001

8-28-01
NE

REPLY TO OFFICE COMMUNICATION

Sir:

Responsive to the Office Communication dated
January 24, 2001, please amend the above-identified
application as follows:

In the Claims:

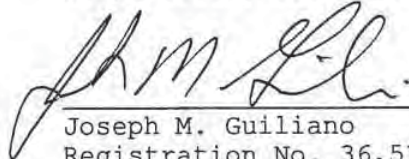
Please cancel claims 142-145 and 147-152.

REMARKS

Responsive to the January 24, 2001 Office
Communication, the Examiner is hereby informed that the
commonly owned assignees of the above-identified application
and U.S. Patents 5,532,754 and 5,808,608 have determined

that the inventors named in the above-identified application, as amended, are the prior inventors of the subject matter claimed therein. Accordingly, applicants respectfully request reconsideration and allowance of the above-identified application.

Respectfully submitted,

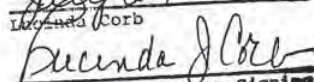


Joseph M. Guiliano
Registration No. 36,539
Attorney for Applicants

I hereby certify that this
Correspondence is being
Deposited with the U.S.
Postal Service as First
Class Mail in an Envelope
Addressed to:
CORRESPONDENCE FOR
PATENTS
WASHINGTON, D.C. 20231 on

July 23, 2001

Richard Corb


Signature of Person Signing

FISH & NEAVE
Customer No. 1473
1251 Avenue of the Americas
New York, New York 10020-1104
Tel.: (212) 596-9000
Fax: (212) 596-9090



RECEIVED
AUG 03 2001
Docket No. UV-133
Technology Center 2600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Bennington et al.
Application No.: 08/119,367
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM SCHEDULE
SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Lee, M.

New York, New York
July 23, 2001

Commissioner for Patents
Washington, D.C. 20231

PETITION UNDER 37 C.F.R. § 1.136(a)
FOR EXTENSION OF TIME

Sir:

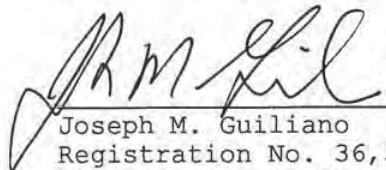
Pursuant to 37 C.F.R. § 1.136(a), applicants hereby petition for a five-month extension of time to respond to the Office Communication dated January 24, 2001. With the extension, a response is due on or before July 24, 2001. A check in the amount of 1,890.00, in payment of the fee required under 37 C.F.R. § 1.17(a), is enclosed herewith.

The Director is authorized to charge any additional fees that may be due, or to credit overpayment of same, to

08/01/2001 AOSMANI 00000044 08119367
01 FC:128 1890.00 DP

Deposit Account No. 06-1075. A duplicate copy of this
Petition is enclosed herewith.

Respectfully submitted,



Joseph M. Guiliano
Registration No. 36,539
Attorney for Applicants

I Herby Certify that this
Correspondence is being
Deposited with the U.S.
Postal Service as First
Class Mail in an Envelope
Addressed to:
COMMISSIONER FOR
PATENTS
WASHINGTON, D.C. 20231 on

July 23, 2001
Lucinda Corb

Lucinda J. Corb
Signature of Person Signing

FISH & NEAVE
Customer No. 1473
1251 Avenue of the Americas
New York, New York 10020-1104
Tel.: (212) 596-9000

Notice of Allowability

Application No.

08/119,367

Examiner

M. Lee

Applicant(s)

BENNINGTON ET AL.

Art Unit

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 7/30/2001.
2. ☒ The allowed claim(s) is/are 38, 42-46, 48, 50, 51, 55, 63-65, 70-73, 75, 77, 85, 86, 90-93, 96, 99-102, 104-105, 112-113, 125-128, 130, 132, 134-141.
3. ☒ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

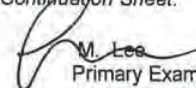
7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☒ CORRECTED DRAWINGS must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No. _____.
 - (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - (c) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. 29.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1 ☐ Notice of References Cited (PTO-892) | 2 ☐ Notice of Informal Patent Application (PTO-152) |
| 3 ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 4 ☐ Interview Summary (PTO-413), Paper No. _____ |
| 5 ☒ Information Disclosure Statements (PTO-1449), Paper No. 63 | 6 ☐ Examiner's Amendment/Comment |
| 7 ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8 ☐ Examiner's Statement of Reasons for Allowance |
| | 9 ☒ Other See Continuation Sheet. |


M. Lee
Primary Examiner
Art Unit: 2614

Continuation Sheet (PTO-37)

Application No. 08/119,367

Continuation of Attachment(s) 9. Other: In amendment received on 5/23/1996, applicant indicates that formal drawing has been submitted along with the amendment. However, after extensive review of the file, no such drawing is found. Applicant must provide corrected drawings in accordance with drawing objection as stated in paper 19, paragraph 5 in responding to this communication.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

712

NOTICE OF ALLOWANCE AND ISSUE FEE DUE

001472 NM0270831
FISH & NEAVE
1251 AVENUE OF THE AMERICAS
SOUTH FLOOR
NEW YORK NY 10020-1105

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/119,367	09/09/93	048	LEE, H 2614	08/01/01
First Named Applicant	BENNINGTON,	35 USC 154(b) term ext. = 0 Days.		

TITLE OF INVENTION ELECTRONIC TELEVISION PROGRAM GUIDE SCHEDULE SYSTEM AND METHOD

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
2 77118.0003	725-040.000	Z99	UTILITY	NO	\$1240.00	11/30/01

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.

HOW TO RESPOND TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.
If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or
- B. If the status is the same, pay the FEE DUE shown above.

If the SMALL ENTITY is shown as NO:

- A. Pay FEE DUE shown above, or
- B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above.

II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give application number and batch number.
Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PATENT AND TRADEMARK OFFICE COPY

PART B—ISSUE FEE TRANSMITTAL

Complete and mail this form, together with applicable fees, to:

Box ISSUE FEE
Assistant Commissioner for Patents
Washington, D.C. 20231

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

001473 WM02/0831
FISH & NEAVE
1251 AVENUE OF THE AMERICAS
50TH FLOOR
NEW YORK NY 10020-1105

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

CLAVE *James M. Glass* (Depositor's name)
James M. Glass (Signature)
November 30, 2001 (Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
08/119,367	09/09/93	048	LEE, M	2614 08/31/01
First Named Applicant	BENNINGTON,	35 USC 154(b) term ext. =	0 Days.	

TITLE OF INVENTION ELECTRONIC TELEVISION PROGRAM GUIDE SCHEDULE SYSTEM AND METHOD

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
2	77118.0003	725-040.000	Z99	UTILITY	NO	11/30/01

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" Indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Fish & Neave
2 James M. Glass
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE United Video Properties, Inc.

(B) RESIDENCE (CITY & STATE OR COUNTRY) Tulsa, Oklahoma

Please check the appropriate assignee category indicated below (will not be printed on the patent)

☐ Individual ☒ corporation or other private group entity ☐ government

- 4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

☒ Issue Fee
☒ Advance Order - # of Copies 15

- 4b. The following deficiency in these fees should be charged to:

DEPOSIT ACCOUNT NUMBER 06-1075
(ENCLOSE AN EXTRA COPY OF THIS FORM)

☒ Issue Fee
☒ Advance Order - # of Copies 15

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature) *James M. Glass* (Date) 11/30/2001
James M. Glass, Reg. No. 46,729

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

12/11/2001 SSESHE2 00000012 08119367

01 FC:142
02 FC:561

1280.00 OP
45.00 OP

TRANSMIT THIS FORM WITH FEE



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/119,367	09/09/1993	GERALD E. BENNINGTON	77118.0003	9751

1473 7590 03/12/2003
FISH & NEAVE
1251 AVENUE OF THE AMERICAS
50TH FLOOR
NEW YORK, NY 10020-1105

EXAMINER

LEE, MICHAEL

ART UNIT	PAPER NUMBER
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2614

DATE MAILED: 03/12/2002

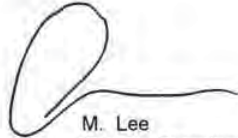
67

Please find below and/or attached an Office communication concerning this application or proceeding.

Response to Rule 312 Communication	Application No.	Applicant(s)	
	08/119,367	BENNINGTON ET AL	
	Examiner	Art Unit	
	M. Lee	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☒ The amendment filed on 29 November 2001 under 37 CFR 1.312 has been considered, and has been:
- a) ☒ entered.
 - b) ☐ entered as directed to matters of form not affecting the scope of the invention.
 - c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
 - d) ☐ disapproved. See explanation below.
 - e) ☐ entered in part. See explanation below.



M. Lee
Primary Examiner
Art Unit: 2614

12-03-01

68/17^B

REV. 9/01
For Other Than A Small Entity



Docket No. UV-133

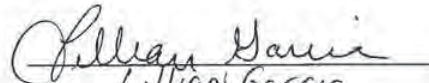
Applicant(s) : Gerald E. Bennington, et al
Application No. : 08/119,367 Confirmation No.: 9751
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Michael Lee
Batch No. : Z99

EXPRESS MAIL CERTIFICATION

"Express Mail" mailing label number EK708052949US

Date of Deposit November 29, 2001

I hereby certify that this transmittal letter and the other papers and fees identified in this transmittal letter as being transmitted herewith are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated above and are addressed to the Hon. Commissioner for Patents, Washington, D.C. 20231.


Lillian Garcia

Commissioner for Patents
Washington, D.C. 20231

New York, New York
November 29, 2001

TRANSMITTAL LETTER

Sir:

Transmitted herewith: [X] an Amendment Pursuant to 37 C.F.R. § 1.312; [] a Reply to Office Action; [] a Supplemental Amendment; [] a substitute Specification; [] a Declaration; [] a Supplemental Declaration; [] a Power of Attorney; [] an Associate Power of Attorney; [] formal

Batch & Return

drawings; to be filed in the above-identified patent application.

FEE FOR ADDITIONAL CLAIMS

☒ A fee for additional claims is not required.

☐ A fee for additional claims is required.

The additional fee has been calculated as shown below:

CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL FEES
TOTAL CLAIMS	-	* =	X \$ 18 =	\$
INDEPENDENT CLAIMS	-	** =	X \$ 84 =	\$
FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM			+ \$280 =	\$
* If less than 20, insert 20.			TOTAL	\$

** If less than 3, insert 3.

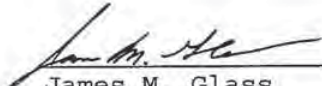
☐ A check in the amount of \$_____ in payment of the filing fee is transmitted herewith.

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 C.F.R. § 1.16, in connection with the paper(s) transmitted herewith, or credit any overpayment of same, to deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.

☐ Please charge \$_____ to Deposit Account No. 06-1075 in payment of the filing fee. A duplicate copy of this transmittal letter is transmitted herewith.

EXTENSION FEE

- ☐ The following extension is applicable to the Response filed herewith; ☐ \$110.00 extension fee for response within first month pursuant to 37 C.F.R. § 1.136(a); ☐ \$400.00 extension fee for response within second month pursuant to 37 C.F.R. § 1.136(a); ☐ \$920.00 extension fee for response within third month pursuant to 37 C.F.R. § 1.136(a); ☐ \$1,440.00 extension fee for response within fourth month pursuant to 37 C.F.R. § 1.136(a); \$1,960.00 within fifth month pursuant to 37 C.F.R. § 1.136(a).
- ☐ A check in the amount of ☐ \$110.00; ☐ \$400.00; ☐ \$920.00; ☐ \$1,440.00; ☐ \$1,960.00 in payment of the extension fee is transmitted herewith.
- ☒ The Director is hereby authorized to charge payment of any additional fees required under 37 C.F.R. § 1.17 in connection with the paper(s) transmitted herewith, or to credit any overpayment of same, to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.
- ☐ Please charge the ☐ \$110.00; ☐ \$400.00; ☐ \$920.00; ☐ \$1,440.00; ☐ \$1,960.00; extension fee to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.


James M. Glass
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Attorneys for Applicants
FISH & NEAVE
1251 Avenue of the Americas
New York, New York 10020-1105
Tel.: (212) 596-9000



Express Mail Label No.

EK708052949US

PATENTS

UV-133

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Applicants : Gerald E. Bennington, et al.
Application No. : 08/119,367 Confirmation No.: 9751
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Michael Lee
Batch No. : Z99

Commissioner for Patents
Box Issue Fee
Washington, D.C. 20231

New York, New York
November 29, 2001

AMENDMENT PURSUANT TO 37 C.F.R. § 1.312

Sir:

Applicants request amendment of the above-identified application as indicated below. Applicants have not yet paid the issue fee, which is due on November 30, 2001.

Kindly amend the application as follows:

In The Claims

Please amend the following claims:

~~138~~. (Thrice Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

*m/v
cond*
a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a selected channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator with said video control commands in response to said user control commands to display each said portion of program schedule information for any chosen one of said television programs for a predetermined display period in partial overlaying relationship with another display signal currently being received on said television receiver;
each said portion being displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing

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concl*

information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

D 42. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

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Cont*

user control means for choosing user control commands, including television tuning and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal

currently appearing on said channel in at least one mode of operation of said programming guide;

may end

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said programs for which listing information is displayed in said partially overlaid portion of said schedule information.

3 43. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

ms cont
a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said set of channels and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television

tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

4 44. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

Mr. Cont
user control means for choosing user control commands, including television tuning, guide time-control and guide channel-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands;

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a currently tuned channel in at least one mode of operation of said programming guide; and

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said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

b 45. (Four Times Amended) An electronic programming guide for use with a video display for displaying program schedule information for television programs appearing on a plurality of television channels comprising:

means for receiving television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide

channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said receiving means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal appearing on said video display;

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cont*
said data processing means being adapted to control said video display generator with said video control commands in response to said user control commands to display for a predetermined display period each said selected portion of program schedule information in partial overlaying relationship with said another display signal currently appearing on said video display, each said portion displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information has been received;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection

messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

Mr. Encl

113 ~~7~~ 48. (Six Times Amended) The electronic programming guide according to claims ~~38~~, ~~42~~, ~~43~~, ~~44~~ or ~~45~~ wherein said schedule information displayed by said video display generator comprises at least program title and program channel.

~~11~~ 53. (Thrice Amended) A process for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

Mr. Cont storing in a memory television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

providing user control means for issuing user control commands, including television tuning and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a video display generator with the data processor for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation said process; and

configuring said data processor to control said video display generator with video control commands in response to said user control commands to display each said portion of program schedule information, in partial overlaying relationship with said currently appearing display signal, for each successive one of said television programs scheduled to appear on said channel and consecutively displaying each said portion in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory, and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

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~~10.64.~~ (Thrice Amended) A process for use with a television receiver having a plurality of television channels

for displaying television programs and program schedule information for said television programs comprising:

storing in a memory television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

providing user control means for issuing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

receiving by a data processor said user control commands;

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controlling a video display generator with the data processor for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said process; and

configuring said data processor to control said video display generator with video control commands in response to said user control commands to display each said portion of program schedule information, in partial overlaying relationship with said currently appearing display signal, for each successive one of said television programs scheduled to appear on said set of channels, and consecutively displaying each said portion in response to corresponding consecutive ones of said

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guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory, and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

15 71. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

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cont.

memory means for storing television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of

said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means;

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said data processing means controlling said program schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

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~~17~~ 73. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

memory means for storing television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

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a program schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said navigation including deleting at least one program listing appearing in the overlay and adding at least another program listing in the overlay; said data processing means controlling said program schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said

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Cont.* selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

19 77. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said television programming guide comprising:

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Cont.* means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning commands and guide control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said receiving means for displaying program schedule information in a browse mode of operation of said electronic programming guide for allowing a user to interactively select display listing information, including for programs other than a currently appearing display signal, using said guide control commands, said program schedule display generator

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displaying said selected program schedule information in
a partial overlay on said currently appearing display
signal in said browse mode, said data processing means
being responsive to said television tuning commands for
allowing a user to select any one of said television
programs for which listing information is displayed in
said partially overlaid portion of said schedule
information.

30 85. (Twice Amended) An electronic television
programming guide for use with a television receiver having a
plurality of television channels for displaying television
programs and program schedule information for said television
programs comprising:

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memory means for storing television program schedule
information for a set of television programs scheduled to
appear on said plurality of television channels;

user control means for choosing user control
commands, including television tuning and guide
channel-control commands, and transmitting signals in
response thereto;

data processing means for receiving said signals in
response to said user control commands; and

a video display generator adapted to receive video
control commands from said data processing means and
program schedule information from said memory means for
displaying interactively-selected successive portions of
said schedule information for programs appearing on

channels different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said programming guide;

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said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel at the same time as the currently appearing display signal on said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

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~~22~~ 90. (Twice Amended) A process for displaying television schedule information on a video display on which is displayed a display signal comprising:

storing in a memory television program schedule information;

providing user control means for issuing user control commands, including television tuning, guide channel-control and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a program schedule display generator with the data processor for displaying, in a partial overlay on a portion of said display signal, interactively-selected successive portions of said schedule information comprising listing information for at least one program different from said display signal; and

consecutively displaying each said portion of said schedule information in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory, and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

13 91. (Twice Amended) A process for displaying television schedule information on a video display on which is displayed a display signal comprising:

storing in a memory television program schedule information;

providing user control means for issuing user control commands, including selection commands, guide channel-control and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a program schedule display generator with the data processor for displaying, in a partial overlay on a portion of said display signal interactively-selected successive portions of said schedule information comprising listing information for at least one program different from said display signal; and

consecutively displaying each said portion of said schedule information in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory; and

also configuring said data processor to control said display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing a user to choose

selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

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cn ~~24~~ 92. (Twice Amended) A process for displaying television schedule information on a video display on which is displayed a display signal comprising:

storing in a memory television program schedule information;

providing user control means for issuing user control commands, including television tuning, guide channel-control and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a program schedule display generator with the data processor for displaying, in a partial overlay on a portion of said display signal, interactively-selected successive portions of said schedule information comprising listing information for at least one program different from said display signal; and

consecutively displaying each said portion of said schedule information in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory, said navigation including deleting one program listing appearing in the overlay and adding another program listing in the overlay, and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

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~~28~~ 100. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

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means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

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a program schedule display generator coupled to said data processing means and said means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information has been received, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

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101. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information has been received;

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said data processing means controlling said program schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

30 102. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

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a program schedule display generator coupled to said data processing means and said means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information has been received, said navigation including deleting at least one program listing appearing in the overlay and adding at least another program listing in the overlay, and said data processing means being responsive to said television

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tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

33 112. (Twice Amended) An electronic guide for displaying schedule information on a video display on which is displayed a television display signal, said guide comprising:

memory means for storing information regarding scheduled events;

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user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

an event schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one receivable signal different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information

is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing said user to select any one of said receivable signals for which listing information is displayed in said partially overlaid portion of said schedule information.

34 113. (Twice Amended) An electronic guide for displaying schedule information on a video display on which is displayed a television display signal, said guide comprising:

memory means for storing information regarding scheduled events;

MI1 cont user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

an event schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one receivable signal different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively

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navigating through listing information for sequential time periods or programs for which schedule information is stored in said memory means, said data processing means controlling said event schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future event, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of transmission of each chosen future one of said events, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

39 130. (Twice Amended) An electronic programming guide for use with a video display for displaying program schedule information for television programs appearing on a plurality of television channels comprising:

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means for receiving television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide time-control and guide channel control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said receiving means for displaying interactively-selected successive portions of said program schedule information for a set of channels, including ones different from a currently tuned channel, simultaneously with another display signal appearing on said video display in at least one mode of operation of said programming guide;

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said data processing means controlling said video display generator with said video control commands in response to said user control commands to display each said selected portion of program schedule information, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said set of channels, simultaneously with said another display signal currently appearing on said video display, each said portion consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information has been received, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed.

11 134. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

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user control means for choosing user control commands, including selection commands and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands;

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal currently appearing on said channel; and

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said currently tuned channel and being

consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory means;

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said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

12 135. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

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a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said set of channels and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means;

said data processing means controlling said video display generator to also selectively display reminder

selection messages in at least one mode of operation of said programming guide, for allowing a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

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136. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising;

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide time-control and guide channel-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and

program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a currently tuned channel;

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said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs,

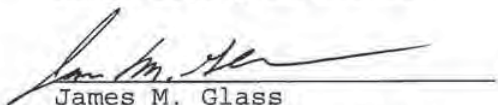
said reminder message being displayed in overlaying
relationship with another display signal being displayed
at said time said reminder message is displayed.

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REMARKS

Applicants acknowledge with appreciation the Examiner's allowance of the claims in this application, as set forth in the Notice of Allowance and Notice of Allowability. Applicants submit this amendment prior to payment of the issue fee in this application. This requested amendment merely corrects various minor inadvertencies in the claims. Approval and entry of the amendment, without withdrawing this application from issue, is therefore respectfully requested. If the Examiner believes that a telephone conference would facilitate resolution of this issue, he is invited to telephone the undersigned.

Respectfully submitted,



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MARKED-UP VERSIONS OF AMENDED
CLAIMS PURSUANT TO RULE 121(c)(1)(ii)

38. (Thrice Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a selected channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator with said video control commands in response to said user control commands to display each said portion of program schedule information for any

chosen one of said television programs for a predetermined display period in partial overlaying relationship with another display signal currently being received on said television receiver; each said portion being displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

42. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal currently appearing on said channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said programs for which listing information is displayed in said partially overlayed portion of said schedule information.

43. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each

successive one of said television programs scheduled to appear on said set of channels and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

44. (Four Times Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide time-control and guide channel-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands;

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a currently tuned channel in at least one mode of operation of said programming guide; and

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

45. (Four Times Amended) An electronic programming guide for use with a video display for displaying program

schedule information for television programs appearing on a plurality of television channels comprising:

means for receiving television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said receiving means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal appearing on said video display;

said data processing means being adapted to control said video display generator with said video control commands in response to said user control commands to display for a predetermined display period each said selected portion of program schedule information in partial overlaying relationship with said another display signal currently appearing on said video display, each said portion displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for

sequential time periods or programs for which program schedule information has been received;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

48. (Six Times Amended) The electronic programming guide according to claims 38, 42, 43, 44 or 45 wherein said schedule information displayed by said video display generator comprises at least program title[,] and program channel.

63. (Thrice Amended) A process for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

storing in a memory television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

providing user control means for issuing user control commands, including television tuning and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a video display generator with the data processor for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation [of said programming guide] said process; and

configuring said data processor to control said video display generator with video control commands in response to said user control commands to display each said portion of program schedule information, in partial overlaying relationship with said currently appearing display signal, for each successive one of said television programs scheduled to appear on said channel and consecutively displaying each said portion in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory [means], and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television

programs for which listing information is displayed in said partially overlaid portion of said schedule information.

64. (Thrice Amended) A process for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

storing in a memory television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

providing user control means for issuing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a video display generator with the data processor for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said [programming guide] process; and

configuring said data processor to control said video display generator with video control commands in response to said user control commands to display each

said portion of program schedule information, in partial overlaying relationship with said currently appearing display signal, for each successive one of said television programs scheduled to appear on said set of channels, and consecutively displaying each said portion in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory [means], and also configuring said data processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

71. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

memory means for storing television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means;

said data processing means controlling said [video] program schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

73. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

memory means for storing television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means, said navigation including deleting at least one program listing appearing in the overlay and adding at least another program listing in the overlay;

said data processing means controlling said [video] program schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

77. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said television programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning commands and guide control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said receiving means for displaying program schedule information in a browse mode of operation of said electronic programming guide for allowing a user to interactively select [for] display listing information, including for programs other than a currently appearing display signal, using said guide control commands, said program schedule display generator displaying said selected program schedule information in a partial overlay on said currently appearing display signal in said browse mode, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

85. (Twice Amended) An electronic television programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning and guide

channel-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for programs appearing on channels different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel at the same time as the currently appearing display signal on said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential programs for which program schedule information is stored in said memory means, said data processing means being responsive to said television

tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlayed portion of said schedule information.

90. (Twice Amended) A process for displaying television schedule information on a video display on which is displayed a display signal comprising:

storing in a memory television program schedule information;

providing user control means for issuing user control commands, including television tuning, guide channel-control and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a program schedule display generator with the data processor for displaying, in a partial overlay on a portion of said display signal, interactively-selected successive portions of said schedule information comprising listing information for at least one program different from said display signal; and

consecutively displaying each said portion of said schedule information in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program

schedule information is stored in said memory [means],
and also configuring said data [processing means]
processor to be responsive to said television tuning
commands for allowing a user to select any one of said
television programs for which listing information is
displayed in said partially overlaid portion of said
schedule information.

91. (Twice Amended) A process for displaying
television schedule information on a video display on which is
displayed a display signal comprising:

storing in a memory television program schedule
information;

providing user control means for issuing user
control commands, including selection commands, guide
channel-control and guide time-control commands, and for
transmitting signals in response thereto;

receiving by a data processor said user control
commands;

controlling a program schedule display generator
with the data processor for displaying, in a partial
overlay on a portion of said display signal
interactively-selected successive portions of said
schedule information comprising listing information for
at least one program different from said display signal;
and

consecutively displaying each said portion of said
schedule information in response to consecutive

user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory [means]; and

also configuring said data [processing means] processor to control said display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing [said] a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

92. (Twice Amended) A process for displaying television schedule information on a video display on which is displayed a display signal comprising:

storing in a memory television program schedule information;

providing user control means for issuing user control commands, including television tuning, guide

channel-control and guide time-control commands, and for transmitting signals in response thereto;

receiving by a data processor said user control commands;

controlling a program schedule display generator with the data processor for displaying, in a partial overlay on a portion of said display signal, interactively-selected successive portions of said schedule information comprising listing information for at least one program different from said display signal; and

consecutively displaying each said portion of said schedule information in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory [means], said navigation including deleting one program listing appearing in the overlay and adding another program listing in the overlay, and also configuring said data [processing means] [✓] processor to be responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

100. (Twice Amended) An electronic programming guide for displaying television schedule information on a video

display on which is displayed a display signal, said programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said [memory means] means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information has been received, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

101. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said [memory means] means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information has been received;

said data processing means controlling said [video] program schedule display generator to also selectively display reminder selection messages in at least one mode

of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

102. (Twice Amended) An electronic programming guide for displaying television schedule information on a video display on which is displayed a display signal, said programming guide comprising:

means for receiving television program schedule information;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a program schedule display generator coupled to said data processing means and said [memory means] means for receiving for displaying, in a partial overlay on said display signal, user-selected portions of said schedule

information comprising listing information for at least one program different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information has been received, said navigation including deleting at least one program listing appearing in the overlay and adding at least another program listing in the overlay, and said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed in said partially overlaid portion of said schedule information.

112. (Twice Amended) An electronic guide for displaying schedule information on a video display on which is displayed a television display signal, said guide comprising:

memory means for storing information regarding scheduled events;

user control means for choosing user control commands, including television tuning, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

an event schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one receivable signal different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information is stored in said memory means, said data processing means being responsive to said television tuning commands for allowing [a] said user to select any one of said receivable signals for which listing information is displayed in said partially overlayed portion of said schedule information.

113. (Twice Amended) An electronic guide for displaying schedule information on a video display on which is displayed a television display signal, said guide comprising:

memory means for storing information regarding scheduled events;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

an event schedule display generator coupled to said data processing means and said memory means for displaying, in a partial overlay on said display signal, user-selected portions of said schedule information comprising listing information for at least one receivable signal different from said display signal, each said portion of said schedule information being interactively selected by a user and consecutively displayed in response to consecutive user-activated ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which schedule information is stored in said memory means, said data processing means controlling said [video] event schedule display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing said user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future event, each said selected reminder message also to be displayed on said display at a predetermined time prior to the time of transmission of each chosen future one of said events, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

130. (Twice Amended) An electronic programming guide for use with a video display for displaying program schedule information for television programs appearing on a plurality of television channels comprising:

means for receiving television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including television tuning, guide time-control and guide channel control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said receiving means for displaying interactively-selected successive portions of said program schedule information for a set of channels, including ones different from a currently tuned channel, simultaneously with another display signal appearing on said video display in at least one mode of operation of said programming guide;

said data processing means controlling said video display generator with said video control commands in response to said user control commands to display each said selected portion of program schedule information, each said portion comprising listing information for each successive one of said television programs scheduled to

appear on said set of channels, simultaneously with said another display signal currently appearing on said video display, each said portion consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information has been received, said data processing means being responsive to said television tuning commands for allowing a user to select any one of said television programs for which listing information is displayed.

134. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands;

a video display generator adapted to receive video control commands from said data processing means and

program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a currently tuned channel in overlaying relationship with another display signal currently appearing on said channel; and

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods for which program schedule information is stored in said memory means;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing [said] a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying

relationship with another display signal being displayed at said time said reminder message is displayed.

135. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising:

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide channel-control and guide time-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said schedule information for a set of channels, including ones different from a currently tuned channel, in overlaying relationship with another display signal currently appearing on said tuned channel;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship

with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on said set of channels and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for which program schedule information is stored in said memory means;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing [said] a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

136. (Amended) An electronic programming guide for use with a television receiver having a plurality of television channels for displaying television programs and program schedule information for said television programs comprising;

memory means for storing television program schedule information for a set of television programs scheduled to appear on said plurality of television channels;

user control means for choosing user control commands, including selection commands, guide time-control and guide channel-control commands, and transmitting signals in response thereto;

data processing means for receiving said signals in response to said user control commands; and

a video display generator adapted to receive video control commands from said data processing means and program schedule information from said memory means for displaying interactively-selected successive portions of said program schedule information in overlaying relationship with another display signal currently appearing on a currently tuned channel;

said data processing means controlling said video display generator to display each said portion of program schedule information in partial overlaying relationship with said currently appearing display signal, each said portion comprising listing information for each successive one of said television programs scheduled to appear on a channel different from said currently tuned channel and being consecutively displayed in response to corresponding consecutive ones of said guide control commands for successively navigating through listing information for sequential time periods or programs for

which program schedule information is stored in said memory means;

said data processing means controlling said video display generator to also selectively display reminder selection messages in at least one mode of operation of said programming guide, for allowing [said] a user to choose selection commands in response to said reminder selection messages for selecting a reminder associated with a chosen future program, each said selected reminder message also to be displayed on said television receiver at a predetermined time prior to the time of occurrence of each chosen future one of said television programs, said reminder message being displayed in overlaying relationship with another display signal being displayed at said time said reminder message is displayed.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Gerald E. Bennington, et al.
Application No. : 08/119,367 Confirmation No: 3531
Filed : September 9, 1993 Batch No. Z99
For : ELECTRONIC TELEVISION PROGRAM
GUIDE SCHEDULE SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Michael Lee New York, New York
November 9, 2001

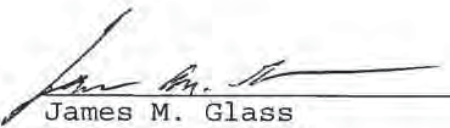
Commissioner for Patents
Washington, D.C. 20231

SUBMISSION OF FORMAL DRAWINGS

Sir:

Pursuant to 37 C.F.R. § 1.85, and in accordance with the requirement in the Notice of Allowability dated August 31, 2001 applicants herewith furnishes forty-two (42) sheets for formal drawings.

Respectfully submitted,


James M. Glass
Reg. No. 46,729
Attorney for Applicants
c/o FISH & NEAVE
1251 Avenue of the Americas
New York, New York 10020-1104
Tel.: (212) 596-9000

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Docket No. UV-133

Applicant(s) : Gerald E. Bennington, et al.
Application No. : 08/119,367 Confirmation No.: 3531
Filed : September 9, 1993
For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD
Group Art Unit : 2614
Examiner : Michael Lee

Commissioner for Patents
Washington, D.C. 20231

New York, New York
November 9, 2001

TRANSMITTAL LETTER

Sir:

Transmitted herewith: ☐ a Preliminary Amendment;
☐ a Reply to Office Action; ☐ a Supplemental Amendment; ☐
☐ a substitute Specification; ☐ a Declaration; ☐ a
Supplemental Declaration; ☐ a Power of Attorney; ☐ an
Associate Power of Attorney; ☒ formal drawings; to be filed
in the above-identified patent application.

FEE FOR ADDITIONAL CLAIMS

☒ A fee for additional claims is not required.

☐ A fee for additional claims is required.

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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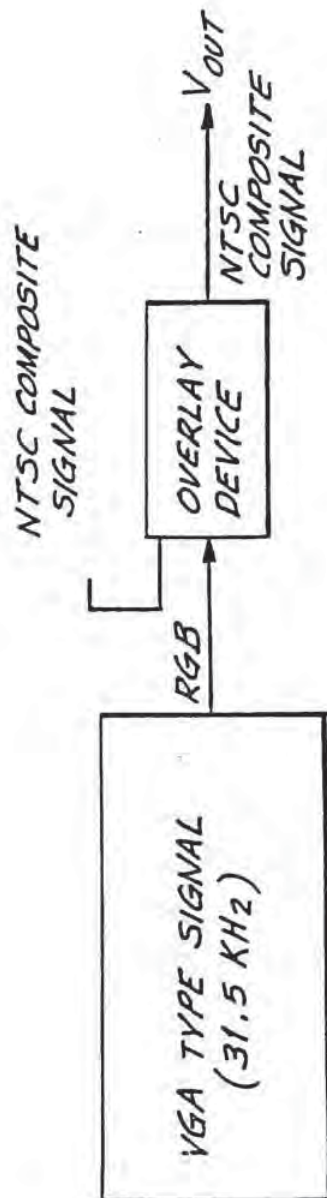
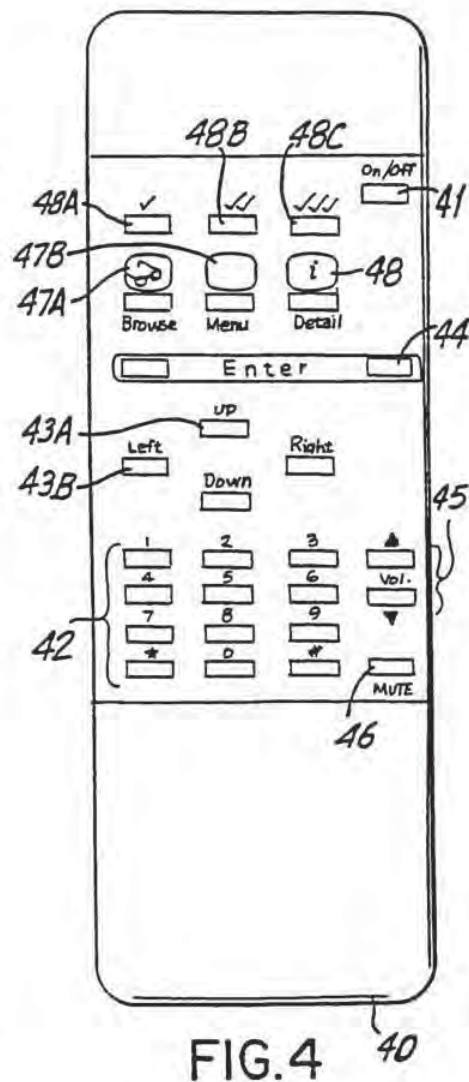
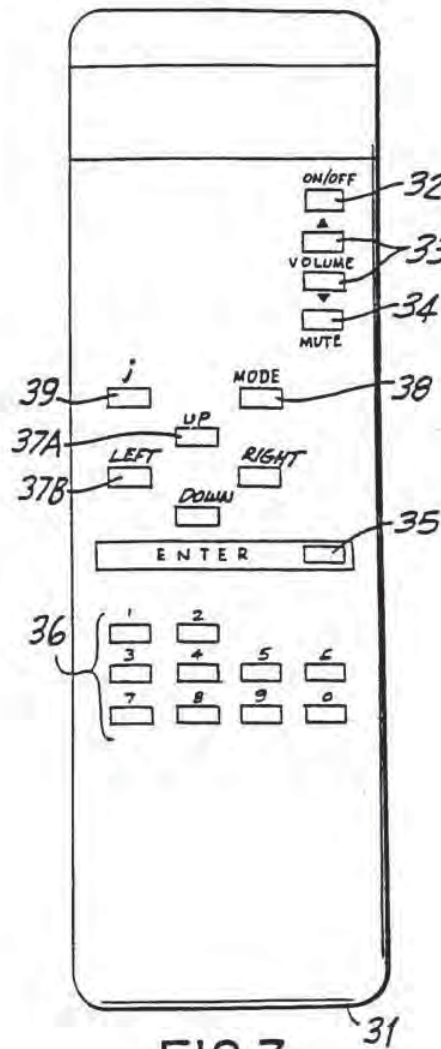


FIG. 2



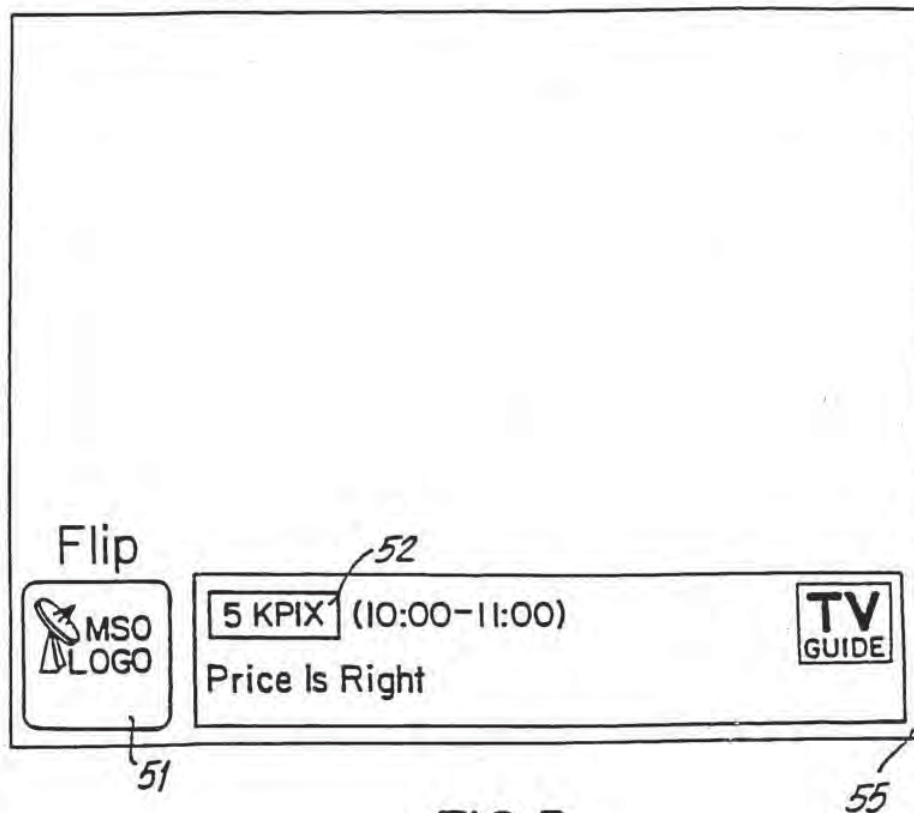


FIG.5

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE

SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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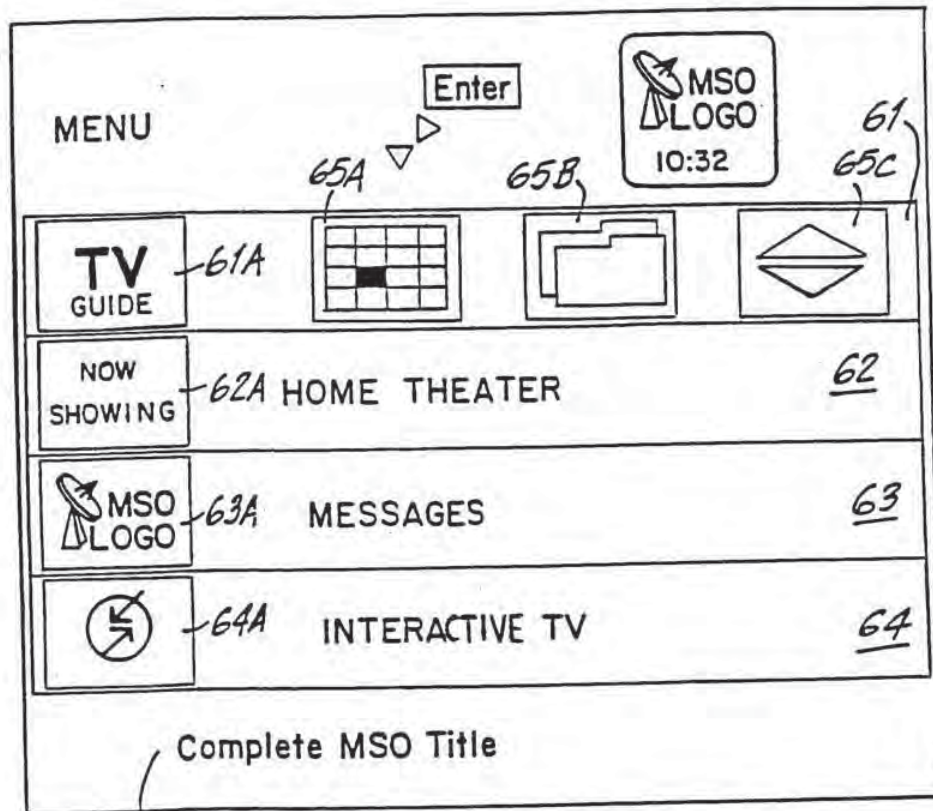


FIG.6

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

For : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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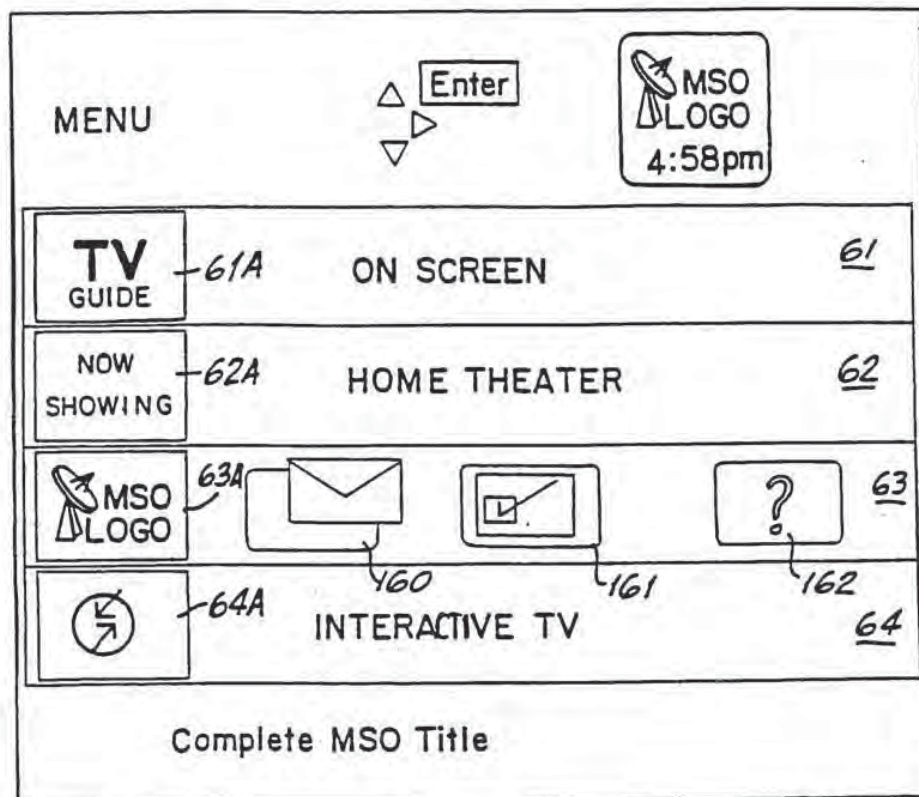


FIG. 6A

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE

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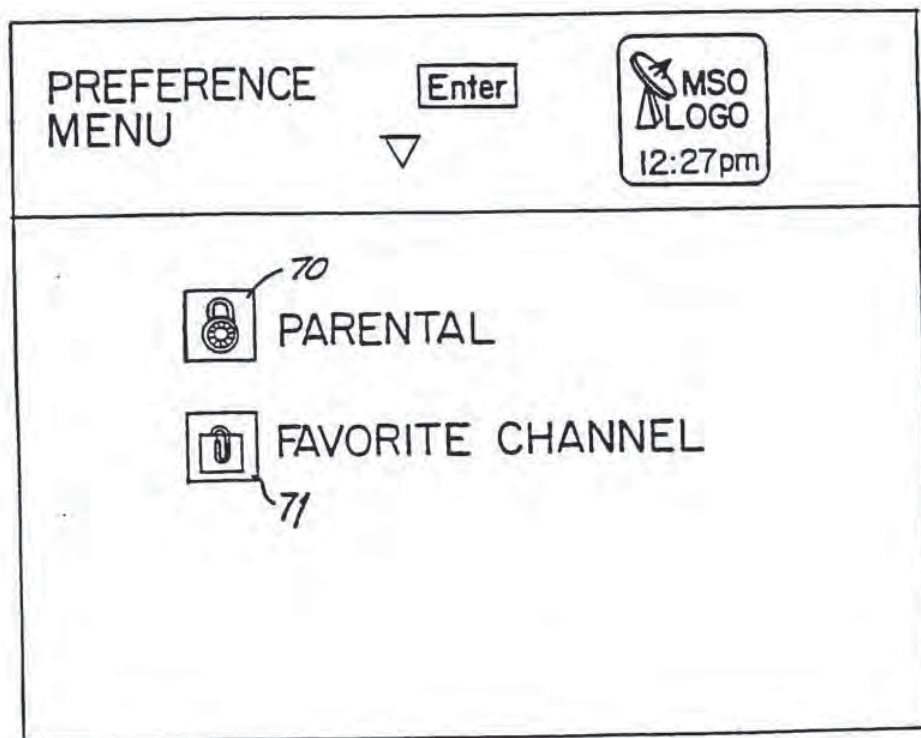


FIG. 7

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Pat. : September 9, 1933

: ELECTRONIC TELEVISION PROGRAM GUIDE
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Attorney : James M. Glass, Reg. No. 46,729

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FAVORITE CHANNEL

Enter

TV GUIDE
12:25 pm

Choices

4 KCNC

5 SHO Delete

6 KRMA

7 KMGH

8 MUN1

9 KUSA ← 80

10 KTCI

11 REQ1

MOVIES

NEWS

SPORTS } 83

82 15 REQ2

84 81 9 KUSA

7 KMGH

5 SHO

3 PPV

MOVIES

FIG.8

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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Jun 7

HBO is a Premium Service

To order this service press Enter

FLIP

 MSO LOGO	6 HBO (4:00-5:30) Shaker Run	 TV GUIDE 
--	---------------------------------	---

FIG.9

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SCHEDULE SYSTEM AND METHOD

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Premium Services	Enter	 5:03pm
▽		
HBO	Home Box Office \$10.40/Month	
SHO	Showtime \$9.95/Month	
DIS	The Disney Channel \$9.95/Month	
TMC	The Movie Channel \$1.50/Month	
MAX	Cinemax \$9.95/Month	
PLA	Playboy at Night \$4.95/Evening(5:00pm to 3:00am)	
ACT	Action \$5.95/Day(11:00pm to 3:00pm)	
Movie, special events and family programming!		
You are not a Subscriber. Press Enter to Subscribe!		

FIG. 10

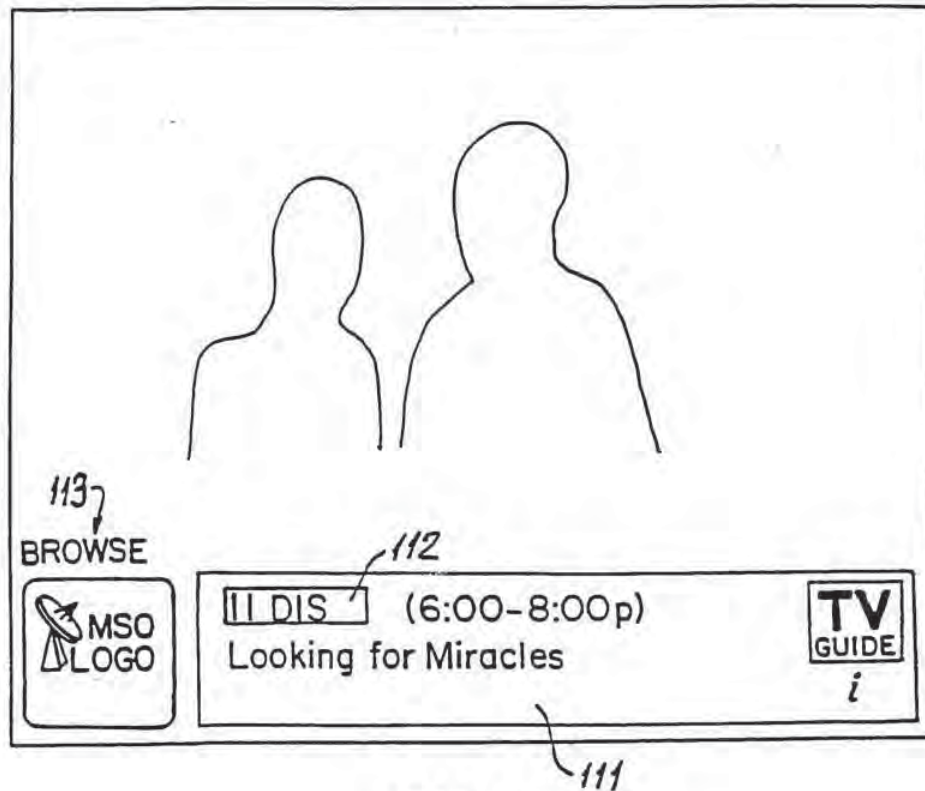


FIG. II

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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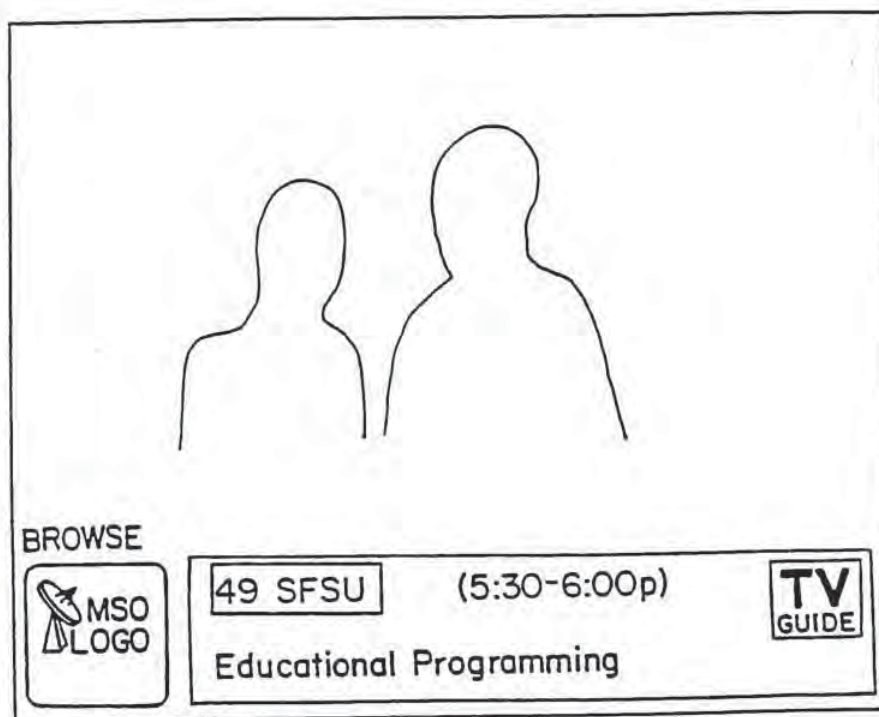


FIG. 12

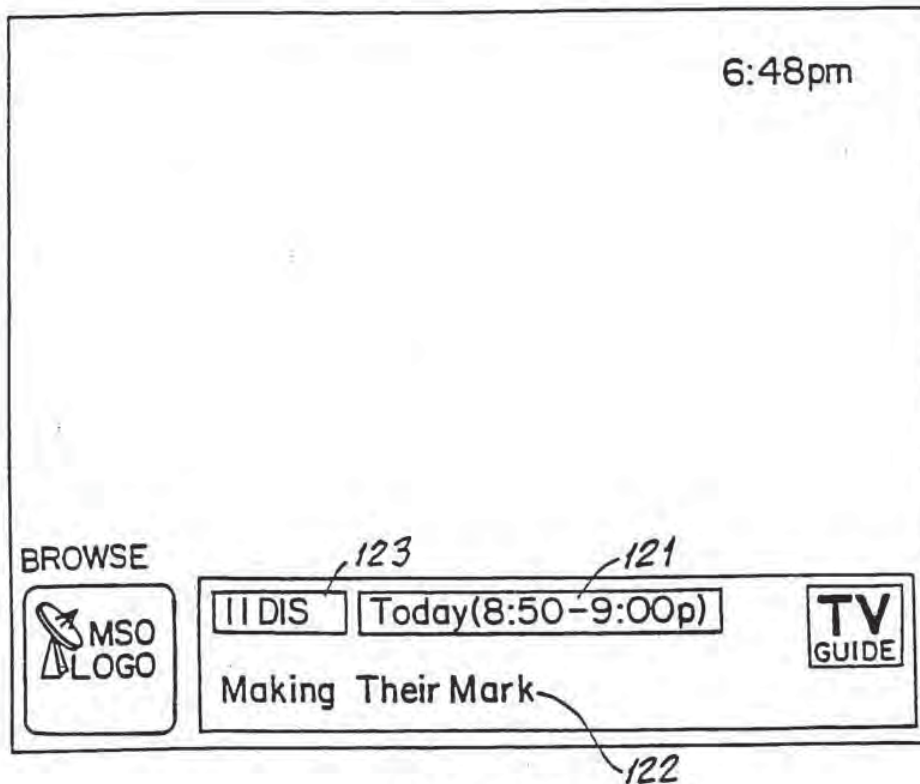


FIG. 12A

Applicants : Gerald E. Bennington, et al.

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Jun 7

132
BROWSE

w Set Reminder for

5:30p Mama's Family

Arrows to select <Enter> to accept Yes

131

FIG.13

Applicants : Gerald E. Bennington, et al.

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Filing Date : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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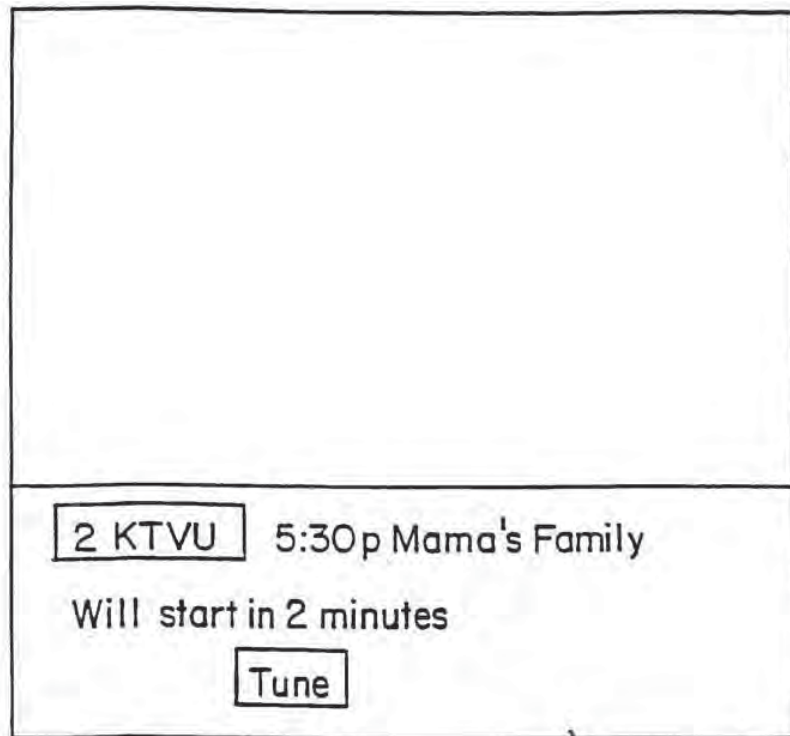


FIG.14

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

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For : ELECTRONIC TELEVISION PROGRAM GUIDE

SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

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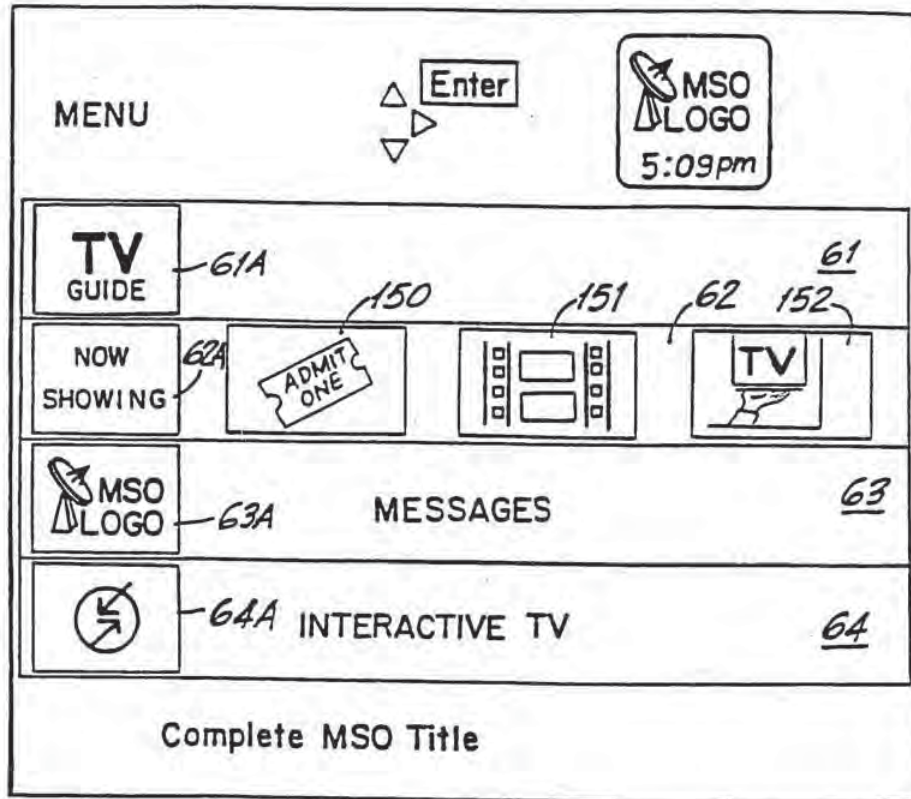
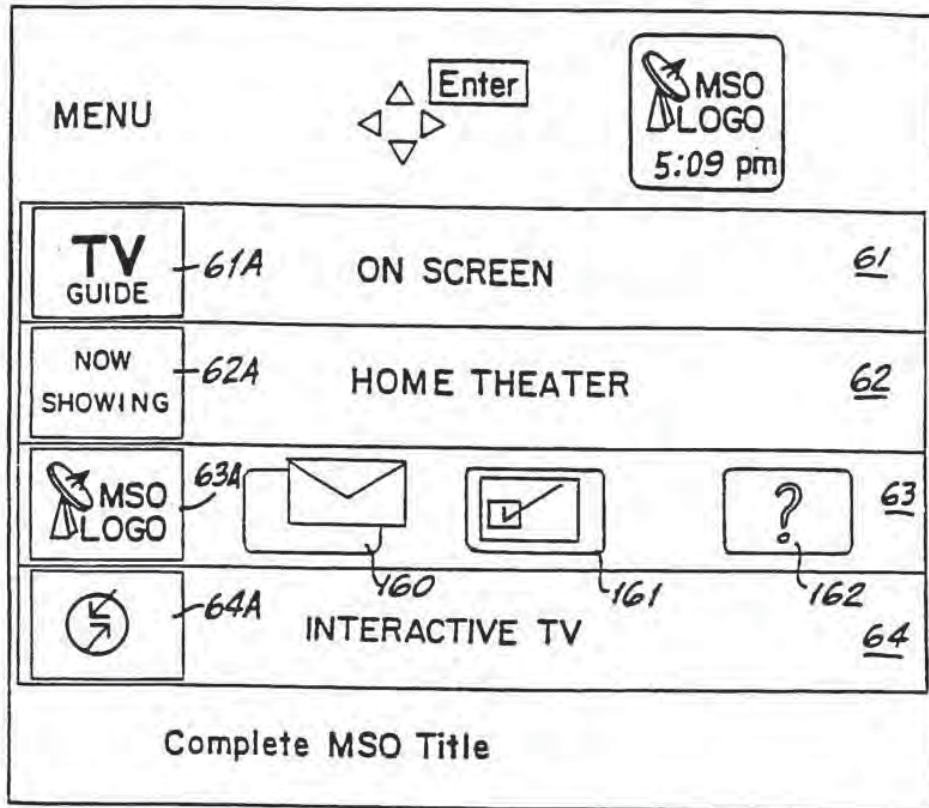


FIG.15



MENU		 Enter 			
TV GUIDE		ON SCREEN			
NOW SHOWING		HOME THEATER			
		CABLE COMPANY			
					
					
Complete MSO Title					

FIG.17

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Attorney : James M. Glass, Reg. No. 46,729

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All-180 Listings

TV GUIDE 7:13 pm 182 183

Enter 184 i

Baseball (4:30 - 7:30p) i

4 KRON	7:00p	7:30p	8:00p	8:30p
Today	Baseball	Ent. Tonight	Fresh Prince	Blossom
4 KRON 185	Evening Shade	Major Dad	Murphy Brown	
5 KPDX	JFK: In His Own Words	JFK		
6 HBO	Jeopardy!	Wheel of Fortune	Day One	
7 KGO				

FIG. 18

Listings By

Category *190A 190B*

Movies **Sports** **News** **Children**

Enter

TV GUIDE **5:45 pm**

190D *190C*

		Today	
22 LIF	4:00p A Case of Deadly Force	☐	
I HOT	4:00p Ring of Fire II: Blood and Steel	☐	
34 AMC	4:00p Texas Across the River	☐	
3I MAX	4:00p The Ballad of the Sad Cafe	☐	
8 SHO	5:00p Blg Girls Don't Cry-They Get Even	☐	
46BRV	5:00p Queen of Hearts	☐	
27 TMC	5:00p The Roaring Twenties	☐	
25 TBS	5 05p No Mercy	☐	

FIG. 19

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For : ELECTRONIC TELEVISION PROGRAM GUIDE
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Attorney : James M. Glass, Reg. No. 46,729

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201

Listings By

Channel 202a, 202b, 202c

3 PREV 4 KRON 5 KPIX

Enter

TV GUIDE 6:50 pm 182 183

Today

4:30p Baseball 1 203

7:30p Entertainment Tonight

8:00p Fresh Prince

8:30p Blossom

9:00p Perry Mason: Notorious Nun 1

11:00p News

11:30 Tonight

12:30a David Letterman

FIG. 20

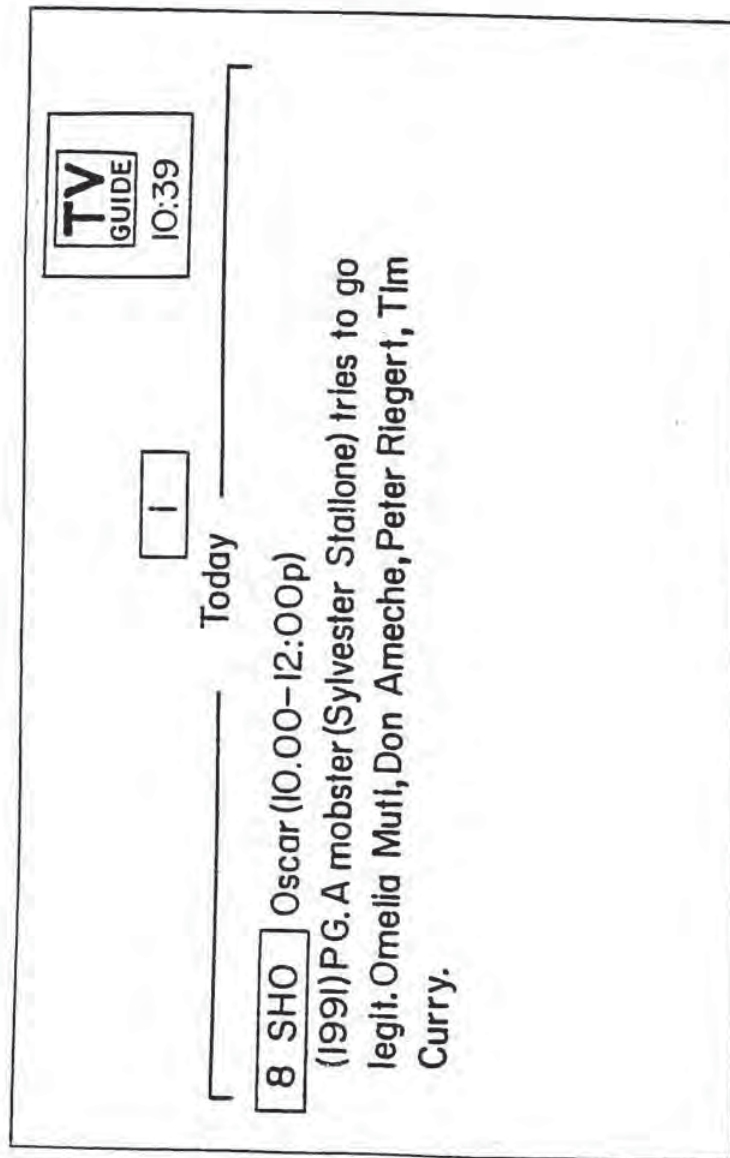


FIG. 21

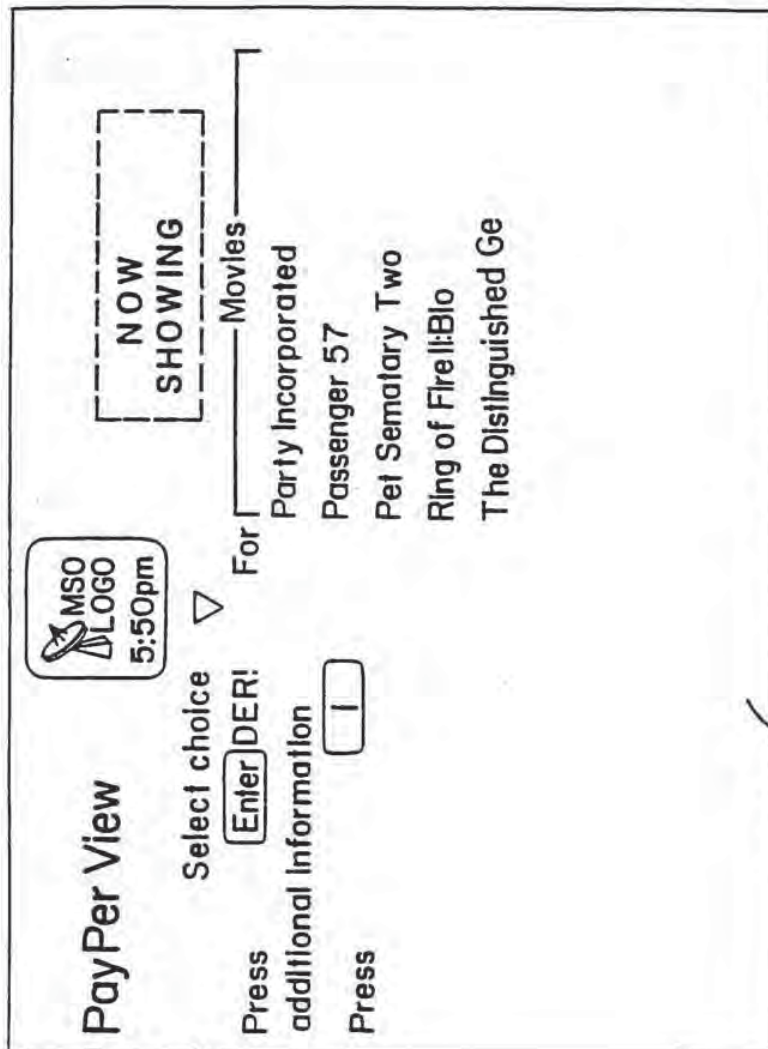


FIG. 22

220

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

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For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

Docket No.: UV-133

Confirmation No. 3531

Sheet 24 of 42

Pay Per View	Enter			
Ordering		5:49 PM		
Passenger 57		\$ 3.99		
What time would you like this show to start?				
Today 9:00p Tomw 12:00p Tomw 6:00p				
Would you like to see a countdown onscreen just before the show start		Yes No		
<table border="1"><tr><td>PPV /</td></tr><tr><td>/ Source</td></tr></table>			PPV /	/ Source
PPV /				
/ Source				

FIG.23

Pay Per View Confirmation 

 5:49 pm

You have requested to order:

Passenger 57 \$ 3.99

NO, I DO NOT WANT TO ORDER.

PPV /
/ Source

FIG.24

Pay Per View Confirmation		
You have requested to order:		
Passenger 57	\$ 3.99	
Yes, I would like to order		
Passenger 57 has been Ordered!		
Tune to Channel 1 Today at 9:00pm.		
PPV /		
/ Source		

FIG.24A

LISTINGS			 Listing 		6:06P AUG 16	
5:00	5:30	6:00	6:30	7:00	7:30	8:00
NBC 4 News						
ABC 6 News						
CBS 10 CBS News						
Fox 28 Club Paradise (5:00)						
PBS 29 Mystery!						
COM 30 Tribute to Carson						
HBO 33 Gremlins 2: The New Batch						
ESN 34 Tennis (4:30)						
AMC 35 Arise my Love (5:00)						
DSC 37 Natural World						
NIK 38 I Love Lucy						

FIG.25

Premium Services	Enter	
HBO	Home Box Office \$10.40/Month	
SHO	Showtime \$9.95/Month	
DIS	The Disney Channel \$9.95/Month	
TMC	The Movie Channel \$1.50/Month	
MAX	Cinemax \$9.95/Month	
PLA	Playboy at Night \$4.95/Evening(5:00pm to 3:00am)	
ACT	Action \$5.95/Day(11:00pm to 3:00pm)	
Movie, special events, and family programming! You are not a Subscriber. Press Enter to Subscribe!		

FIG.26

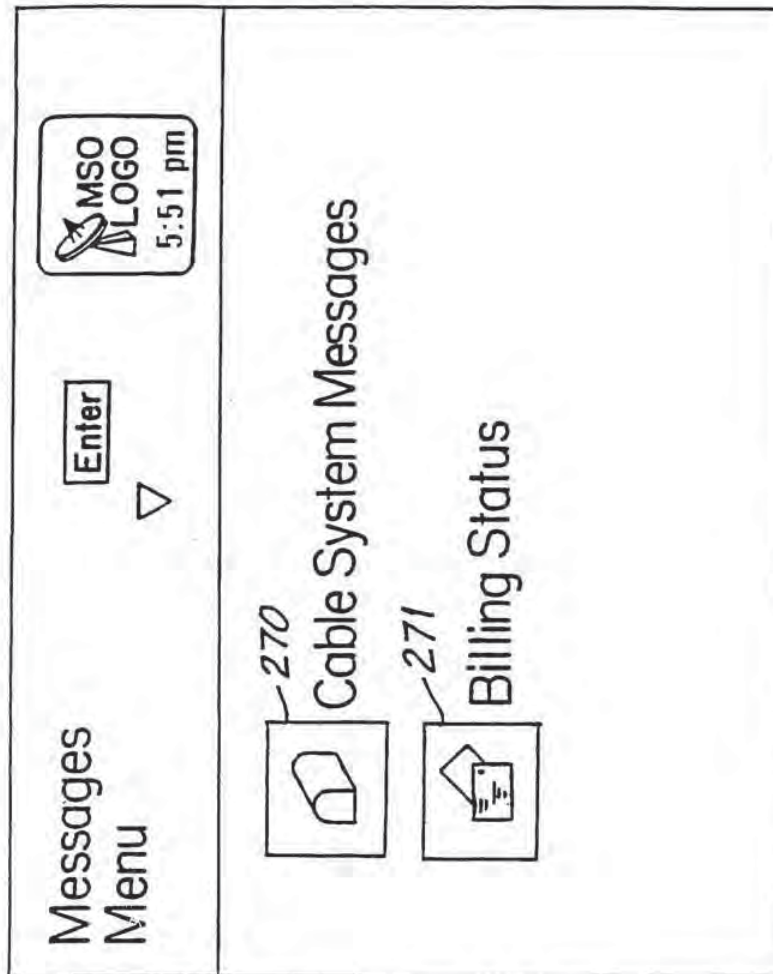


FIG. 27

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filing Date : September 9, 1993

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

Docket No.: UV-133

Confirmation No. 3531

Sheet 30 of 42

Cable System Messages  5:52 pm	Pay Per View is featuring "Batman Returns" this month. Get a free sneak peek of HBO this weekend.	Complete MSO Title
---	---	---------------------------

FIG.28

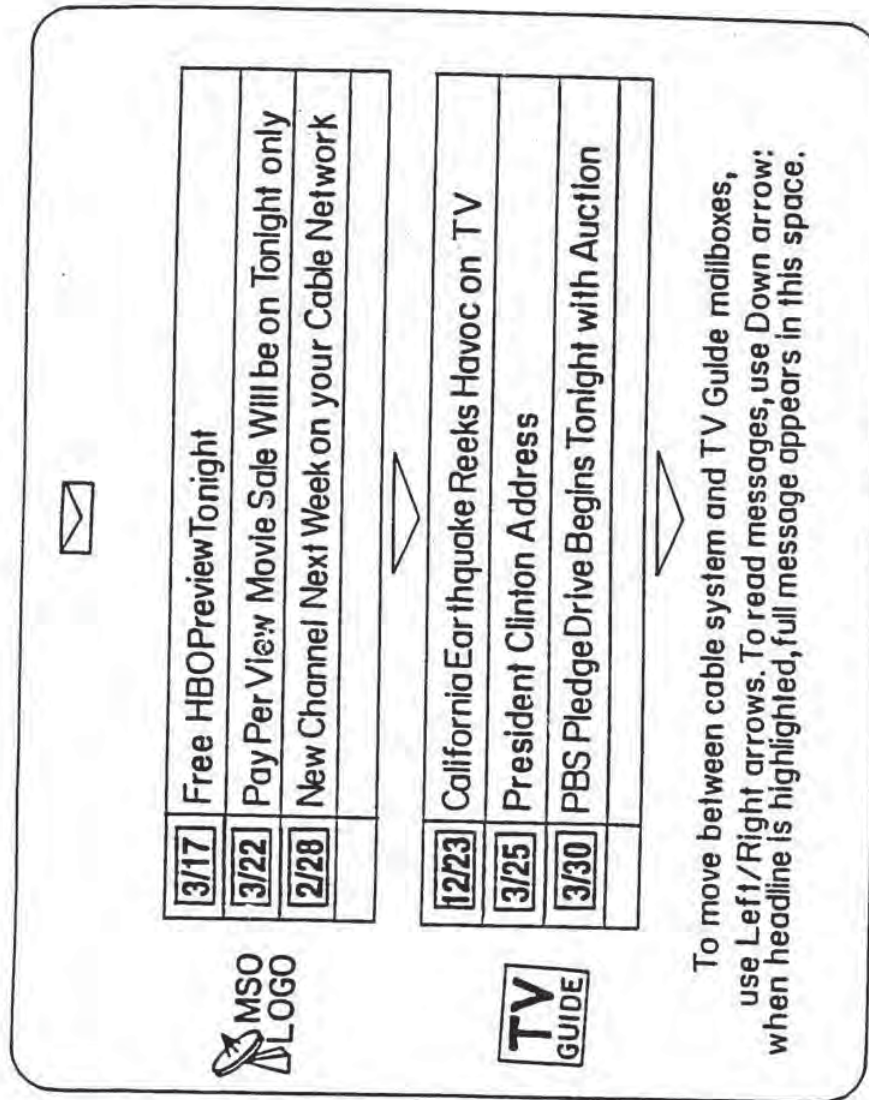


FIG. 28A



5:52 pm

Acct. #: 12345-098765-08-9

Billing

Name : TV Guide Onscreen

Billed From: 05/25/93 Billed To: 06/25/93 Total : \$3.99

FOR CUSTOMER SERVICE CALL: 790-0900

Date	Time	Service / PPV Event	Cost
06/07/93	9:00 p	PASSENGER 57	\$3.99

FIG.29

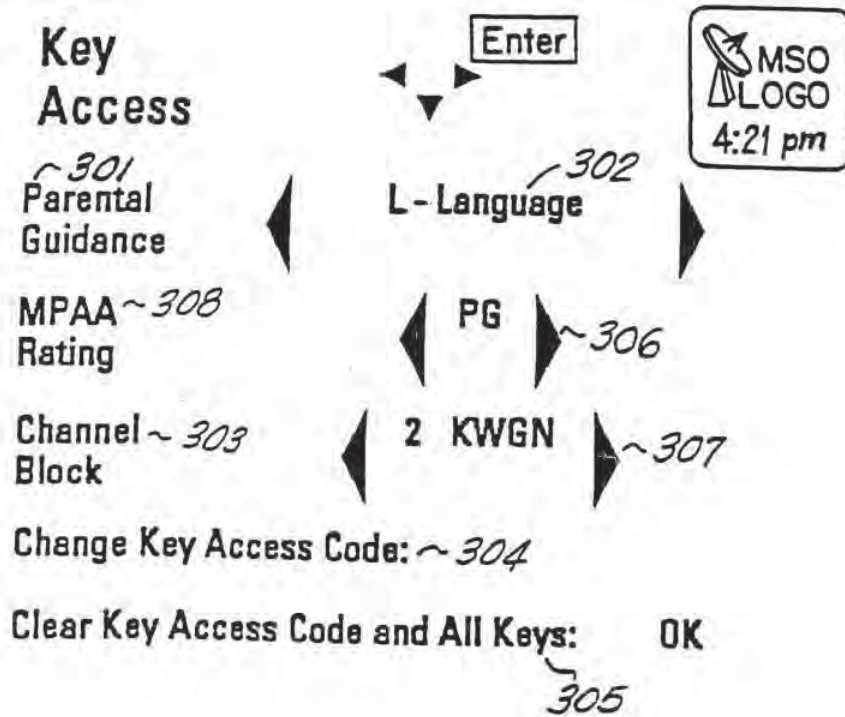


FIG.30

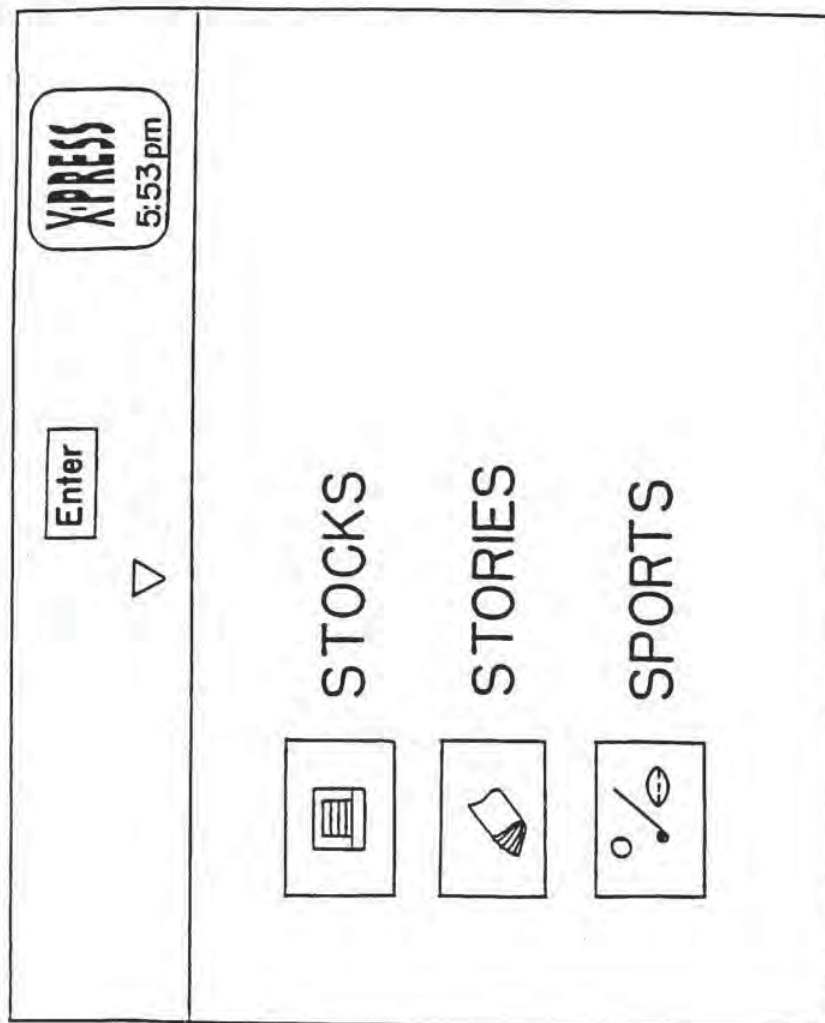


FIG. 31

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed September 9, 1933

For : ELECTRONIC TELEVISION PROGRAM GUIDE

SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

Docket No.: UV-133

Confirmation No. 3531

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Quote Watch		XPRESS 5:53 pm		Change	
Alarms	Symbol	Last	Vol(100s)		
	CMCSA	18	5415	-0.25	
	CVC	29.75	129	-0.125	
	JOIN	10.5	22	0	
△	LBTYA	18.125	873	0.625	
△	LBTYB	18	0	1.5	
	TCOMA	18.25	22970	-0.5	
	TCOMB	19.25	51	-0.375	
	TUNE	5.375	407	-0.125	
Portfolio Value is 433200 and your gain is 443					

FIG. 32

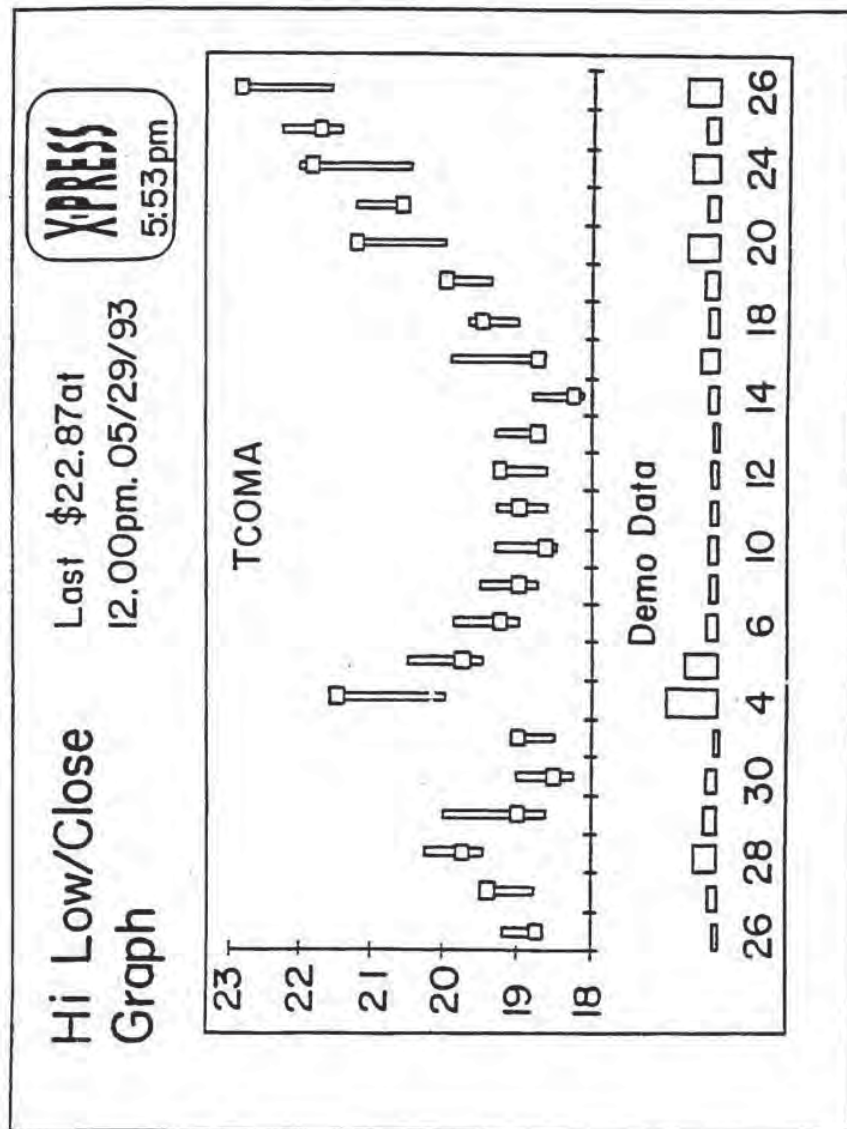


FIG. 33

Applicants : Gerald E. Bennington, et al.

Applicant No.: 08/119,367

Filed September 9, 1933

For : ELECTRONIC TELEVISION PROGRAM GUIDE
SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

Docket No.: UV-133

Confirmation No. 3531

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STORIES



US World News

Cubans use Vitamins to combat epidemic

Geneva - A costly campaign to provide vitamins to all Cubans has helped curb a mysterious epidemic that has afflicted thousands with vision problems, a World Health Organization official said yesterday.

The outbreak of optical neuritis has dimmed the vision of about 20,000 Cubans and a related malady has affected 6,000 other people, mostly women.

FIG.34

Applicants : Gerald E. Bennington, et al.

Application No.: 08/119,367

Filed : November 9, 1933

For : ELECTRONIC TELEVISION PROGRAM GUIDE

SCHEDULE SYSTEM AND METHOD

Attorney : James M. Glass, Reg. No. 46,729

Docket No.: UV-133

Confirmation No.: 631

Sheet 38 of 42

SPORTS



Major League Baseball

Yesterday in National League Action

Colorado 7, Houston 5

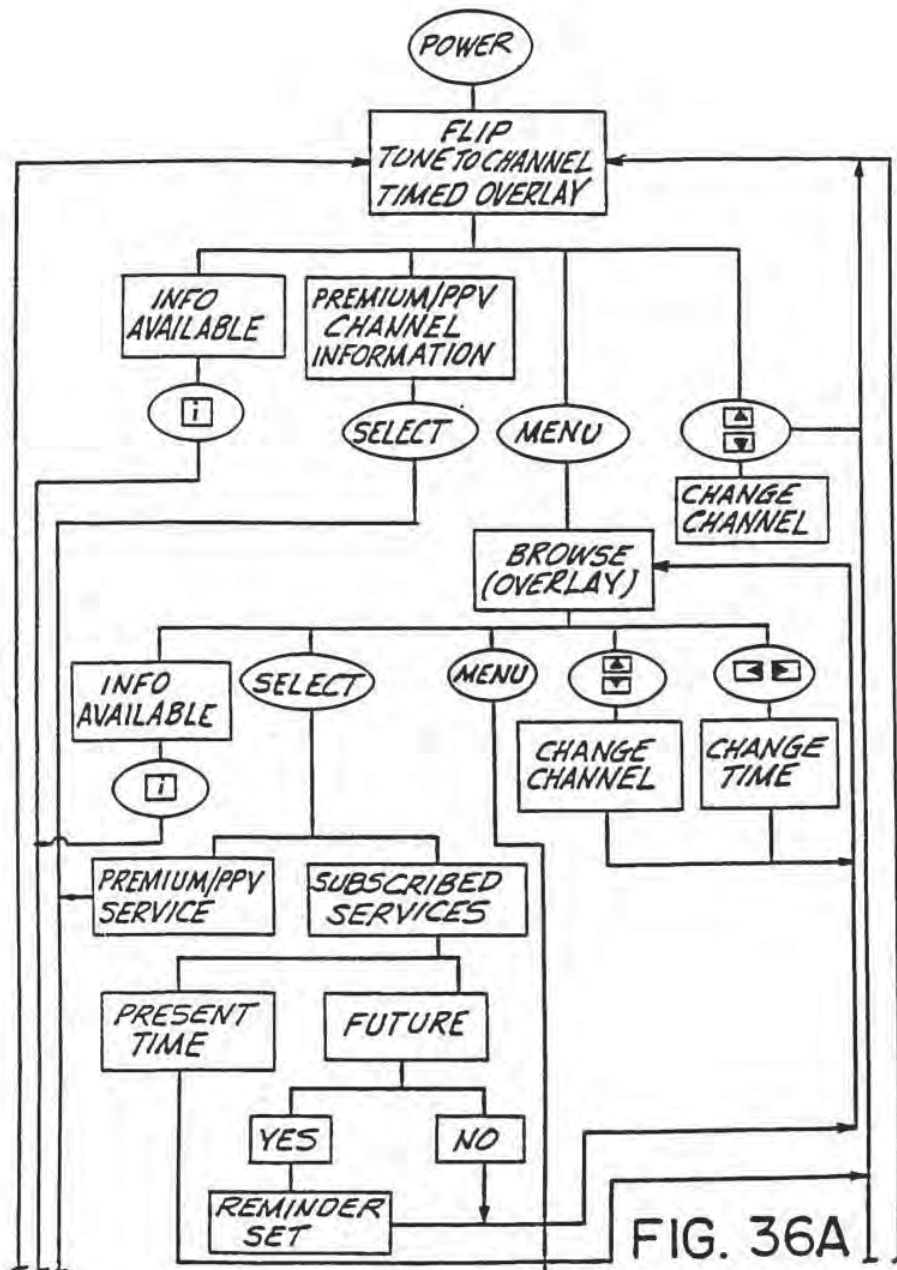
San Francisco 5, Chicago 4

Yesterday in American League Action

Detroit 4, Boston 1

Toronto 4, Milwaukee 2

FIG.35



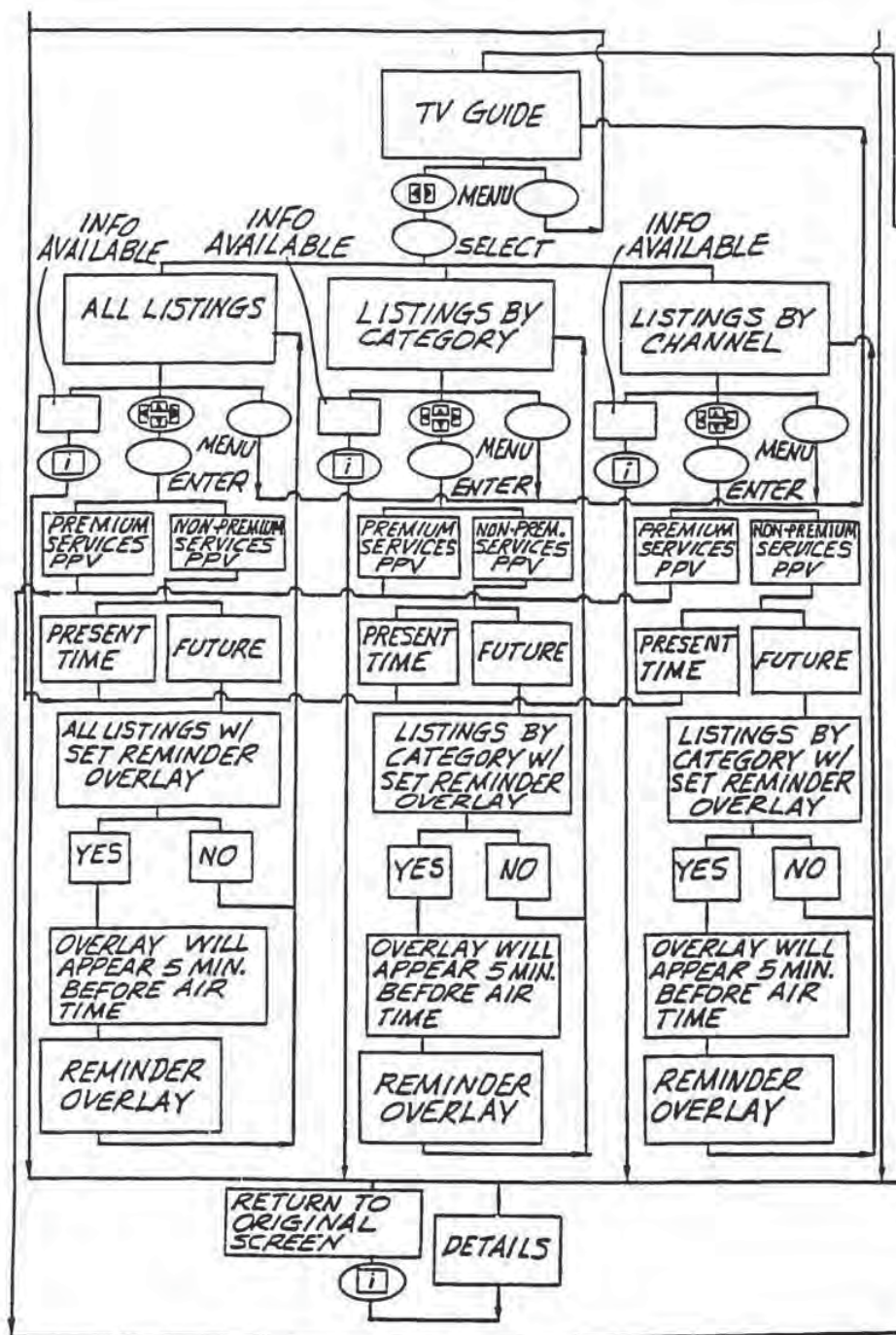


FIG. 36B

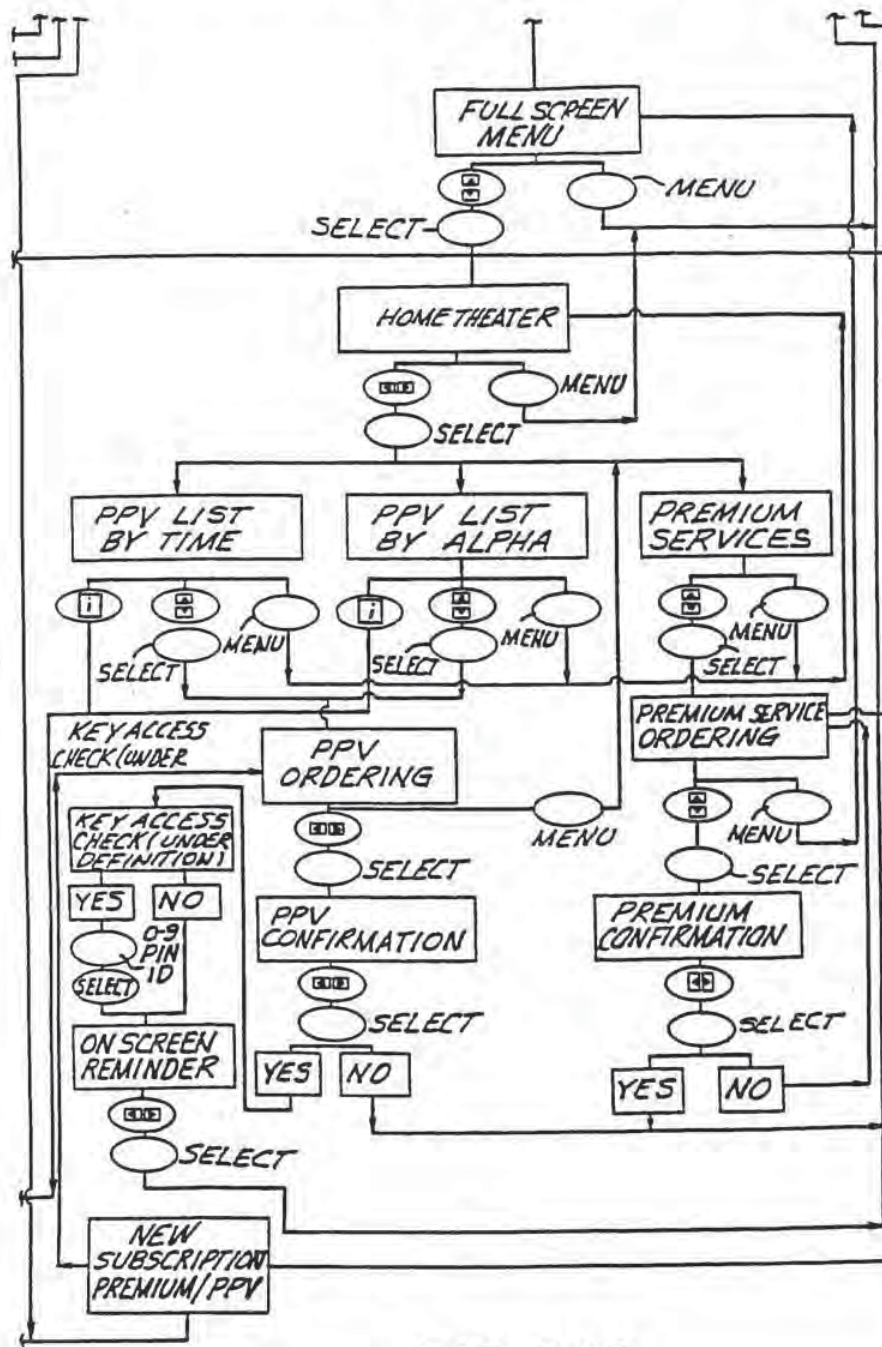


FIG. 36C

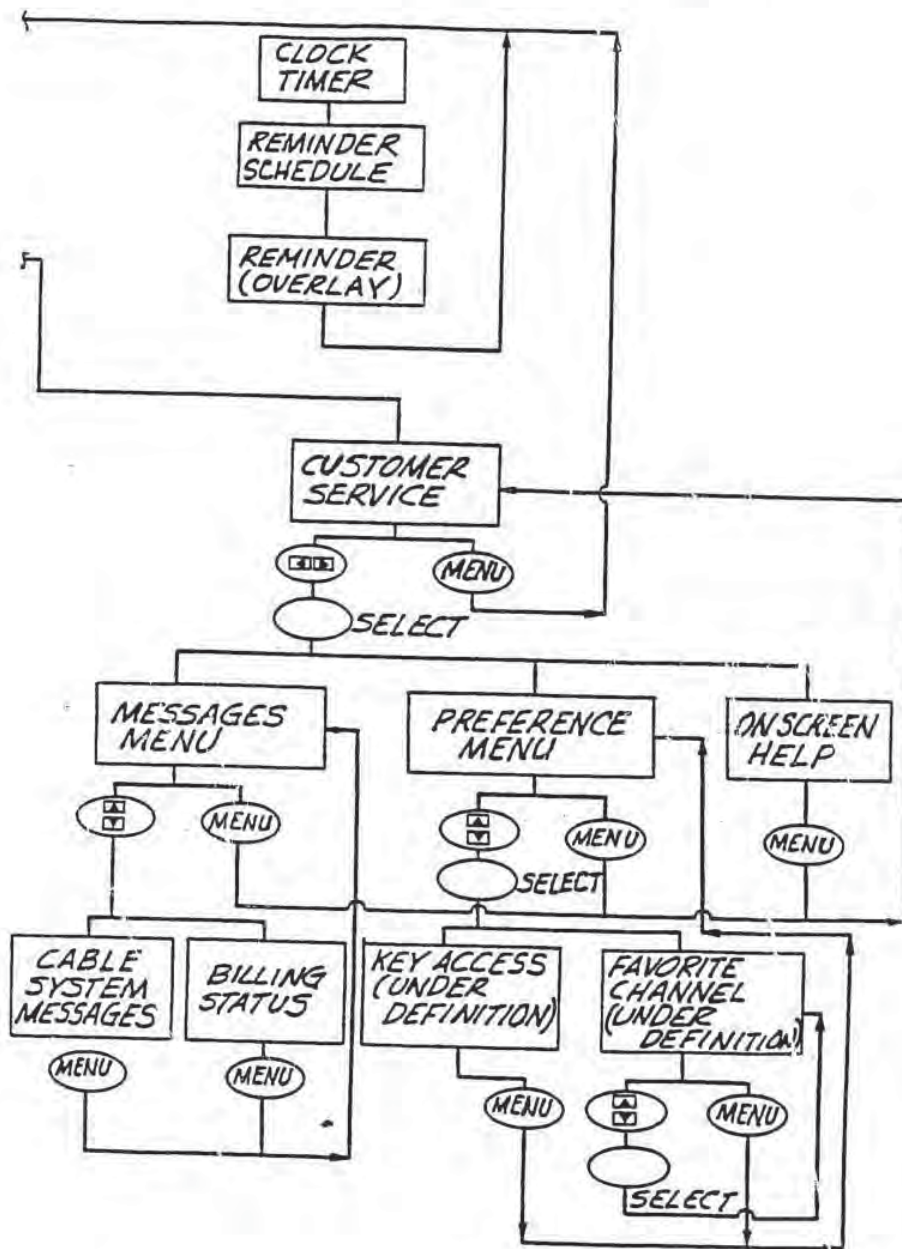
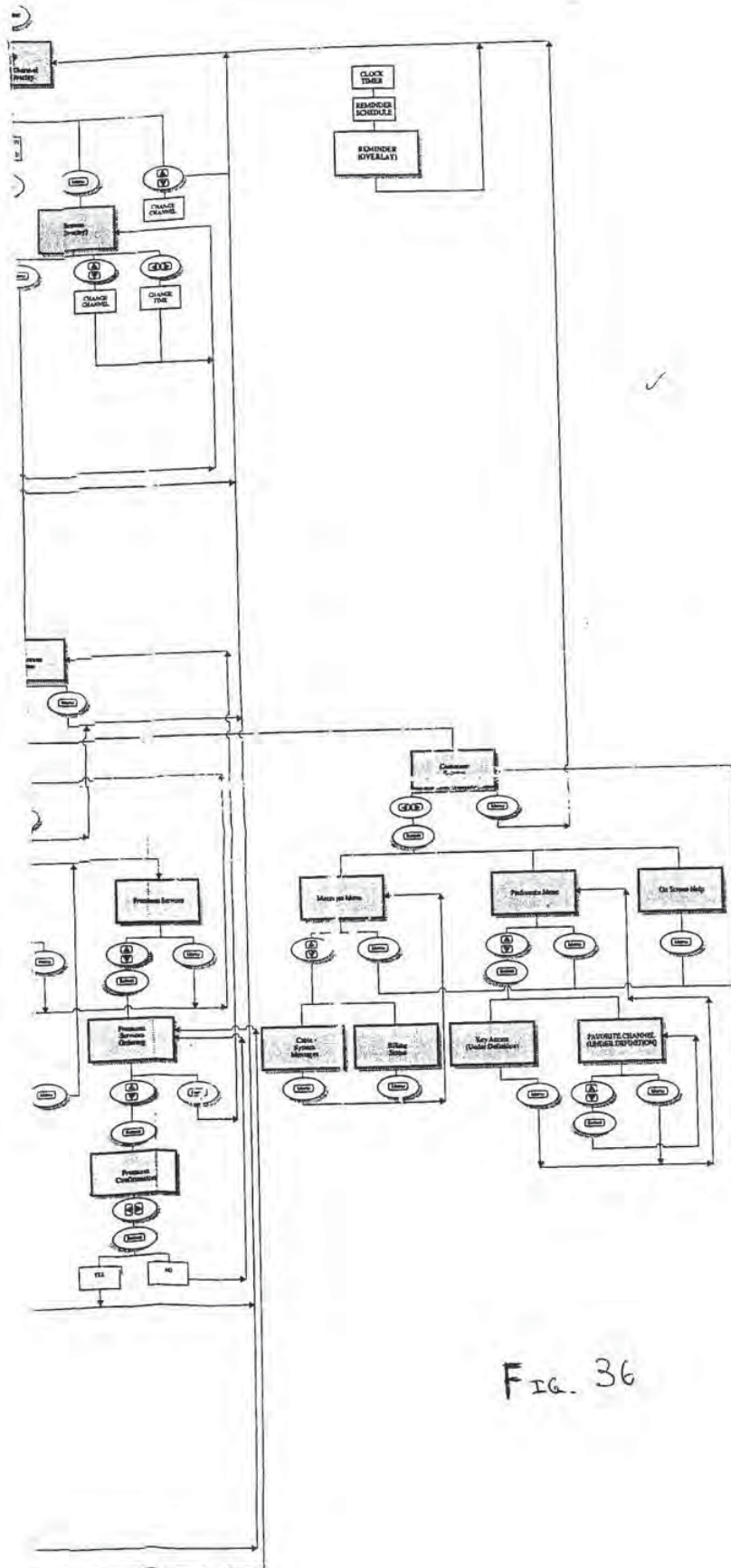


FIG. 36D





US005479268A

United States Patent [19]
Young et al.

[11] **Patent Number:** 5,479,268
[45] **Date of Patent:** Dec. 26, 1995

[54] **USER INTERFACE FOR TELEVISION SCHEDULE SYSTEM**

[75] Inventors: **Patrick Young**, San Mateo; **John H. Roop**, Palo Alto; **Allan R. Ebright**, Los Gatos; **Michael W. Faber**, Pleasanton; **David Anderson**, Mountain View, all of Calif.

[73] Assignee: **Starsight Telecast Inc.**, Fremont, Calif.

[21] Appl. No.: 198,538

[22] Filed: Feb. 18, 1994

Related U.S. Application Data

- [63] Continuation of Ser. No. 579,555, Sep. 10, 1990, abandoned.
[51] Int. Cl.⁶ **H04N 5/76**
[52] U.S. Cl. **358/335; 360/33.1; 348/734; 348/906; 348/13**
[58] Field of Search **358/335, 310; 455/171.1, 186; 360/33.1, 69; 348/734, 906, 578, 6, 13; 345/146; H04N 5/76**

[56] **References Cited**

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Primary Examiner—Tommy P. Chin
Assistant Examiner—Khoi Truong
Attorney, Agent, or Firm—Cooly Godward Castro Huddleson & Tatum

[57] **ABSTRACT**

Screen (10) for a user interface of a television schedule system and process consists of an array (24) of irregular cells (26), which vary in length, corresponding to different television program lengths of one half hour to one-and-one half hours or more. The array is arranged as three columns (28) of one-half hour in duration, and twelve rows (30) of program listings. Some of the program listings overlap two or more of the columns (28) because of their length. Because of the widely varying length of the cells (26), if a conventional cursor used to select a cell location were to simply step from one cell to another, the result would be abrupt changes in the screen (10) as the cursor moved from a cell (26) of several hours length to an adjacent cell in the same row. An effective way of taming the motion is to assume that behind every array (24) is an underlying array of regular cells. By restricting cursor movements to the regular cells, abrupt screen changes will be avoided. With the cursor (32), the entire cell (26) is 3-D highlighted, using a conventional offset shadow (34). The offset shadow (34) is a black bar that underlines the entire cell and wraps around the right edge of the cell. To tag the underlying position—which defines where the cursor (32) is and thus, where it will move next—portions (36) of the black bar outside the current underlying position are segmented, while the current position is painted solid.

11 Claims, 24 Drawing Sheets

	11:00 AM	11:30 AM	12:00 PM
32	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
4	GOLDEN GIRLS	NEWS 26	INSIDE EDITION
5	YOUNG & RESTLESS		NEWS 26
7	PERFECT STRA	LOVING	ALL MY CHILD
9	SESAME STREET 26		
13	ALL MY CHILDREN		NEWS 26
44	EVERYDAY 26		MOVE
A&E	LORNE GREFFIN'S WORLD OF S		FUGITIVE
CNN	NEWS	52	NEWS
DIS	DOROTHY BRINGS SOPHIA'S SISTER		
LIF	(NANCY WALKER) OVER FROM SICILY 45		
TNT	A BIRTHDAY SURPRISE		
CH 2	KNTV-FOX	CBL 2	11:25A TUE APR 31

U.S. PATENT DOCUMENTS

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Don Snider Demo Videotape of TVIS System, San Diego & Orlando Broadcast 1983 "Bluelagoon" Screen Shot (V79392) (Hand Carried).

11:00 AM		11:30 AM		12:00 PM	
JUDGE(PART 1)		JUDGE(PART 2)		AT NOON	
GOLDEN GIRLS		NEWS		INSIDE EDITION	
YOUNG & RESTLESS		LOVING		NEWS	
PERFECT STRA		SESAME STREET		ALL MY CHILD	
ALL MY CHILDREN		EVERYDAY		NEWS	
LORNE GREEN'S WORLD OF S		MOVIE		FUGITIVE	
NEWS		NEWS		LUNCH BOX	
WALT DISNEY PRESENTS		JANE WALLACE		FRUGAL GOURM	
MOVIE		KNTV-FOX		CBL 2	
CH 2		11:25A		TUE APR 3	

FIG. -1

		11:00 AM	11:30 AM	12:00 PM
32	2	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
	4	GOLDEN GIRLS	NEWS	INSIDE EDITION
	5	YOUNG & RESTLESS	26	NEWS 26
	7	PERFECT STRA	LOVING	ALL MY CHILD
	9	SESAME STREET	26	
	13	ALL MY CHILDREN		NEWS
	44	EVERYDAY	26	MOVIE
	A&E	LORNE GREEN'S WORLD OF S		FUGITIVE
	CNN	NEWS		NEWS
	DIS	WALT DISNEY PRESENTS		LUNCH BOX
	LIF	JANE WALLACE		FRUGAL GOURM
	TNT	MOVIE	26	
	CH 2	KNTV-FOX	CBL 2	11:25A
				TUE APR 3

FIG.-2

44	11:00 AM		11:30 AM		12:00 PM	
	JUDGE (PART 1)		JUDGE (PART 2)		AT NOON	
[2]	GOLDEN GIRLS		NEWS ²⁶		INSIDE EDITION	
[4]	YOUNG & RESTLESS				NEWS ²⁶	
[5]	PERFECT STRA		LOVING		ALL MY CHILD	
[7]	SESAME STREET					
[9]	ALL MY CHILDREN				NEWS ²⁶	
[13]	EVERYDAY ²⁶				MOVIE	
[44]	LORNE GREEN'S WORLD OF S				FUGITIVE	
A&E	NEWS				NEWS	
CNN	WALT DISNEY PRESENTS				LUNCH BOX	
DIS	JANE WALLACE				FRUGAL GOURM	
LIF	MOVIE ²⁶					
TNT						
CH 2	KNTV-FOX		CBL 2			

FIG.-3

PENDING RECORDINGS	RECORDED PROGRAMS	LINKED TITLES	ON GRID PROG
NEWS	CH 4	4/3 11:30A	:30
ROSEANNE	CH 13	4/3 9:00P	:30
ALL MY CHILDREN	CH 7	4/4 12:00P	1:00
MACNEIL, LEHRER	CH 9	4/4 6:30P	1:00
QUANTUM LEAP	CH 4	4/5 10:00P	1:00
NOVA	CH 9	4/5 8:00P	1:00
MOVIE: ALIEN NATION	HBO	4/5 9:00P	2:00
ALL MY CHILDREN	CH 7	4/6 12:00P	1:00
CHEERS	CH 5	4/6 7:00P	:30
MOVIE: SUMMER JOB	SHO	4/6 9:00P	2:00
NBA BASKETBALL	CH 5	4/7 4:00P	?
		SP	EP

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FIG. -4

	11:00 AM	11:30 AM	12:00 PM
[2]	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
[4]	GOLDEN GIRLS	NEWS ²⁶	INSIDE EDITION
[5]	YOUNG & RESTLESS	⁴⁶	NEWS ²⁶
[7]	PERFECT STRA	LOVING	ALL MY CHILD
[9]	SESAME STREET ²⁶		
[13]	ALL MY CHILDREN		NEWS ²⁶
[44]	EVERYDAY		MOVIE
A&E	LORNE GREEN'S WORLD OF S		FUGITIVE
CNN	NEWS ²⁶		NEWS ¹⁸
DIS	WALT DISNEY PRESENTS		LUNCH BOX
LIF	JANE WALLACE		FRUGAL GOURM
TNT	MOVIE ²⁶		
CH 2	KNTV-FOX	CBL 2	11:25A
			TUE APR 3

FIG.-5

		11:00 AM	11:30 AM	12:00 PM
2	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON	
4	GOLDEN GIRLS	NEWS ²⁶	INSIDE EDITION	
5	YOUNG & RESTLESS		NEWS ²⁶	
7	PERFECT STRA	LOVING	ALL MY CHILD	
9	SESAME STREET ²⁶			
13	ALL MY CHILDREN		NEWS ²⁶	
44	EVERYDAY ²⁶		MOVIE	
A&E	LORNE GREEN'S WORLD OF S		FUGITIVE	
CNN	NEWS		NEWS	
DIS	DOROTHY BRINGS SOPHIA'S SISTER (NANCY WALKER) OVER FROM SICILY AS A BIRTHDAY SURPRISE			
LIF				
TNT				
CH 2	KNTV-FOX	CBL 2	11:25A	TUE APR 3

FIG.-6

WHAT'S NEXT ON CHANNEL 2			
11:00	A	JUDGE (PART 1)	58
11:30	A	JUDGE (PART 2)	
12:00	P	AT NOON	22
1:00	P	MOVIE: ANATOMY OF A SEDUCTION	
3:00	P	ALVIN AND THE CHIPMUNKS	58
3:30	P	SUPER MARIO BROS. SUPER SHOW	
4:00	P	CHIP'N DALES RESCUE RANGERS	22
4:30	P	DUCKTALES	
5:00	P	SILVER SPOONS	58
5:30	P	THREE'S COMPANY	
6:00	P	WHO'S THE BOSS	22
6:30	P	MAMA'S FAMILY	
7:00	P	CHEERS	58
CH 2	KNTV-FOX	CBL 2	
		11:25A	TUE APR 3

FIG. -7

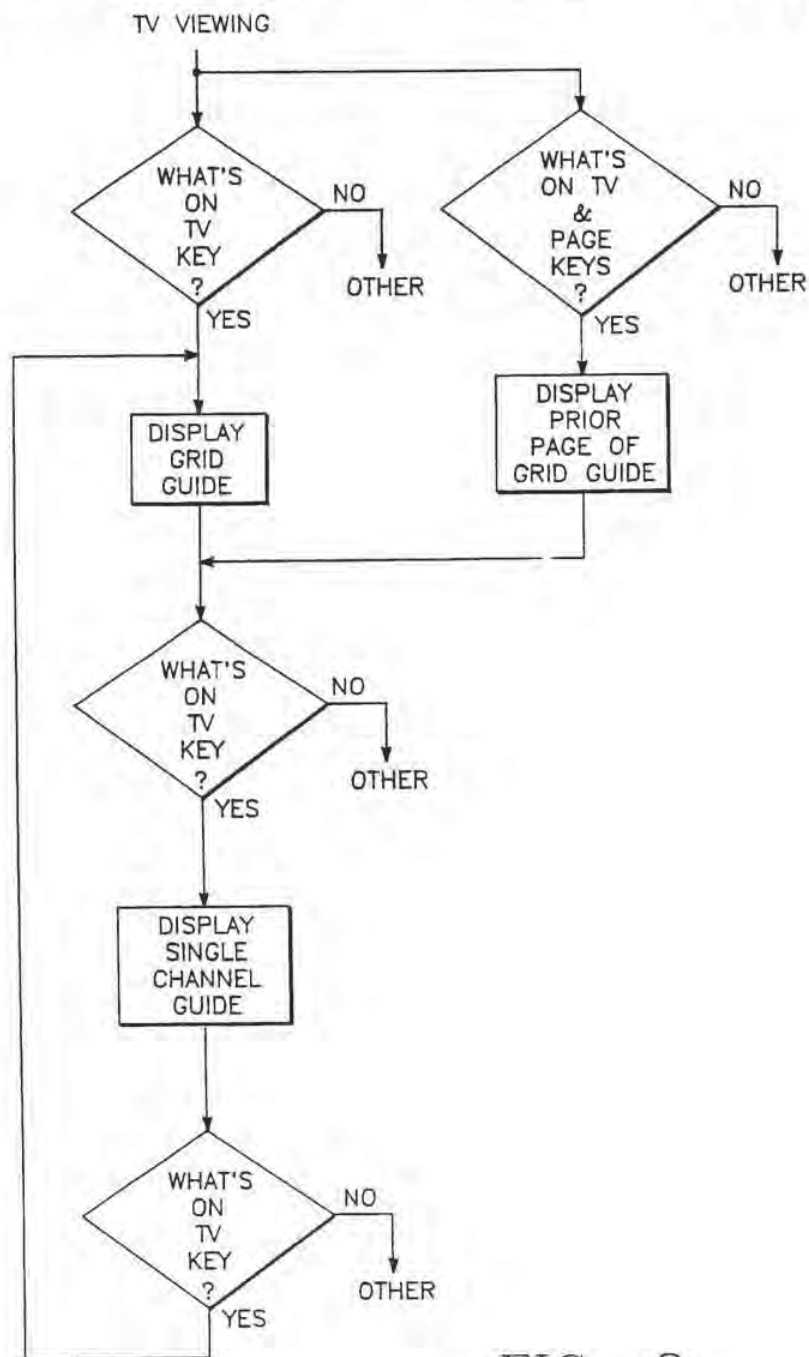


FIG.-8

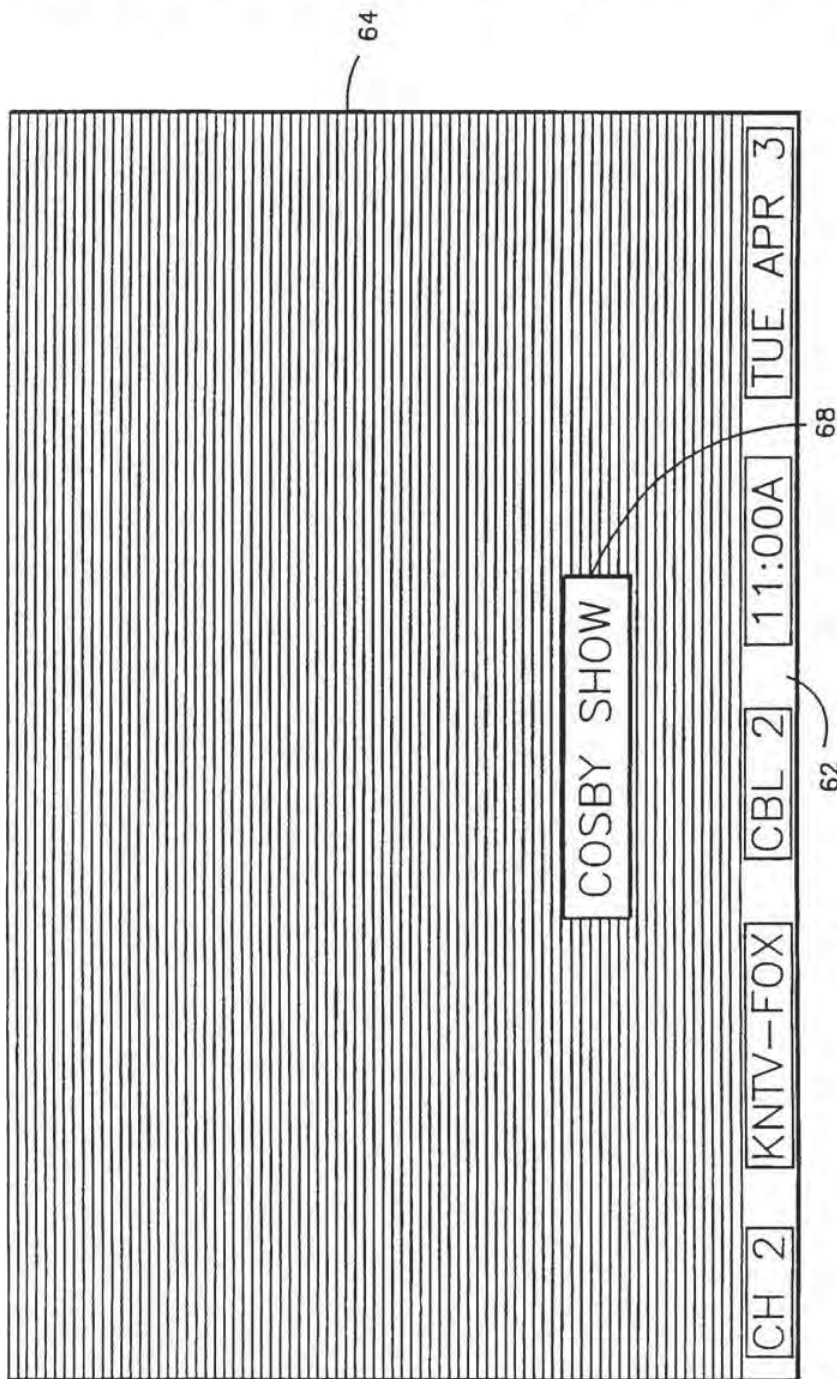


FIG. -9

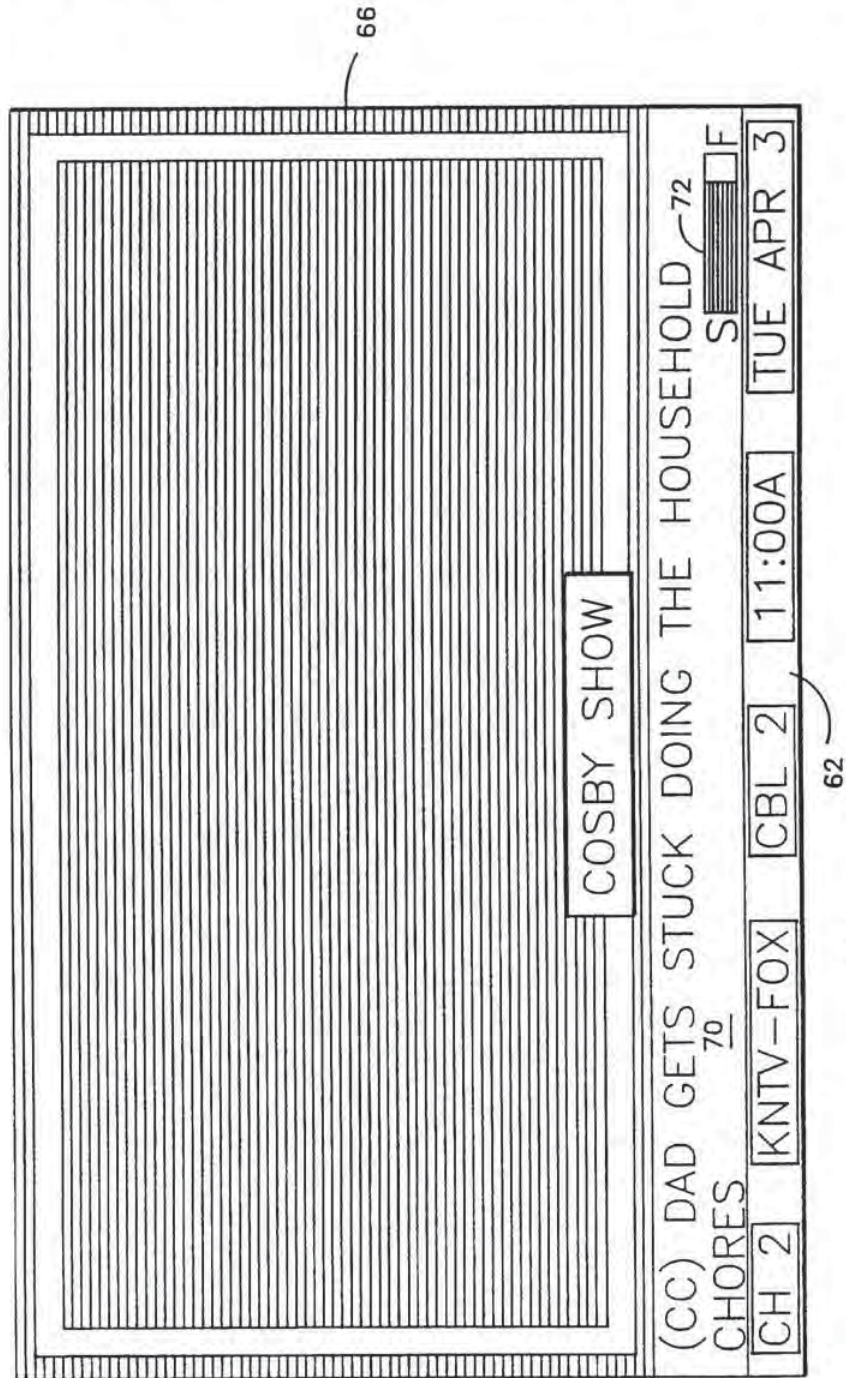


FIG. -10

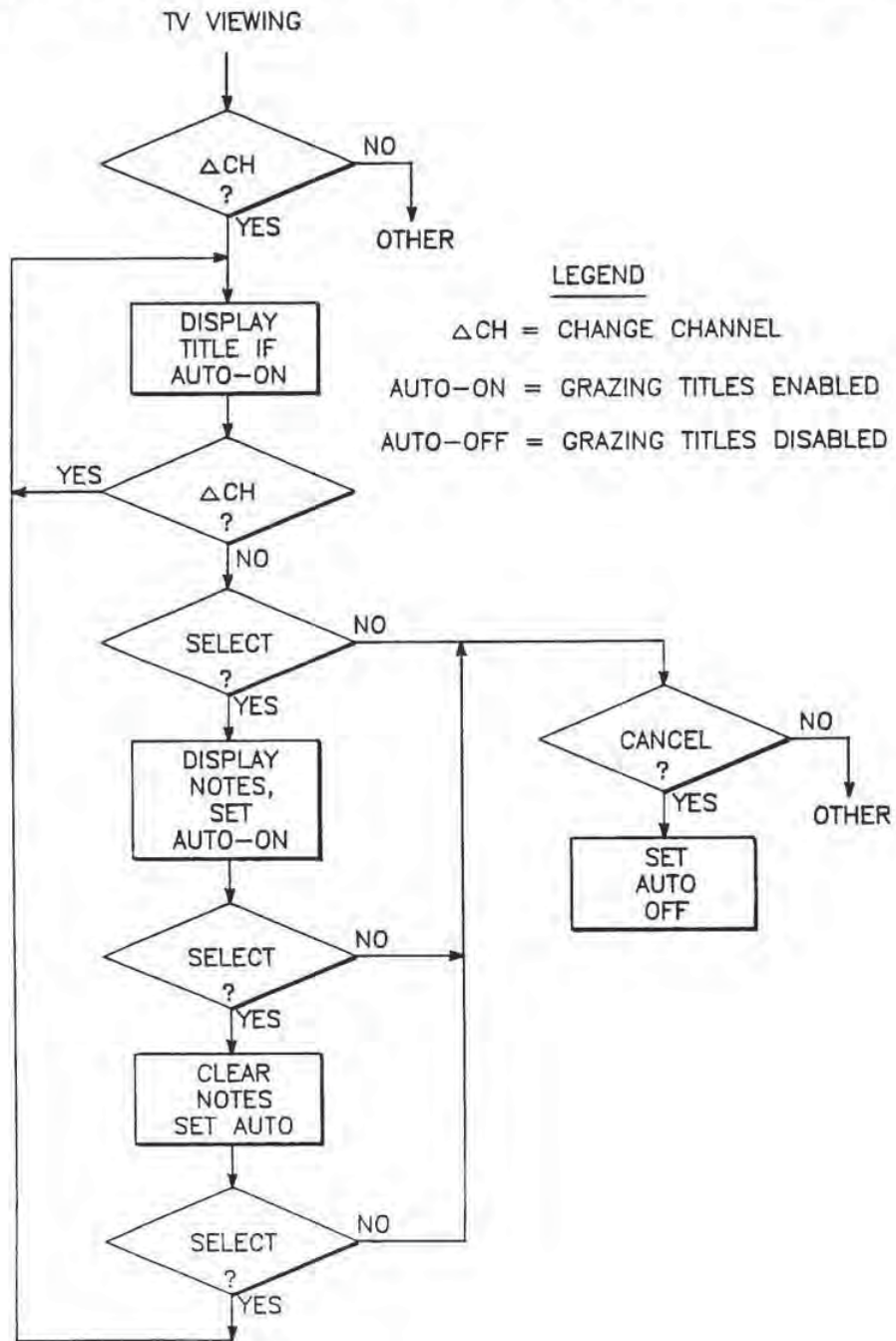


FIG.-11

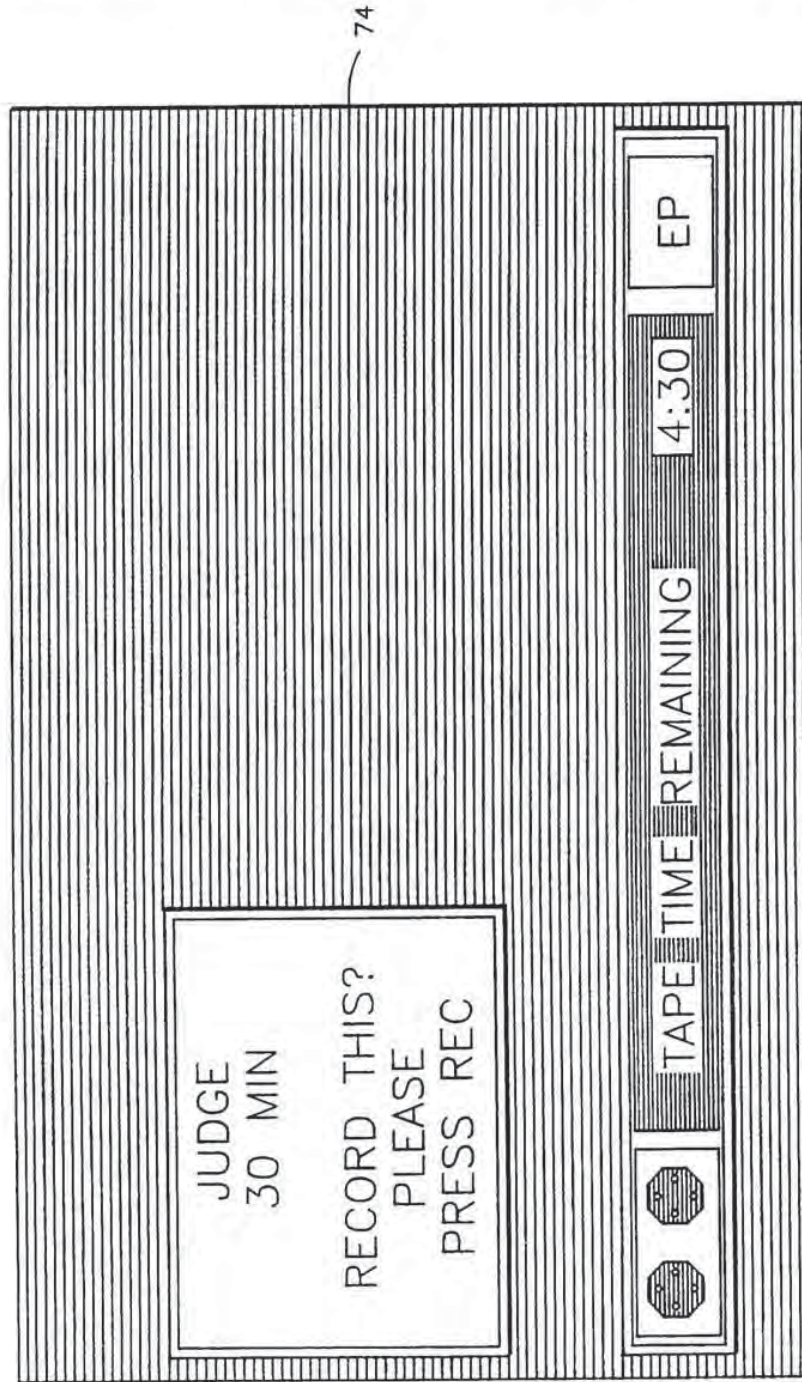


FIG.-12

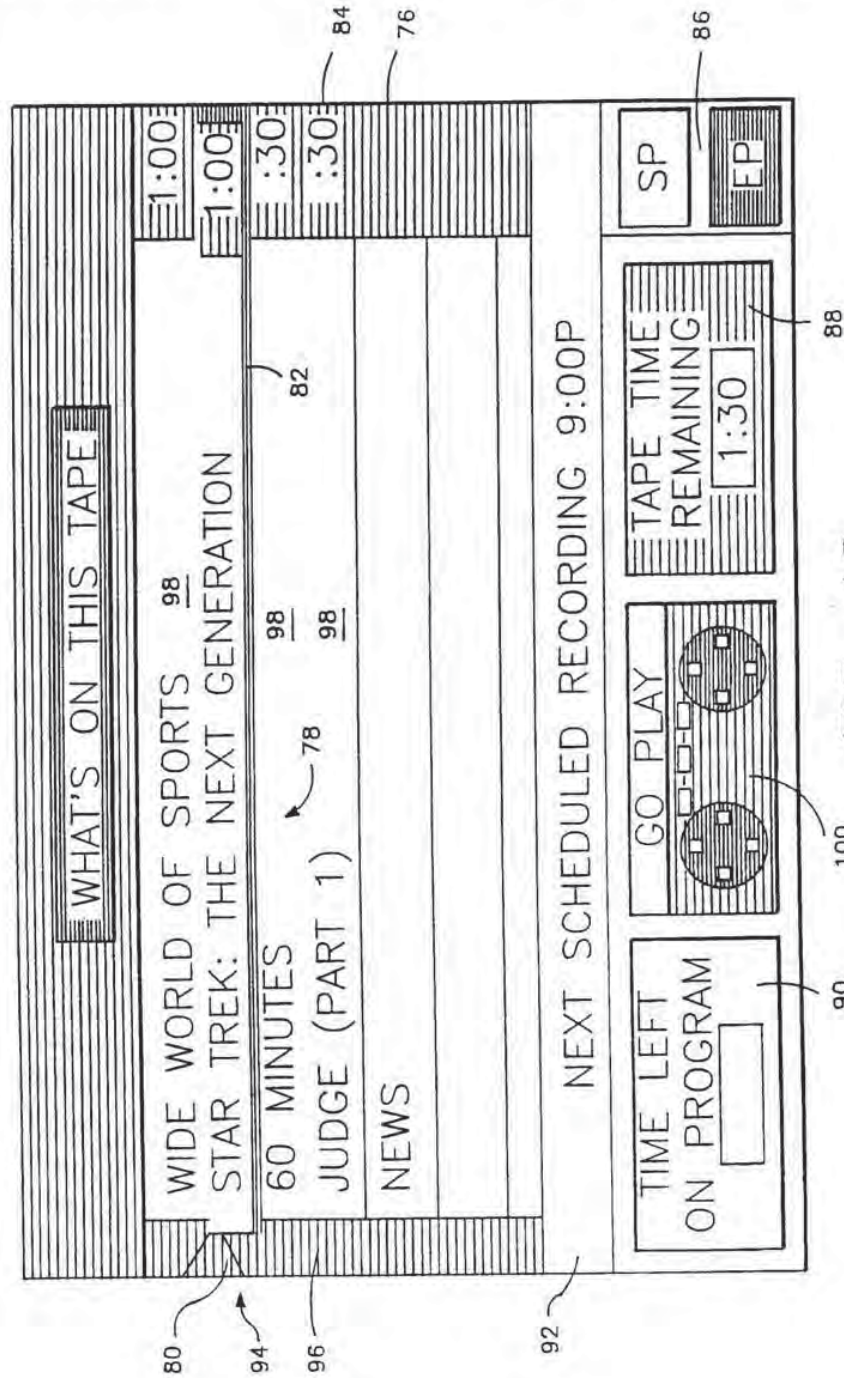


FIG. -13

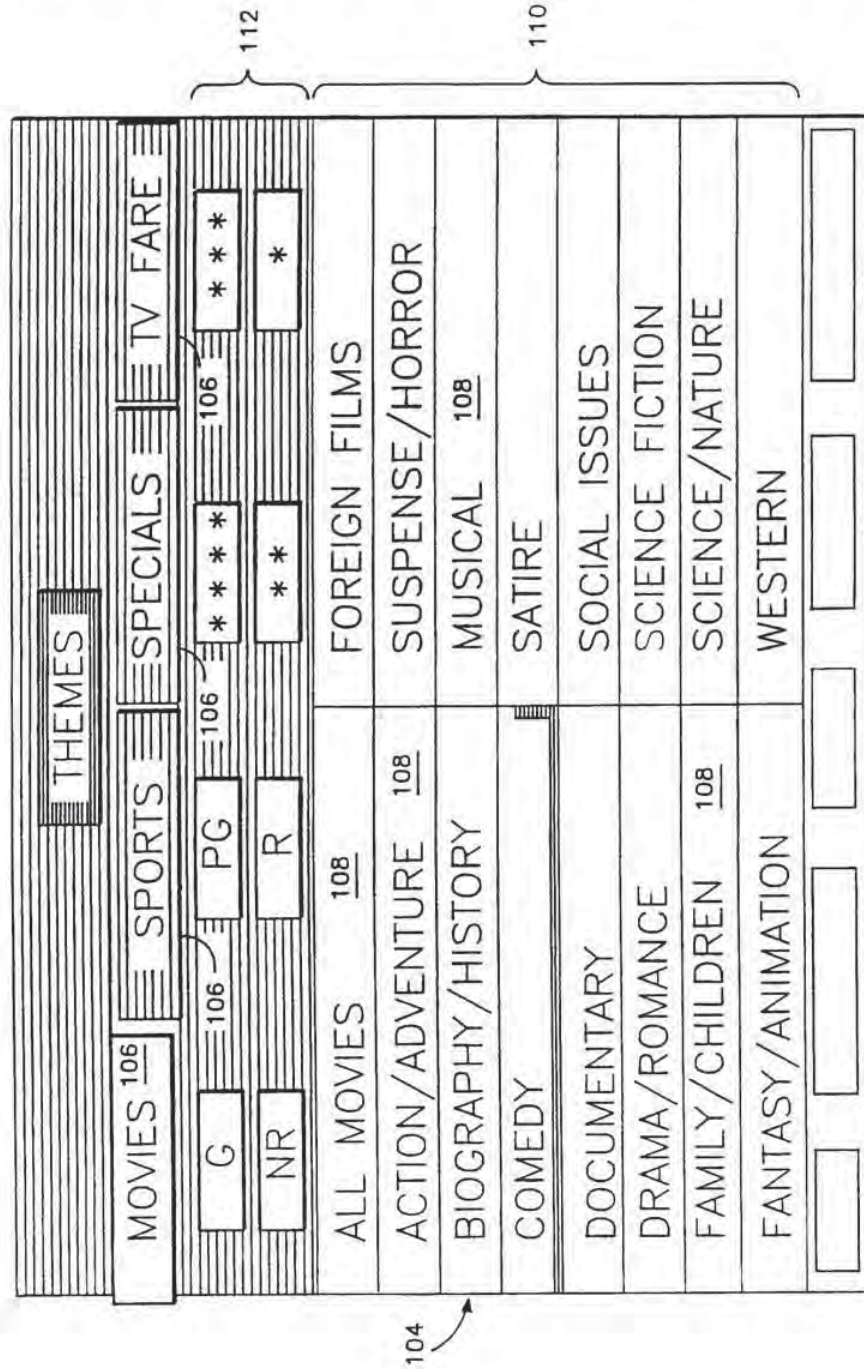


FIG. -14

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THEMES	
MOVIES	SPORTS
SPECIALS	TV FARE
PROFESSIONAL	COLLEGIATE
CHAMPIONSHIP	
ALL SPORTS	GOLF
AUTORACING	HORSERACING
BASEBALL	OLYMPICS
BASKETBALL	TENNIS
BOATRACING	TRACK/FIELD
BOWLING	SPORTS ANTHOLOGY
BOXING	SPORTS NEWS/COMMENT
FOOTBALL	OTHER SPORTS

FIG. -15

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THEMES			
MOVIES	SPORTS	SPECIALS	TV FARE
LIVE	FIRST RUN	RERUN	
ALL SPECIALS	NEWS		
AWARD/PAGEANTS	PICK OF THE WEEK		
COMEDY	PIPELINE PROGRAMS		
DRAMA	BULLETIN BOARD		
ENTERTAINMENT			
FAMILY/CHILD			
HOLIDAY			
MINI-SERIES			

FIG. -16

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THEMES			
MOVIES	SPORTS	SPECIALS	TV FARE
LIVE	FIRST RUN	RERUN	
ALL TV FARE	ACTION/ADVENTURE	ETHNIC/DEVOTIONAL	
ANIMATION/CARTOON	BUSINESS/FINANCE	GAME SHOWS	
CHILDREN	COMEDY/VARIETY	HEALTH/EXERCISE	
DRAMA/SUSPENSE	EDUCATIONAL	NEWS/INFORMATION	
		MUSIC	
		SCI FI/HORROR	
		SCIENCE/NATURE	
		TALK SHOWS	
[]	[]	[]	[]

FIG.-17

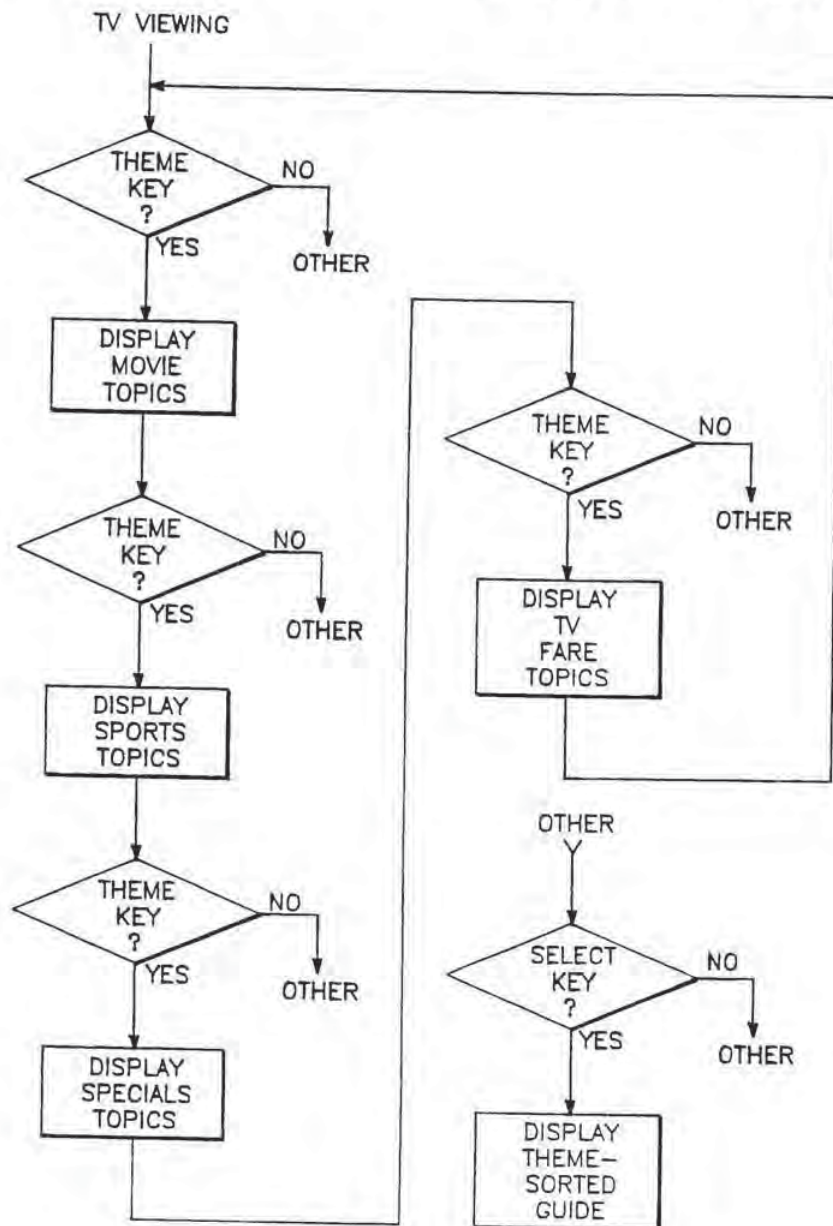


FIG.—18

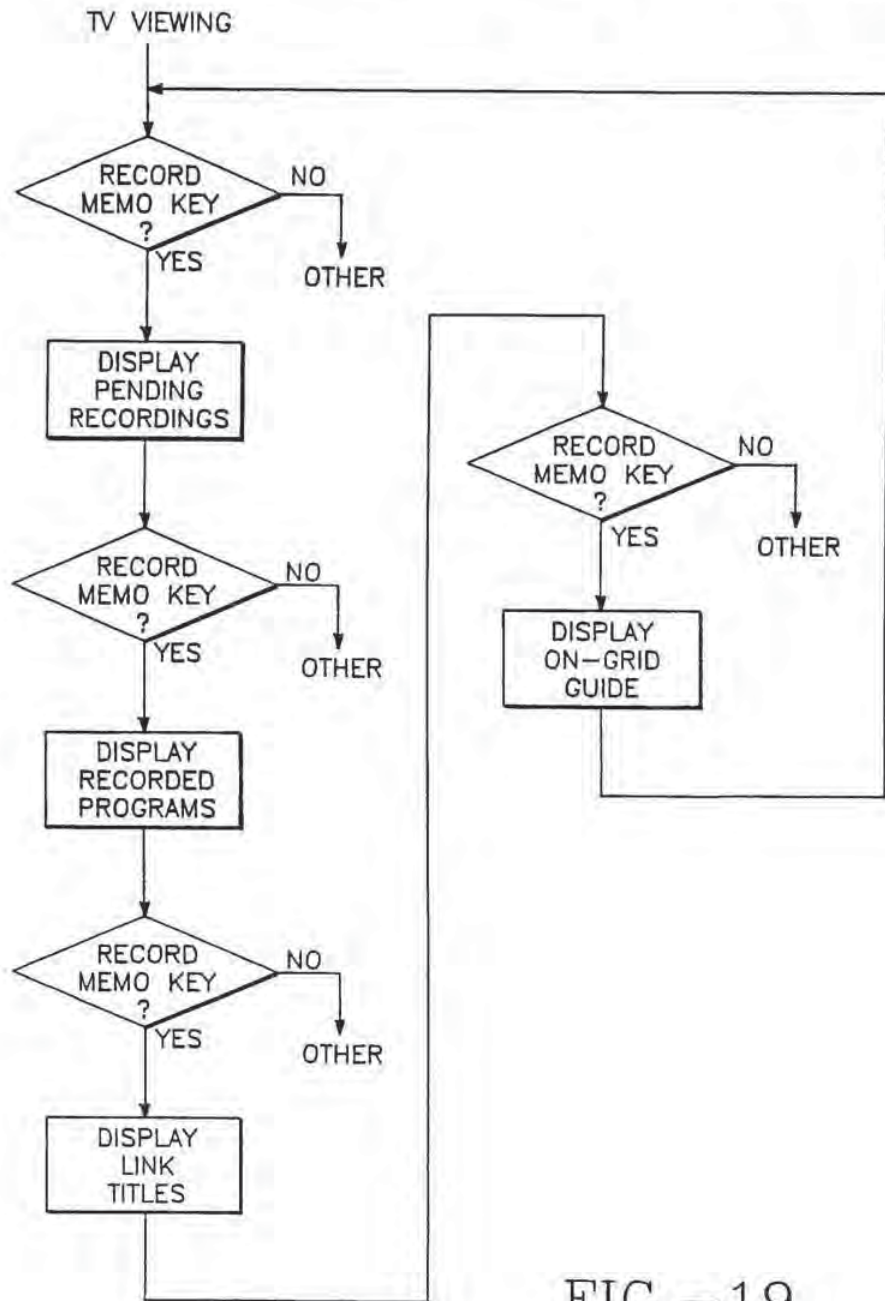


FIG.-19

MY
CHANNEL CUSTOMIZATION
PAGE 1

2	KTVU-2	14	WGN	26	CSPAN
4	KICU-36	15	PPVW	27	MAX
5	KRON-4	16	KVOF-38	28	CSPAN
7	KPIX-5	17	WTBS	29	EDUC
9	KSTS-48	18	KCSM-60	30	DIS
20	KGO-7	19	KTSF-26	31	VH-1
44	KTEH-54	20	KOFY-20	32	SHO
HBO	KQED-9	21	TRVL	33	CNN
SHO	KDTV-14	22	CBN	34	ESPN
CNN	KNTV-11	23	CBB	35	LIF
DIS	KBHK-44	24	BDSS	36	HBO
ESPN	KQEC-32	25	BARC	37	GALA

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118

116

124

120

USE SELECT TO CHANGE STATUS: MY OFF ON

FIG.-20

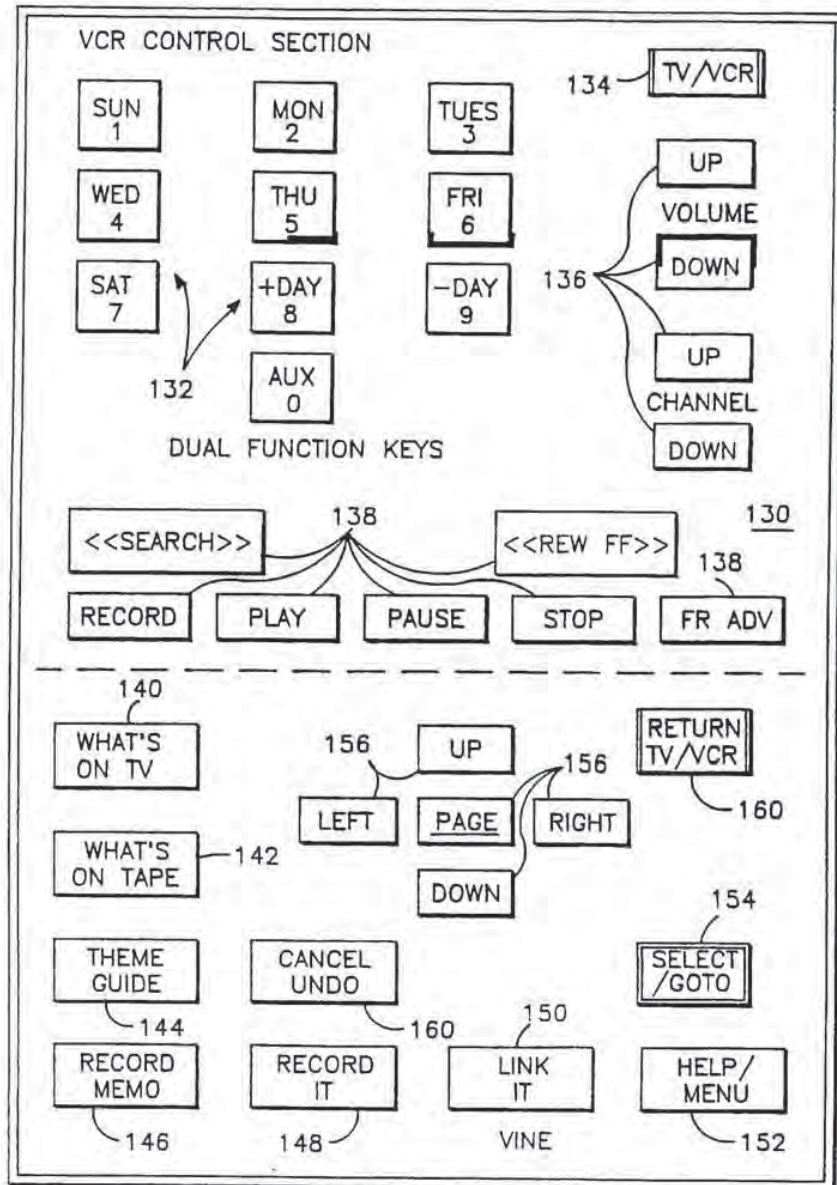


FIG.-21

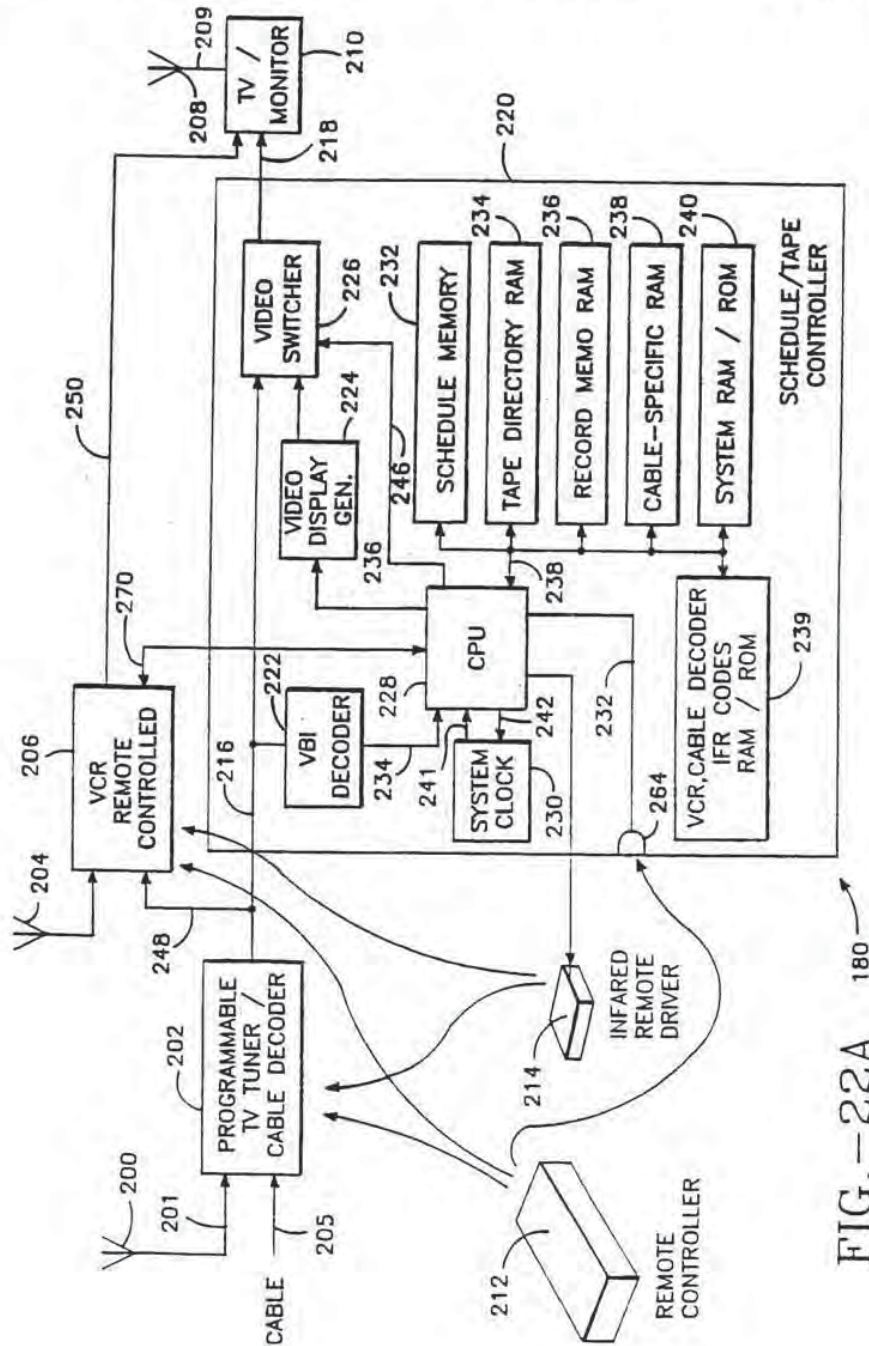


FIG.-22A

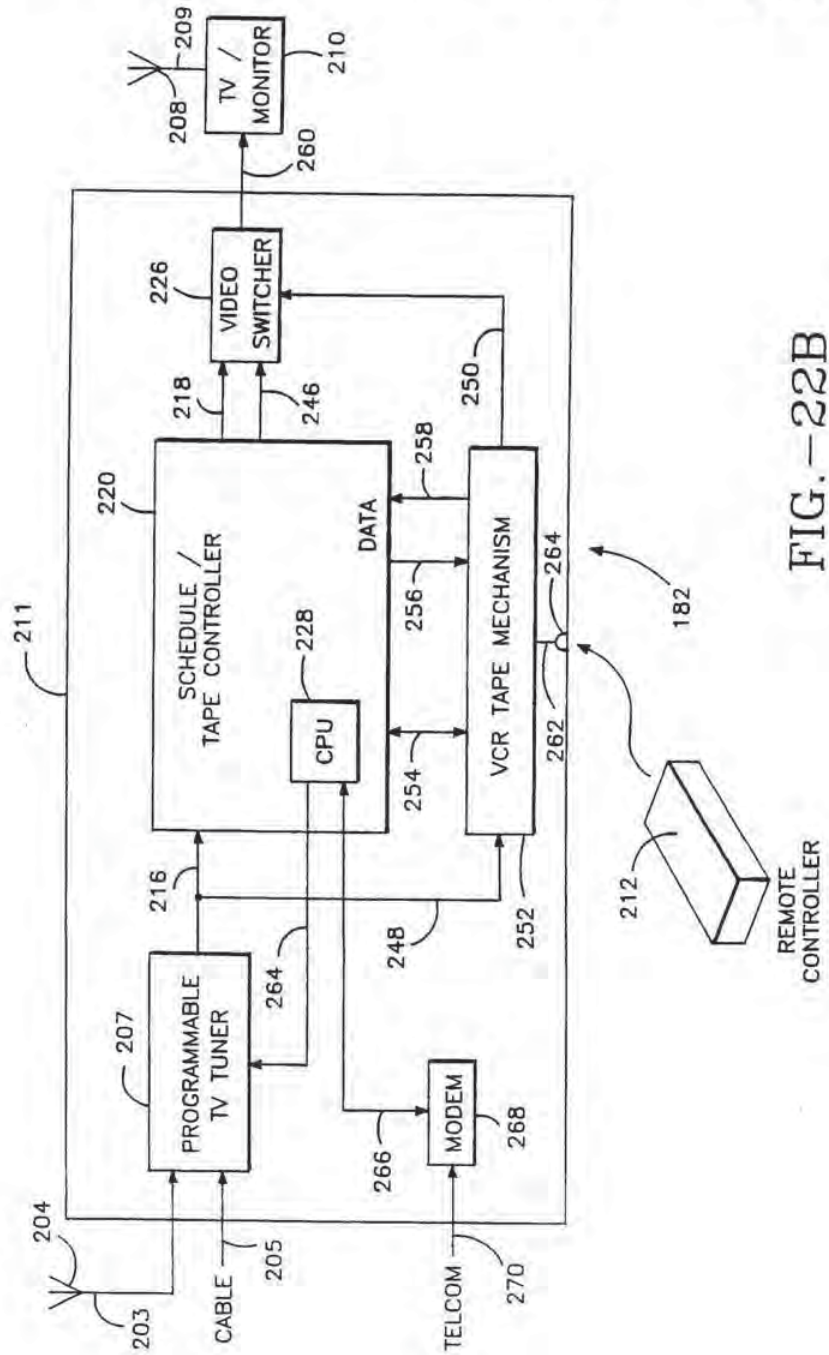


FIG. -22B

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PENDING RECORDINGS	RECORDED PROGRAMS	LINKED TITLES	ON GRID PROG
ROOTS		CH 44 8:00 P	
LUCY			
49ER'S FOOTBALL			
TWIN PEAKS			
U.S. OPEN GOLF			
LUCY (TWO)		CH 36 4:30 P SUSPENDED	
TO CANCEL SELECTION, USE CANCEL/UNDO TO SUSPEND SELECTION, USE SELECT			

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FIG.-23

1

USER INTERFACE FOR TELEVISION SCHEDULE SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a File Wrapper Continuation of U.S. application Ser. No. 07/579,555, filed Sep. 10, 1990, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a system and process that allows a television viewer to access on screen television program listings and use the program listings in an easy and convenient way to control operation of a video cassette recorder (VCR) or other recording device. In addition, it relates to such a system and process that creates a directory of recorded programs by title for easy retrieval and program playback. More particularly, it relates to such a system and process in which the VCR or other recording device is controlled by a simple selection of program title and a record command, even for recording at a future date and time. Most especially, it relates to such a system and process incorporating an intuitive user interface.

2. Description of the Prior Art

The difficulty of setting a VCR for automatic recording at a future date is notorious. Even users who are technically sophisticated will often make mistakes in the VCR programming procedure that cause them to record the wrong program or not to record anything at all. This difficulty has even resulted in a substantial body of humor dedicated to the subject of programming VCRs.

The difficulty of VCR programming has been alleviated somewhat by the development of VCRs that use a television set as a display for user prompts and feedback to the user during the programming process. U.S. Pat. No. 4,908,713, issued Mar. 13, 1990 to Michael R. Levine, discloses such a VCR using the television set as a display for VCR programming with an interactive user interface for directing the user on a step-by-step basis. Such a user interface removes a great deal of the mystery from VCR programming, but users still have difficulty with such a command-based interface and encounter problems carrying out the programming without making mistakes that cause them to miss recording programs they would like to watch at a different time than when they are broadcast.

Commonly assigned U.S. Pat. No. 4,706,121, issued Nov. 10, 1987 to Patrick Young, discloses a system and process in which user selections from television schedule information are used for automatic control of a VCR. That patent also contains a description of a proposed user interface for such a system and process. However, the provision of a highly intuitive user interface that makes such a system and process easy and convenient to operate is a difficult task. Further development of this system and process has produced considerable change in the user interface as originally proposed.

In addition to simplifying VCR programming, users who do a substantial amount of program taping also need an improved system and process for keeping track of their recorded programs. Commonly assigned application Ser. No. 07/219,971, filed Jul. 15, 1988, in the name of Patrick Young, now U.S. Pat. No. 4,977,455, discloses a system and process that provides indexing capability for taped material. A user interface for a television schedule system and process

should also handle this capability on an intuitive basis.

Thus, while the art pertaining to the control of VCRs and to television schedule systems is a well-developed one, a need still remains for a television schedule system and process incorporating an improved user interface. In particular, unlike most computer menus, a grid TV guide is an array of irregular cells, where the cell size can vary from a fraction of an hour to many hours—extending well beyond the current screen. If this array is navigated by a cursor that goes from cell to cell, a single cursor command can produce violent screen changes. For example, a cursor right command may cause an abrupt jump to a cell situated several hours from the current page. Not only is this unsettling, but may take considerable effort to recover. Clearly, a gentler cursor motion is needed for the irregular cells found in a grid TV guide.

Printed grid television schedule guides often include additional information besides the program title and broadcast names. Such grids are also typically provided in combination with a more detailed printed schedule that contains a synopsis of each program, whether the program is a repeat, ratings for movies, and other information. When using a television set as a display for a schedule system, the size and resolution of the television display limit the amount of text that can be displayed with the grid. Improved techniques are required for conveying the most amount of information to the user in an easily understood manner within the limitations of the television display. When a large number of channels are available for viewing, there is also a need to order the display of information most conveniently for the user.

SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide a television schedule system and process with a user interface that is configured to compensate for the particular nature of the television schedule information.

It is a further object of the invention to provide such a user interface having a cursor operation that compensates for an irregular grid format of the television schedule information.

It is another object of the invention to provide such a user interface in which the schedule information is presented in a format that compensates for limited resolution of the television display.

It is still another object of the invention to provide such a user interface in which supplemental schedule information is presented in overlays that obscure a minimum amount of useful other information.

It is a still further object of the invention to provide such a user interface in which order of presentation of the schedule information is customizable by user preference.

The attainment of these and related objects may be achieved through use of the novel television schedule system and process user interface herein disclosed. A television schedule system including a user interface in accordance with this invention has a display. A means is connected to the display for displaying the television schedule on the display as an array of irregular cells which vary dimensionally in length, corresponding to different television program time lengths. A means is connected to the display for providing a cursor with the television schedule on the display. The cursor has a variable length corresponding to the length of a selected one of the irregular cells in which the cursor is located. A means is connected to the means for providing the cursor for moving the cursor in the array in a series of equal

length steps. At least some of the irregular cells have a length which is greater than the length of the steps.

In the process of operating a television schedule system with the user interface of this invention, the television schedule is displayed as an array of irregular cells which vary dimensionally in length, corresponding to different television program time lengths. A cursor is provided with the television schedule on the display, the cursor has a variable length corresponding to the length of a selected one of the irregular cells in which the cursor is located. The cursor is moved in the array in a series of equal length steps, with at least some of the irregular cells having a length which is greater than the length of the steps.

In another aspect of the invention, a control system for a video recording machine has a controller for starting and stopping the video recording machine, for recording video information on recording media, and for playing recorded video information on recording media. A display generator provides display image generation signals. A means supplies information to the display generator for generation of display images relating to operation of the video recording machine. The means for supplying information includes means for generating a recording media position indicator graduated as segments corresponding to programs recorded on the recording media.

In a process for controlling a video recording machine, a recording media position indicator is graduated as segments corresponding to programs recorded on the recording media. The recording media position indicator is displayed as position of a selected one of the recording media in the video recording machine is changed.

In a further aspect of the invention, a television schedule system includes a display and means connected to the display for displaying the television schedule on the display. The means for displaying a schedule is configured to allow selection by a user of a first number of desired channels for display of schedule information which is less than a second number of available channels. A programmable tuner is connected to the means for displaying a schedule. The programmable tuner is configured to follow the first number of desired channels when the television schedule is shown on the display in response to a channel up or channel down command. The programmable tuner is configured to follow the second number of available channels in the absence of the television schedule on the display in response to a channel up or channel down command.

In a process for operating a television schedule system, a first number of desired channels is selected for display of schedule information, which is less than a second number of available channels. The schedule information is displayed on a display. The first number of desired channels is followed when the schedule information is shown on the display in response to a channel up or channel down command. The second number of available channels is followed in the absence of the television schedule on the display in response to a channel up or channel down command.

The attainment of the foregoing and related objects, advantages and features of the invention should be more readily apparent to those skilled in the art, after review of the following more detailed description of the invention, taken together with the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1-3 are diagrammatic representations of a television schedule grid incorporating the user interface for the system and process of this invention.

FIG. 4 is a diagrammatic representation of a screen display used in the system and process of the invention.

FIGS. 5-7 are additional diagrammatic representations of the television schedule grid incorporating the user interface for the system and process of the invention.

FIG. 8 is a flow chart for understanding the operation of the FIG. 7 diagram.

FIGS. 9-10 are additional diagrammatic representations of screen displays of the user interface for the system and process of the invention.

FIG. 11 is a flow chart for understanding the operation of the FIGS. 9-10 diagrams.

FIGS. 12-13 are diagrammatic representations of taping and tape index screen displays of the user interface for the system and process of the invention.

FIG. 14-17 are diagrammatic representations of program selection by category screen displays of the user interface for the system and process of the invention.

FIG. 18 is a flow chart for understanding operation of the FIGS. 14-18 diagrams.

FIG. 19 is a flow chart for understanding operation of the FIG. 20 diagram.

FIG. 20 is a diagrammatic representation of a channel customization screen display of the user interface for the system and process of the invention.

FIG. 21 is a diagrammatic plan view of a control panel for the system of the invention.

FIG. 22 is a block diagram of a television schedule system in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

Turning now to the drawings, more particularly to FIGS. 1-7, there are shown a series of menu screens 10, 12, 14, 16, 18, 20 and 22 used in operation of the system and carrying out the process of the invention. Screens 10, 12, 14, 18 and 20 each consists of an array 24 of irregular cells 26, which vary in length, corresponding to different television program lengths of one half hour to one-and-one half hours or more. The array is arranged as three columns 28 of one-half hour in duration, and twelve rows 30 of program listings. Some of the program listings overlap two or more of the columns 28 because of their length. Because of the widely varying length of the cells 26, if a conventional cursor used to select a cell location were to simply step from one cell to another, the result would be abrupt changes in the screens 10, 12, 14, 18 and 20 as the cursor moved from a cell 26 of several hours length to an adjacent cell in the same row. Such abrupt changes disorient a user of the system.

An effective way of taming the motion is to assume that behind every array 24 is an underlying array of regular cells. By restricting cursor movements to the regular cells, abrupt screen changes will be avoided. However, there is now a potential ambiguity between the underlying cell which governs cursor movement and a visible cell 26 which holds the program title.

Viz.: if the cursor moves in half hour steps, and the cell length is, say four hours, should the cursor be $\frac{1}{2}$ hour long or four hours long? If the cursor only spans the interval of the underlying cell ($\frac{1}{2}$ hour), the cursor appears to be highlighting a segment of the cell, which is misleading. On the other hand, if the cursor spans the entire four hours of the TV listing, the cursor underlying position will be obscure. In

this case, cursor right/left commands will appear inoperative while traversing a long cell. The absence of feedback following a cursor command is befuddling to users. Therefore, an innovative cursor 32 (FIG. 1) for the irregular array 24 is required which satisfies several conflicting requirements.

With the cursor 32, the entire cell 26 is 3-D highlighted, using a conventional offset shadow 34. The offset shadow 34 is a black bar that underlines the entire cell and wraps around the right edge of the cell. To tag the underlying position—which defines where the cursor 32 is and thus, where it will move next—portions 36 of the black bar outside the current underlying position are segmented, while the current position is painted solid.

For an half hour cell 26, the offset shadow's underline bar will always be solid black. FIGS. 2 and 3 show the cursor 32 as it appears for a half-hour program. For programs that go beyond ½ hour, only the current ½ hour position will be solid black. All remaining positions will be striped. If the cursor is moved left or right, the solid section will move accordingly, providing complete visual feedback. Thus, this modified 3D offset shadow cursor 32 satisfies the demands stated above: it spans the entire cell, yet clearly highlights the current underlying position. Movement of the cursor 32 will always be visible even for cells 26 that are much longer than the underlying cell.

A grid continuity icon 38 is shown in FIG. 1. Printed grid television schedule guides often include parenthetical comments, (such as "cont'd") to indicate program continuity. In an electronic guide displayed on a TV screen, limited text space precludes parenthetical comments. To conserve space, an icon 38 will be used to indicate cell 26 continuity. At the border of a cell 26 that is continued to the next screen, an arrow icon 38 pointing to the right will be overlaid. The arrow direction always points to right, which is the direction of program elapse.

FIGS. 2 and 3 show recording status representations. When a program has been selected for recording, its listing cell 26 will be outlined or highlighted in red, as indicated at 40. If guard time has been added or deleted, the cell will be stretched or shrunk to reflect the change. Cell 26 continuity will be treated the same as above. There are four other record status representations:

If the cell is actively being recorded, the outline 40 will blink off and on.

A recorded cell will be displayed with a solid red background 42 (Note: Not shown in drawing).

A mis-recorded cell will be indicated by red hash-marks 44 over the title. A mis-recording can be the result of insufficient tape, VCR loss of power, stopped before completion, etc.

A program linking icon 46 is shown in FIG. 5.

After each schedule update, the schedule system examines the new listings for the occurrence of any titles that match a title in Linked Titles (FIG. 23). If a title matches, it will automatically be tagged for recording. When a linked program is displayed in the guide, it will have two identifiers: a red outline 40 indicating that the title has been selected for recording, and a link icon 46 appended to the title to indicate that this title was link-selected. After a linked program has been recorded, it will be treated like any recorded program with the title shaded in red. To differentiate this recording from others, the link icon will remain appended to the title.

Further details on the linking feature are given in screen 19 of FIG. 23. 1) A linked program 47 may be suspended by the user (perhaps to avoid conflict with a pending recording),

by de-selecting the link title in the Link List screen, under the Record Memo command. A suspended link program will still be identified by a link icon, but the red-outline will be suppressed since the program will not be recorded. 2) A smart link process is used to tame the matching of titles when there is a likelihood of excessive candidates for recording. The Lucy show, for example, is often syndicated on several channels. Untamed linking of Lucy may result in a plethora of recordings. For such series, the link list will include the channel and time as well as the link title. For the avid Lucy-phile, the user can locate each series individually for linking. If there is more than one link title of the same name, the series will be numbered, in the order of acquisition. Thus, the second Lucy will be identified as Lucy (Two), at 47.

FIGS. 1-3 show the columns 28 headed by half-hour header status indicators. The ½ hour header strip across the top of the grid TV guide has two auxiliary functions: 1) as an indicator 48 of pending or in-progress recording scheduled at that time, and 2) as a time-bar 50 to delineate the past from the future. The past is darkened, while the future is lightly shaded. If there is an in-progress recording, the ½ hour header will be red-outlined at 48 in the same manner as a pending recording title cell 26.

FIG. 6 shows a television schedule grid screen 20 with a program note overlay 52. With limited text capacity on TV displays, it is preferable to display as many lines of TV listings as feasible. To handle program notes, which are text intensive, on-demand overlays 52 are used. Program note overlays 52 may include any or all of the following information:

- A program genre
- Program description
- Stars and personalities
- Year of release
- Episodic subtitles
- Run-time of program
- Elapse time of the program
- Critique (Star Ratings)
- Rating (PG, G, etc.)
- Call letter, channel markers
- Closed caption, stereo.

Program notes for a selected program are overlaid over the grid guide upon request. The program note can be toggled off/on using a SELECT command. The program note 52 overlays and hides 3 or 4 listings of a guide. To minimize concealment of the guide, an auto-rolling note is used. The program note will overlay either the top half or bottom half of the screen, as necessary to avoid masking the title of the selected listing. If the cursor 32 is in the upper half of the screen, the note will appear in the bottom half, and vice versa. If the cursor 32 is moved to the lower half of the screen, the note will automatically position itself in the upper half of the screen.

FIGS. 1-3 and 5-6 show a channel column 54 in the television schedule grid 24. Favorite stations and cable channels may be listed together to create a personalized grid guide. The channel column 54, unlike most printed TV guides, has a mix of over-the-air station names and cable services names.

The grid 24 guide lists channels by favorite combinations of station number and cable names, and not in the usual numerical order. When viewing the grid 24 guide, a Tuner Up/Down channel command will be mapped according to the channels and order listed on the screen. When not viewing the guide, the tuner sequence will revert back to the usual numerical order. When the last channel on a page is

reached, the next Tuner command will change the channel to the channel listed at the beginning of the following page.

When a channel to which the tuner is tuned is displayed on the grid 24, it is highlighted, as shown at 56. A grid 24 page may be changed by either a page command or by entering a channel Up/Dn command as described above. If a page is turned using the page command, the current channel is now located in the previous page, and will not be seen in the new page. Therefore, the new page must suppress the highlighting of a channel, since that indicates the current channel. Note that information about the current channel will still be presented in the channel information boxes 58 at the bottom of the screen.

When is the highlighting re-enabled? Once into the new page, the first channel up/down command will cause the tuner to automatically change to the channel listed in the last or first row 30 respectively of the new page. Since the tuner channel is now located on the new page, the current channel will be highlighted again.

If the channel highlighting is not suppressed after a page is selected, by definition, the tuner must be changed to track the highlighted channel. This is undesirable since casual paging should not cause the channel to change.

When a guide is first opened, as shown in FIG. 2, both the cursor 32 and the current channel 56 are situated on the same row 30 of the grid 24. When the channel 56 is changed, it is desirable to drag the cursor 32 along with the channel in unison. In doing so, the cursor 32 will be ready for a Select command (to retrieve the program note) or for a Record It command. Cursor dragging by the channel command takes place whenever the channel 56 and cursor 32 are united on the same row. If they are not united, the cursor 32 is disengaged from the channel command. Note that dragging is not reciprocal; moving the cursor 32 does not affect channel selection.

FIG. 7 shows a screen 22, showing a program list 58 for a single channel, generated by toggling a user What's On TV command, which switches between the grid 24 and the list 58. The list 58 consists of rows 60 of sequential program listings on the channel and a channel information field 62. Program notes are overlaid on the list 58 in the same manner as shown in FIG. 6 for the grid 24.

Each What's On TV command alternates between the grid guide 24 and the What's Next on Channel row guide 58. While viewing the grid guide 24, the next What's On TV command will replace the grid guide 24 with a single-channel row guide 58. FIG. 8 is the flow diagram for the What's On TV command.

The page relationship between the two guides 24 and 58 are tightly coupled. The single channel guide will open to the channel and schedule time that was selected by the cursor 32 on the grid 24. While viewing the single channel guide 58, the Up/Down channel command may be used to change the channel to be listed. When exiting the single channel guide 58 and returning to the grid guide 24, the grid cursor 32 will be pointed to the channel and schedule time last selected on the single channel guide 58.

FIGS. 9 and 10 show channel grazing overlays 64 and 66 that provide information on current programs when switching channels while watching television. In the overlay 64, when scanning channels, the title of each program is overlaid at 68, along with the name of the TV service (HBO, ABC etc.), the cable channel number, and the current date, day of week, and time in the channel information field 62. The overlay 66 is the same as the overlay 64 except that this overlay includes a program note 70, which is similar to the program note 52 in FIG. 6, but contains information pertinent

to a program currently being broadcast on the selected channel. To access program notes, press the Select key. In addition to the program note 70, elapsed time is indicated by a percentage calibrated time bar 72. The bar is bracketed by S for start, and F for finish. By default, titles will appear automatically when channels are scanned. Grazing Titles may be de-activated using the CANCEL key. To restore auto-titles, press Select while viewing TV. The flow diagram governing titles/program notes, while viewing TV, is shown in FIG. 11.

An express recording screen 74 is shown in FIG. 12. The express recording screen includes the following information:

Title of Program
Length of Program
Tape Time Remaining
Recording Speed.

FIG. 13 shows a tape index screen 76. Locating a recorded segment is often an arduous task when several programs have been recorded on the tape. Without a table of contents, the VCR users muddle through stretches of recording trying to find what's recorded on the tape, where the beginning of the desired program is, and where the tape is now. Some premium VCRs provide tape indexing that automatically finds the start of each recording. However, while the viewer can find the start of a recording, the indexing VCRs do not record titles. The net result is about as useful as having a table of contents without chapter titles. Considerable searching is still required to find what is recorded at each index.

The tape index screen 76 provides a virtual tape directory, giving the equivalent function of a table of contents for a tape recording. There is a list 78 of titles of recorded programs, a pointer 80 to the start of the program, and a current position indicator cursor 82 showing the "chapter" location on the tape. The virtual directory is automatically compiled, revised and stored in off-tape memory as the user records over the tape.

The What's on Tape command will display a list of titles of programs recorded on the tape. The title of the selected program (the segment of tape that is positioned over tape head) is highlighted by the cursor 82. The tape position pointer 80 dynamically tracks the current tape position. All searching is done simply by title, bypassing the need for index numbers. The tape directory is equivalent to a table of contents showing titles, but not page number. It automatically opens to the starting page by simply pointing to the title of the program. In addition to the tape directory 78 of recorded programs, the screen 76 includes a program duration field 84, a recorded speed of each title field 86, a remaining time left on tape field 88, a remaining time left on program field 90 and a next scheduled recording time field 92.

The virtual tape directory is generated as follows. It is difficult to implement a competent self-contained tape directory for a non-random access storage such as a video tape. No matter where the directory is stored on the tape, the latent access time to locate the directory and return to current position (for a standard six hour tape) is excruciating slow, in the order of 6 to 10 minutes.

If redundant directories are recorded uniformly across the tape to minimize latency time, the problem of sluggishness is merely shifted from playback to updating the multiple directories. After each video program is recorded, the entire tape must be scanned to update each directory. Even if this update process is automated, there is a question of excessive wear on tapes and the VCR itself. Viz: each recording, no matter how short, results in high-speed scanning of the entire tape in order to revise all directories.

Even more troubling is the question of when to perform the update, since there is no "safe" period for the VCR to take control. For example, the user may have stopped the tape momentarily, perhaps to skip commercials, only to find that the VCR has commandeered control and placed the tape in a high speed update mode. The safest update is one that is user-initiated. Unfortunately, few VCR users will follow a regimented procedure of updating after each recording session. Clearly, an on-tape directory based on existing technology is not satisfactory.

The following innovative solution, the "virtual tape directory", stores directory information in off-tape memory and does not require an on-tape directory or any augmentation of the video cassette. Since the directory is held in external memory instead of the tape, it is best suited for tapes that have recently been played and recorded, the "working tapes".

When a program is recorded, the title of the program is written to the data (control track) channel of the tape and, at the same time stored in a non-volatile (NV) memory. Other information about the recorded program, such as length of program, theme category, date recorded, and tape identifier code may be written to the data channel, as well as stored in the NV memory. The NV memory is adequate to support a number of working tapes.

When a tape is first loaded, the tape data channel will be scanned for a few seconds to identify the recorded program under the tape head. This data will be matched against the directories stored in NV memory. If there is a match, the directory of the working tape will be displayed immediately when the What's On Tape key is pressed. The "virtual" tape directory appears to have been read from the tape, but is actually obtained from NV memory.

If there is no match, a new directory for the tape will be created. During playback and recording of this tape, a virtual directory will be generated for that tape. Directories of inactive tapes will be automatically purged from memory as new working tapes are introduced.

It is relatively easy to estimate remaining time of a scheduled televised program with the assist of a clock and a TV schedule. In contrast, there are few clues as to current location during playback of a recorded program, particularly when there are several recorded segments on a tape. Tape index counters or running-time clocks require diligent bookkeeping before the start of a recorded segment. Few consumers will tinker with 5 or 6 digit numbers when a "ballpark" indicator is adequate, such as, "is the program about over?", or "about when does the next segment start?". Clearly, there is need to provide a location indicator without the burden of bookkeeping.

To provide an at-a-glance indicator of relative tape location, an on-screen tape position gauge 94 has been devised. The tape position gauge 94 consists of a vertical bar 96 with the arrow pointer 80 located on the left edge of the screen 76. The arrow 80 dynamically tracks the current tape position as the tape is advanced or rewound.

The gauge 94 is graduated, not in linear units, but in units of recorded segments 98 with each segment labelled with its program title. Thus, a 10 minute program or a 6 hour program is represented as one vertical unit corresponding in the width of a segment 98. However, the gauge 94 is linear within each segment 98. If the arrow is pointing at the upper 25% of the program segment 98, it indicates that the tape head is positioned over the first 25% of the program. If a conventional linear gauge were displayed, a far more complicated gauge would be required, that would likely confuse rather than clarify.

Thus, this tape gauge 94 provides a quick capsule indication of the where the tape head is currently positioned, relative to the current program, and relative to other programs or the tape, and the title of other programs.

The tape index screen 76 includes a tape motion indicator field 100. When the tape is undergoing high speed repositioning, the What's On This Tape (WOT) screen 76 will be displayed. During high speed search of a long program, the tape gauge 94 will appear to be dormant, since the gauge is relatively coarse for programs of long duration. To supplement the tape gauge 94, the tape indicator 100 is included. During high speed positioning, one of these messages will be displayed in the space above twin-hub tape icon 102: GO PLAY, GO RECORD, FORWARDING, REVERSING, PAUSE, and STOP.

GO PLAY is displayed while the tape is repositioning to the selected title. When the title is reached, the WOT screen 76 will be displaced by the playback video. GO RECORD is displayed while the tape is positioning to the selected program segment 98, where the new recording will be written.

FIGS. 14-17 show Theme function screens 104. The Theme function allows the viewer to quickly sort the downloaded schedule and display a subset schedule based on a subject of interest. The user has the freedom to select listings sorted first by major themes, second by topic(s) within a theme, and/or by topic qualifiers. All guides sorted by theme, topic and qualifier will be displayed in a row-tabulated format and begins by listing programs nearest to the current half-hour. The theme function screens 104 have the following attributes: Rotating Themes. There are four theme categories, with each theme title enclosed in horizontally-arranged selection boxes 106. From left to right, the themes are: [Movies] [Sports] [Specials] [TV Fare] FIG. 18 is a flow diagram defining the Theme command. Topic Selection. There are up to 16 topics 108 for each theme arranged in an 8 row by two column field 110. Any number of topics may be selected under a selected theme. Topics is a logical OR function, meaning that each listing that meets the definition of the topic will be displayed. For example under the theme of Movies, if the topic titles Comedy and Satire are selected, a subset schedule of both comedy movies and satire movies will be displayed.

Default All Selection

When the Theme screen 104 is first opened, the first slot (upper left most topic 108) will be highlighted. This is the ALL function, which is the sum of all topics 108 for the selected theme. The ALL function was created to minimize key stroking. Without an all topic category, the user must enable all 16 topics 108 individually. Conversely, if the user wishes to go from an all topics to an individual topic, the user must cursor to and deselect each of the other 15 topics. Qualifiers

Each theme includes a group of search attributes or qualifiers 112. The qualifiers for each theme 106 are shown in the respective one of FIGS. 14-17 for each theme 106. Any number of qualifiers can be enabled at one time. These qualifiers perform a logical OR functions: they will select for display all listings (sorted first by theme and topic) that satisfy the qualifiers.

The qualifiers 112 are positioned for easy selection. The selection of qualifiers is made using the usual cursor commands. When a theme 106 is initially opened, by default, the cursor is located near the top of the screen. To minimize cursor commands, the qualifiers are also located near the top of the screen. In contrast, placing the qualifiers at the bottom of the screen would require a round trip of up to 16 key strokes.

The complete theme sorting strategy is defined as follows:
 Listings=(Topic A+Topic B+etc.)*(Qualifier A+Qualifier
 b+etc.)

This may be read as listing all Topic A that also meets
 Qualifier A or Qualifier B, plus all Topic B that also meets
 Qualifier A or Qualifier B, etc.

Qualifiers, topics and themes are rooted in relational
 database operations and allow logical sorting of the sched-
 ule. To support these higher order of sorting, auxiliary data
 must be delivered to the VCR. In contrast, simple sorting
 operations, such as sorting by time and by channel are
 inherent in the fundamental information of a TV guide, and
 do not require auxiliary search data.

The keystroke sequence for using the themes screens 104
 are as follows. While watching TV, the first Theme key
 command will summon the opening theme screen with the
 left most theme, Movies, highlighted. Further theme com-
 mands will rotate the theme selection from left to right. Each
 theme screen will be initialized to the ALL (topics) selection.
 If no topic selection is made, an all topics guide for the
 selected theme will be displayed upon depressing the Select/
 Goto command.

To additionally sort the theme by a single topic, position
 the cursor key to the desired topic and depress the Select/
 Goto key. Use the cursor to return to a topic.

To sort by more than one topic, position the cursor over
 each desired topic and depress the Select key. When fin-
 ished, press Select/Goto to display a multiple-topic guide.

To sort by one or more attributes, position the cursor over
 each desired attribute and press the Select key. When
 finished, move the cursor to a topic and press Select/Goto to
 retrieve the theme/attribute-sorted TV guide.

Other than express recording, all recording activities are
 controlled with the Record Memo screen 16 of FIG. 4. The
 Record Memo screen 16 is accessed with a Record Memo
 key. When the Record Menu key is depressed, the following
 titles enclosed in horizontally-arranged selection boxes 114
 will appear at the top of the opening screen. From left to
 right: [Pending] [Recorded] [Linked] [On-Grid Recordings]
 [Programs] [Titles] [Prog.] Each Record Memo key command
 will highlight a new selection, rotating from left to right, and
 wrapping around to Pending Recordings after the right most
 position. FIG. 19 is a flow diagram defining the Record
 Memo command.

FIG. 20 shows a Channel Customization screen 116. The
 screen 116 allows the user to customize channels to match
 viewing interest, providing a compact listing as well as
 eliminating undesired channels during up down scanning.
 During schedule update, a list of all cable channels available
 at the subscriber's cable system (or broadcast stations for
 over-the-air subscribers) is also delivered to the VCR. This
 unabridged set of channels may be customized using screen
 116.

The channel customization screen 116 has two fields, a 3
 column field 118 listing up to 36 unabridged channels and a
 single column field 120 listing 12 favorite MY channels. The
 latter is a replica of the channel descriptor column 122 (FIG.
 1) of the opening grid guide. Additional pages are available
 (using the page key to swap between the pages) to accom-
 modate systems with more than 36 channels. Each cell 124
 in the 3 column field 118 contains the following information:
 Channel number and program service name (such as HBO or
 station KTVU, 2). The cell 124 is color-coded to indicate the
 following states: ON, default state before any customization,
 with the cell 124 in light green background. MY, favorite
 channels listed in the single column field 120, also shown in
 the three column field 118 with a blue background. OFF, a

channel deleted from all guides, as well as during Channel
 Up/Dn scanning (still accessible using the ten key channel
 keypad). OFF cells have a gray background.

When first installed, the system assigns the first 12 (listed
 in numerical order) channels as MY favorites. The channel
 status may be changed by selecting a channel and picking a
 state, MY, ON, or OFF using the SELECT key.

Since only 12 favorites are allowed, the user must first
 remove a favorite channel by changing the status of an
 existing favorite channel to OFF or ON. When that is done,
 the first column will automatically open up a space for the
 next MY selection. When a new MY is selected, the MY
 column 120 will automatically insert the new selection in the
 prescribed order. The order of listing in the MY favorite
 channel column 120 is as follows:

All favorite broadcast stations will be listed first in
 numerical order. Next, all cable services will be listed in
 alphabetical order.

A new cable service, which displaces a previous service,
 will be inserted under the previous status. Example: If the
 channel was MY, the new service will be MY. However, a
 new cable service that appears on a new channel will be
 initialized ON.

FIG. 21 shows a front panel 130 for a remote controller
 of the schedule system. The top half of the front panel 130
 corresponds to a conventional remote controller for a tele-
 vision set and a VCR. Included are a dual function ten key
 keypad 132, with the alternate functions of each key and its
 digit shown, a TV/VCR toggle key 134, volume and channel
 up/down keys 136, and VCR control keys 138. The lower
 half of the front panel 130 contains control keys that are
 specific to the schedule system. Included are a What's On
 Tape key 140, a What's On TV key 142, a Theme key 144,
 a Record Memo key 146, a Record It key 148, a Link It key
 150, a Help/Menu key 152, a Select/Goto key 154, Left,
 Right, Up, Down and Page Cursor keys 156, a Return
 TV/VCR key 158 and a Cancel/Undo key 160. The use of
 these keys has either been explained above or is apparent
 from their labels.

FIGS. 22A and 22B are block diagrams of television
 schedule systems/tape controllers 180 and 182 in which the
 user interface is used. The schedule system/controller 180 is
 applicable to existing television equipment, where the
 schedule system is separate from the basic television equip-
 ment. Programmable tuner 202 is shown as part of a cable
 decoder. The schedule system/controller 182 is shown as
 integrated into a VCR 211. In this version, a cable decoder
 is not required, and tuner 207 is part of the VCR 211. It
 should be clear from these two systems 180 and 182 that the
 schedule/tape controller may be integrated into other tele-
 vision equipment, such as a cable decoder or a TV/Monitor
 receiver. It is also practical to implement the entire schedule/
 tape controller in a remote controller by adding a text
 display, such as an LCD screen, on remote controller 212.

In the system 180, programmable tuner 202, which may
 be part of a cable decoder unit, receives a TV signal from
 antenna 200 and/or from cable input 205. Tuner output 216
 goes to a vertical blanking interval (VBI) decoder 222,
 which may be a closed caption decoder or a high speed
 teletext decoder. Listing information and other support
 information, such as cable channel assignment data, will be
 transmitted over the VBI by one or more local stations or
 cable channels several times a day or continuously.

When update is required, programmable tuner 202 will be
 tuned automatically to the station or cable channel carrying
 the data. After the VBI signal is processed by CPU 228, the
 listing data is stored in schedule memory 232, while the
 cable channel assignment data is stored in cable-specific
 RAM memory 238. This data is used to convert generic TV

source names, such as HBO, to channel assignments for the specific cable system.

Other information transmitted to the schedule/tape controller 180 and stored in the system RAM memory 240 includes clock update data to set system clock 230 automatically, schedule update time, which may vary from once a day to a continuously transmitted format, new theme categories, and last minute schedule change data.

For a What's on TV request, the listing stored in schedule memory 232 is retrieved, processed by CPU 228, and outputted to video display generator 224. Video switcher 226 is enabled by CPU output 246 to select the video display generator 224 output whenever schedule data is to be presented to the TV/monitor 210.

When a request to time-shift record a program is made, the title of the program and its record parameters (channel, start time and length) is copied from the schedule memory 232 to the Record Memo RAM memory 236. When the system clock 230 matches the schedule time, the CPU 228 will issue a channel command to the programmable tuner of the cable decoder 202, and a power on and record command to VCR 206 by means of an infrared remote driver 214 directed at infrared input ports of these two devices. In the VCR integrated version 182, the command to the tuner 207 is made on a wired bus 264.

In addition to programming by selecting a title from the on-screen schedule, it is also possible to program the VCR 206 or 211 and the cable decoder 202 or 207 with remote controller 212. In this mode, programming information is entered into the remote controller 212, and at the required time, the remote controller 212 will issue programming commands to the proper TV device. While there are many universal remote controllers that offer programming capability, none allow the user to enter generic names, such as station and cable channel names, and have the CPU convert the names to specific channels for tuning the VCR or the cable decoder. This is implemented by incorporating CPU 228 and the cable-specific RAM 238 in the remote controller 212.

Remote controller 212 and infrared remote driver 214 are capable of emulating the infrared command instructions required by the cable decoder 202 and VCR 206. The command emulation codes for the remote driver 214 are stored in cable decoder IFR code RAM/ROM memory 239. Commands for popular cable decoders and VCRs are pre-programmed in ROM. Alternatively, the infrared commands of the original remote controller may be learned by aiming the controllers at the IFR input receiver 264 and storing the command codes in RAM memory 239 after processing by CPU 228. This process is well known in the art of universal remote controllers and need not be detailed here.

As shown in FIG. 22A, the VCR 206 and cable decoder 202 may be manually controlled by remote controller 212, or it may be automatically controlled by infrared remote driver 214.

During recording, the tape index location of the VCR 206 will be transmitted over control/data bus 270 to the CPU 228. This start address information is stored in tape directory RAM memory 234, together with the program title. The bus 270 also carries VCR control commands for recording, playback, tuner selection, and other functions, including power on/off.

Once a program is recorded, its title and other program information is stored in a section of the Record Memo RAM memory 236. To play back a recorded program, the What's on Tape request will cause a directory of recorded programs on the tape to be displayed. When a program is selected for playback from this directory, the tape will fast forward or

reverse to the tape index location specified in the Tape Directory RAM memory 234.

In the system 182, schedule/tape controller 220 is embedded in the VCR 211. The VCR tape mechanism 252 contains all the record and playback electronics of the video recorder, less the programmable tuner 207. Data recorded on the control track of a tape is coupled to the CPU 228 over input bus 258 and output bus 256. The art of recording data on the control track is well known, for example, in recent VCRs with indexing capability. CPU 228 commands to the VCR 211 are carried over bus 254. When schedule information is to be displayed, video switcher control input 246 selects the display generator on line 218. At other times, video switcher 226 selects the output of the VCR mechanism 252 on line 250.

Schedule information may be downloaded from the VBI. Alternatively or supplementally, it may be downloaded from a telecommunication line 270 to modem 268 and to CPU 228 via line 266. Other means of delivering schedule information can be employed, including the use of a subcarrier channel on the cable service.

It should now be readily apparent to those skilled in the art that a system and method incorporating a novel user interface capable of achieving the stated objects of the invention has been provided. The user interface that is configured to compensate for the particular nature of the television schedule information. The user interface has a cursor operation that compensates for an irregular grid format of the television schedule information. The user interface presents the schedule information in a format that compensates for limited resolution of the television display. The user interface presents supplemental schedule information in overlays that obscure a minimum amount of useful other information. Order of presentation of the schedule information in the interface is customizable by user preference.

It should further be apparent to those skilled in the art that various changes in form and details of the invention as shown and described may be made. It is intended that such changes be included within the spirit and scope of the claims appended hereto.

What is claimed is:

1. An interactive television schedule system, which comprises:

a television display;

means coupled to said television display for displaying the television schedule on said television display as a grid of two-dimensionally arranged, adjacent irregular cells which vary in length corresponding to time duration of programs, with a title of a program being displayed in each of said irregular cells, said grid having a plurality of channels listed in a first dimension and time listed in a second dimension;

user input means coupled to said means for displaying the television schedule, said user input means including a program selector and a movement control for a visual identification of ones of said irregular cells which initiates movement of said visual identification in the first dimension, and irregular movement of said visual identification in the second dimension in steps corresponding to variation in cell size, responsive to an input by a user to said movement control, between first and second ones of said irregular cells to select a desired one of said irregular cells corresponding to a desired program;

a tuner coupled to said user input means for tuning to the desired program, and

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means coupled to said means for displaying the television schedule for displaying a program note overlay including a program description for the desired program on said television display.

2. The interactive television schedule system of claim 1 additionally comprising means coupled to said means for displaying the television schedule for selecting the desired visually identified program in response to activation of said program selector, and

a receiver coupled to said means for selecting the desired program to tune said receiver to a select channel for the desired program.

3. The interactive television schedule system of claim 1 additionally comprising means coupled to said means for displaying the television schedule for selecting the desired visually identified program in response to activation of said program selector, and

a recording device coupled to said means for selecting the desired program to record the desired program.

4. The interactive television schedule system of claim 1 in which said means for displaying the program note overlay is configured to display the program note overlay in different locations over said grid depending on a location of said visual identification on said grid to avoid masking said visual identification.

5. The interactive television schedule system of claim 4 in which said means for displaying the program note overlay is configured to display the program note overlay above said visual identification when said visual identification is near a bottom of said grid.

6. The interactive television schedule system of claim 4 in which said means for displaying the program note overlay is configured to display the program note overlay below said visual identification when said visual identification is near a top of said grid.

7. The interactive television schedule system of claim 1 in which said visual identification comprises a cursor.

8. An interactive television schedule system, which comprises: a television display,

means coupled to said television display for displaying the television schedule on said television display as a grid of two-dimensionally arranged, adjacent irregular cells which vary in length corresponding to time duration of programs, with a title of a program being displayed in each of said irregular cells, said grid having a plurality of channels listed in a first dimension and time listed in a second dimension.

user input means coupled to said means for displaying the television schedule, said user input means including a program selector and a movement control for a visual identification of ones of said irregular cells which initiates movement of said visual identification in the first dimension, and irregular movement of said visual identification in the second dimension in steps corresponding to variation in cell size, responsive to an input by a user to said movement control, between first and second ones of said irregular cells to select a desired one of said irregular cells corresponding to a desired

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program.

means coupled to said means for displaying the television schedule for selecting the desired visually identified program in response to activation of said program selector.

means coupled to said means for displaying the television schedule for displaying a program note overlay including a program description for the desired program on said television display, and

a programmable tuner coupled to said means for selecting the desired program for tuning said programmable tuner to a selected channel for the desired program while the program note overlay is displayed on said television display.

9. The interactive television schedule system of claim 8 in which said visual identification comprises a cursor.

10. An interactive television schedule system, which comprises:

a television display,

means coupled to said television display for displaying the television schedule on said display as a grid of two-dimensionally arranged, adjacent irregular cells which vary in length corresponding to time duration of programs, with a title of a program being displayed in each of said irregular cells, said grid having a plurality of channels listed in a first dimension and time listed in a second dimension,

user input means coupled to said means for displaying the television schedule, said user input means including a program selector and a movement control for a visual identification of ones of said irregular cells which initiates movement of said visual identification in the first dimension, and irregular movement of said visual identification in the second dimension in steps corresponding to variation in cell size, responsive to an input by a user to said movement control, between first and second ones of said irregular cells to select a desired one of said irregular cells corresponding to a desired program.

means coupled to said means for displaying the television schedule for selecting the desired visually identified program in response to activation of said program selector.

means coupled to said means for displaying the television schedule for displaying a program note overlay including a program description for the desired program on said television display.

a recording device coupled to said means for selecting the desired program for recording the desired program, and

a tuner coupled to said program selector for tuning to the desired program while the program note overlay is displayed on said television display.

11. The interactive television schedule system of claim 10 in which said visual identification comprises a cursor.

* * * * *



US005532754A

United States Patent [19]

Young et al.

[11] **Patent Number:** 5,532,754[45] **Date of Patent:** Jul. 2, 1996**[54] BACKGROUND TELEVISION SCHEDULE SYSTEM**

[75] Inventors: Patrick Young, San Mateo; John H. Roop, Palo Alto; Michael W. Faber, Pleasanton, all of Calif.

[73] Assignee: Starsight Telecast Inc., Fremont, Calif.

[21] Appl. No.: 226,209

[22] Filed: Apr. 11, 1994

Related U.S. Application Data

[63] Continuation of Ser. No. 33,773, Mar. 19, 1993, Pat. No. 5,353,121, which is a continuation-in-part of Ser. No. 579,555, Sep. 10, 1990, abandoned, and a continuation-in-part of Ser. No. 916,043, Jul. 17, 1992, abandoned, which is a continuation of Ser. No. 778,404, Oct. 17, 1991, Pat. No. 5,151,789, which is a continuation-in-part of Ser. No. 428,620, Oct. 30, 1989, abandoned.

[51] Int. Cl.⁶ H04N 5/44

[52] U.S. Cl. 348/569; 348/563; 348/734; 348/906; 455/185.1

[58] Field of Search 348/569, 570, 348/734, 906, 6, 12, 13, 563; 358/335; 455/185.1, 186.1, 168; H04N 5/44

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Primary Examiner—Victor R. Kostak

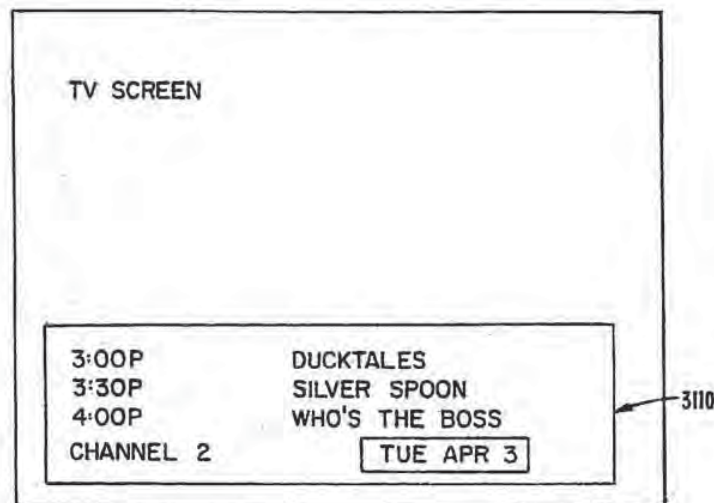
Assistant Examiner—Glenton B. Burgess

Attorney, Agent, or Firm—Townsend and Townsend and Crew

[57] ABSTRACT

Screen (10) for a user interface of a television schedule system and process consists of an array (24) of irregular cells (26), which vary in length, corresponding to different television program lengths of one half hour to one-and-one half hours or more. The array is arranged as three columns (28) of one-half hour in duration, and twelve rows (30) of program listings. Some of the program listings overlap two or more of the columns (28) because of their length. Because of the widely varying length of the cells (26), if a conventional cursor used to select a cell location were to simply step from one cell to another, the result would be abrupt changes in the screen (10) as the cursor moved from a cell (26) of several hours length to an adjacent cell in the same row. An effective way of timing the motion is to assume that behind every array (24) is an underlying array of regular cells. By restricting cursor movements to the regular cells, abrupt screen changes will be avoided. With the cursor (32), the entire cell (26) is 3-D highlighted, using a conventional offset shadow (34). The offset shadow (34) is a black bar that underlines the entire cell and wraps around the right edge of the cell. A background mode for the television program guide presents several lines of guide information overlying a portion of the current television program.

7 Claims, 26 Drawing Sheets



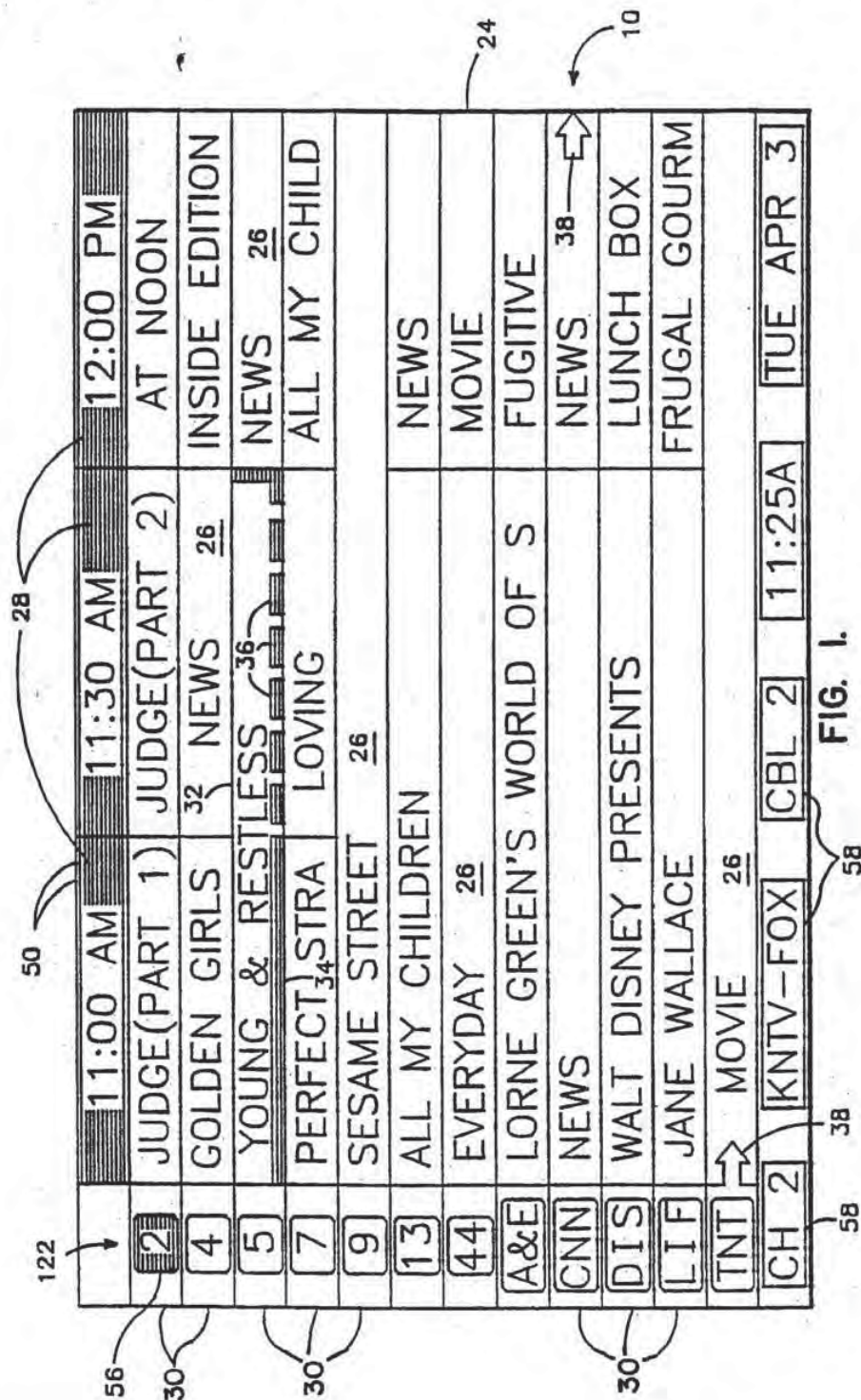


FIG. 1.

32	40	48	11:00 AM	11:30 AM	12:00 PM
			JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
2	4		GOLDEN GIRLS	NEWS	INSIDE EDITION
	5		YOUNG & RESTLESS	NEWS	NEWS
	7		PERFECT STRA	LOVING	ALL MY CHILD
	9		SESAME STREET		
	13		ALL MY CHILDREN		NEWS
	44		EVERYDAY		MOVIE
A&E			LORNE GREEN'S WORLD OF S		FUGITIVE
CNN			NEWS		NEWS
DIS			WALT DISNEY PRESENTS		LUNCH BOX
LIF			JANE WALLACE		FRUGAL GOURM
TNT			MOVIE		
CH 2	KNTV-FOX	CBL 2	11:25A	TUE APR 3	

FIG. 2.

44	11:00 AM		11:30 AM		12:00 PM	
	JUDGE (PART 1)		JUDGE (PART 2)		AT NOON	
[2]	GOLDEN GIRLS		NEWS ²⁶		INSIDE EDITION	
[4]	YOUNG & RESTLESS		LOVING		NEWS ²⁶	
[5]	PERFECT STRA		SESAME STREET		ALL MY CHILD	
[7]	ALL MY CHILDREN		EVERYDAY ²⁶		NEWS ²⁶	
[9]	LORNE GREEN'S WORLD OF S		NEWS		MOVIE	
[13]	WALT DISNEY PRESENTS		TNT		FUGITIVE	
[44]	JANE WALLACE		MOVIE ²⁶		NEWS	
A&E	KNTV-FOX		CBL 2		LUNCH BOX	
CNN					FRUGAL GOURM	
DIS						
LIF						
TNT						
CH 2						

FIG. 3.

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PENDING RECORDINGS	RECORDED PROGRAMS	LINKED TITLES	ON GRID PROG
NEWS	CH 4	4/3 11:30A	:30
ROSEANNE	CH 13	4/3 9:00P	:30
ALL MY CHILDREN	CH 7	4/4 12:00P	1:00
MACNEIL, LEHRER	CH 9	4/4 6:30P	1:00
QUANTUM LEAP	CH 4	4/5 10:00P	1:00
NOVA	CH 9	4/5 8:00P	1:00
MOVIE: ALIEN NATION	HBO	4/5 9:00P	2:00
ALL MY CHILDREN	CH 7	4/6 12:00P	1:00
CHEERS	CH 5	4/6 7:00P	:30
MOVIE: SUMMER JOB	SHO	4/6 9:00P	2:00
NBA BASKETBALL	CH 5	4/7 4:00P	?
		SP	EP

FIG. 4.

	11:00 AM	11:30 AM	12:00 PM
[2]	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
[4]	GOLDEN GIRLS	NEWS ²⁶	INSIDE EDITION
[5]	YOUNG & RESTLESS	⁴⁶	NEWS ²⁶
[7]	PERFECT STRA	LOVING	ALL MY CHILD
[9]	SESAME STREET ²⁶		
[13]	ALL MY CHILDREN		NEWS ²⁶
[44]	EVERYDAY		MOVIE
[A&E]	LORNE GREEN'S WORLD OF S		FUGITIVE
[CNN]	NEWS ²⁶		NEWS ↗
[DIS]	WALT DISNEY PRESENTS		LUNCH BOX
[LIF]	JANE WALLACE		FRUGAL GOURM
[TNT]	↗ MOVIE ²⁶		
[CH 2]	[KNTV-FOX]	[CBL 2]	[11:25A] [TUE APR 3]

FIG. 5.

	11:00 AM	11:30 AM	12:00 PM
2	JUDGE(PART 1)	JUDGE(PART 2)	AT NOON
4	GOLDEN GIRLS	NEWS ²⁶	INSIDE EDITION
5	YOUNG & RESTLESS		NEWS ²⁶
7	PERFECT STRA	LOVING	ALL MY CHILD
9	SESAME STREET ²⁶		
13	ALL MY CHILDREN		NEWS ²⁶
44	EVERYDAY ²⁶		MOVIE
A&E	LORNE GREEN'S WORLD OF S		FUGITIVE
CNN	NEWS		NEWS
DIS	DOROTHY BRINGS SOPHIA'S SISTER (NANCY WALKER) OVER FROM SICILY AS A BIRTHDAY SURPRISE		
LIF			
TNT			
CH 2	KNTV-FOX	CBL 2	11:25A
			TUE APR 3

FIG. 6.

WHAT'S NEXT ON CHANNEL 2			
11:00 A	JUDGE (PART 1)		
11:30 A	JUDGE (PART 2)		
12:00 P	AT NOON		
1:00 P	MOVIE: ANATOMY OF A SEDUCTION		
3:00 P	ALVIN AND THE CHIPMUNKS		
3:30 P	SUPER MARIO BROS. SUPER SHOW		
4:00 P	CHIP'N DALES RESCUE RANGERS		
4:30 P	DUCKTALES		
5:00 P	SILVER SPOONS		
5:30 P	THREE'S COMPANY		
6:00 P	WHO'S THE BOSS		
6:30 P	MAMA'S FAMILY		
7:00 P	CHEERS		
CH 2	KNTV-FOX	CBL 2	11:25A TUE APR 3

FIG. 7.

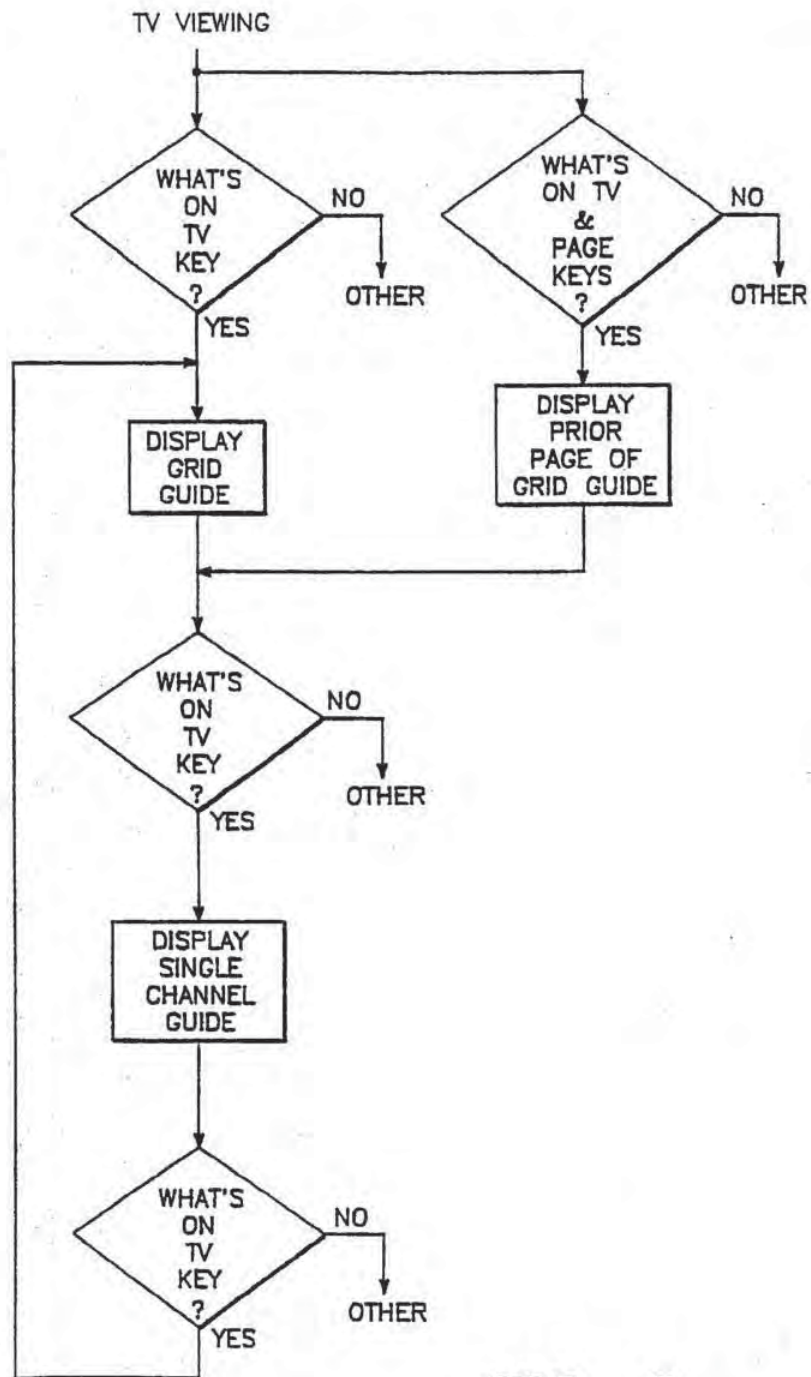


FIG.-8

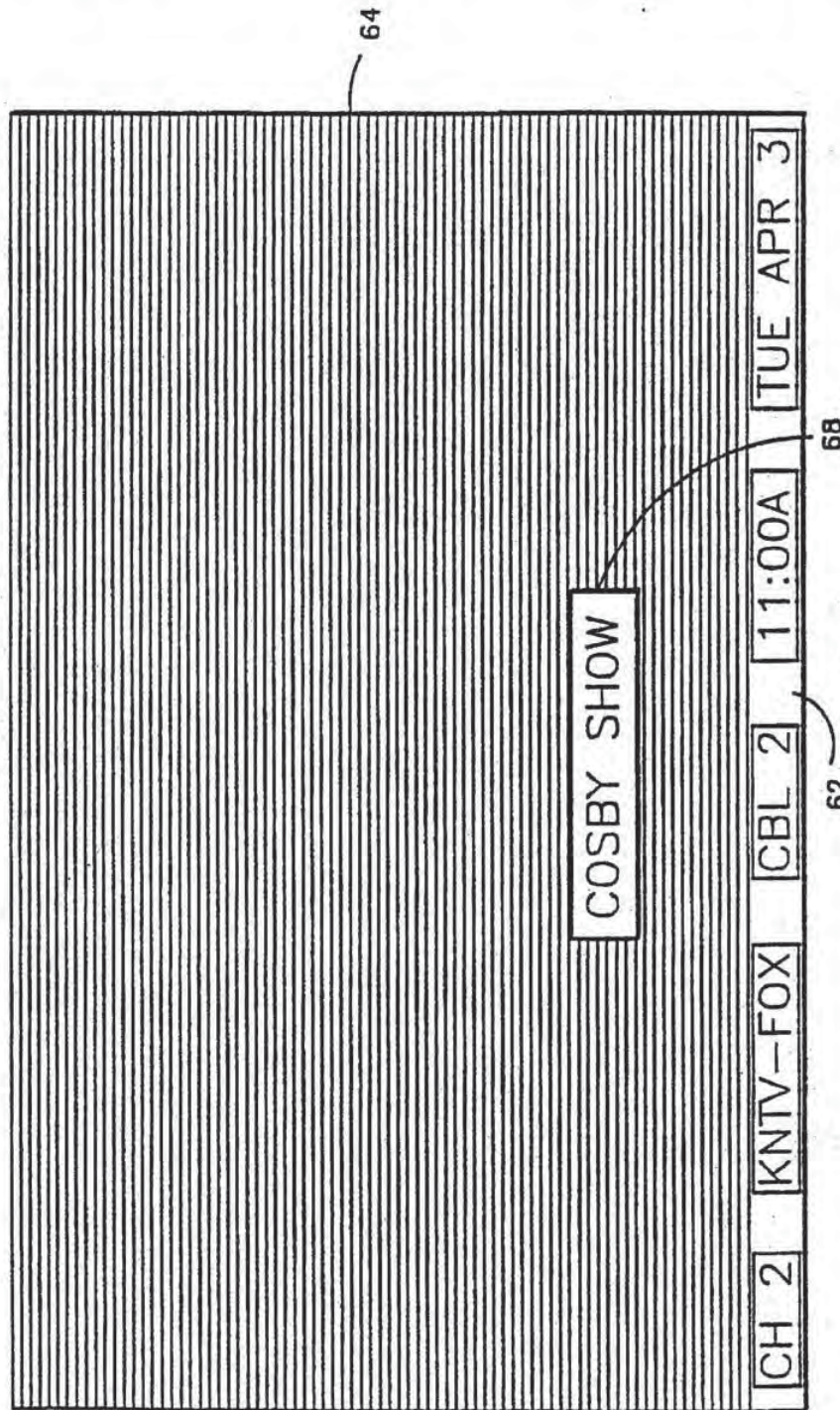
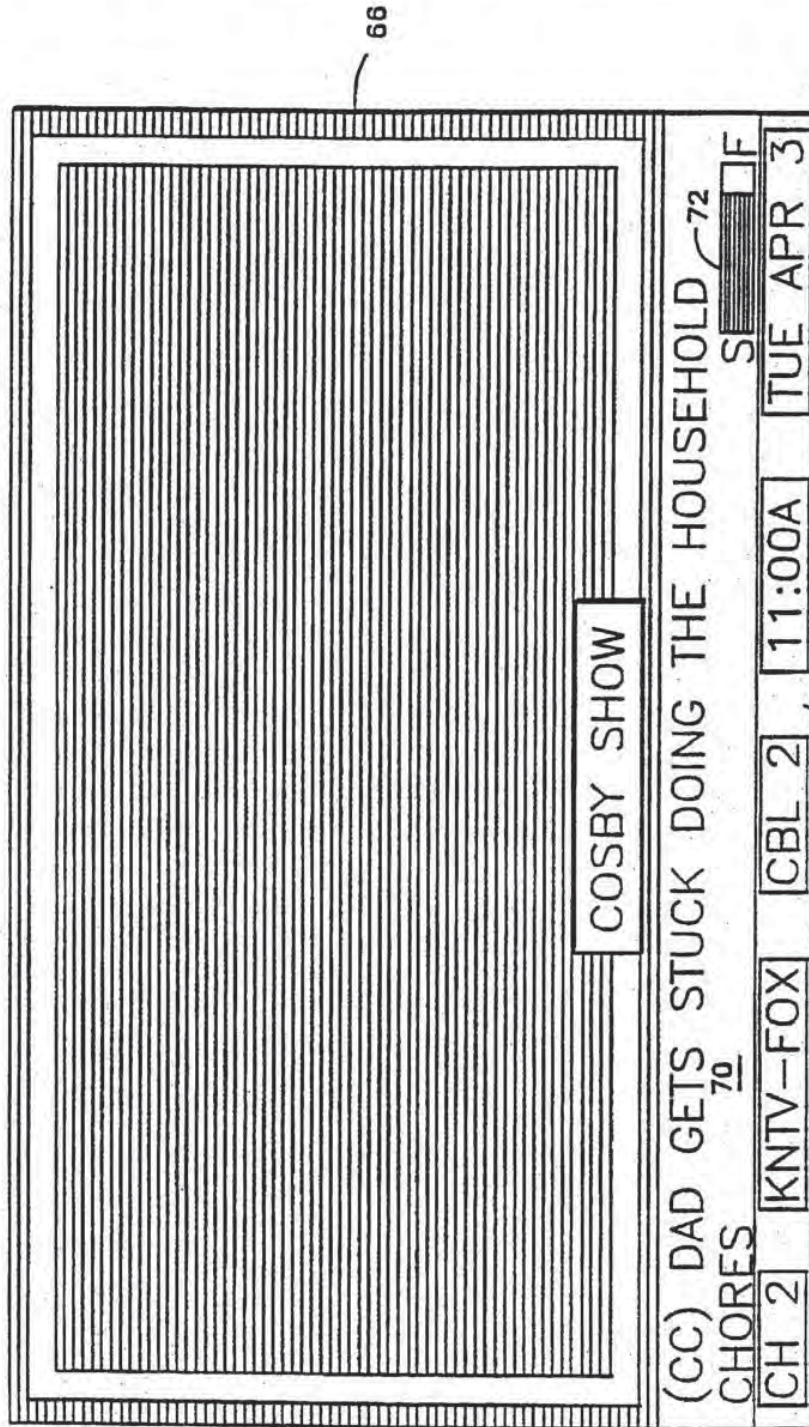


FIG. 9.



62 FIG. 10.

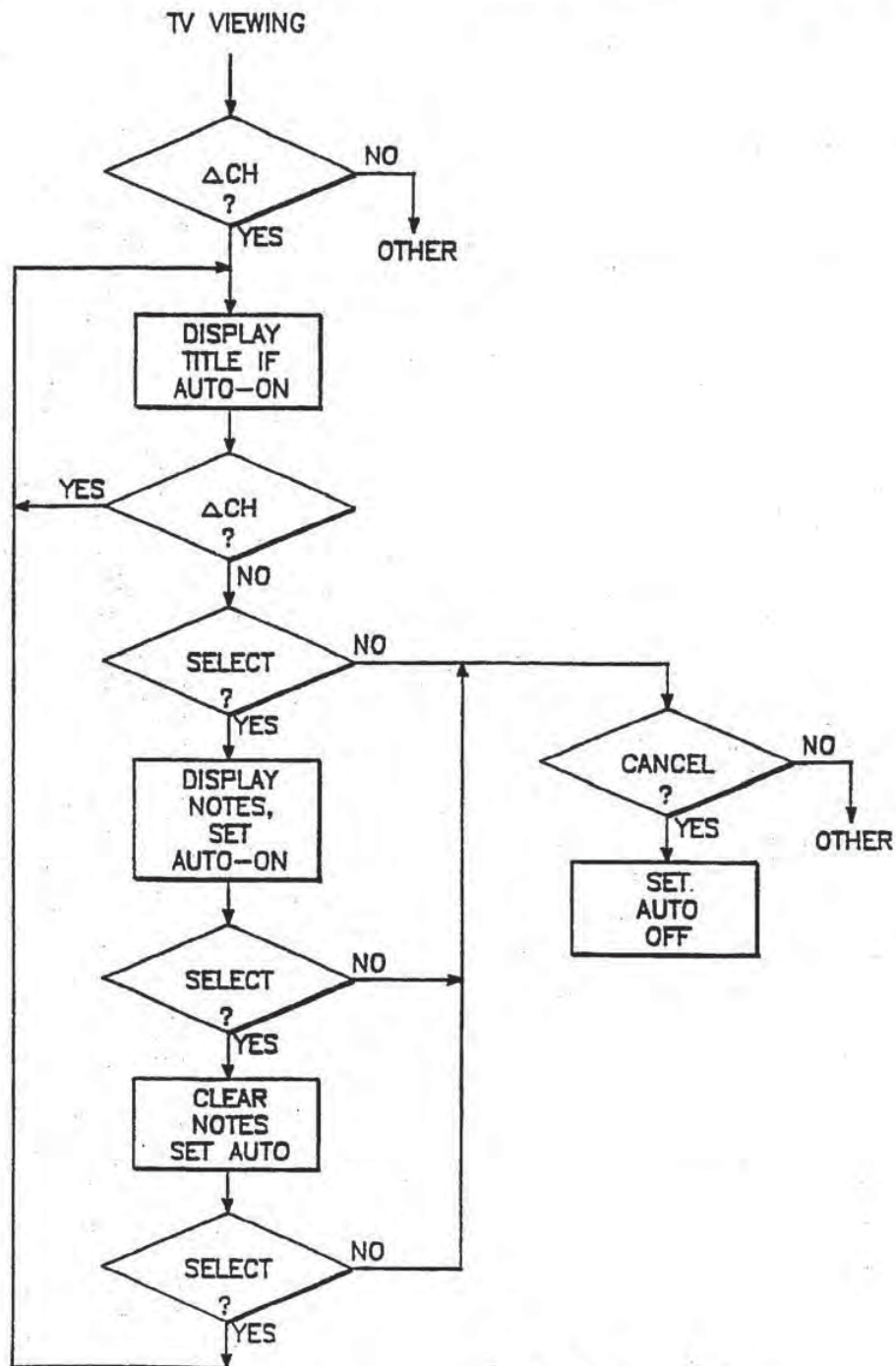


FIG.-11

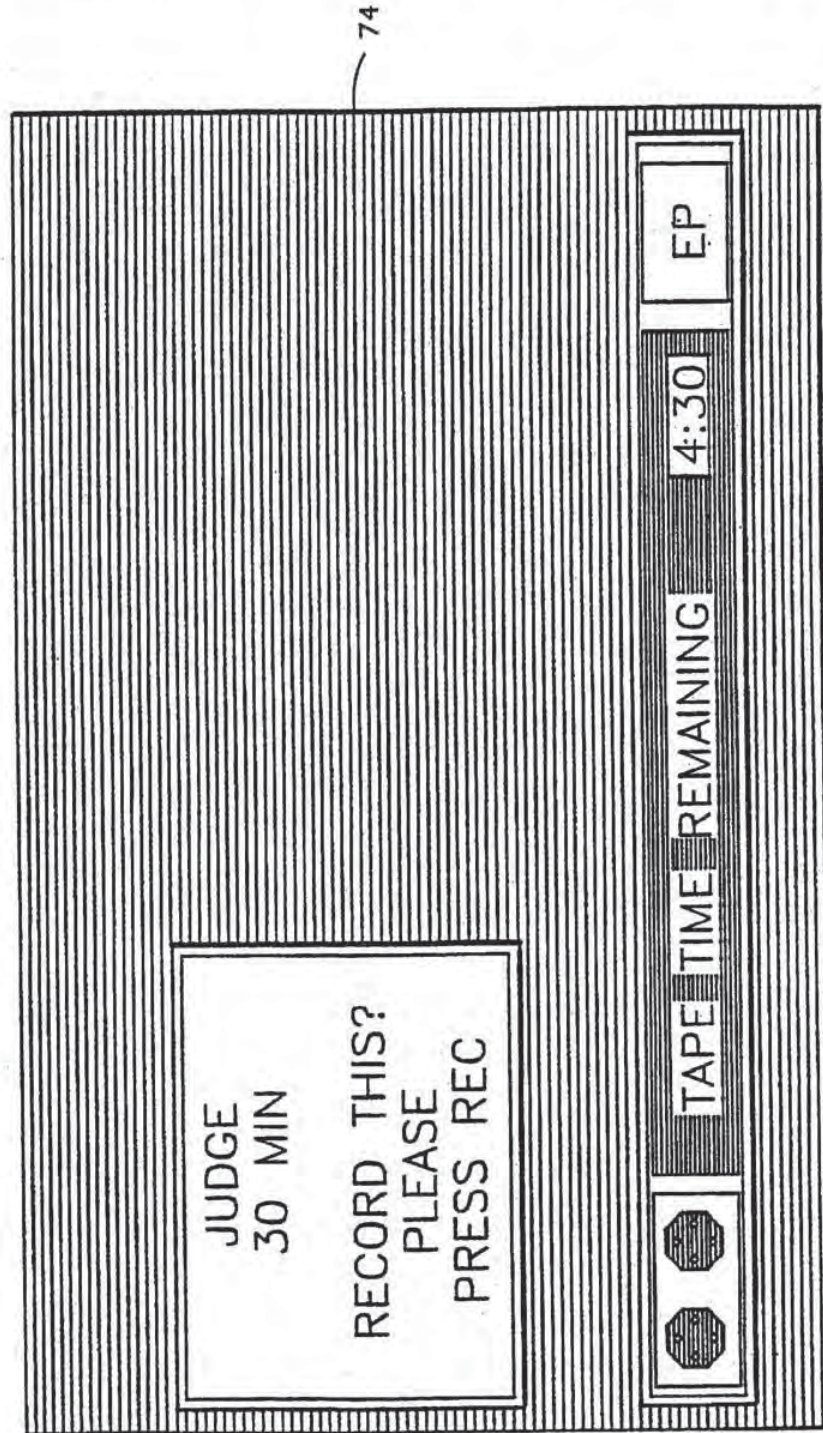


FIG. 12.

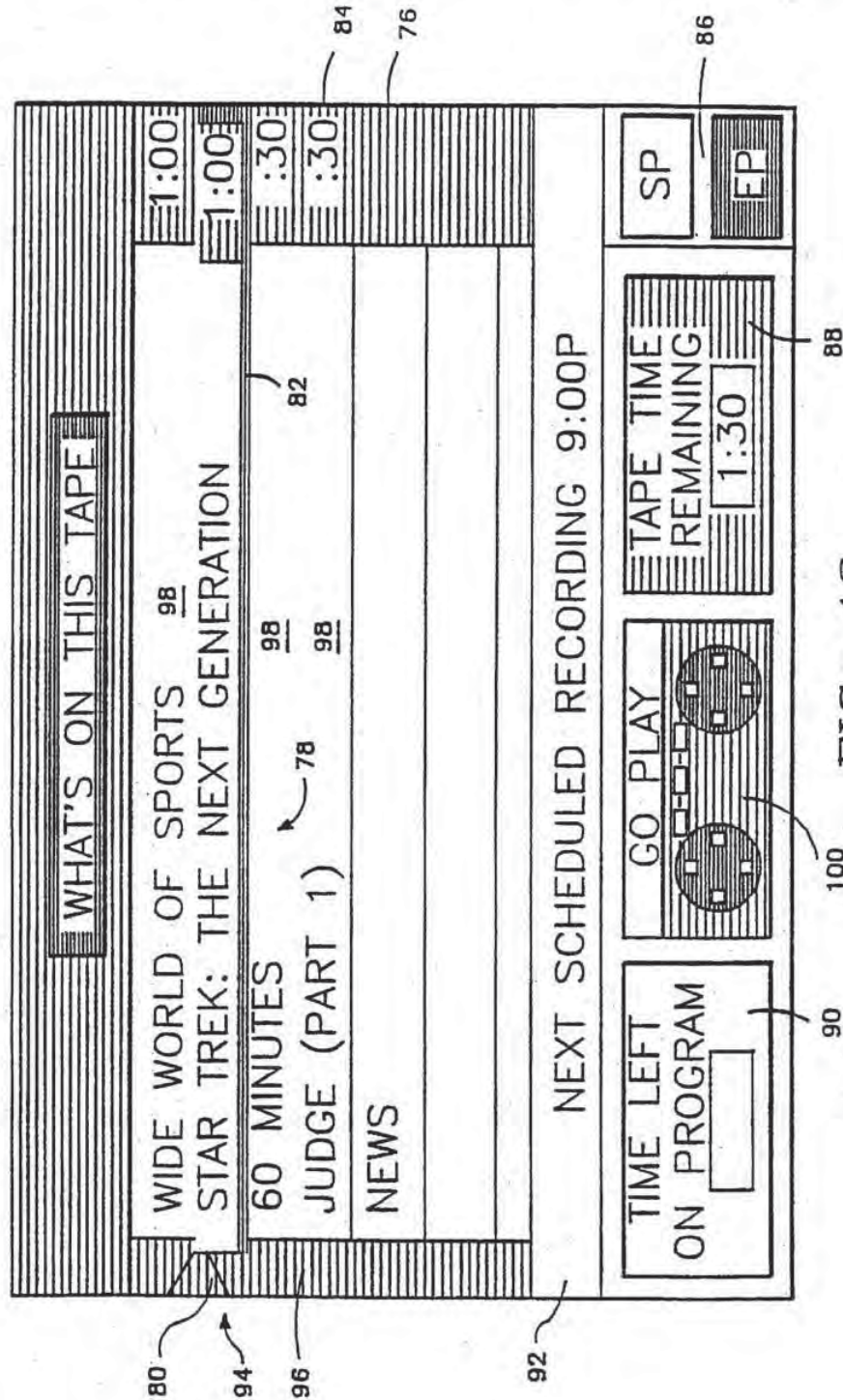


FIG. -13

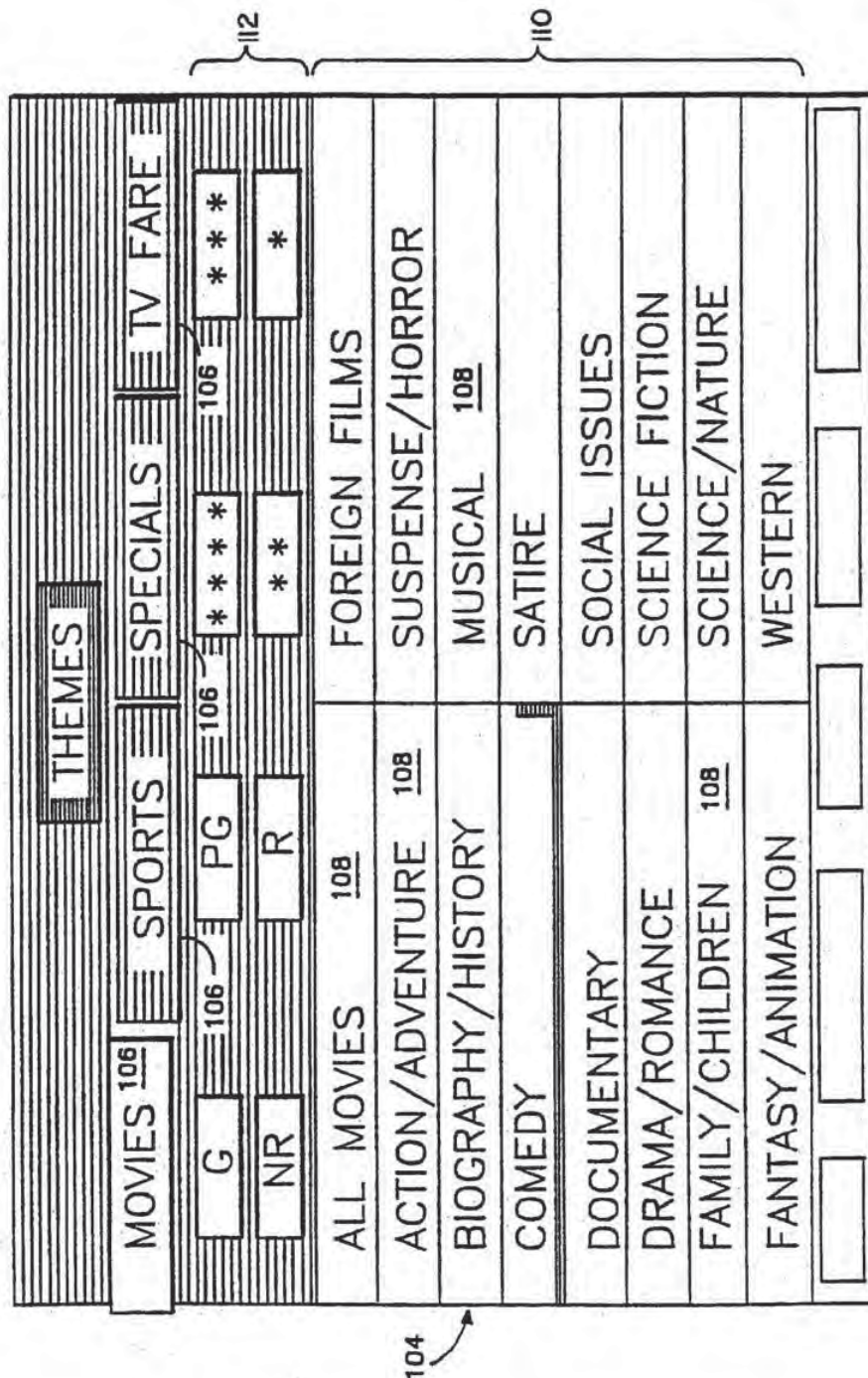


FIG. 14.

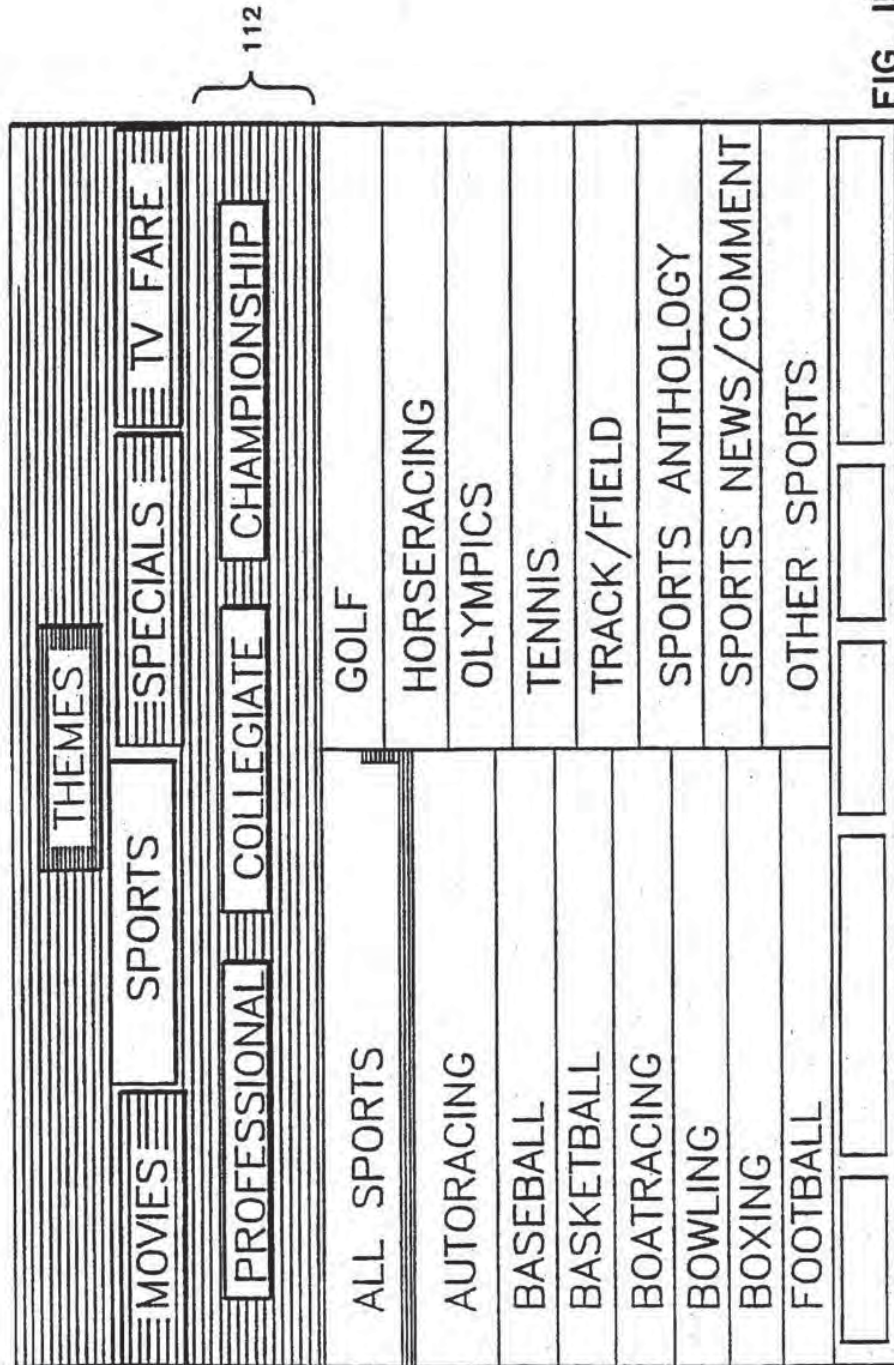
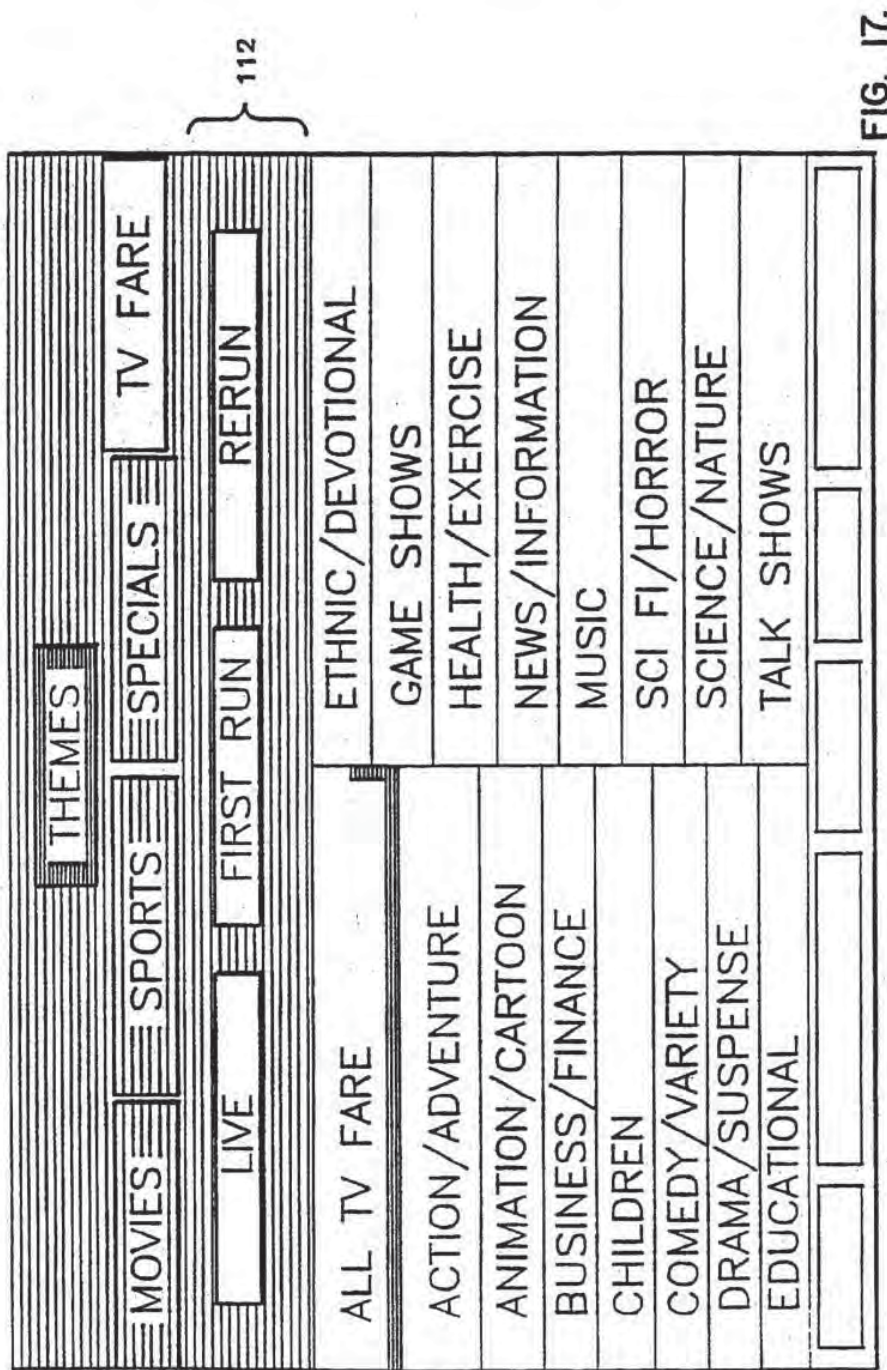


FIG. 15.

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THEMES	
MOVIES	SPECIALS
LIVE	FIRST RUN
	RERUN
ALL SPECIALS	NEWS
AWARD/PAGEANTS	PICK OF THE WEEK
COMEDY	PIPELINE PROGRAMS
DRAMA	BULLETIN BOARD
ENTERTAINMENT	
FAMILY/CHILD	
HOLIDAY	
MINI-SERIES	

FIG. 16.



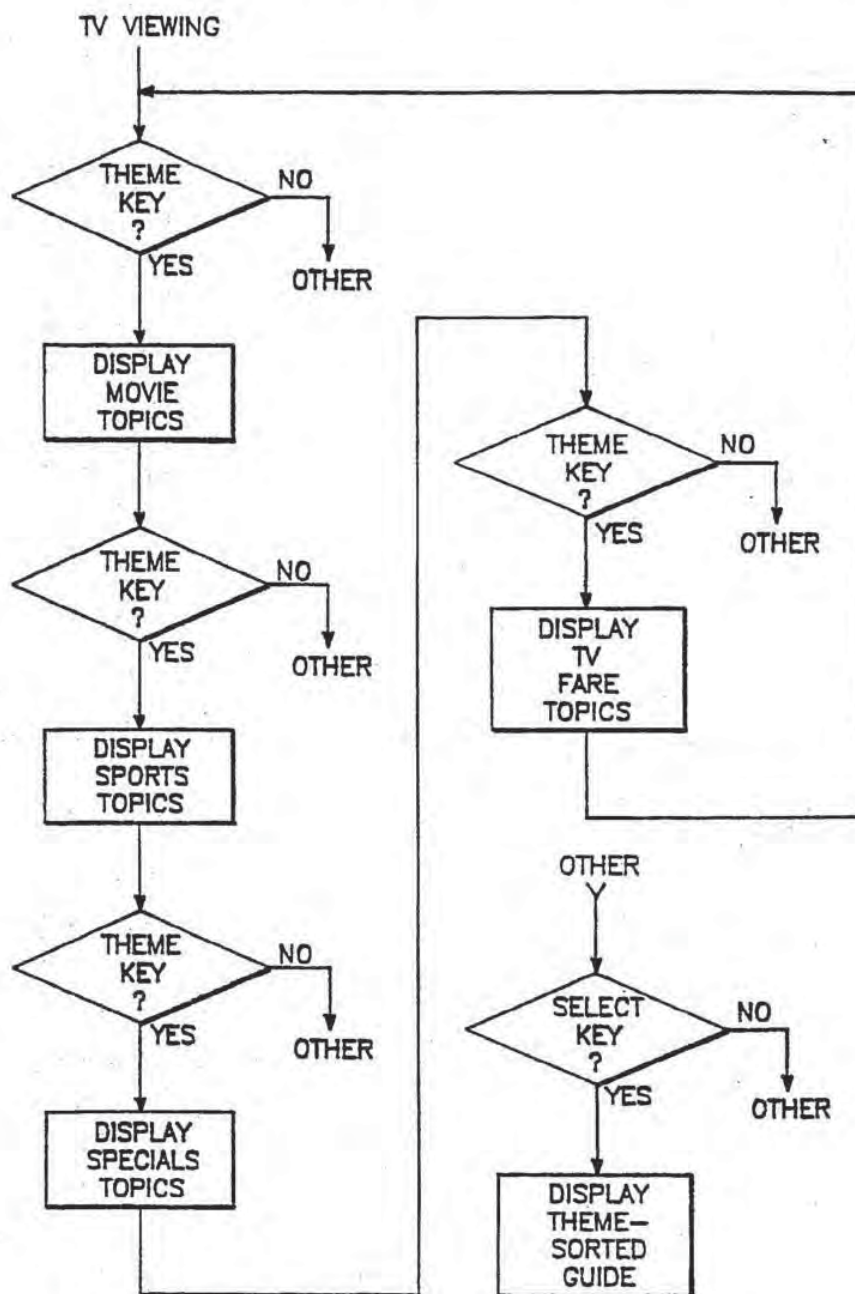


FIG. - 18

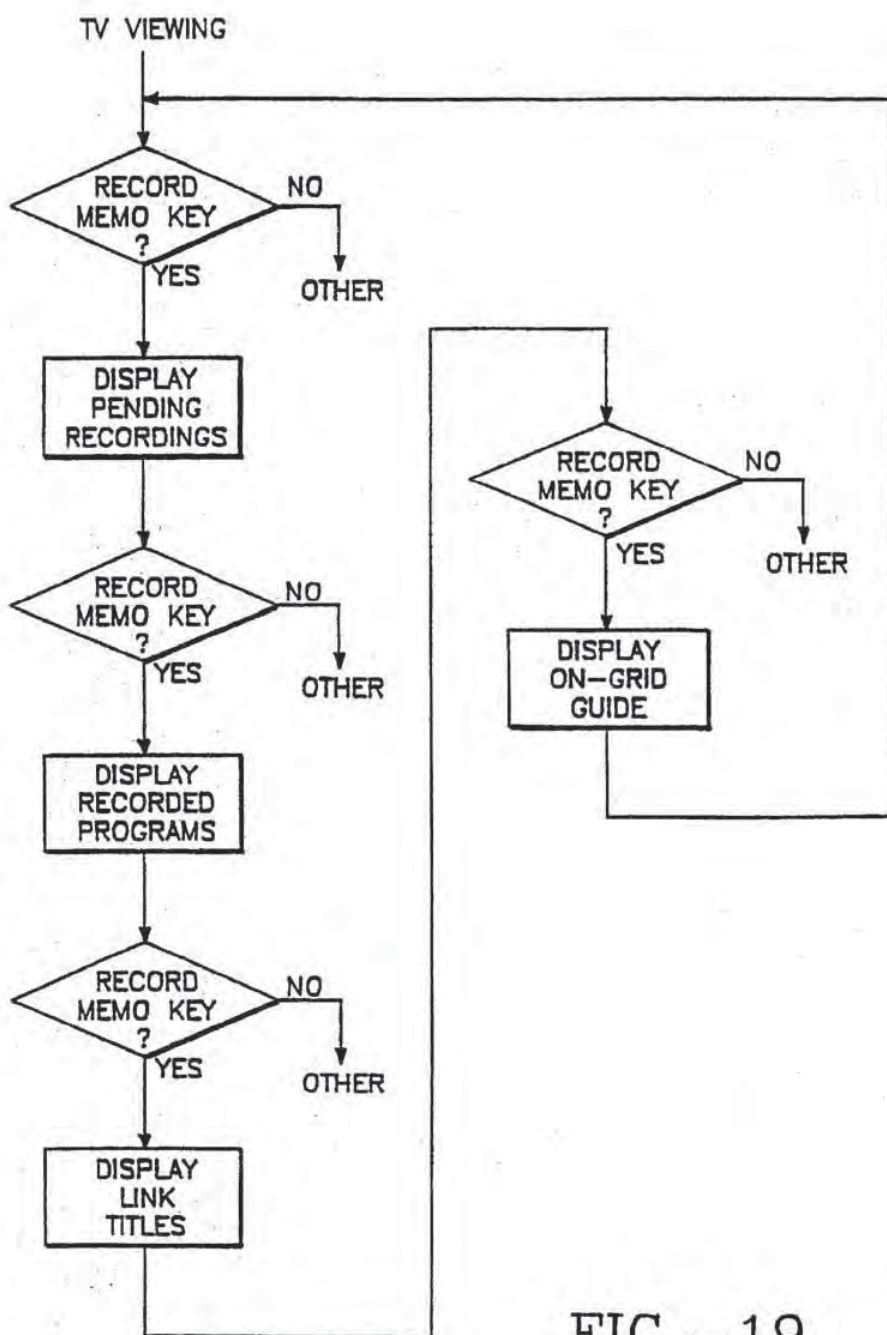


FIG.-19

CHANNEL CUSTOMIZATION				PAGE 1
MY	2	KTVU-2	14 WGN	26 CSPAN
4	3	KICU-36	15 PPVW	27 MAX
5	4	KRON-4	16 KVOF-38	28 CSPAN
7	5	KPIX-5	17 WTBS	29 EDUC
9	6	KSTS-48	18 KCSM-60	30 DIS
20	7	KGO-7	19 KTSF-26	31 VH-1
44	8	KTEH-54	20 KOFY-20	32 SHO
HBO	9	KQED-9	21 TRVL	33 CNN
SHO	10	KDTV-14	22 CBN	34 ESPN
CNN	11	KNTV-11	23 CBB	35 LIF
DIS	12	KBHK-44	24 BDSS	36 HBO
ESPN	13	EKQEC-32	25 BARC	37 GALA
USE SELECT TO CHANGE STATUS:				MY OFF ON

FIG. 20.

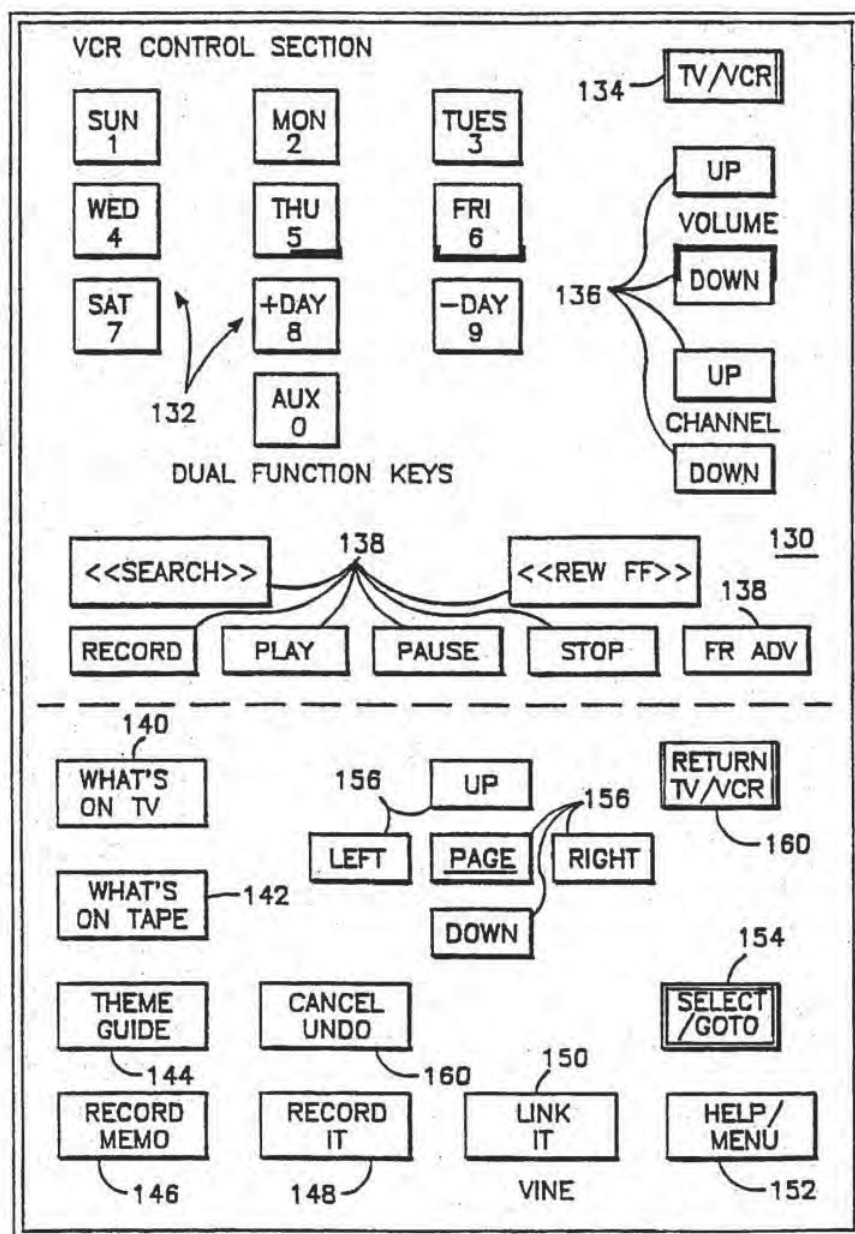


FIG.-21

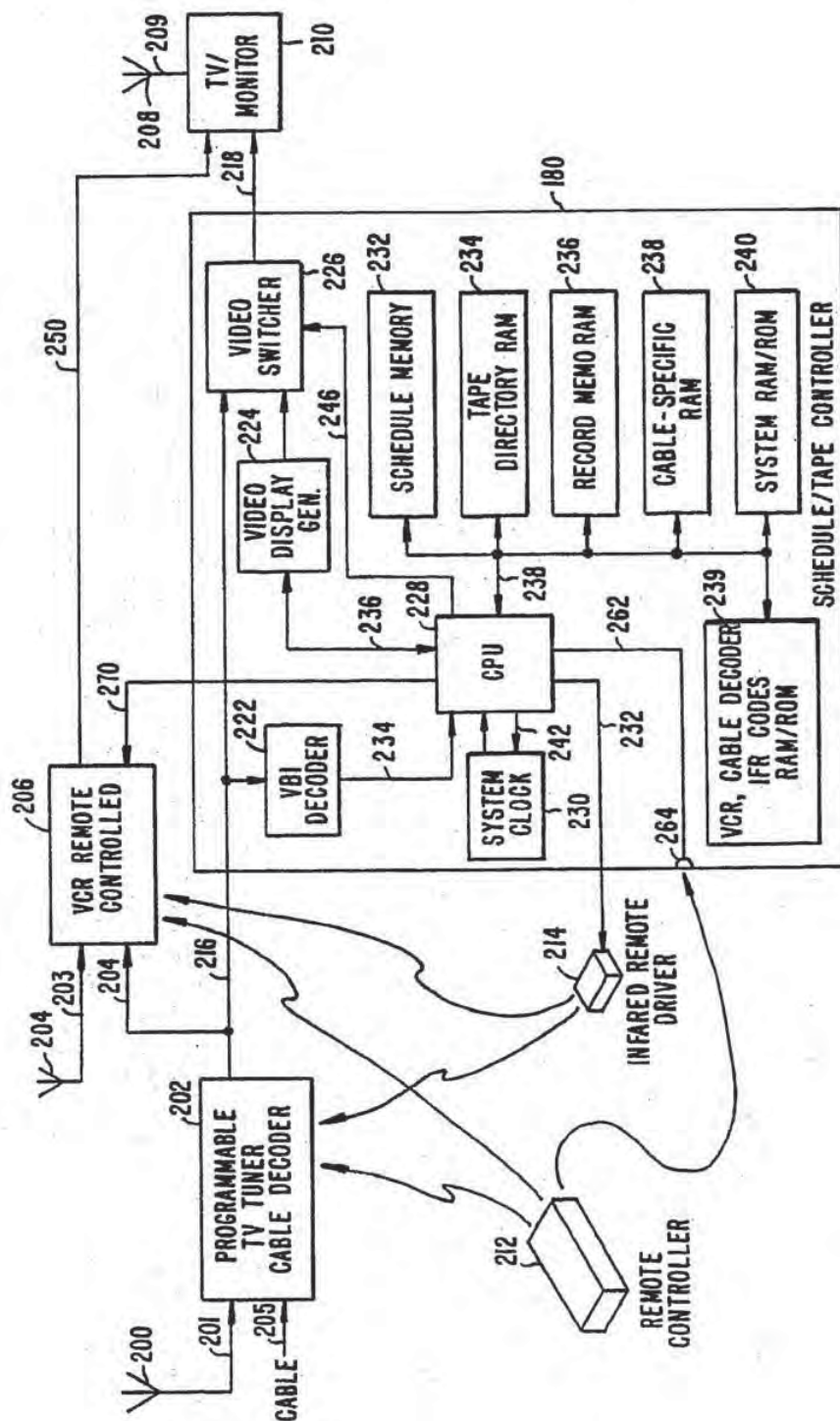


FIG. 22A.

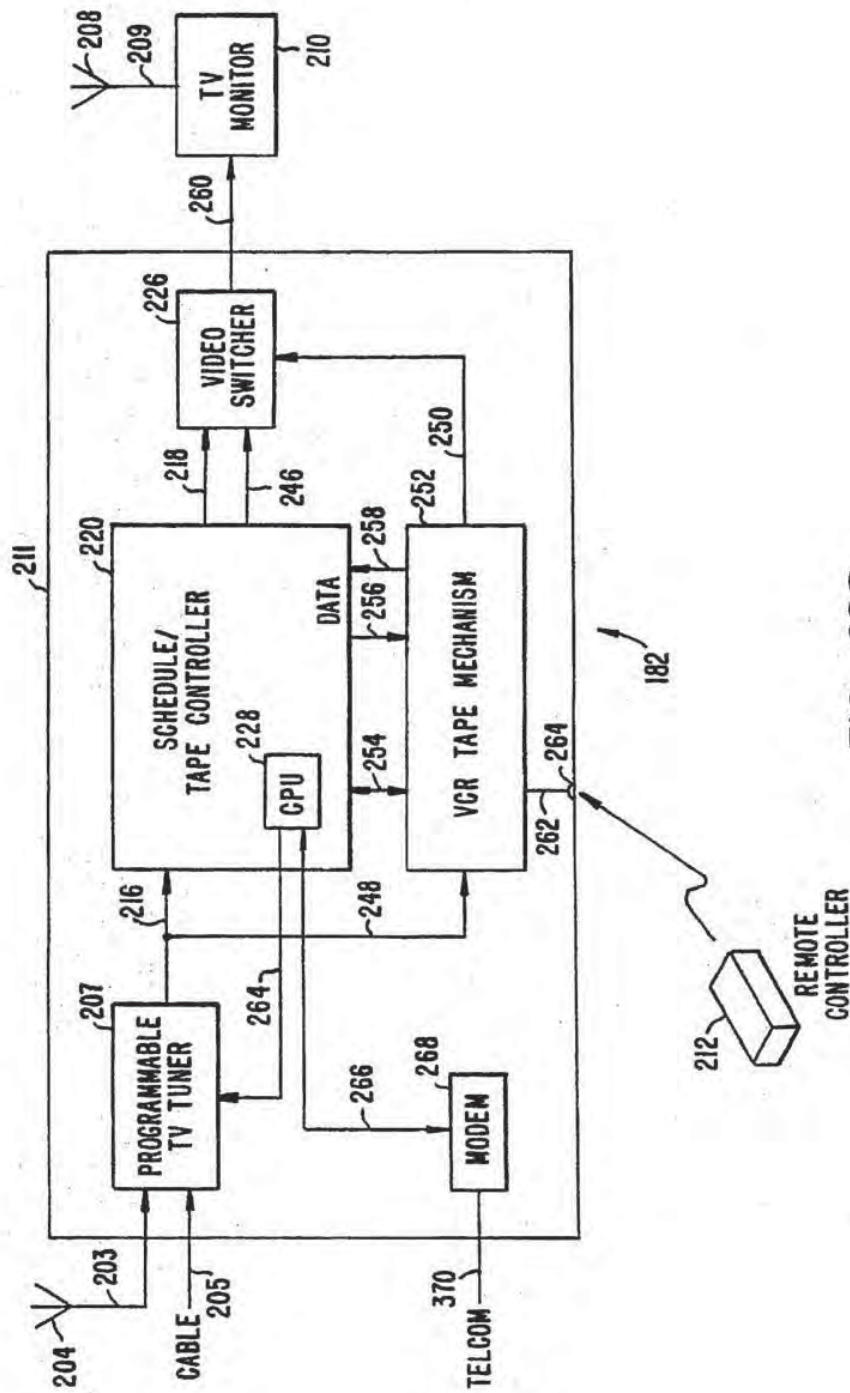


FIG. 22B.

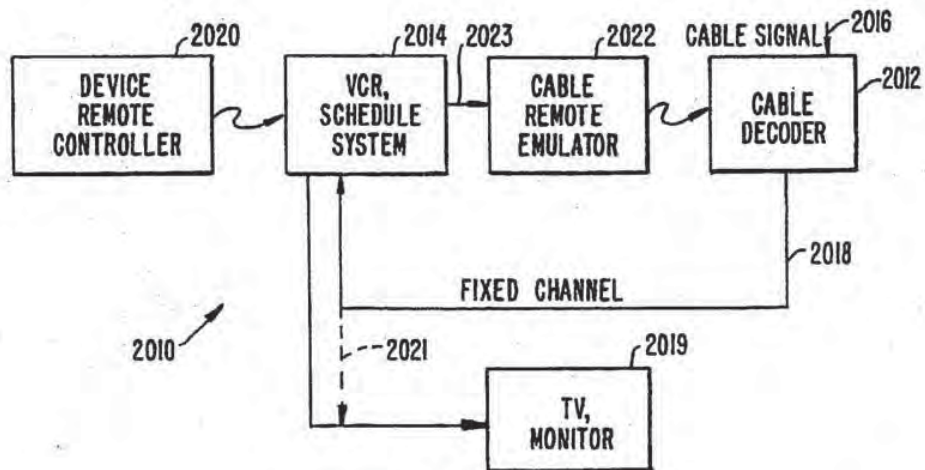


FIG. 23.

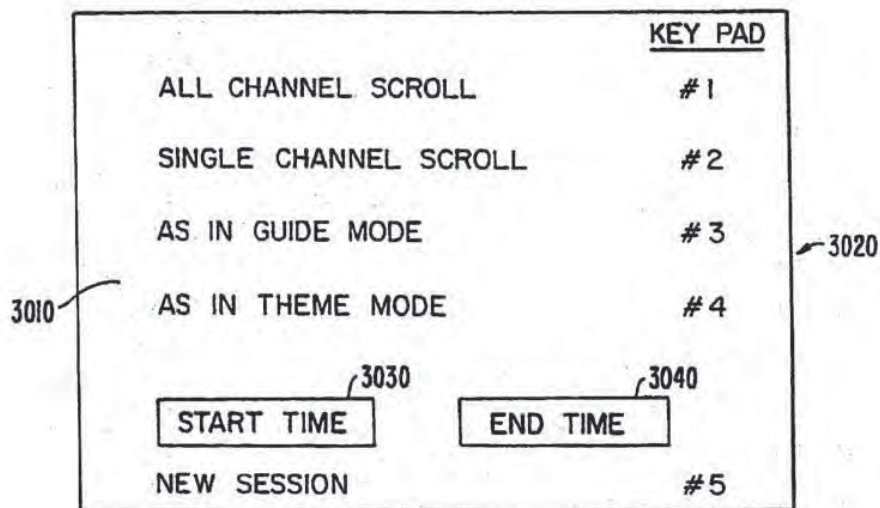


FIG. 25.

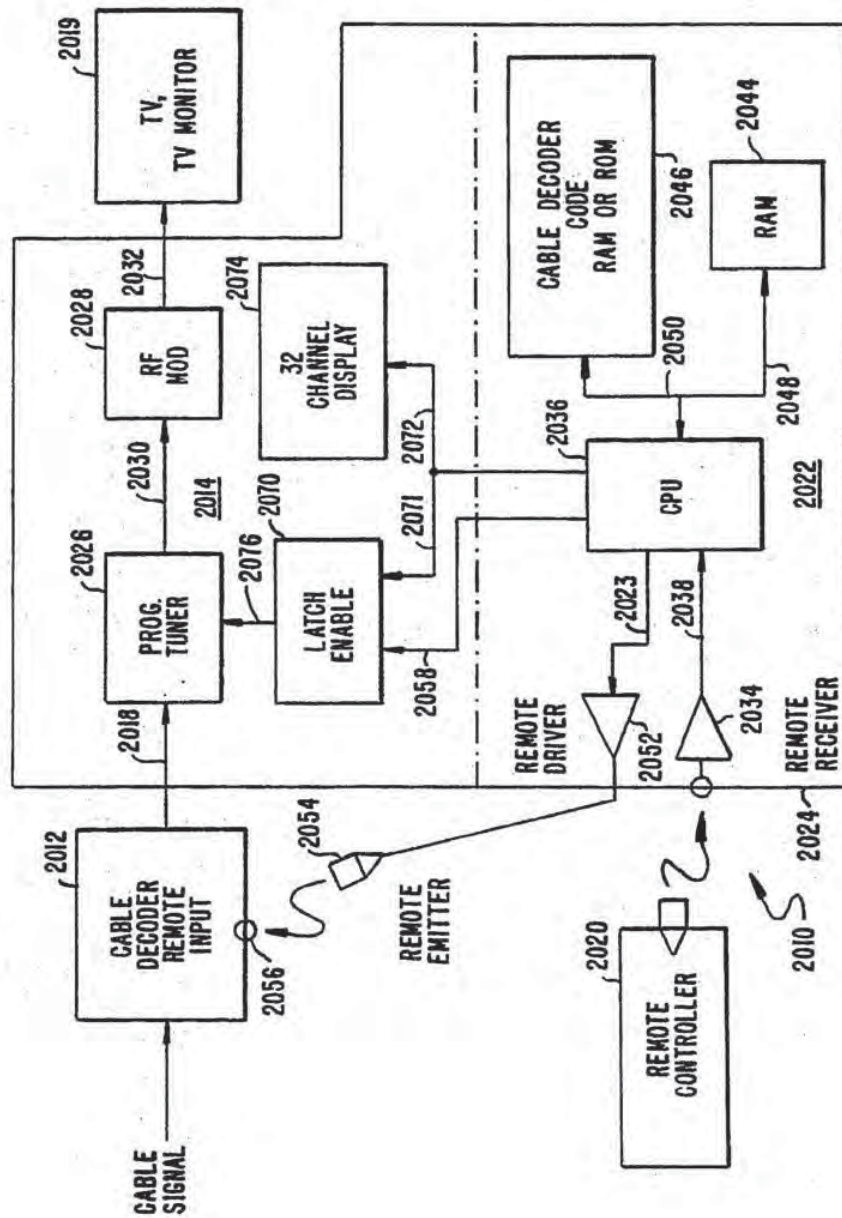
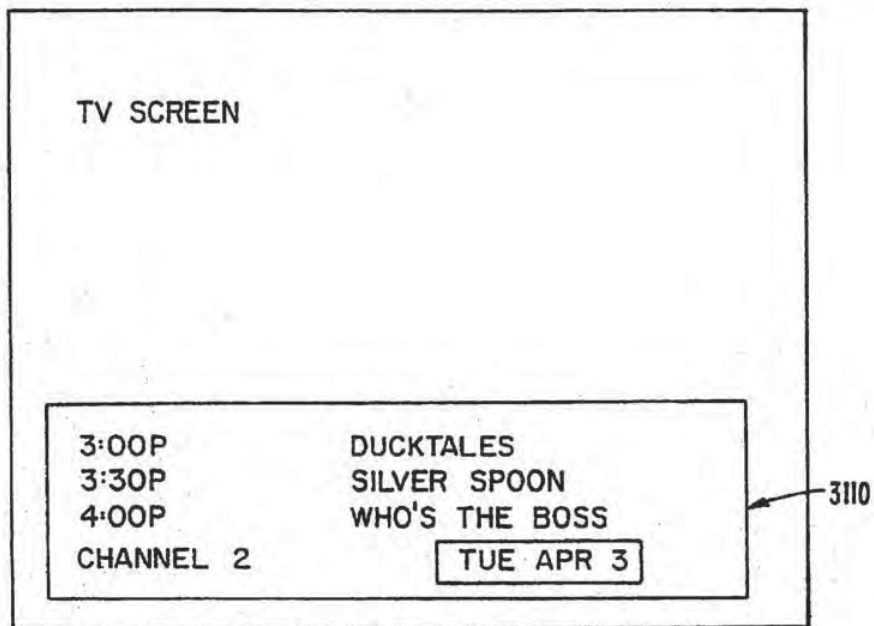
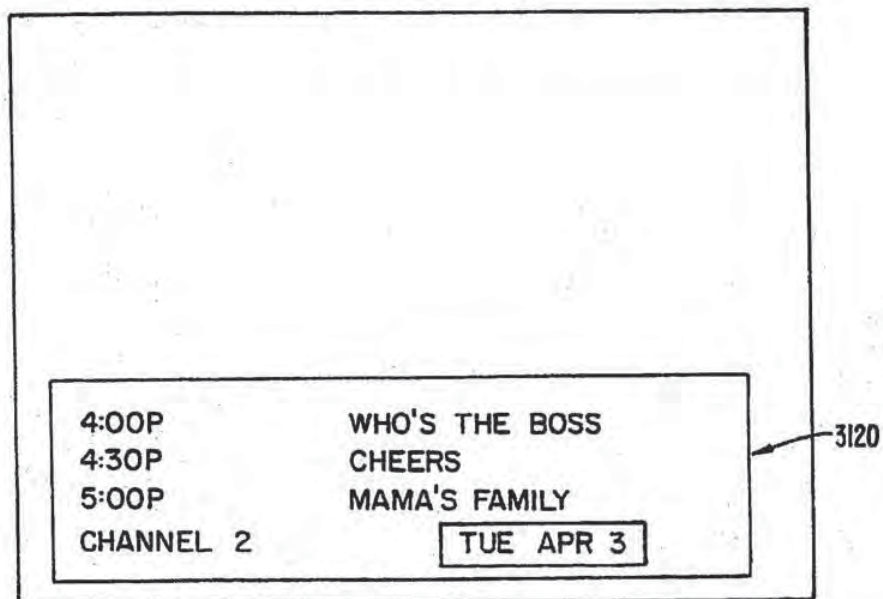


FIG. 24.

**FIG. 26A.****FIG. 26B.**

BACKGROUND TELEVISION SCHEDULE SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

This is a continuation of U.S. Ser. No. 08/033,773, filed Mar. 19, 1993, Now U.S. Pat. No. 5,353,121, which is a continuation-in-part both of U.S. Ser. No. 07/579,555, filed Sep. 10, 1990, abandoned, which is herein incorporated by reference in its entirety, and of U.S. Ser. No. 07/916,043, filed Jul. 17, 1992, abandoned, which is herein incorporated by reference in its entirety and which is a continuation of U.S. Ser. No. 07/778,404, U.S. Pat. No. 5,151,789, filed Oct. 17, 1991, which is herein incorporated by reference in its entirety and which is a continuation-in-part of U.S. Ser. No. 07/428,620, filed Oct. 30, 1989, now abandoned, which is herein incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

One aspect of the present invention relates generally to a system and process that allows a television viewer to access on screen television program listings and use the program listings in an easy and convenient way to control operation of a video cassette recorder (VCR) or other recording device. In particular, it relates to a system and process that displays on a television screen, overlaying a primary television display or program, a small background schedule guide that can be easily accessed by a user during lulls in the primary television display or program.

Another aspect of the present invention relates to such a system and process that creates a directory of recorded programs by title for easy retrieval and program playback. More particularly, it relates to such a system and process in which the VCR or other recording device is controlled by a simple selection of program title and a record command, even for recording at a future date and time. Most especially, it relates to such a system and process incorporating an intuitive user interface.

Yet another aspect of the present invention relates generally to a cable television (CATV) decoder interface. More particularly, it relates to such an interface for connecting the cable television decoder to a television accessory, such as a video cassette recorder (VCR). Most especially, it relates to such an interface which maintains full functionality of the television accessory while connected to the decoder.

The difficulty of setting a VCR for automatic recording at a future date is notorious. Even users who are technically sophisticated will often make mistakes in the VCR programming procedure that cause them to record the wrong program or not to record anything at all. This difficulty has even resulted in a substantial body of humor dedicated to the subject of programming VCRs.

The difficulty of VCR programming has been alleviated somewhat by the development of VCRs that use a television set as a display for user prompts and feedback to the user during the programming process. U.S. Pat. No. 4,908,713, issued Mar. 13, 1990 to Michael R. Levine, discloses such a VCR using the television set as a display for VCR programming with an interactive user interface for directing the user on a step-by-step basis. Such a user interface removes a great deal of the mystery from VCR programming, but users still have difficulty with such a command-based interface and encounter problems carrying out the programming without making mistakes that cause them to

miss recording programs they would like to watch at a different time than when they are broadcast.

Commonly assigned U.S. Pat. No. 4,706,121, issued Nov. 10, 1987 to Patrick Young, discloses a system and process in which user selections from television schedule information are used for automatic control of a VCR. That patent also contains a description of a proposed user interface for such a system and process. However, the provision of a highly intuitive user interface that makes such a system and process easy and convenient to operate is a difficult task. Further development of this system and process has produced considerable change in the user interface as originally proposed.

In addition to simplifying VCR programming, users who do a substantial amount of program taping also need an improved system and process for keeping track of their recorded programs. Commonly assigned application Ser. No. 07/219,971, filed Jul. 15, 1988, in the name of Patrick Young, discloses a system and process that provides indexing capability for taped material. A user interface for a television schedule system and process should also handle this capability on an intuitive basis.

Thus, while the art pertaining to the control of VCRs and to television schedule systems is a well-developed one, a need still remains for a television schedule system and process incorporating an improved user interface. In particular, unlike most computer menus, a grid TV guide is an array of irregular cells, where the cell size can vary from a fraction of an hour to many hours-extending well beyond the current screen. If this array is navigated by a cursor that goes from cell to cell, a single cursor command can produce violent screen changes. For example, a cursor right command may cause an abrupt jump to a cell situated several hours from the current page. Not only is this unsettling, but may take considerable effort to recover. Clearly, a gentler cursor motion is needed for the irregular cells found in a grid TV guide.

Printed grid television schedule guides often include additional information besides the program title and broadcast names. Such grids are also typically provided in combination with a more detailed printed schedule that contains a synopsis of each program, whether the program is a repeat, ratings for movies, and other information. When using a television set as a display for a schedule system, the size and resolution of the television display limit the amount of text that can be displayed with the grid. Improved techniques are required for conveying the most amount of information to the user in an easily understood manner within the limitations of the television display. When a large number of channels are available for viewing, there is also a need to order the display of information most conveniently for the user.

Programming a VCR for unattended recording becomes even more problematic when it is desired to record cable programs. Cable television decoders typically operate by requiring a television set and a VCR connected to the decoder to be set to a predetermined channel, such as channel 2, 3 or 4, and all channel selection is accomplished by the decoder. This presents problems for unattended recording, in that not all of the advanced features available on state-of-the-art VCRs can be used while the VCR is under control of the decoder.

Two Zenith Electronics Corporation technical papers disclose systems which attempt to deal with this problem. Merrell, "Tac-Timer," 1986 NCTA Technical Papers, pp. 203-206, discloses a smart remote controller to solve the unattended programming problem when a cable decoder

precedes a VCR. The smart controller is programmed to turn on the cable decoder at specific times, but the VCR must be programmed independently to match the programming of the smart controller. However, this remote controller does not coordinate channel selection for such devices as television schedule systems; such as disclosed in my U.S. Pat. No. 4,706,121, issued Nov. 10, 1987, nor does it support unique features of more advanced VCRs. For example, this controller does not support on-screen VCR programming, even if that feature is otherwise available on a VCR. The controller does not include any capability for conveying information about a channel selected on the cable decoder unit to a television schedule system or a VCR in any useful way.

Long, "The VCR Interface," 1986 NCTA Technical Papers, pp. 197-202, discloses two solutions for the unattended programming problem when a cable decoder precedes a VCR. The first of these is a VCR baseband decoder, also called BASE-TAC, and currently marketed by Zenith as MultiPort or MP. MPs allow the core functions (descrambling and addressing) of a cable decoder to be added to TVs and VCRs. The decoder accepts the baseband output of the TV or VCR tuner, eliminating the need for a separate decoder tuner and attendant need to coordinate two tuners. This method is effective for supporting television schedule systems and allows full functionality of advanced VCR features. However, the MP alternative requires new TV or VCR equipment and is not compatible with the existing installed base of cable decoders. This method has not been well-received at this time. The second is the VCR Interface, which uses RF switching and a centralized approach for all TVs and VCRs in the home. It descrambles incoming CATV channels and, after modulation, combines them back onto the CATV cable at unused upper channels. The result is that any TV set on the cable can receive premium channels without a separate decoder. This method eliminates the need for redundant decoders at every TV set or VCR. As described, the system was conceived for only one premium channel. To support a television schedule system, all premium channels must be descrambled together and be available simultaneously. If not, it would be necessary to provide a way of tuning the centralized descrambler from any TV set or VCR attached to the cable. Such a scheme would be awkward when more than one TV or VCR competes for control of the single descrambler. The VCR interface may be implemented using retrofitted decoders, but the overall cost may be prohibitive for the average home.

A somewhat similar system for use with the German television networks is described in Sommerhauser, "Video Programm System: Flexibel programmieren mit VPS," Funkschau, No. 25, December 1985, pp. 47-51.

Other prior art relating to CATV, its decoders, and programmable remote devices includes west German Published Application 2,338,380, published Feb. 13, 1975; U.K. Patent 1,554,411, published Oct. 17, 1979; U.S. Pat. No. 4,375,651, issued Mar. 1, 1983 to Templin et al.; U.S. Pat. No. 4,394,691, issued Jul. 19, 1983 to Amano et al.; U.S. Pat. No. 4,802,114, issued Jan. 31, 1989 to Sogame. While the prior art relating to cable decoder interfaces and similar devices is a well-developed one, a need remains for further development of such devices. None of the existing interfaces both provides a complete solution to the problem of unattended recording and is compatible with already installed equipment.

SUMMARY OF THE INVENTION

The above problems and difficulties present in the prior art are overcome through the use of the novel system and

method of the present invention. One aspect of the present invention is directed to a system and method to allow automatic, unattended recording of cable television programs supplied on a cable system as herein disclosed. A video recording system to allow automatic, unattended recording of at least two cable television programs supplied sequentially at different times on different channels of a cable system includes a television receiver, a remote controllable cable decoder and a remote controllable video recorder with unattended programming capability connected between the television receiver and the cable decoder. A remote controller for the video recorder includes a means for user input of program selections from a television schedule. The remote controller is coupled to the video recorder. A channel selection coordinator includes a memory means for storing channel tuning conversion information and program selections input by the user with the means for user input of program selections. A means converts channels of the at least two program selections to channel tuning commands recognizable by the cable decoder using the channel tuning conversion information and the program selections. A means automatically transmits the channel tuning commands to the cable decoder at desired activation times of the at least two program selections (typically the broadcast times, with a guard time at the beginning and end of each program). A means automatically supplies recording commands to the video recorder at the desired activation times of the at least two program selections.

The method of this aspect of the invention automatically records cable television programs supplied sequentially at different times on a cable system unattended, even with channel changes between the programs. A remote controllable video recorder having unattended programming capability is connected between a television receiver and a remote controllable cable decoder. Channel tuning conversion information is stored in a memory. Program selections for at least two programs on different channels is input from a television schedule with a remote controller for the video recorder. The program selections are stored in the memory. Channels of the program selections are converted to channel tuning commands recognizable by the cable decoder using the channel tuning conversion information and the program selections. The channel tuning commands are automatically transmitted to the cable decoder at broadcast times of the program selections. Recording commands are automatically transmitted to the video recorder at the broadcast times of the program selections.

Another aspect of the present invention is directed to a novel television schedule system and process user interface herein disclosed. A television schedule system including a user interface in accordance with this aspect of the invention has a display and a means connected to the display for displaying the television schedule on the display as an array of irregular cells which vary dimensionally in length, corresponding to different television program time lengths. A means is connected to the display for providing a cursor with the television schedule on the display. The cursor has a variable length corresponding to the length of a selected one of the irregular cells in which the cursor is located. A means is connected to the means for providing the cursor for moving the cursor in the array in a series of equal length steps. At least some of the irregular cells have a length which is greater than the length of the steps.

In the process of operating a television schedule system with the user interface of this aspect of the invention, the television schedule is displayed as an array of irregular cells which vary dimensionally in length, corresponding to dif-

ferent television program time lengths. A cursor is provided with the television schedule on the display, the cursor has a variable length corresponding to the length of a selected one of the irregular cells in which the cursor is located. The cursor is moved in the array in a series of equal length steps, with at least some of the irregular cells having a length which is greater than the length of the steps.

In another aspect of the invention, a control system for a video recording machine has a controller for starting and stopping the video recording machine, for recording video information on recording media, and for playing recorded video information on recording media. A display generator provides display image generation signals. A means supplies information to the display generator for generation of display images relating to operation of the video recording machine. The means for supplying information includes means for generating a recording media position indicator graduated as segments corresponding to programs recorded on the recording media.

In a process for controlling a video recording machine according to this aspect of the invention, a recording media position indicator is graduated as segments corresponding to programs recorded on the recording media. The recording media position indicator is displayed as position of a selected one of the recording media in the video recording machine is changed.

In a further aspect of the invention, a television schedule system includes a display and means connected to the display for displaying the television schedule on the display. The means for displaying a schedule is configured to allow selection by a user of a first number of desired channels for display of schedule information which is less than a second number of available channels. A programmable tuner is connected to the means for displaying a schedule. The programmable tuner is configured to follow the first number of desired channels when the television schedule is shown on the display in response to a channel up or channel down command. The programmable tuner is configured to follow the second number of available channels in the absence of the television schedule on the display in response to a channel up or channel down command.

In a process for operating a television schedule system according to this further aspect of the invention, a first number of desired channels is selected for display of schedule information, which is less than a second number of available channels. The schedule information is displayed on a display. The first number of desired channels is followed when the schedule information is shown on the display in response to a channel up or channel down command. The second number of available channels is followed in the absence of the television schedule on the display in response to a channel up or channel down command.

According to yet another aspect of the present invention, user control of a television is simplified by a system and process that displays on a television screen, overlaying a primary television display or program, a small background schedule guide that can be easily accessed by a user during lulls in the primary television display or program.

The attainment of the foregoing and related objects, advantages and features of the invention should be more readily apparent to those skilled in the art, after review of the following more detailed description of the invention, taken together with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1-3 are diagrammatic representations of a television schedule grid incorporating the user interface for the

system and process of this invention,

FIG. 4 is a diagrammatic representation of a screen display used in the system and process of the invention.

FIGS. 5-7 are additional diagrammatic representations of the television schedule grid incorporating the user interface for the system and process of the invention.

FIG. 8 is a flow chart for understanding the operation of the FIG. 7 diagram.

FIGS. 9-10 are additional diagrammatic representations of screen displays of the user interface for the system and process of the invention.

FIG. 11 is a flow chart for understanding the operation of the FIGS. 9-10 diagrams.

FIGS. 12-13 are diagrammatic representations of taping and tape index screen displays of the user interface for the system and process of the invention.

FIG. 14-17 are diagrammatic representations of program selection by category screen displays of the user interface for the system and process of the invention.

FIG. 18 is a flow chart for understanding operation of the FIGS. 14-18 diagrams.

FIG. 19 is a flow chart for understanding operation of the FIG. 20 diagram.

FIG. 20 is a diagrammatic representation of a channel customization screen display of the user interface for the system and process of the invention.

FIG. 21 is a diagrammatic plan view of a control panel for the system of the invention.

FIGS. 22a and 22b are block diagrams of television schedule systems in accordance with the invention.

FIG. 23 is a block diagram of a system for interfacing a cable television decoder to a television accessory in accordance with one aspect of the invention.

FIG. 24 is a more detailed block diagram of the system shown in FIG. 23.

FIG. 25 shows a setup screen for a background guide according to one aspect of the present invention.

FIGS. 26a and 26b show background guide presentations according to one aspect of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

I. User Interface

Turning now to the drawings, more particularly to FIGS. 1-7, there are shown a series of menu screens 10, 12, 14, 16, 18, 20 and 22 used in operation of the system and carrying out the process of the invention. Screens 10, 12, 14, 18 and 20 each consists of an array 24 of irregular cells 26, which vary in length, corresponding to different television program lengths of one half hour to one-and-one half hours or more. The array is arranged as three columns 28 of one-half hour in duration, and twelve rows 30 of program listings. Some of the program listings overlap two or more of the columns 28 because of their length. Because of the widely varying length of the cells 26, if a conventional cursor used to select a cell location were to simply step from one cell to another, the result would be abrupt changes in the screens 10, 12, 14, 18 and 20 as the cursor moved from a cell 26 of several hours length to an adjacent cell in the same row. Such abrupt changes disorient a user of the system.

An effective way of taming the motion is to assume that behind every array 24 is an underlying array of regular cells. By restricting cursor movements to the regular cells, abrupt

screen changes will be avoided. However, there is now a potential ambiguity between the underlying cell which governs cursor movement and a visible cell 26 which holds the program title.

Viz.: if the cursor moves in half hour steps, and the cell length is, say four hours, should the cursor be ½ hour long or four hours long? If the cursor only spans the interval of the underlying cell (½ hour), the cursor appears to be highlighting a segment of the cell, which is misleading. On the other hand, if the cursor spans the entire four hours of the TV listing, the cursor underlying position will be obscure. In this case, cursor right/left commands will appear inoperative while traversing a long cell. The absence of feedback following a cursor command is befuddling to users. Therefore, an innovative cursor 32 (FIG. 1) for the irregular array 24 is required which satisfies several conflicting requirements.

With the cursor 32, the entire cell 26 is 3-D highlighted, using a conventional offset shadow 34. The offset shadow 34 is a black bar that underlines the entire cell and wraps around the right edge of the cell. To tag the underlying position—which defines where the cursor 32 is and thus, where it will move next—portions 36 of the black bar outside the current underlying position are segmented, while the current position is painted solid.

For an half hour cell 26, the offset shadow's underline bar will always be solid black. FIGS. 2 and 3 show the cursor 32 as it appears for a half-hour program. For programs that go beyond ½ hour, only the current ½ hour position will be solid black. All remaining positions will be stripped. If the cursor is moved left or right, the solid section will move accordingly, providing complete visual feedback. Thus, this modified 3D offset shadow cursor 32 satisfies the demands stated above: it spans the entire cell, yet clearly highlights the current underlying position. Movement of the cursor 32 will always be visible even for cells 26 that are much longer than the underlying cell.

A grid continuity icon 38 is shown in FIG. 1. Printed grid television schedule guides often include parenthetical comments, (such as "cont'd") to indicate program continuity. In an electronic guide displayed on a TV screen, limited text space precludes parenthetical comments. To conserve space, an icon 38 will be used to indicate cell 26 continuity. At the border of a cell 26 that is continued to the next screen, an arrow icon 38 pointing to the right will be overlaid. The arrow direction always points to right, which is the direction of program elapse.

FIGS. 2 and 3 show recording status representations. When a program has been selected for recording, its listing cell 26 will be outlined or highlighted in red, as indicated at 40. If guard time has been added or deleted, the cell will be stretched or shrunk to reflect the change. Cell 26 continuity will be treated the same as above. There are four other record status representations:

If the cell is actively being recorded, the outline 40 will blink off and on.

A recorded cell will be displayed with a solid red background 42 (Note: Not shown in drawing).

A mis-recorded cell will be indicated by red hash-marks 44 over the title. A mis-recording can be the result of insufficient tape, VCR loss of power, stopped before completion, etc.

A program linking icon 46 is shown in FIG. 5. After each schedule update, the schedule system examines the new listings for the occurrence of any titles that match a title in Linked Titles (FIG. 23). If a title matches, it will automati-

cally be tagged for recording. When a linked program is displayed in the guide, it will have two identifiers: a red outline 40 indicating that the title has been selected for recording, and a link icon 46 appended to the title to indicate that this title was link-selected. After a linked program has been recorded, it will be treated like any recorded program with the title shaded in red. To differentiate this recording from others, the link icon will remain appended to the title.

Further details on the linking feature are given in screen 19 of FIG. 23. 1) A linked program 47 may be suspended by the user (perhaps to avoid conflict with a pending recording), by de-selecting the link title in the Link List screen, under the Record Memo command. A suspended link program will still be identified by a link icon, but the red-outline will be suppressed since the program will not be recorded. 2) A smart link process is used to tame the matching of titles when there is a likelihood of excessive candidates for recording. The Lucy show, for example, is often syndicated on several channels, each running a different vintage series of Lucy. Untamed linking may result in a plethora of recording, mixing segments from one vintage with segments from another vintage. To differentiate vintages of a series, each Lucy vintage can be given a distinct title. For example, one may be entitled "The Lucy Hour" while another may be "The Lucy Show" etc. However, due to syndication right overlaps, it is possible for two or more television or cable TV stations to carry the same vintage of a series, but still be running different segments of the same vintage. For such series, the link list will include the channel and time as well as the link title. For the avid Lucy-phile, the user can locate each series individually for linking. If there is more than one link title of the same name, the series will be numbered, in the order of acquisition. Thus, the second Lucy will be identified as Lucy (Two), at 47.

FIGS. 1-3 show the columns 28 headed by half-hour header status indicators. The ½ hour header strip across the top of the grid TV guide has two auxiliary functions: 1) as an indicator 48 of pending or in-progress recording scheduled at that time, and 2) as a time-bar 50 to delineate the past from the future. The past is darkened, while the future is lightly shaded. If there is an in-progress recording, the ½ hour header will be red-outlined at 48 in the same manner as a pending recording title cell 26.

FIG. 6 shows a television schedule grid screen 20 with a program note overlay 52. With limited text capacity on TV displays, it is preferable to display as many lines of TV listings as feasible. To handle program notes, which are text intensive, on-demand overlays 52 are used. Program note overlays 52 may include any or all of the following information:

- A program genre
- Program description
- Stars and personalities
- Year of release
- Episodic subtitles
- Run-time of program
- Elapse time of the program
- Critique (Star Ratings)
- Rating (PG, G, etc.)
- Call letter, channel markers
- Closed caption, stereo.
- Pay Per View Program

Program notes for a selected program are overlaid over the grid guide upon request. The program note can be toggled off/on using a SELECT command. The program

note 52 overlays and hides 3 or 4 listings of a guide. To minimize concealment of the guide, an auto-rolling note is used. The program note will overlay either the top half or bottom half of the screen, as necessary to avoid masking the title of the selected listing. If the cursor 32 is in the upper half of the screen, the note will appear in the bottom half, and vice versa. If the cursor 32 is moved to the lower half of the screen, the note will automatically position itself in the upper half of the screen.

FIGS. 1-3 and 5-6 show a channel column 54 in the television schedule grid 24. Favorite stations and cable channels may be listed together to create a personalized grid guide. The channel column 54, unlike most printed TV guides, has a mix of over-the-air station names and cable services names.

The grid 24 guide lists channels by favorite combinations of station number and cable names, and not in the usual numerical order. Note that the order of channels can be arranged in any sequence, and need not be the numeric grouping followed by alphabetical grouping, as shown in the figures. For example, the first channel of column 54 may be DIS, followed next by channel 44, next by A&E, next channel 4, etc. The method of rearranging the channels is described in detail below. When viewing the grid 24 guide, a Tuner Up/Down channel command will be mapped according to the channels and order listed on the screen. When not viewing the guide, the tuner sequence will revert back to the usual numerical order. When the last channel on a page is reached, the next Tuner command will change the channel to the channel listed at the beginning of the following page.

When a channel to which the tuner is tuned is displayed on the grid 24, it is highlighted, as shown at 56. A grid 24 page may be changed by either a page command or by entering a channel Up/Dn command as described above. If a page is turned using the page command, the current channel is now located in the previous page, and will not be seen in the new page. Therefore, the new page must suppress the highlighting of a channel, since that indicates the current channel. Note that information about the current channel will still be presented in the channel information boxes 58 at the bottom of the screen.

When is the highlighting re-enabled? Once into the new page, the first channel up/down command will cause the tuner to automatically change to the channel listed in the last or first row 30 respectively of the new page. Since the tuner channel is now located on the new page, the current channel will be highlighted again.

If the channel highlighting is not suppressed after a page is selected, by definition, the tuner must be changed to track the highlighted channel. This is undesirable since casual paging should not cause the channel to change.

When a guide is first opened, as shown in FIG. 2, both the cursor 32 and the current channel 56 are situated on the same row 30 of the grid 24. When the channel 56 is changed, it is desirable to drag the cursor 32 along with the channel in unison. In doing so, the cursor 32 will be ready for a Select command (to retrieve the program note) or for a Record It command. Cursor dragging by the channel command takes place whenever the channel 56 and cursor 32 are united on the same row. If they are not united, the cursor 32 is disengaged from the channel command. Note that dragging is not reciprocal; moving the cursor 32 does not affect channel selection.

FIG. 7 shows a screen 22, showing a program list 58 for a single channel, generated by toggling a user What's On TV command, which switches between the grid 24 and the list

58. The list 58 consists of rows 60 of sequential program listings on the channel and a channel information field 62. Program notes are overlaid on the list 58 in the same manner as shown in FIG. 6 for the grid 24.

Each What's On TV command alternates between the grid guide 24 and the What's Next on Channel row guide 58. While viewing the grid guide 24, the next What's On TV command will replace the grid guide 24 with a single-channel row guide 58. FIG. 8 is the flow diagram for the What's On TV command.

The page relationship between the two guides 24 and 58 are tightly coupled. The single channel guide will open to the channel and schedule time that was selected by the cursor 32 on the grid 24. While viewing the single channel guide 58, the Up/Down channel command may be used to change the channel to be listed. When exiting the single channel guide 58 and returning to the grid guide 24, the grid cursor 32 will be pointed to the channel and schedule time last selected on the single channel guide 58.

FIGS. 9 and 10 show channel grazing overlays 64 and 66 that provide information on current programs when switching channels while watching television. In the overlay 64, when scanning channels, the title of each program is overlaid at 68, along with the name of the TV service (HBO, ABC etc.), the cable channel number, and the current date, day of week, and time in the channel information field 62. The overlay 66 is the same as the overlay 64 except that this overlay includes a program note 70, which is similar to the program note 52 in FIG. 6, but contains information pertinent to a program currently being broadcast on the selected channel. To access program notes, press the Select key. In addition to the program note 70, elapsed time is indicated by a percentage calibrated time bar 72. The bar is bracketed by S for start, and F for finish. By default, titles will appear automatically when channels are scanned. Grazing Titles may be de-activated using the CANCEL key. To restore auto-titles, press Select while viewing TV. The flow diagram governing titles/program notes, while viewing TV, is shown in FIG. 11.

An express recording screen 74 is shown in FIG. 12. The express recording screen includes the following information:

- Title of Program
- Length of Program
- Tape Time Remaining
- Recording Speed.

FIG. 13 shows a tape index screen 76. Locating a recorded segment is often an arduous task when several programs have been recorded on the tape. Without a table of contents, the VCR users muddle through stretches of recording trying to find what's recorded on the tape, where the beginning of the desired program is, and where the tape is now. Some premium VCRs provide tape indexing that automatically finds the start of each recording. However, while the viewer can find the start of a recording, the indexing VCRs do not record titles. The net result is about as useful as a having a table of contents without chapter titles. Considerable searching is still required to find what is recorded at each index. The tape index screen 76 provides a virtual tape directory, giving the equivalent function of a table of contents for a tape recording. There is a list 78 of titles of recorded programs, a pointer 80 to the start of the program, and a current position indicator cursor 82 showing the "chapter" location on the tape. The virtual directory is automatically compiled, revised and stored in off-tape memory as the user records over the tape.

The What's on Tape command will display a list of titles of programs recorded on the tape. The title of the selected

program (the segment of tape that is positioned over tape head) is highlighted by the cursor 82. The tape position pointer 80 dynamically tracks the current tape position. All searching is done simply by title, bypassing the need for index numbers. To play back a program, the up/down cursor 5
command is used to select the program. For example, to play back Judge, the down cursor is pressed until it highlights the program Judge. As seen in FIG. 13, the tape head is currently positioned over Star Trek with the cursor on Star Trek. When the cursor is moved to Judge, the tape will immediately 10
begin going forward to the start of Judge. Although the cursor immediately underscores the Judge listing, the tape lags behind as shown by tape position indicator 80, which will be gradually moving down. To graphically portray tape movement, a tape motion indicator field, block 100, is 15
provided, as explained below.

The tape directory is equivalent to a table of contents showing titles, but not page number. It automatically opens to the starting page by simply pointing to the title of the program. In addition to the tape directory 78 of recorded 20
programs, the screen 76 includes a program duration field 84, a recorded speed of each title field 86, a remaining time left on tape field 88, a remaining time left on program field 90 and a next scheduled recording time field 92.

The virtual tape directory is generated as follows. It is 25
difficult to implement a competent self-contained tape directory for a non-random access storage such as a video tape. No matter where the directory is stored on the tape, the latent access time to locate the directory and return to current position (for a standard six hour tape) is excruciating slow, 30
in the order of 6 to 10 minutes.

If redundant directories are recorded uniformly across the tape to minimize latency time, the problem of sluggishness is merely shifted from playback to updating the multiple 35
directories. After each video program is recorded, the entire tape must be scanned to update each directory. Even if this update process is automated, there is a question of excessive wear on tapes and the VCR itself. Viz.: each recording, no matter how short, results in high-speed scanning of the entire tape in order to revise all directories.

Even more troubling is the question of when to perform the update, since there is no "safe" period for the VCR to take control. For example, the user may have stopped the tape momentarily, perhaps to skip commercials, only to find that the VCR has commandeered control and place the tape 45
in a high speed update mode. The safest update is one that is user-initiated. Unfortunately, few VCR users will follow a regimented procedure of updating after each recording session. Clearly, an on-tape directory based on existing technology is not satisfactory.

The following innovative solution, the "virtual tape directory", stores directory information in off-tape memory and does not require an on-tape directory or any augmentation of the video cassette. Since the directory is held in external 55
memory instead of the tape, it is best suited for tapes that have recently been played and recorded, the "working tapes".

When a program is recorded, the title of the program is written to the data (control track) channel of the tape and, at the same time stored in a non-volatile (NV) memory. Other 60
information about the recorded program, such as length of program, theme category, date recorded, and tape identifier code may be written to the data channel, as well as stored in the NV memory. The NV memory is adequate to support a number of working tapes.

When a tape is first loaded, the tape data channel will be scanned for a few seconds to identify the recorded program

under the tape head. This data will be matched against the directories stored in NV memory. If there is a match, the directory of the working tape will be displayed immediately when the What's On Tape key is pressed. The "virtual" tape 5
directory appears to have been read from the tape, but is actually obtained from NV memory.

If there is no match, a new directory for the tape will be created. During playback and recording of this tape, a virtual directory will be generated for that tape. Directories of 10
inactive tapes will be automatically purged from memory as new working tapes are introduced.

The foregoing off-tape realization of the virtual tape directory is an approach that can be implemented without any alterations to existing video cassettes. However, with 15
minor augmentation of the video tape cassette and video recorder mechanism, a true random-access permanent directory for each tape can be realized.

In a preferred implementation, a digitally encodable read/write planar magnetic strip is located on a surface of the video cassette. Ideally, the strip will be located on one of the four planes which are orthogonal to the direction of video cassette insertion, for a front loading VCR. A most preferred location is on the face of the video cassette, which is usually reserved for a 1 1/2" by 2" label. In the video recorder, a 25
read/write magnetic head is located to be aligned with the magnetic strip as the cassette is inserted. The head comes into contact with the magnetic strip when the cassette is loaded or removed from the recorder. As the cassette is inserted, the stored data from the strip will be read and transferred to the tape directory buffer of the electronic guide. When programs are recorded on or erased from the tape, the content of the tape directory buffer will be updated to reflect the program content and index location of the program on the video tape. As the video cassette is ejected 30
from the recorder, the content of the tape directory will be transferred to the magnetic strip on the video cassette. By augmenting the video cassette with a random access rewrite permanent memory, directory information for the tape is retained long after a video record session. This method is a significant improvement over using the tape media itself to record directory information. 40

In the above method, the movement of the video cassette magnetic strip during cassette insertion and ejection over a stationary magnetic head allows the magnetic flux changes to be sensed. Alternatively, a moving or rotating read/write magnetic head mounted on the video recorder can be used to scan a stationary magnetic strip after the video cassette is loaded. In this variation, data from the magnetic strip can be read and updated immediately from the tape directory buffer. 45
Such magnetic strip encoding is similar to that commonly used in credit cards, personnel identification tags, security entrance cards, etc. As another alternative, optical read/write methods may be used instead of magnetic encoding.

It is relatively easy to estimate remaining time of a scheduled televised program with the assist of a clock and a TV schedule. In contrast, there are few clues as to current location during playback of a recorded program, particularly when there are several recorded segments on a tape. Tape index counters or running-time clocks require diligent book-keeping before the start of a recorded segment. Few consumers will tinker with 5 or 6 digit numbers when a "ballpark" indicator is adequate, such as, "is the program about over?", or "about when does the next segment start?". 55
Clearly, there is need to provide a location indicator without the burden of bookkeeping.

To provide an at-a-glance indicator of relative tape location, an on-screen tape position gauge 94 has been devised.

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The tape position gauge 94 consists of a vertical bar 96 with the arrow pointer 80 located on the left edge of the screen 76. The arrow 80 dynamically tracks the current tape position as the tape is advanced or rewound.

The gauge 94 is graduated, not in linear units, but in units of recorded segments 98 with each segment labelled with its program title. Thus, a 10 minute program or a 6 hour program is represented as one vertical unit corresponding to the height of the left vertical edge of a title line. Since the left vertical edge of a title is the same for all programs (independent of program duration), the position indicator is only a rough approximation of actual tape position. If the arrow is pointing at the upper 25% of the left vertical edge of a title line, it indicates that the tape head is positioned approximately into the first 25% of the program. If a conventional linear gauge were displayed, a far more complicated gauge would be required, that would likely confuse rather than clarify.

As noted by the tape position indicator 80 in FIG. 13, the tape head is positioned to the start of Star Trek. If the viewer wishes to play back another program, the cursor is simply moved until it highlights the desired program. As soon as the cursor is moved to another program, the tape will immediately go forward or backward to the selected program. Tape position pointer 80 will move very slowly if it is scanning past a long program. This motion may not be readily apparent. To provide an unequivocal graphic representation, a tape motion indicator field, block 100, indicates direction of scanning and whether the tape is being prepared for playback or for recording.

Thus, this tape gauge 94 provides a quick capsule indication of the where the tape head is currently positioned, relative to the current program, and relative to other programs or the tape, and the title of other programs.

The tape index screen 76 includes a tape motion indicator field 100. When the tape is undergoing high speed repositioning, the What's On This Tape (WOT) screen 76 will be displayed. During high speed search of a long program, the tape gauge 94 will appear to be dormant, since the gauge is relatively coarse for programs of long duration. To supplement the tape gauge 94, the tape indicator 100 is included. During high speed positioning, one of these messages will be displayed in the space above twin-hub tape icon 102: GO PLAY, GO RECORD, FORWARDING, REVERSING, PAUSE, and STOP.

GO PLAY is displayed while the tape is repositioning to the selected title. When the title is reached, the WOT screen 76 will be displaced by the playback video. GO RECORD is displayed while the tape is positioning to the selected program segment 98, where the new recording will be written.

FIGS. 14-17 show Theme function screens 104. The Theme function allows the viewer to quickly sort the downloaded schedule and display a subset schedule based on a subject of interest. The user has the freedom to select listings sorted first by major themes, second by topic(s) within a theme, and/or by topic qualifiers. All guides sorted by theme, topic and qualifier will be displayed in a row-tabulated format and begins by listing programs nearest to the current half-hour. The theme function screens 104 have the following attributes: Rotating Themes. There are four theme categories, with each theme title enclosed in horizontally-arranged selection boxes 106. From left to right, the themes are:

[Movies] [Sports] [Specials] [TV Fare]

FIG. 18 is a flow diagram defining the Theme command. Topic Selection. There are up to 16 topics 108 for each

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theme arranged in an 8 row by two column field 110. Any number of topics may be selected under a selected theme. Topics is a logical OR function, meaning that each listing that meets the definition of the topic will be displayed. For example under the theme of Movies, if the topic titles Comedy and Satire are selected, a subset schedule of both comedy movies and satire movies will be displayed. Other qualifiers may include a Pay Per View selection box in addition to the Live selection box of FIGS. 16 and 17.

Default All Selection: when the Theme screen 104 is first opened, the first slot (upper left most topic 108) will be highlighted. This is the ALL function, which is the sum of all topics 108 for the selected theme. The ALL function was created to minimize key stroking.

Without an all topic category, the user must enable all 16 topics 108 individually. Conversely, if the user wishes to go from an all topics to an individual topic, the user must cursor to and deselect each of the other 15 topics.

Qualifiers: each theme includes a group of search attributes or qualifiers 112. The qualifiers for each theme 106 are shown in the respective one of FIGS. 14-17 for each theme 106. Any number of qualifiers can be enabled at one time. These qualifiers perform a logical OR functions; they will select for display all listings (sorted first by theme and topic) that satisfy the qualifiers.

The qualifiers 112 are positioned for easy selection. The selection of qualifiers is made using the usual cursor commands. When a theme 106 is initially opened, by default, the cursor is located near the top of the screen. To minimize cursor commands, the qualifiers are also located near the top of the screen. In contrast, placing the qualifiers at the bottom of the screen would require a round trip of up to 16 key strokes.

The complete theme sorting strategy is defined as follows:

Listings =

(TopicA + TopicB + etc.) × (Qualifier A + QualifierB + etc.)

This may be read as listing all Topic A that also meets Qualifier A or Qualifier B, plus all Topic B that also meets Qualifier A or Qualifier B, etc. For example, the qualifier field of FIG. 14 includes four star ****, three star ***, two star ** and one star * rated TV programs, based on the auxiliary schedule information described above. By selecting both the **** and *** boxes, only programs that have at least a three star rating will be listed. Other criteria, such as year of release, may also be included as a qualifier field. In this case, the guide will restrict listings to movies or TV shows released during a specified year period. The year period may be implemented with two selection boxes: the first box indicating the start year and the next box indicating the end year. To change the year window, the year values may be incremented or decremented with the page up/down keys when a year box is selected.

Qualifiers, topics and themes are rooted in relational database operations and allow logical sorting of the schedule. To support these higher order of sorting, auxiliary data must be delivered to the VCR. In contrast, simple sorting operations, such as sorting by time and by channel are inherent in the fundamental information of a TV guide, and do not require auxiliary search data.

The keystroke sequence for using the themes screens 104 are as follows. While watching TV, the first Theme key command will summon the opening theme screen with the left most theme, Movies, highlighted. Further theme commands will rotate the theme selection from left to right. Each theme screen will be initialized to the ALL (topics) selection. If no topic selection is made, an all topics guide for the