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(54) Title: ONLINE/OFFLINE TRIGGERS

(57) **Abstract:** Online and offline triggers are provided to allow a viewer access to content in an internet/TV environment employing a set top device. A trigger is used to notify a viewer of an event using content available to a set top device. In some instances the viewer may also interact with the trigger to cause a processor of the set top device to navigate the viewer to content associated with the event. The set top device receives triggers through any of a number of types of connections. The set top device may store triggers in an associated memory, and may download triggers from a service provider in response to viewer interaction with the set top device. A browser in the set top device notifies the viewer of content associated with the trigger by displaying a message or content of the trigger on an associated TV/monitor. By responding to the trigger, the viewer can cause the processor to navigate to other content that is related to the event. If the viewer does not respond to the trigger, the trigger may be removed from display on the TV/monitor. The trigger also may be re-triggered until the viewer takes action. The trigger can be displayed anywhere on the monitor, and may to overlay TV content. The triggers are real-time (or time stamped) notifications of events that are displayed on the TV screens or web-pages and include both sender and receiver components.

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ONLINE/OFFLINE TRIGGERS

This application claims the benefit of U.S. Provisional Application No. 60/195,243, filed April 7, 2000, the entire disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

This invention relates to providing online and offline triggers in television (TV) programming for use, for example, in an internet-based TV system.

BACKGROUND

The computer system 100 shown in Fig. 1 illustrates a hardware setup for executing software that allows a user to perform tasks such as communicating with other computer users, accessing various computer resources, and viewing, creating, or otherwise manipulating electronic content in the form of, for example, any combination of text, images, movies, music or other sounds, animations, 3D virtual worlds, and links to other objects. The system 100 includes input/output (I/O) devices, such as, for example, a mouse 103, a keyboard 105, and a display 107. The system 100 also includes a general purpose computer 110 that may include a central processor unit (CPU) 115, an I/O unit 117, and a memory 119. The memory 119 stores data and various programs such as an operating system 121 and one or more application programs 123. The computer system 100 may also include a communications card or device 125 (e.g., a modem or network adapter) for exchanging data with a network 127 via a communications link 129 (e.g., a telephone line).

As shown in Fig. 2, a user of a computer system can access electronic content or other resources either stored locally at the user's own client system 202 (for example, a personal or laptop computer) or remotely at one or more server systems 200. An example of a server

system 200 is a host computer that provides subscribers with online computer services such as e-mail, e-commerce, chat rooms, Internet access, electronic newspapers and magazines. Users of a host computer's online services typically communicate with one or more central server systems 200 through client software executing on their respective client systems 202. 5 The client computer 202 can communication with the host 200 via a modem 204 or TCP/IP network connection over communication links 206 and 207, respectively.

In practice, a server system 200 typically will not be a single monolithic entity. Rather, the server system 200 will be a network of interconnected server computers, possibly physically dispersed from each other, each dedicated to its own set of duties and/or to a 10 particular geographical region. In such a case, the individual servers are interconnected by a network of communication links, in known fashion. One such server system is "America Online 5.0" from America Online, Inc.

A browser is an example of client software that enables users to access and view electronic content stored either locally or remotely, through a network environment (e.g., a 15 local area network (LAN), an intranet, the Internet). A browser typically is used for displaying documents described in Hyper-Text Markup Language (HTML) and stored on servers connected to a network such as the Internet.

A user instructs a browser to access an HTML document, or webpage, by specifying a network address, or Uniform Resource Locator (URL), at which a desired document resides. 20 In response, the browser contacts the corresponding server hosting the requested webpage specified by the URL, retrieves one or more files that make up the webpage, and then displays the webpage in a window on the display of the user's client system.

Fig. 3 is a screenshot of a browser application 300 displaying a typical HTML document in the form of a webpage 302. As shown, a single webpage 302 may be composed

of several different files potentially of different data types 304 (e.g., text, graphics, images, virtual worlds, sounds, and movies). In addition, a webpage can include links 306 pointing to other resources (e.g., webpages or individual files) available on the network. Links 306 can take virtually any visual form. For example, a link can appear as a text string, as a graphical image, or as a combination of the two. Each link 306 has an associated URL pointing to a location on the network. When a user clicks on, or otherwise selects, a displayed link 306, the browser automatically retrieves the webpage (or other resource) corresponding to the link's associated URL and displays it to, or executes it for, the user.

Referring to Fig. 4, an internet-based TV system 400 makes dual usage of a conventional TV 402. That is, a user of the internet-based TV system can watch TV or view webpages and otherwise use the Internet. In this regard, a special purpose computer 404, referred to as a set top device, is used in connection with a standard TV 402 for viewing webpages on the Internet.

Accessories, such as, for example, a wireless keyboard 408 may be added to the internet-based TV system 400. The wireless keyboard 408 can be similar to keyboard 105 but it also may have specialized keys designed for use in the web-based TV system 400 to make viewing and web use easier. Additionally, a wireless remote control 410 may be used to control the set top device 404 and to facilitate channel changing and web-based TV connections via various buttons 412, which may be specialized for the web-based TV environment.

An example of an existing internet-based TV system 400 is "WebTV" by Microsoft. Information about WebTV service may be found, for example, at <http://www.webtv.net> and <http://developer.webtv.net>.

SUMMARY

In one general aspect, the invention provides online and offline triggers to notify a viewer of TV programming in an internet-based TV environment of an event using content available to a set top device. In some instances, a viewer may also interact with the trigger to
5 navigate to content associated with the event. As a result, a viewer can be notified in real time about events that may be of interest to the viewer (e.g., as an instant message from a buddy who is online), and service providers can provide information about these events to the viewer (e.g., a limited time offer from a service to which the viewer subscribes), even when a viewer is watching TV programming.

10 According to another aspect, triggers are real-time, or time stamped, notifications of events that are displayed on a viewer's TV/monitor overlaying TV content or Internet content displayed on the TV/monitor by the set top device. As a result, no predetermined area or screen layout is necessary for presenting content associated with the triggers to the viewer. This preserves the viewing surface area of the screen and provides flexibility in the
15 presentation of the content. The arrival or generation of a trigger serves as a signal to notify a viewer of the event or interactive opportunity. Triggers may include one or more of the URL, an event name, an application name, an expiration date, and a script. After a trigger has been received or generated by the set top device, a number of components at the set top device are used to process the trigger. The components may include one or more of a state, a
20 source ID, a release timer, a return path, and a content type.

The set top device may perform various actions in real-time in response to the receipt of the triggers. Alternatively, the set top device may store triggers in an associated memory to be activated, or triggered, at a later time. Upon receipt or activation of a trigger, a browser located, for example, in the set top device can notify the viewer of an event associated with

the trigger. For example, the browser may display a graphic or content associated with the trigger on a TV/monitor connected to the set top device. By responding to the trigger, the viewer can navigate to content that is related to the event corresponding to the trigger. If the viewer does not respond to the trigger, the graphic display may be removed from display on the TV/monitor or it may be re-triggered (until the viewer takes action or at a later time).

Alternatively, other internet or TV programming content may be displayed to the viewer in response to the processing of a trigger by the set top device. In addition, a trigger may cause an application to run on the set top device or to be downloaded to the set top device (e.g., from the Internet).

The graphic display or content associated with a trigger can be positioned anywhere on the viewing area of the TV/monitor, so as to overlay TV content. The trigger graphic display or content is not restricted to an area on the screen that is predetermined by a TV content provider. This provides great flexibility to service providers supplying the triggers in the display of information associated with the trigger.

A number of rules can also be stored in the set top device to allow more refined processing of triggers received by the set top device.

Triggers can be received by the set top device through communications adapters such as modems and network cards. These adapters can be connected to a variety of communications media, including telephone lines, satellite dishes, cable networks, computer networks, or any other communications media that are used to implement a network.

Other mechanisms for communicating triggers to the set top device include sending data using satellite communications, for example, a pager message or Personal Communication Services (PCS) network, or using an "always connected" technology such as a Digital Subscriber Line (DSL). In either case, the received triggers can be implemented

immediately or stored for subsequent use in an offline state. In addition, the vertical blanking intervals (VBIs) in TV frames may be used to communicate triggers to the set top device.

Other features and advantages will be apparent from the following description,
5 including the drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. 1 is a block diagram of a computer system.

FIG. 2 shows a conventional network computing environment.

FIG. 3 shows a screenshot of a browser displaying a webpage.

10 FIG. 4 is a block diagram of a set top device.

FIG. 5 is an exemplary block diagram of a communications system.

FIG. 6 is an exemplary block diagram of a set top device.

FIGS. 7A-7D are exemplary illustrations of triggers shown in a TV program
environment.

15 FIG. 8 is an exemplary flow chart of a procedure for processing triggers.

FIG. 9 is an exemplary illustration of using a VBI to send a trigger.

FIG. 10 is an exemplary flow chart of a procedure for using a VBI to send a trigger.

DETAILED DESCRIPTION

Referring to FIG. 5, a system including a set top device 500 can be used to implement
20 triggers. The set top device 500 is connected to a TV/monitor 502 for displaying content on the TV/monitor 502. The set top device 500 is capable of receiving content from a number of sources. For example, the set top device 500 can receive broadcast TV signal transmissions 571, cable TV signals 531, or wireless signals 541 (e.g., broadcast from a base

station 540 or a satellite 520 via an uplink 522 from a broadcast station). The set top device may also be connected to the Internet 127 via a communications link 125. A content service provider connected to the Internet 127 can be accessed by the set top device 500. The systems shown in Fig. 5 for supplying content are exemplary only and not necessarily
5 comprehensive. In general, essentially any available mechanism for receiving digital and/or analog signals may be used by the set top device 500 to gather content.

The set top device 500 gathers two main types of content: Internet and TV content. Internet content is, for example, digital information that is typically, but not exclusively, communicated over a computer network. Examples of internet content include web pages,
10 image files, audio files, video files, virtual worlds, data files, e-mail, instant messages, and chat sessions. TV content may be digital or analog information, generally corresponding to established NTSC or PAL standards, intended for presentation on a TV or video monitor. Examples of TV content are broadcast television programs, cable TV programs, and output of video players such as tape players, laser disc players, and DVD players. The set top
15 device 500 may use any of a variety of known methods to gather TV content from any of several different sources.

Referring to FIG. 6, the set top device 500 may include a TV tuner 606 capable of receiving broadcast TV signals 541 using an antenna. In addition, the set top device 500 may receive TV signals from cable 531, video player (e.g., VCR, DVD player, laser disc player),
20 computer 100, satellite dish 512 (e.g., Direct TV), or other sources of TV signals. The set top device 500 may also include separate or combined receivers for these sources of TV signals.

The set top device 500 also includes a memory 614 for storing application programs 618, an operating system 618 and internet content. A CPU 610 is provided for accessing and

running program applications, such as a browser, stored in the memory 614. The CPU 610 also controls the interaction of the various interfaces and data received through the I/O unit. In addition, the CPU 610 can implement functions of the set top device 500 through its programming or through commands received from a viewer using, for example, an input
5 device such as pad 610 or wireless keyboard 608.

Online and offline triggers may be used to provide viewer access to content in an internet/TV environment. A trigger notifies a viewer of an event available through the set top device 500. In some instances, the trigger is interactive and allows a viewer to respond to the trigger. In this case, the trigger allows the viewer to navigate to content associated with
10 the event corresponding to the trigger. For example, a viewer may be watching TV programming with the set top device online and an application such as AOL instant messaging, running on the processor of the set top device. When an event such as, for example, a buddy coming online occurs, the service provider may generate a trigger for this event and send the trigger to the viewer's set top device. The viewer's set top device, after
15 receiving and processing the trigger, notifies the viewer that a buddy has just come online. This notification occurs even though the viewer is watching TV programming. As a result, the viewer is notified about events of interest to the viewer. Service providers also can provide information about events to the viewer.

The set top device 500 can receive triggers through any of the connections to content
20 previously described, examples of which are provided in further detail below. The set top device 500 also may store triggers downloaded from a service provider in an associated memory 614 for retrieval offline. In addition, the set top device 500 can generate triggers using the set top device processor 610 in response to viewer interaction with the set top device 500. For example, a viewer may wish to have the device 500 generate a trigger to

notify the viewer whenever a particular sporting event occurs. The viewer would input the criteria for the event using, for example, a keyboard. In this case, the processor would evaluate a program guide listing all available sports broadcasts, or the like, to determine if the criteria for a selected event are met. If the criteria are met, then the set top box can
5 generate a trigger at the appropriate time to notify the viewer of the event and to direct the viewer to the channel showing the event. Alternatively, the set top device could turn on the TV/monitor and/or automatically tune to the channel showing the event. The set top device also could activate a recording device, such as, for example, a VCR, to record the event.

When the set top device 500 receives or generates a trigger (either from memory or
10 viewer interaction), a browser running on the processor 610 in the set top device 500 notifies the viewer of content associated with the trigger. The browser performs this notification by displaying a message or content associated with the trigger on the TV/monitor 502. For example, the trigger may notify the viewer that an interactive event is available by displaying a window over the TV programming content with a message or image describing the event.
15 By responding to the trigger, the viewer can navigate to the content that is related to the event. If the viewer does not respond to the trigger, the graphic display may be removed from display on the TV/monitor after a predetermined amount of time has passed. The graphic display may be periodically re-triggered until the viewer takes action, or may be continuously displayed until the viewer takes action. The content or message associated with
20 the trigger can be displayed anywhere on the TV/monitor 502, and can overlay the TV content. Similarly, other TV content associated with a trigger may be displayed using a picture-in-picture function of the TV/monitor 502.

As noted above, the content or message associated with the trigger is not restricted to a particular area on the TV/monitor 502 screen. As a result, great flexibility is given to

service providers in the presentation of the content or graphic displays associated with the triggers.

As indicated above, triggers are real-time, or time stamped, notifications of events that are displayed on the TV/monitor associated with the set top device 500. Triggers may include both sender and receiver components. A sender component governs the transmission of information associated with the trigger. A receiver component determines how the set top device processes the trigger. A trigger's sender components may include one or more of a URL, an event name, an application name, an expiration date, and a script.

The URL can be used by the trigger to inform the browser where to go for content that is to be displayed on the TV/monitor 502 screen. The URL also can indicate where a browser should access application programs for downloading to the set top device. The trigger also may include a name such as "You've got mail." The name can indicate the type of message that is to be displayed on the TV/monitor.

A trigger may also have an application name that associates the trigger with an application type. The application name is used by the set top device processor 610 as a pointer that initiates an application stored in the set top device. Examples of applications that may be run are an e-mail program, an instant messaging program, and a chat program.

The trigger can also have an expiration date. After the expiration date has passed a trigger will no longer be sent to a viewer. In addition, an expired trigger can be discarded from a cache or memory, even if the viewer has not acted upon the expired trigger.

The trigger may also contain a script. A script is an embedded program that adds functionality and interactivity to a trigger. A script can be programmed using an interpreted language in which commands are executed by the browser in the order in which the browser reads them. A script usually takes the form of an object followed by a method for using the

object (e.g., opening a graphic display, such as a window on the screen, to display a message). Parameters can also be added to specify the size of the window and the font of text appearing in the window. A script can also specify an active region within the window to provide for viewer interaction with the graphic display. JavaScript is one example of a scripting language that can be used within a trigger. Other programming languages, such as C⁺⁺, can also be used to provide functionality to the trigger.

After a trigger has been received at the set top device 500 and has been identified by the processor 610, a number of receiver components at the set top device are used to process the received trigger. The receiver components may include one or more of a state, a source ID, a release timer, a return path, and a content type.

The state of the trigger indicates whether the trigger should be enabled or disabled. For example, the viewer may indicate that all triggers received for display during a certain period of time during the day should be disabled to prevent children from using or viewing interactive triggers. The processor 610 can use any number of rules stored in the memory 614 to determine whether or not a trigger should be enabled or disabled. The rules can be adjusted or entered by a viewer operating the set top device. Rules can also be downloaded to the set top device through a connection to the Internet, for example.

The source ID allows the processor 610 to determine the content feed source of the trigger.

A release timer can also be provided to allow the processor 610 to determine when, and how often, to activate a trigger.

A return path may be stored by the processor 610 in the memory 614 to allow a unidirectional or bi-directional exchange of information or content with the set top device. This allows the processor 610 to quickly display content associated with the trigger or to

respond to viewer interaction with the displayed message or content associated with the trigger.

A content type indicates to the processor 610 what kind of content is being triggered so that the processor 610 may take appropriate steps to present the content to the viewer using a predetermined format. The content type may be used to determine how information is displayed. For example, the content type may indicate what type of font is to be used for ASCII text or what the best image version is for MPEG video.

A number of rules can also be stored in the memory 614 of the set top device 500 to allow more refined processing of triggers received by the set top device 500. For example, the rules can designate what happens when triggers overlap or interfere with each other. In this case, a priority scheme can determine which of the overlapping triggers will be executed. Another rule may be used to process triggers having scripts or branching rules.

Rules may also permit viewers to control the display of triggers on the TV/monitor 502. Rules can be provided that indicate when triggers should not interfere with watching TV. For example, if children are watching TV, and the parents do not want triggers and their scripts (which might, for example, take the viewer to an e-commerce site) to be executed, the content or messages associated with the triggers can be blocked by a rule that temporarily disables triggers from being displayed when parents are not home, or during certain hours of the day. Rules can also be provided to allow the processor 610 to handle situations when triggers and their associated actions are interrupted. In this case, the rules provide for removal of the associated display from the screen and possible re-triggering of the message, if necessary.

FIG. 7A illustrates an exemplary graphic display for a message generated by the set top device 500 in response to receiving a trigger. The set top device 500 may be

programmed to create a trigger, or a service provider may send a trigger, to remind the viewer of an event. For example, when the viewer is a member of an alumni club, the club may use an internet service provider to send a trigger to remind the viewer that the viewer's school is participating in a sporting event. An example of a graphic display associated with such a trigger is shown in FIG. 7A. In this case, the trigger is sent to the set top device over the Internet. Upon receipt of the trigger, the processor in the set top device detects the trigger and causes a graphic display 711 to appear on the screen 715 of the TV/monitor 502. In this example, the screen displays the message "Maryland v. Duke Men's College Basketball in one hour," thereby alerting the viewer of an upcoming event. The graphic display 711 may be displayed anywhere on the screen 715.

The trigger does not necessarily have to send a message or content appearing on the screen. For example, in an alternate implementation, the trigger could cause an e-mail to be sent to notify the viewer that there is a game. A trigger also could be programmed by the viewer to cause the TV to be automatically turned on at game time and to be tuned to the channel broadcasting the game. The viewer could also be sent a pager message in response to the activation of the trigger.

FIG. 7B illustrates an exemplary notification by an interactive trigger that allows a viewer to navigate to content specified by the display associated with the trigger. In this example, the trigger causes the display of message 712 indicating "Duke v. Maryland Men's Basketball in one minute-Do you want to watch?" Also displayed in the device are two interactive buttons, or active regions, 713 and 714, that navigate the viewer to the trigger's associated content. For example, if the viewer selects the YES button 713, the processor 610 causes the tuner 606 in the set top device 500 to change the viewed channel to the channel showing the game. If the viewer selects the NO button 714, the message 712 and active

regions are removed from the screen and the content associated with the trigger is not displayed. The two interactive buttons may be selected by using, for example, a keyboard, a keypad, or an interactive on-screen mouse.

In an alternative implementation, the active regions could be used to cause the processor to make a connection using a URL embedded in the trigger to display an electronic programming guide or a web page showing, for example, team statistics.

The active regions can be visible or invisible to the viewer. Visible active regions may be indicated by using a script of the trigger to generate a desired appearance using transparency, translucency, shape (e.g., button), colors, special effects (e.g., flashing), and tri-state appearance information. In addition, the active regions can change appearance in response to sensed external stimuli. The active regions also may be specified by separate triggers so that the active regions appear to overlay the graphic display. Additional triggers may also be used to add or remove active regions from the graphic display in response to viewer interaction so that the graphic display does not need to be redrawn after each viewer interaction. The active regions may also be displayed at a location on the screen that is separate from the graphic display.

As shown in FIG. 7C, multiple triggers may be displayed at the same time. For example, the game message 711 may be displayed at the same time as a message 718 "You've got mail." By selecting the "You've got mail" display, the viewer can cause the processor to execute an application that allows the viewer to retrieve the viewer's mail. In this case, a window 717 associated with the application is displayed to allow retrieval of the e-mail, as shown in Fig. 7D.

Referring to FIG. 8, the processor 610 of the set-top device 500 may operate according to a procedure 800. The processor 610 monitors a data stream of signals received

by the set top device 500 (step 805) through any of the sources noted above, until a trigger is sensed (step 810). Once a trigger is sensed, the processor 610 determines if the trigger is to be executed or stored for later activation (step 815).

5 If the trigger is to be stored, the processor stores the trigger (step 820) along with a date and time at which the trigger is to be executed. The trigger is stored in such a way that it is automatically inserted into the data stream at the appropriate date and time.

If the trigger is to be executed, the processor 610 determines if the trigger has an associated application (step 825). If the trigger includes such an application, the application is accessed or executed (step 830). If the trigger does not have an associated application, the
10 processor 610 executes any scripts or programs included in the trigger to display an onscreen graphic associated with the trigger (step 835). If the trigger is not interactive (step 840), the processor waits for elapse of a timer (step 845) and then removes the graphic from the screen (step 850).

If the trigger is interactive (step 840), the processor waits for a viewer response (step
15 855). If the viewer responds to the graphic, then the processor navigates the viewer to the content associated with the viewer's response (step 860) as indicated by the script, URL, or application associated with the trigger. The processor then monitors the data stream for additional triggers (step 805).

If the viewer does not respond within an allocated time (step 865), the processor
20 removes the graphic from the screen (step 850). Either before or after removing the graphic from the screen, the processor may optionally store the trigger for re-initiation at a later date or time (step 870). The processor then monitors the data stream for additional triggers (step 805).

Triggers can be received by the set top device 500 through communications adapters such as modems and network cards 623. These adapters can be connected to a variety of communications media, including telephone lines, satellite dishes, cable networks, computer networks, or any other communications media that are used to implement a network. For example, a trigger could be sent via an internet service provider through a telephone line connected to the set top device using a HTML page and script.

Other mechanisms for communicating triggers to the set top device include sending data using satellite communications -- for example, using messages in a pager or Personal Communication Services (PCS) network -- and/or using an "always connected" technology such as a Digital Subscriber Line (DSL). In either case, the triggers received by the set top device 500 are detected using the processor 610 and can be used immediately or stored in the memory 614 for subsequent use in an offline state.

Another mechanism for communicating triggers to the set top device involves the use of vertical blanking intervals (VBIs) in TV frames. The standard NTSC TV signal used in the United States is made up of "frames" that are broadcast at a rate of 30 per second. Each frame is formed of 525 scan lines divided equally into two separate and contiguous fields, field 1 and field 2. Each field includes 262.5 scan lines, 241.5 of which carry TV signal information that is visible to the viewer of the TV.

The first 21 lines in each field represent the VBI. The VBI corresponds to the period of time that it takes an electron beam emitted by the TV set's cathode ray tube (CRT) to reposition itself from the bottom of the TV screen to the top of the screen (also referred to "vertical retracing"). After each field is received and displayed, the electron beam must be repositioned in this manner before drawing of the first scan line of the next field may commence. Accordingly, no visible TV signal information can be transmitted during the

VBI; since that TV signal information would be lost. However, basically any other type of information may be transmitted during the VBI for purposes such as closed captioning, teletext, and providing electronic program guide information. The amount of data that can be transmitted in this manner is roughly equal to the capacity of a 9500 baud modem for each
5 available scan line in the VBI.

In one implementation, the VBI can be used to communicate triggers directly from the TV broadcaster to a set top device. For each TV field received, the set top device 500 can extract the trigger information from the VBI and use the information to generate a graphic display associated with the trigger or allow the processor 610 to navigate the viewer
10 to a content page. The VBI can be used in this regard either in real time or near real time (i.e., the triggers in the VBI can be extracted and used by the set top device 500 immediately upon receipt) or the VBI can be used to slowly transmit information to the set top device for storage and subsequent retrieval.

Thus, data defining the trigger and its parameters can be communicated directly from
15 the TV broadcaster to a set top device 610 within the VBIs of a TV signal. As shown in the example of Fig. 9, definitions for two different triggers are transmitted to the set top device in each VBI. Specifically, the VBI for Field 1 includes definitions for triggers 1 and 2 (TR1 and TR2) while the VBI for Field 2 includes definitions for triggers 3 and 4 (TR3 and TR4). Essentially any other number of triggers (from zero to a number corresponding to the
20 bandwidth of the VBI and/or the processing capacity of the set top device) could be used instead. For each TV field received, the set top device 500 extracts this information from the VBI on the fly and uses the information to execute the trigger. For example, the set top device can retrieve the trigger from a VBI and generate a graphic display (e.g., a message

overlay or a window) for the trigger with the appropriate size, shape and appearance, at a location on the TV screen specified by the trigger in the VBI.

As shown in the example of Fig. 9, a trigger includes seven different fields: event name 901, application name 902, location 903, size 905, highlight 907, action 909, and extension 911. Elements 903-909 may constitute a script, for example. All of these fields are not necessarily required for implementing triggers; however, the fields are included in this example to show the types of information that can be used to implement a trigger. In addition, the triggers shown in Fig. 9 are not necessarily comprehensive. For example, several additional or different parameters relating to the appearance, location, size, shape, and behavior of a trigger may be specified.

In this example, the event name field 901 refers to an internally used identifier for each trigger, such as "You've got Mail." The event name 901 may be a unique name, or may be implemented as a globally unique identifier (GUID).

The application name 902 is a pointer that is used by the processor 610 to initiate an application stored in the memory 614 of the set top device. Alternatively, the application name could indicate an application that is to be downloaded from the Internet (e.g., a Java application) for use by the set top box. Triggers that do not have an application are processed using their scripts, for example, to supplement or change other triggers and applications that are currently active. In this case, the application may contain a pointer to a program stored in the set top device, which allows a viewer to retrieve the viewer's e-mail.

The location field 903 refers to the screen location, typically specified in screen coordinates, at which the graphic display or content should be generated. The location field 903 can specify either a single location (e.g., the center or upper left corner of the screen) or several locations. Similarly, the size field 905 can be a single value defining, for example, a

relative size (e.g., small, medium or large) or a data structure fully defining the geometric size and/or shape of the trigger.

The highlight field 907 can be used to control the visual appearance of the graphic display, active region, or content. For example, the highlight field 907 may include data specifying, for example, transparency, translucency, shape (e.g., button), colors, special effects (e.g., flashing), tri-state appearance information, how the appearance should change in response to sensed external stimuli, different alternative appearances for different contexts, such as, for example, whether the set top device was online (logged into the online service provider network) or offline (not logged into the online service provider network). The highlight field 907 may also specify how the appearance changes in response to rules (e.g., how triggers should be processed).

The action field 909 holds data defining the type of action to be undertaken when the trigger is selected by the viewer. This could be as simple as identifying a single URL to be accessed. The action field also may include different URLs to be accessed in response to different contexts that might arise. In this case, a different action could be undertaken depending on the current context. For example, selecting an active region in the graphic display associated with a trigger for causing an application for retrieval of e-mail to execute may result in different behaviors depending on whether or not the set top device was logged into an online service (a first context) or offline (a second context). In addition, the action field 909 could include non-URL data, such as, for example, data defining actions to be taken by the set top device (e.g., change TV broadcast channel or start VCR) without having to access any network resources.

The extension field 911 may serve as a hook to specify or handle any special data types, or other extensions, to the trigger functionality. For example, the extension field 911

may hold data specifying that the trigger under consideration should be repeated once every five minutes for one minute durations over the next hour. In response, the set top device may cache an associated web page overlay corresponding to that trigger and simply re-display it periodically without having to regenerate the web page again each time that it was to be overlaid on the TV screen. Moreover, the TV broadcaster would not have to retransmit the trigger definition every time a periodic trigger is to be implemented. Accordingly, this capability would help to preserve processing and communications bandwidth.

Alternatively, or in addition, the extension field 911 could be used to implement a "delta" implementation for trigger definitions. That is, the extension field 911 could hold an indication that a newly received trigger definition does not completely define a web page overlay, and instead defines a difference (either additive or subtractive) between a previously defined web page overlay and a new desired web page overlay. In this manner, new content, graphic displays, or active regions associated with triggers could be added to an existing overlay, and/or old graphic displays or content associated with old triggers could be removed, without having to completely define the web page overlay from scratch. This capability would also help to preserve processing and communications bandwidth.

Fig. 10 is a flowchart showing a procedure 1000 implemented by a set top device to provide interactive links in the manner described above. First, the set top device extracts the trigger definition information from the VBI (step 1005). Next, the set top device uses the trigger definition information to generate an appropriate message or content and overlays it on top of the TV program content (step 1010). While the web page overlay remains on the screen, the set top device monitors for viewer input indicating that a particular trigger has been selected (step 1015). Upon sensing that a viewer has clicked on a trigger, the set top device initiates the action associated with the selected trigger, for example, by retrieving and

displaying a webpage located at a URL specified in the trigger definition by the TV broadcaster (step 1020). In general, the procedure 1000 is performed each time that a VBI that contains trigger definition information is received. Alternatively, triggers communicated by the VBI could be stored and retrieved for later use by the processor in response to a condition or a timer function.

Other implementations of and uses for the trigger techniques described above are possible. A trigger can have as its associated action virtually any computer-implemented function or resource. In the basic case, selecting a trigger can cause a web page of electronic content (e.g., text, images) to appear on the TV screen, either instead of or in combination with the TV broadcast signal. Alternatively, triggers can be used to trigger sounds, movies, or other utilities such as e-mail, instant messaging programs, chat programs (either text- or voice-based), whether resident locally (e.g., on the set top device) or remotely (e.g., on a host computer). In addition, interactive links may be used to control TV or VCR functions (e.g., channel, volume, record, program for future recording and playback), to set bookmarks for designated TV programs and/or webpages, to allow viewers to vote (e.g., for a favorite performer or in response to a news poll), to buy merchandise associated with a TV program, or to access a file or program stored at a specified URL on the set top device, on a public network (e.g., the Internet) or on private networks (e.g., America Online).

As previously mentioned, another available technique is to "trickle-down" or "push" triggers from the host system to the set top device in the background (i.e., transparently to, and without being requested by, the viewer). This content can be sent using ordinary network connections while the viewer is logged in to the host system, or can be sent via other routes that do not require the set top device to be logged in, such as in the VBI as described above. This trickled-down content is then stored in a cache memory by the set top device so

that it is available for future use, such as for example, to display a content page associated with a trigger activated while the viewer is offline.

Other embodiments are within the scope of the following claims.

WHAT IS CLAIMED IS:

- 1 1. A method of providing triggers with TV programming display, the method
2 comprising:
3 detecting a trigger in a data stream;
4 retrieving TV content or internet content associated the detected trigger; and
5 presenting the content to a viewer of the TV programming display.
- 1 2. The method of claim 1 further comprising generating a graphic display associated
2 with the detected trigger in a region of the TV programming display.
- 1 3. The method of claim 2 further comprising:
2 generating an active region on the TV programming display; and
3 navigating the viewer to TV content or internet content in response to selection of the active
4 region by the viewer.
- 1 4. The method of claim 3 wherein TV content is one of a TV signal or a video player
2 output.
- 1 5. The method of claim 3 wherein internet content is provided by one of a web page, an
2 image file, an audio file, a video file, a virtual world, a data files, an e-mail, an instant
3 message, and a chat sessions.
- 1 6. The method of claim 1 wherein the received data stream comprises TV signal data in
2 which one or more triggers are embedded.
- 1 7. The method of claim 6 wherein a trigger is embedded in a vertical blanking interval
2 of the TV signal.
- 1 8. The method of claim 1 wherein the trigger is received through a satellite, radio
2 frequency, wireless, internet, or optical communications link.

- 1 9. The method of claim 1 wherein receipt of the trigger further comprises extracting
2 from the trigger information defining the display of TV content or internet content associated
3 with the trigger.
- 1 10. The method of claim 3 wherein receipt of the trigger further comprises extracting
2 from the trigger information defining the active region.
- 1 11. The method of claim 10 wherein the extracted information comprises a script.
- 1 12. The method of claim 3 wherein the viewer is navigated to a web page.
- 1 13. The method of claim 1 further comprising sending the trigger in response to an event
2 determined by a TV signal broadcaster.
- 1 14. The method of claim 3 wherein the graphic display and the active region are
2 displayed for a period of time specified by the trigger.
- 1 15. The method of claim 1 further comprising determining if the detected trigger should
2 be enabled.
- 1 16. The method of claim 1 further comprising:
2 storing the detected trigger; and
3 retrieving the trigger at a predetermined time.
- 1 17. The method of claim 1 wherein the trigger contains at least one of the following
2 attributes: an URL; an event name; an application name; an expiration date, and a script.
- 1 18. The method of claim 3 further comprising executing an application specified in the
2 trigger in response to the selection of the active region.
- 1 19. The method of claim 3 further comprising retrieving data from a URL specified in the
2 trigger.

- 1 20. The method of claim 3 further comprising changing a channel of the TV
2 programming display in response to the selection of the active region.
- 1 21. A method for supplying a viewer of TV programming a graphic display comprising:
2 generating a trigger in response to an event; and
3 generating a graphic display specified by the trigger in a manner that overlays the TV
4 programming.
- 1 22. The method of claim 21 further comprising:
2 storing the trigger;
3 activating the trigger in response to a condition or event; and
4 generating the graphic display in response to activation of the trigger.
- 1 23. The method of claim 21 wherein the graphic display is generated in accordance with
2 an application specified by the trigger.
- 1 24. The method of claim 21 wherein the graphic display is a web page specified by a
2 URL included in the trigger.
- 1 25. The method of claim 21 wherein the graphic display is generated by a script included
2 in the trigger.
- 1 26. The method of claim 15 further comprising generating an active region in the graphic
2 display wherein the active region provides for viewer interaction with the graphic display.
- 1 27. The method of claim 26 wherein the active region's appearance is modified in
2 response to the passage of time.
- 1 28. The method of claim 26 wherein the active region's appearance changes based on a
2 current context.

- 1 29. The method of claim 28 wherein the graphic display is shown on a TV display and
2 the generated trigger is received by a set top device.
- 1 30. The method of claim 29 wherein the current context may be one of a first context
2 corresponding to a first state in which a set top device is logged into an online service
3 provider host system and a second context corresponds to a second state in which the set top
4 device is not logged into the online service provider host system.
- 1 31. The method of claim 26 wherein an application is executed in response to the viewer's
2 selection of the active region.
- 1 32. The method of claim 26 further comprising detecting that the viewer has selected the
2 active region.
- 1 33. The method of claim 32 comprising modifying the active region's appearance in
2 response to the selection of the active region.
- 1 34. The method of claim 33 wherein modification of the active region's appearance
2 comprises changing one or more of the following visual characteristics of the active region:
3 transparency, translucency, color, shape, size, or location.
- 1 35. The method of claim 32 further comprising accessing a resource linked to the active
2 region in response to the detected viewer selection.
- 1 36. The method of claim 35 wherein the accessed resource comprises a communications
2 utility that enables the viewer to communicate with others.
- 1 37. The method of claim 36 wherein the communications utility comprises one or more
2 of the following: an e-mail program, an instant messaging program, or a chat program.
- 1 38. The method of claim 35 wherein the accessed resource comprises a TV or VCR
2 control operation.

1 39. The method of claim 30 wherein modification of the predetermined action comprises
2 changing an address of a link associated with the active region to specify a different resource.

1 40. The method of claim 21 further comprising:
2 receiving a plurality of generated triggers; and
3 generating an active region in one or more of the graphic displays, wherein the active
4 region provides for viewer interaction with the graphic display.

1 41. The method of claim 21 further comprising generating a separate active region for
2 each received trigger.

1 42. The method of claim 41 wherein each separate active region has its own associated
2 predetermined action.

1 43. The method of claim 42 further comprising activating a separate predetermined action
2 for each active region.

1 44. The method of claim 26 wherein information defining the active region is received
2 during a vertical blanking interval of a TV signal.

1 45. The method of claim 21 wherein information defining the generated trigger is
2 received during a vertical blanking interval of a TV signal.

1 46. The method of claim 21 wherein a predetermined action is specified by a script
2 included in the trigger.

1 47. A set top device for providing content to a TV programming display comprising:
2 an interface for receiving a data stream of signals;
3 a processor including
4 a detector for detecting a trigger in the data stream, and
5 a browser for retrieving TV content or internet content associated with the
6 trigger; and

7 an output for providing the TV or internet content to the TV programming display.

1 48. The set top device of claim 47 further comprising a memory for storing a detected
2 trigger and the content associated with the trigger.

1 49. The set top device of claim 47 wherein the processor generates a graphic display
2 associated with the detected trigger for output to a region of the TV programming display.

1 50. The set top device of claim 49 wherein the processor generates an active region and
2 the browser navigates a viewer of the TV programming display to TV content or internet
3 content in response to selection of the active region.

1 51. The set top device of claim 47 wherein the data stream comprises TV signal data in
2 which the trigger is embedded.

1 52. The set top device of claim 51 wherein a trigger is embedded in the vertical blanking
2 interval of the TV signal.

1 53. The set top device of claim 50 wherein the processor extracts from the trigger
2 information defining the active region.

1 54. The set top device of claim 53 wherein the extracted information comprises a script.

1 55. The set top device of claim 50 wherein the browser navigates the viewer to a web
2 page.

1 56. The set top device of claim 47 wherein the trigger is detected in response to an event
2 determined by a TV signal broadcaster.

1 57. The set top device of claim 50 wherein the graphic and the active regions are
2 displayed for a period of time specified by the trigger.

- 1 58. The set top device of claim 479 wherein the processor determines if the detected
2 trigger should be enabled.
- 1 59. The set top device of claim 47 further comprising a memory storing the detected
2 trigger wherein the processor retrieves the stored trigger at a predetermined time.
- 1 60. The set top device of claim 50 further comprising a memory for storing applications
2 wherein the processor executes an application specified in the trigger in response to the
3 selection of the active region.
- 1 61. The set top device of claim 50 wherein the browser retrieves data from a URL
2 specified in the trigger.
- 1 62. The set top device of claim 50 wherein the processor changes a channel of the TV
2 programming display in response to the selection of the active region.
- 1 63. A program product on an electronic storage medium comprising instructions for
2 causing a processor to detect a trigger in a data stream; retrieve TV content or internet
3 content associated the detected trigger; and present the content to a viewer of a TV
4 programming display.
- 1 64. The program product of claim 63 further comprising instructions for causing the
2 processor to generate a graphic display associated with the detected trigger in a region of the
3 TV programming display.
- 1 65. The program product of claim 64 further comprising instructions for causing the
2 processor to generate an active region and to navigate the viewer to TV content or internet
3 content in response to selection of the active region by the viewer.
- 1 66. The program product of claim 65 wherein the TV content is one of a TV signal or a
2 video player output.

1 67. The program product of claim 65 wherein the data stream comprises TV signal data
2 in which the trigger is embedded.

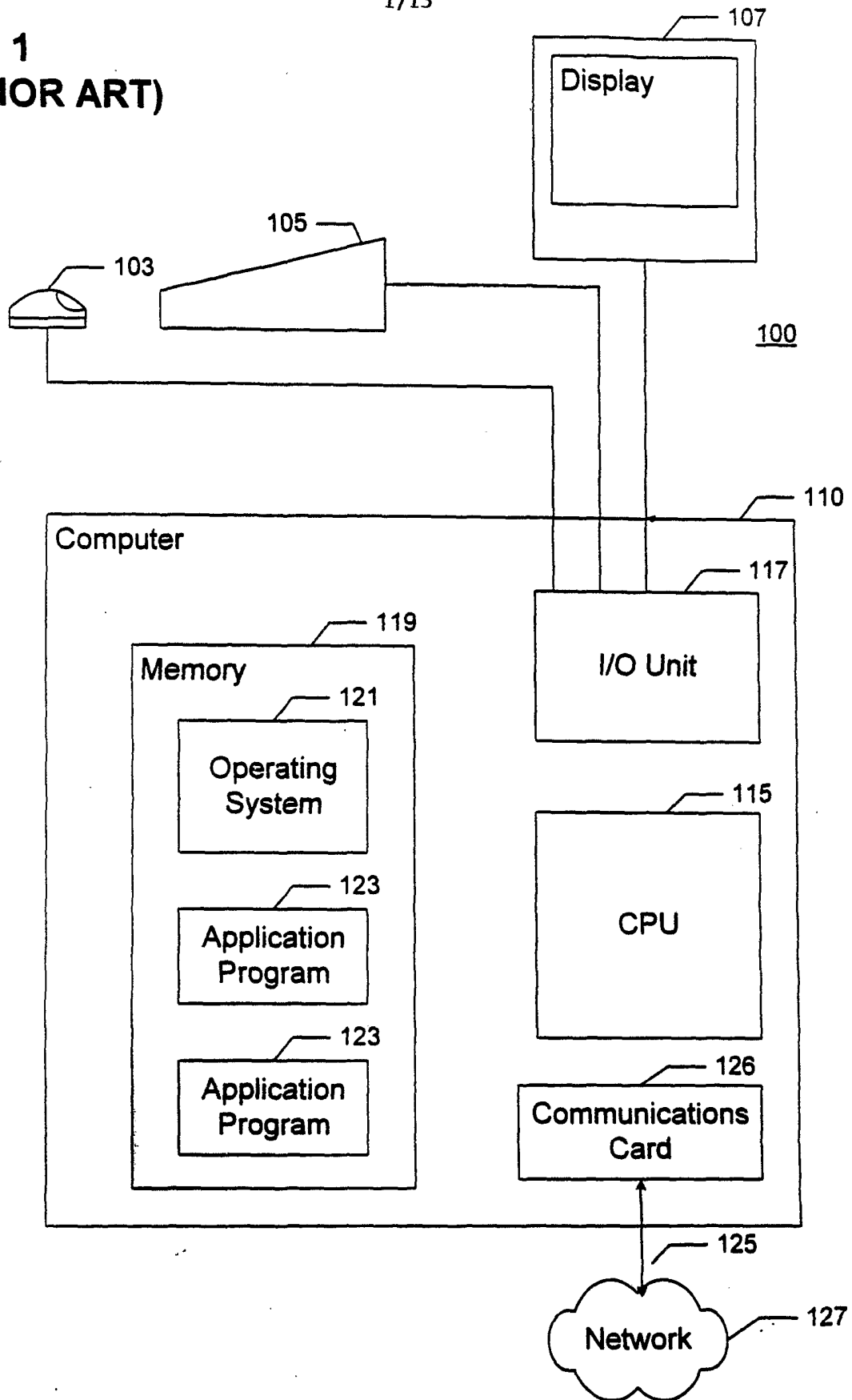
1 68. The program product of claim 67 wherein the trigger is embedded in a vertical
2 blanking interval.

1 69. The program product of claim 63 further comprising instructions to extract from the
2 trigger information defining the display of TV content or internet content associated with
3 said trigger.

1 70. The program product of claim 65 further comprising instructions to extract from the
2 trigger information defining the active region.

1 71. The program product of claim 63 wherein the information extracted comprises a
2 script..

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Fig. 1
(PRIOR ART)

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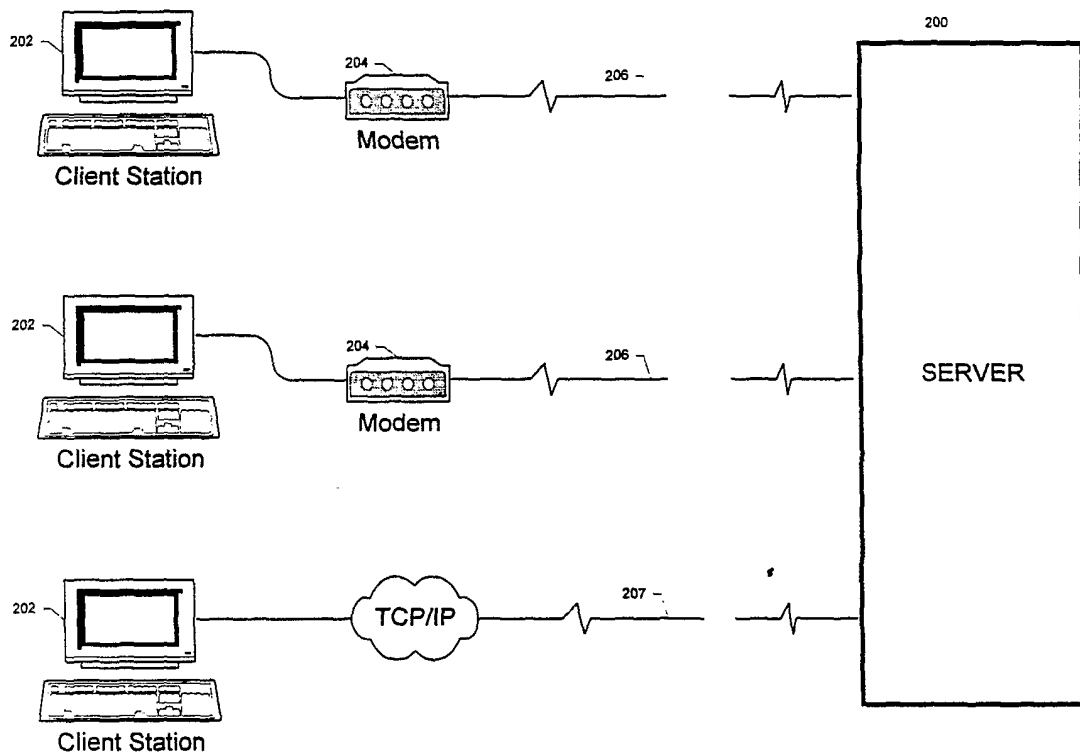


Fig. 2
(PRIOR ART)

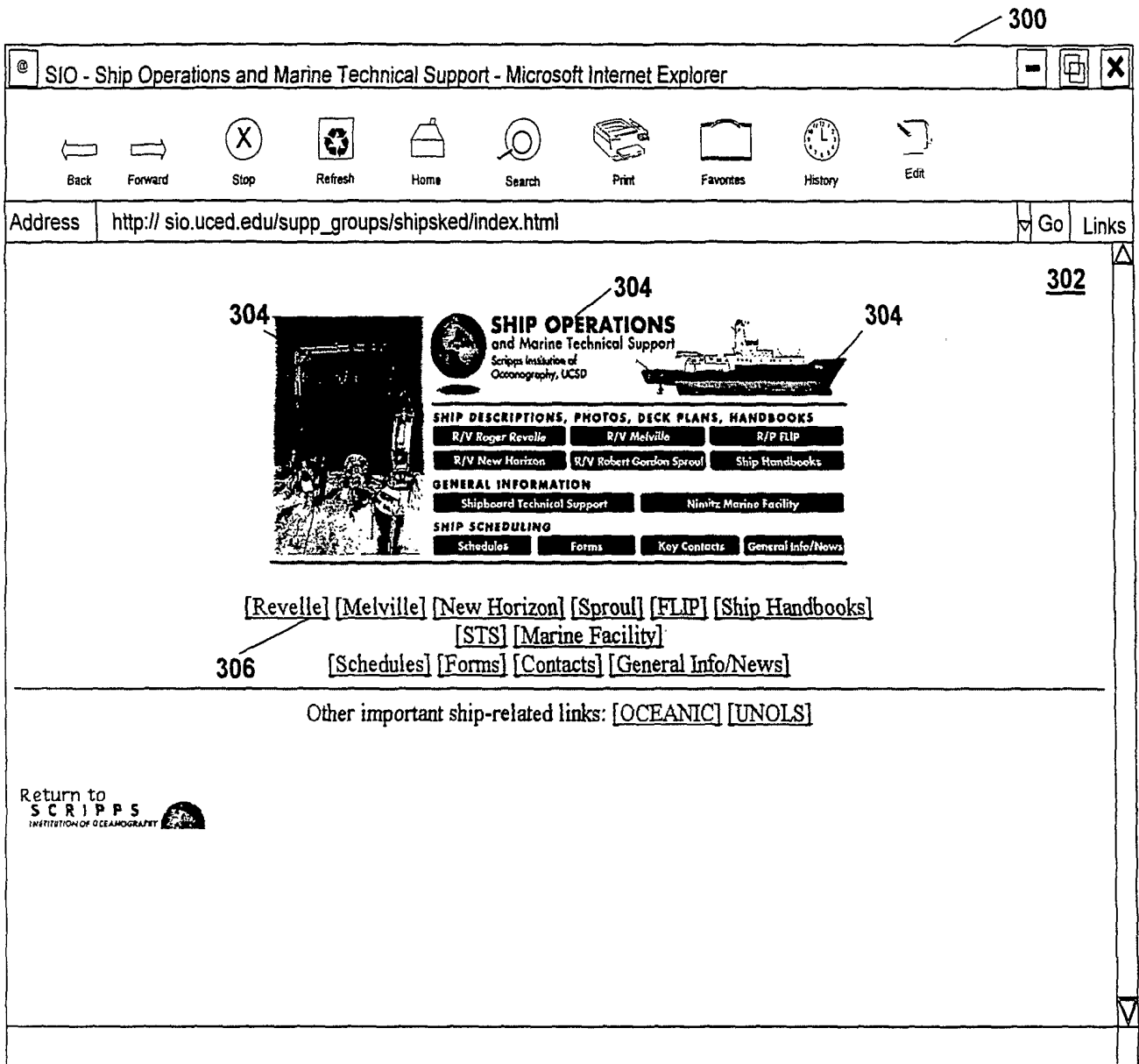


Fig. 3 (Prior Art)

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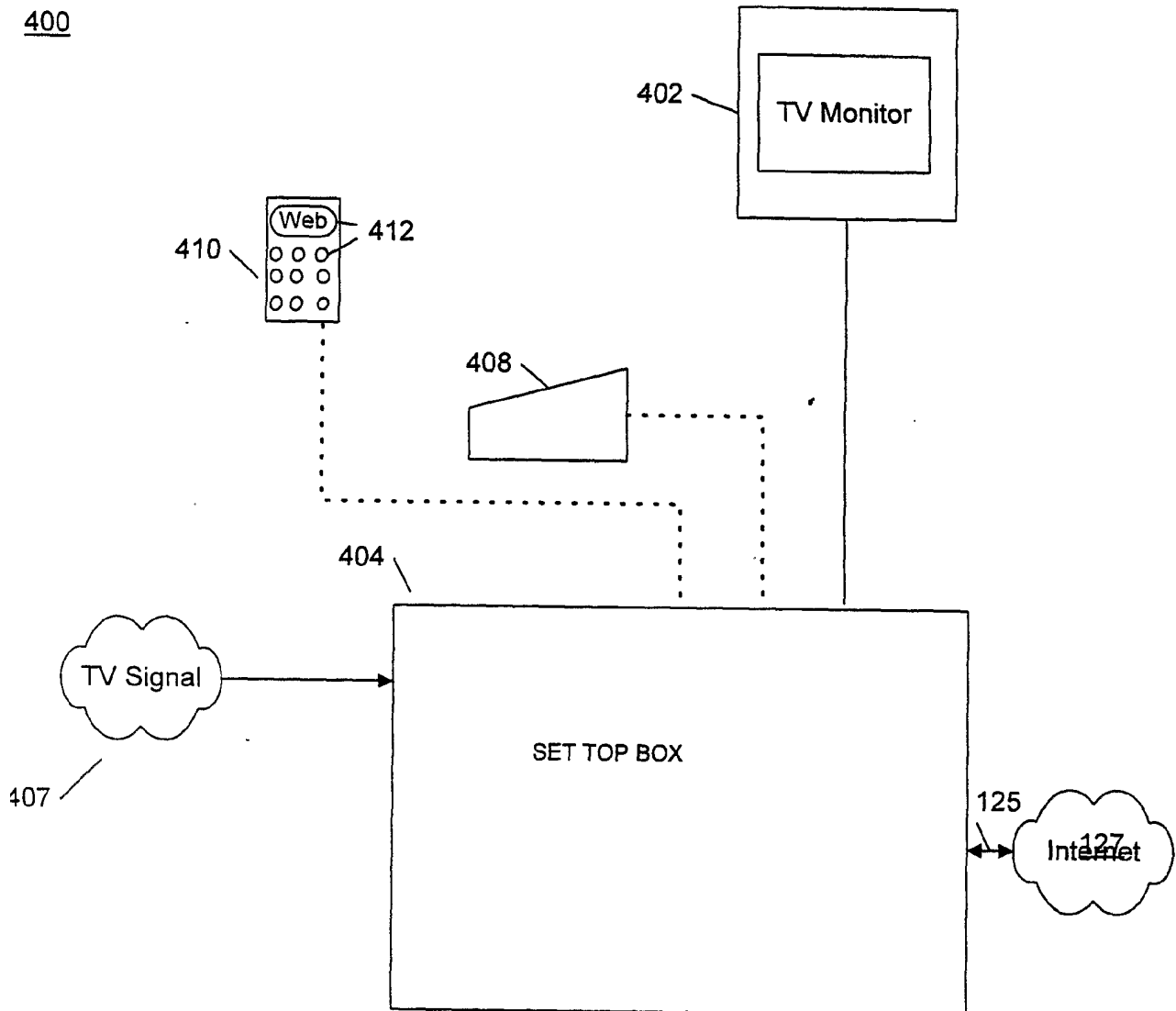


Fig. 4
(PRIOR ART)

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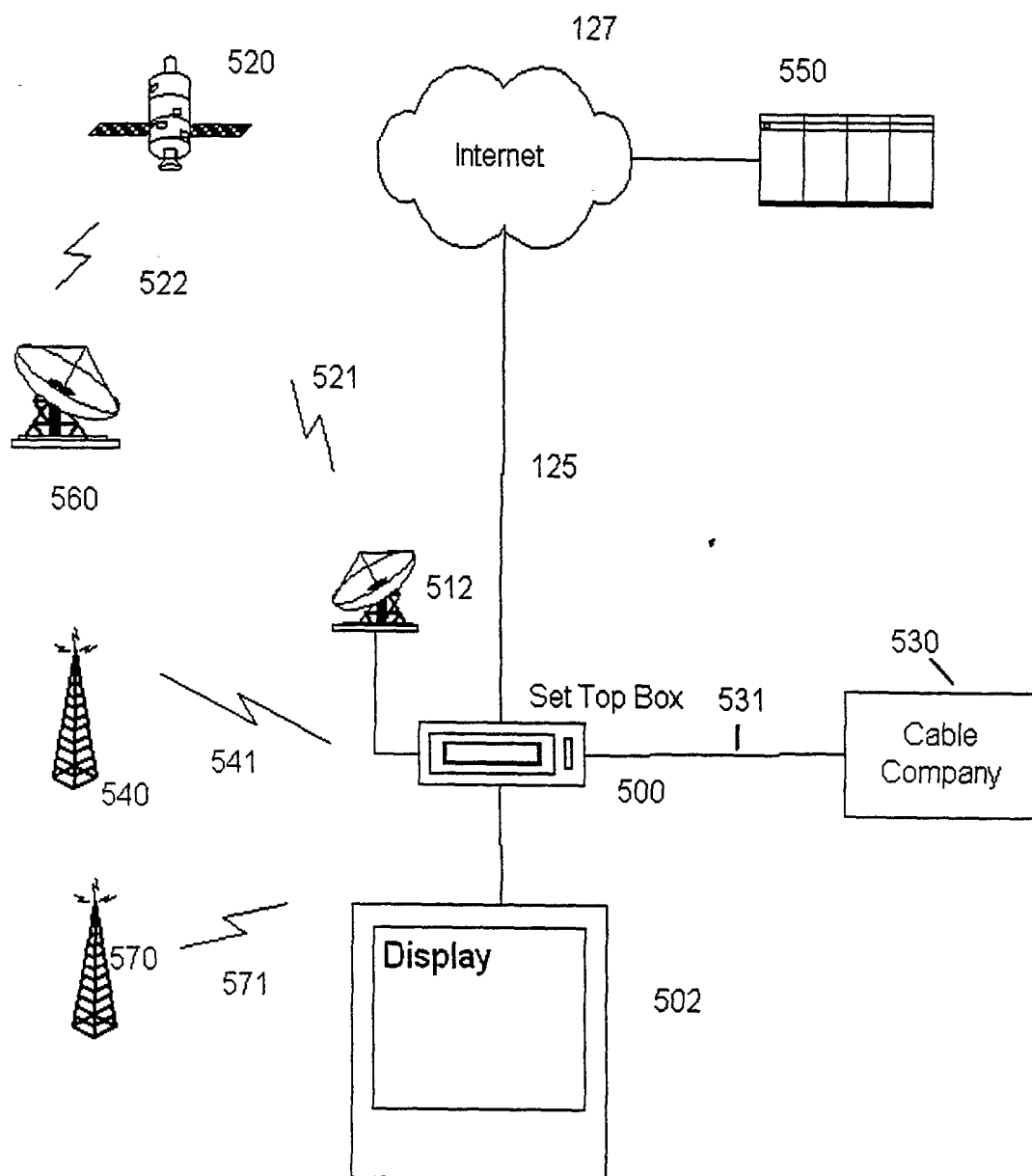
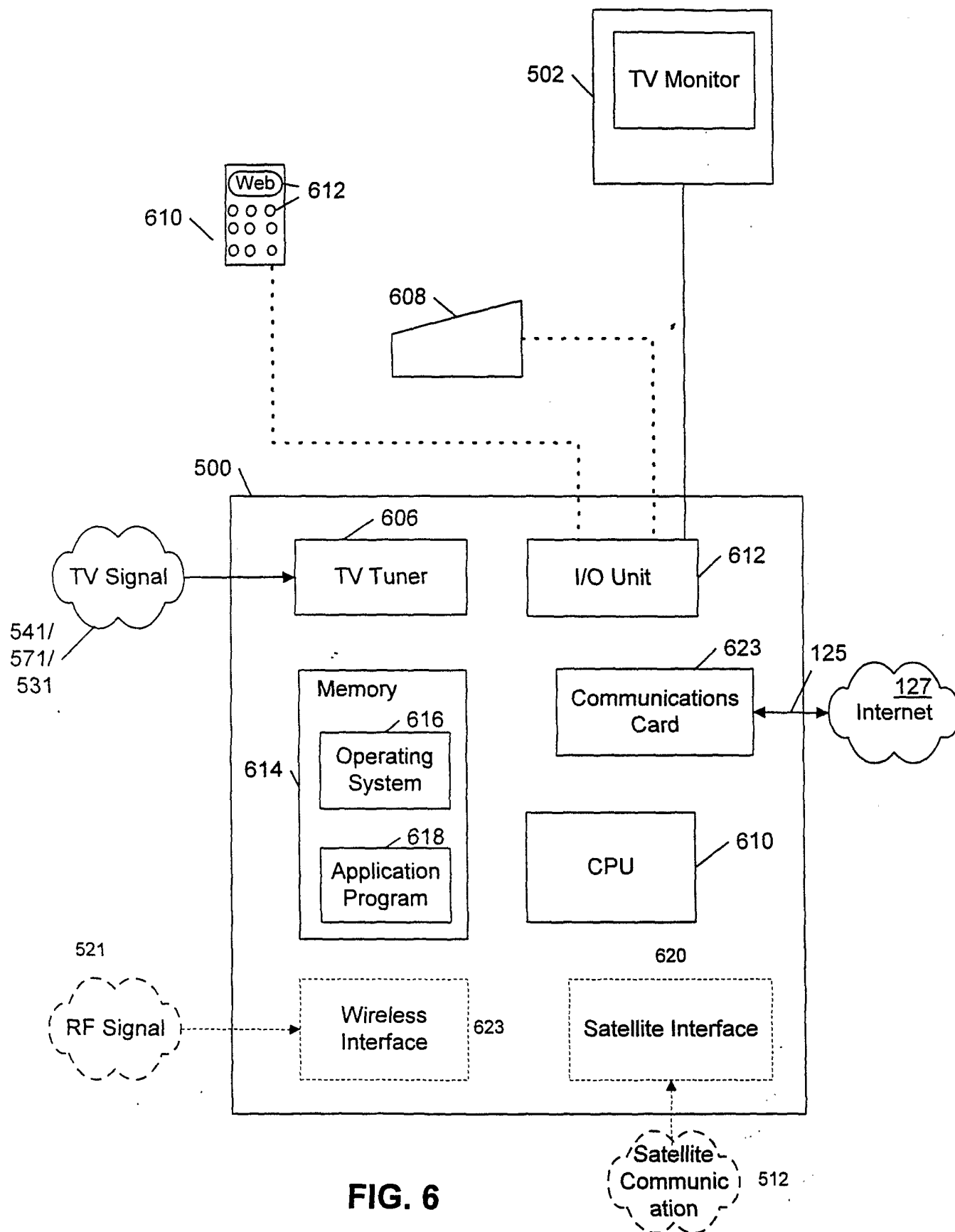


FIG. 5

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**FIG. 6**

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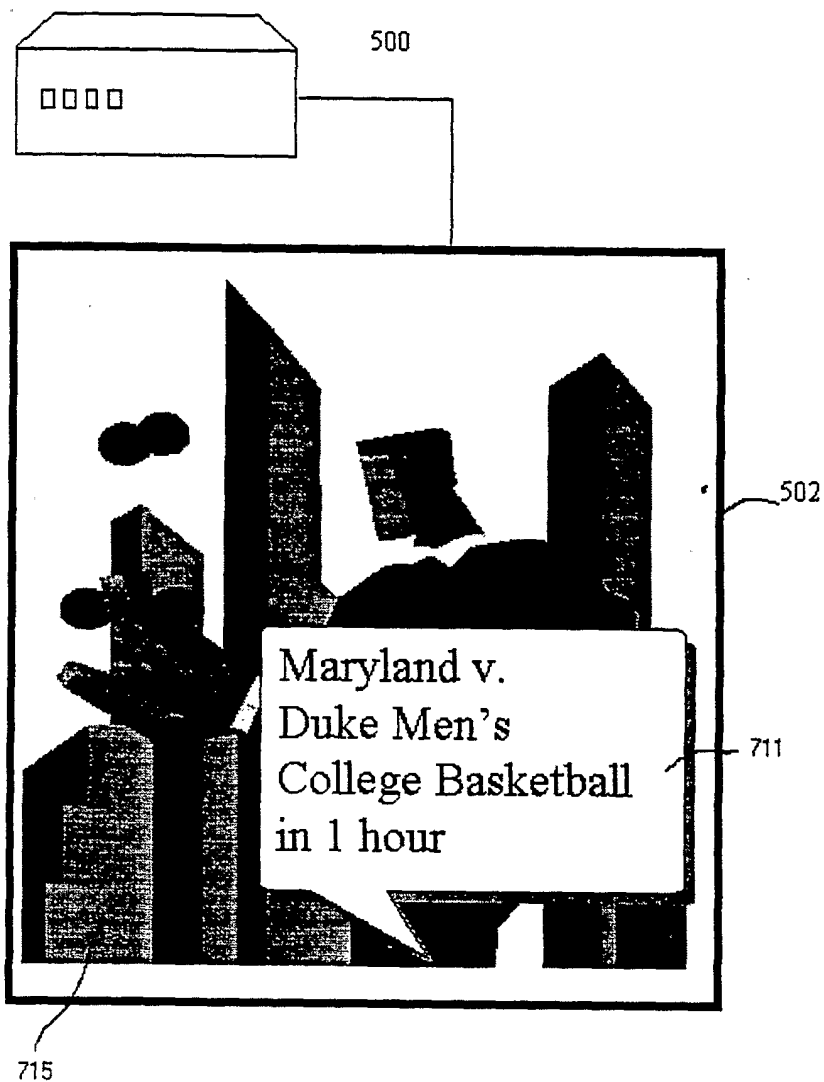


FIG. 7A

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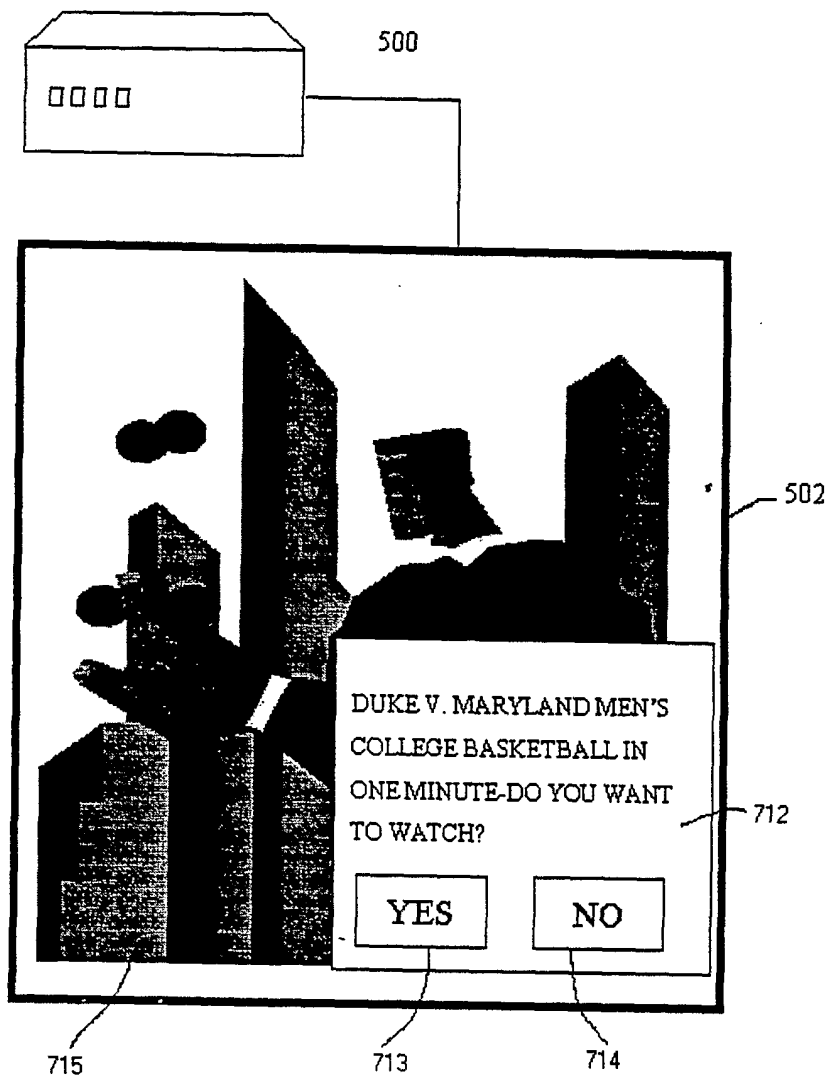


FIG. 7B

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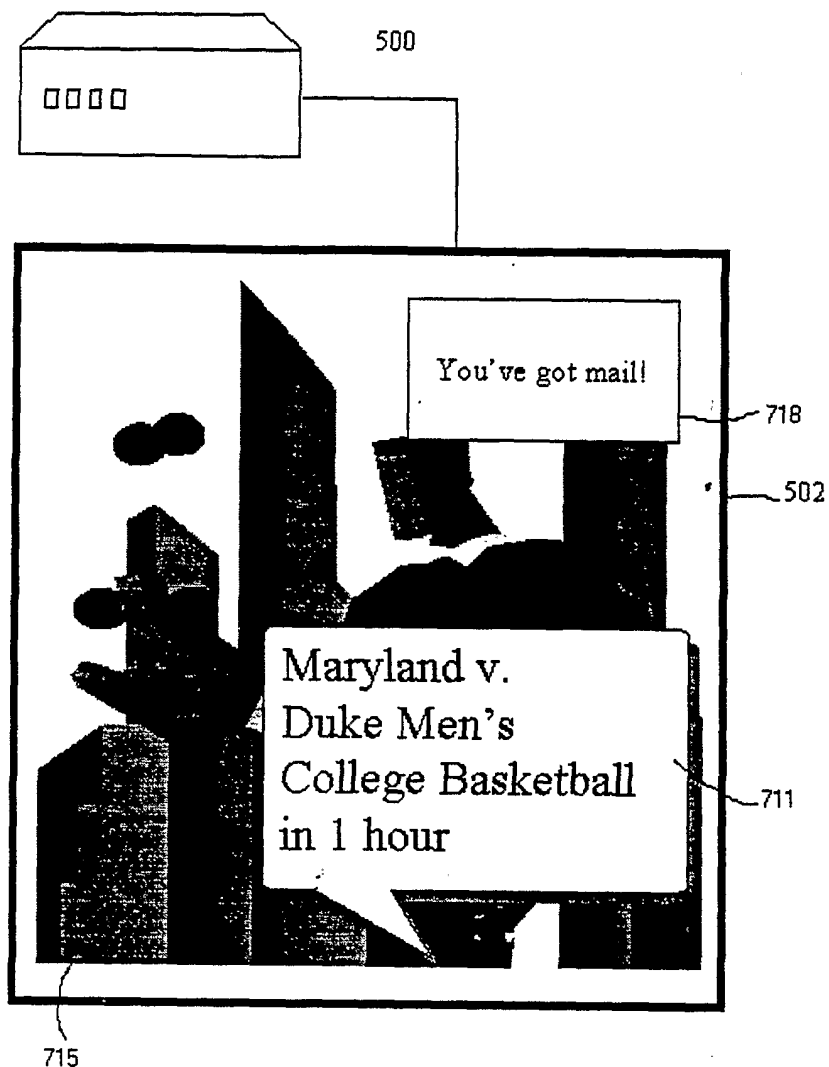


FIG. 7C

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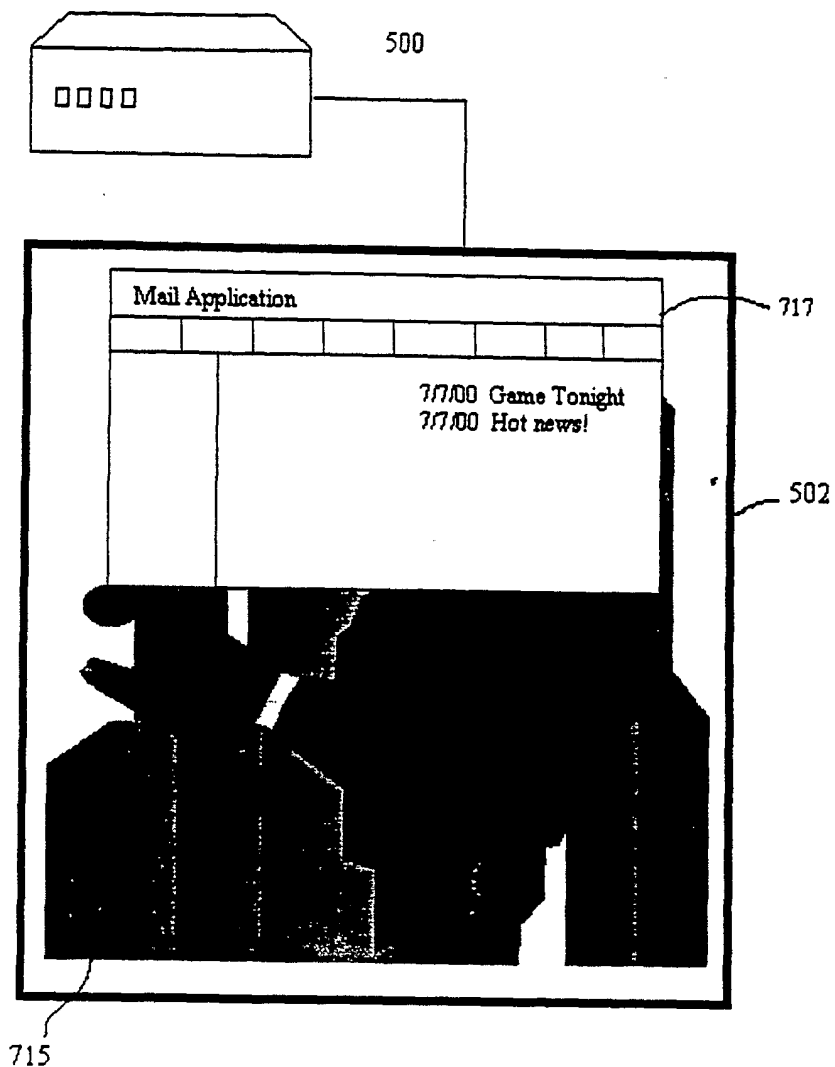
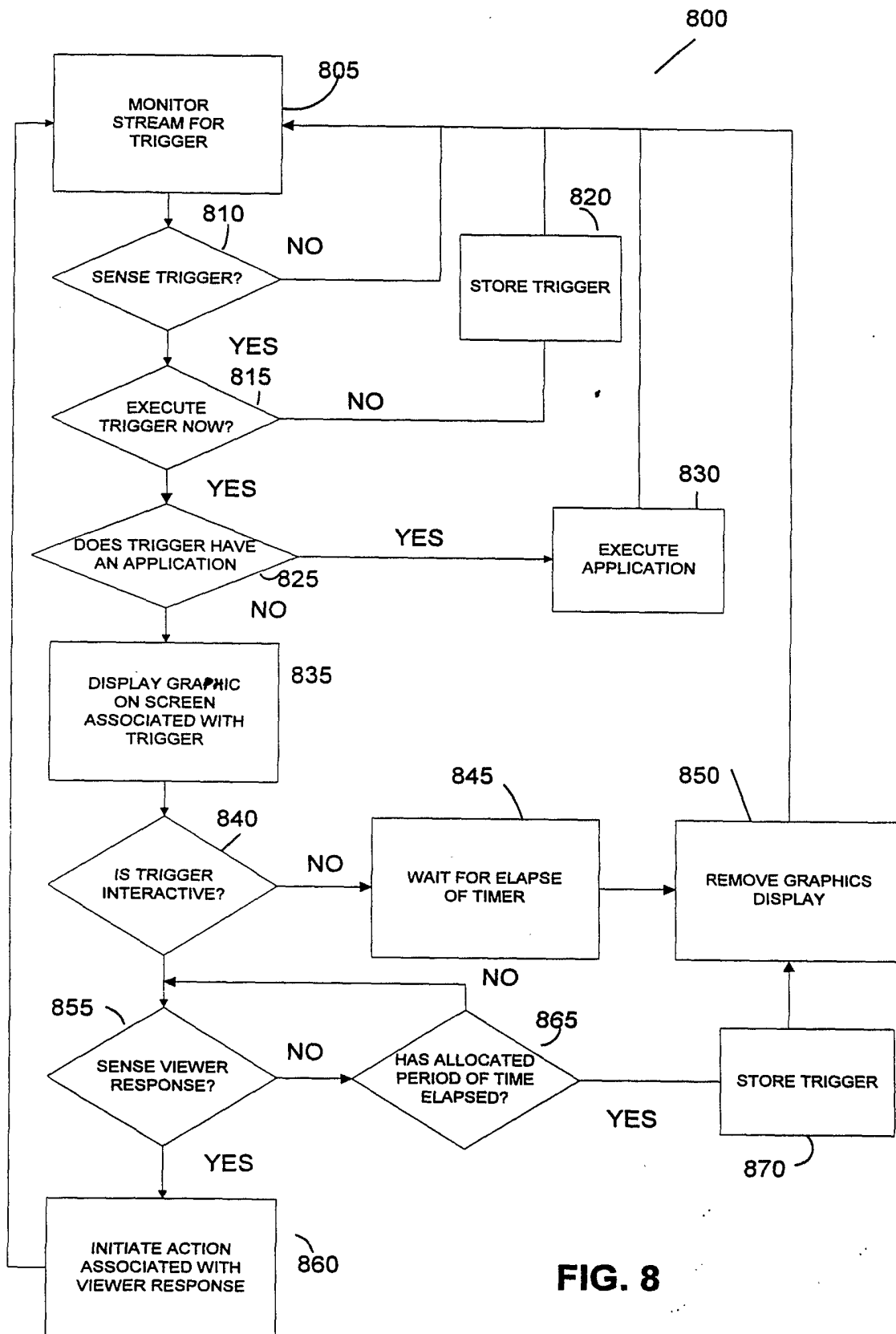


FIG. 7D

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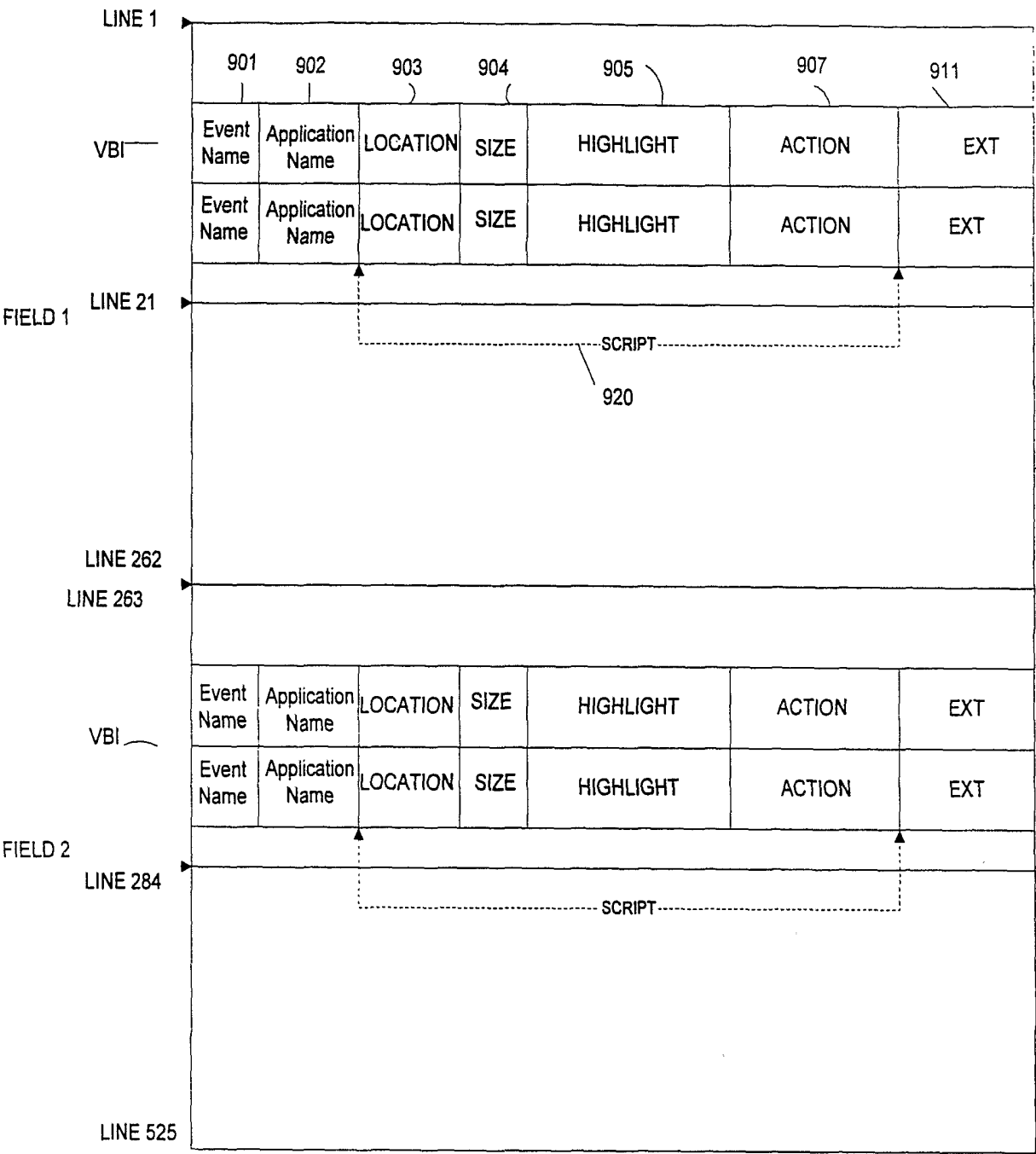
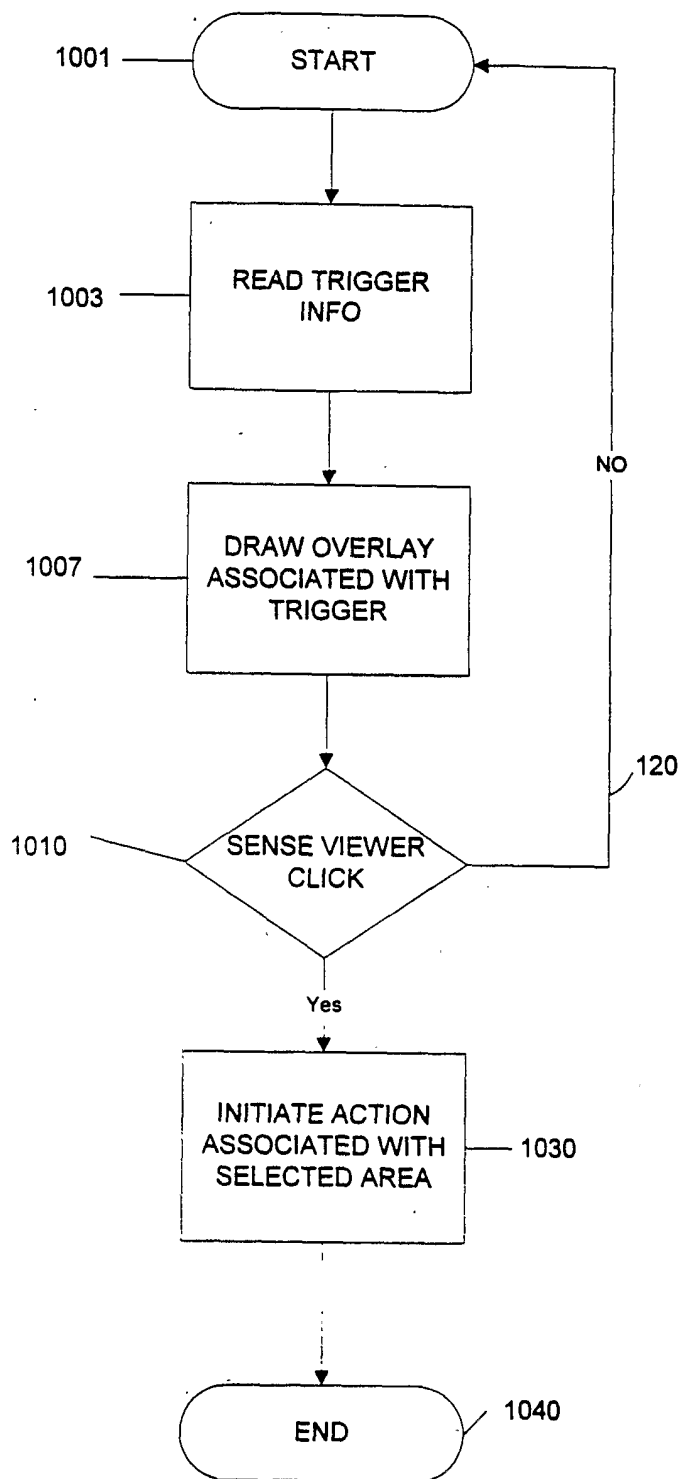


FIG. 9

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**FIG. 10**