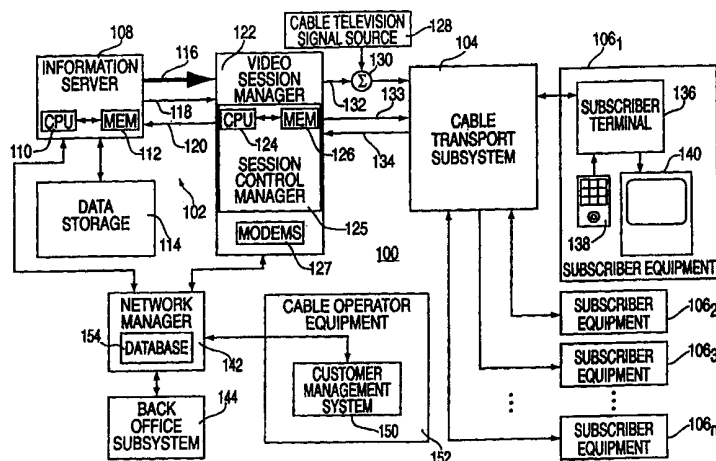




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<p>(21) International Application Number: PCT/US99/11936</p> <p>(22) International Filing Date: 28 May 1999 (28.05.99)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>09/086,799</td> <td>29 May 1998 (29.05.98)</td> <td>US</td> </tr> <tr> <td>60/127,747</td> <td>5 April 1999 (05.04.99)</td> <td>US</td> </tr> <tr> <td>09/322,605</td> <td>28 May 1999 (28.05.99)</td> <td>US</td> </tr> </table> <p>(71) Applicant: DIVA SYSTEMS CORPORATION [US/US]; Building 203, 333 Ravenswood Avenue, Menlo Park, CA 94025 (US).</p> <p>(72) Inventors: GOODE, Christopher; 722 Creek Drive, Menlo Park, CA 94025 (US). McDEVITT, F., Ray; 303 Grandview Drive, Woodside, CA 94062 (US). GORDON, Donald, F.; 170 Formway Court, Los Altos, CA 94022 (US). ROZA, Eric, S.; 548 Lombard Street, San Francisco, CA 94133 (US). LaROCCA, Tobie; 3352 Nesta Drive, San Jose, CA 95118 (US). THOMAS, Phillip, A.; 1410 Cedarmeadow Court, San Jose, CA 95131 (US). JOHNSON, Michael, D.; 254 Arency Court, Danville, CA 94506 (US).</p> <p>(74) Agents: MOSER, Raymond, R., Jr. et al.; 2-40 Bridge Avenue, P.O. Box 8160, Red Bank, NJ 07701 (US).</p>		09/086,799	29 May 1998 (29.05.98)	US	60/127,747	5 April 1999 (05.04.99)	US	09/322,605	28 May 1999 (28.05.99)	US	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>
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(54) Title: INTERACTIVE INFORMATION DISTRIBUTION SYSTEM AND METHOD



(57) Abstract

A method and apparatus for providing subscription-on-demand (SOD) services, dependent subscription services, contingent services and dynamic pricing of services for an interactive information distribution system (100), where a consumer may subscribe to packages of on-demand programs for a single price and view the programs in the subscribed package at any time for no additional cost (or a discount cost). The apparatus and method are embodied in a combination of software, which provides a so-called navigator, and hardware, including a subscriber terminal (136) that provides certain functionality for the navigator and service provider equipment that supports the functionality of the terminal. As such, graphical user interface functionality is distributed between the service provider equipment (102) and subscriber equipment (106) (subscriber terminal). Such distribution provides an enjoyable, real time interactive process for accessing SOD services that allows the subscriber to rapidly identify and access a subscription service. In addition, a non-subscriber of a particular service is quickly identified and provided the opportunity to, through the use of a graphical user interface, subscribe to the programming provided by the system.

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INTERACTIVE INFORMATION DISTRIBUTION SYSTEM AND METHOD

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CROSS REFERENCE TO RELATED APPLICATIONS

This application claims benefit to United States Provisional patent application serial number 60/127,747, 10 filed April 5, 1999, incorporated herein by reference, and is a continuation in part of copending United States patent application serial number 09/086,799, filed May 29, 1998, incorporated herein by reference.

15 BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an interactive information distribution system such as a video-on-demand 20 (VOD) system. More particularly, the present invention relates to a method and apparatus for providing subscription-on-demand (SOD) services dependent subscription services and contingent services for such an interactive information distribution system.

25

2. Description of the Background Art

Recent advances in digital signal processing techniques and, in particular, improvements in digital compression 30 techniques, have led to a plethora of proposals for providing new digital services to a customer's home via existing telephone and coaxial cable networks. For example, it has been proposed to provide hundreds of cable television channels to subscribers by compressing digital data and 35 digital video, transmitting the compressed digital signals over conventional coaxial cable television channels, and then decompressing the signals in the subscriber's receiver. Another proposed application for this technology is a video-on-demand (VOD) system in which a subscriber 40 communicates directly with a video service provider via

telephone lines to request a video program from a video library and the requested video program is routed to the subscriber's home via telephone lines or via coaxial cable television cables for immediate viewing. Other proposed VOD
5 systems use a frequency multiplexing technique to enable control information for a subscriber's receiver to be transmitted through a cable network back to an information server. Such a system permits a bi-directional communications over a single network.

10 In most of these information distribution systems, graphical menus are displayed upon the subscribers television and using a remote control device, a subscriber selects a desired program for viewing. One such graphical user interface based VOD system is disclosed in US Patent
15 5,619,249, issued April 8, 1997, and hereby incorporated herein by reference, wherein a viewing station including a television monitor and a high-power graphics computer are used to generate a graphical user interface. The viewing stations are in communication with a telecasting facility
20 (i.e., service provider head end equipment) that transmits selected video information as requested by the viewing station. The graphics computer within the viewing station locally stores all the executable programs that generate the graphical interface, control the graphical interface, and
25 interact with the subscriber. The graphics computer not only enables a subscriber to select programming to view, but also enables a non-subscriber to become a subscriber by interacting with certain interface screens.

Although having such a high-power computer within the
30 viewing station is beneficial in providing nearly instantaneous responsiveness to the subscriber's and non-subscriber's inputs, such a high-power computer system is economically unfeasible to utilize as subscriber equipment for a large number of subscriber homes. As such,
35 set top terminals or television receivers containing built-in high-power computers are generally not feasible as a commercial product.

Additionally, prior art VOD systems have only contemplated selling services on a program-by-program basis. For example, in the prior art systems, a viewer navigates through various menus to arrive at a menu containing a program title that the subscriber desires to view. The subscriber then requests the program and the program is supplied to the subscriber's display. The subscriber's account is then billed for the order of that particular program. As such, the concept of subscriptions extends only to the general access to content and an a la carte purchase of a unit of content. In this respect, the consumer's experience is nothing more than the transformation of the video store experience to the customer's home; the consumer is purchasing the ability to access a program for a prescribed period of time. Such systems use the term "subscriber" to represent someone who has received an installation of the subscriber equipment to enable a technically different class of service to be accessed, namely, digital or analog/digital services instead of the purely analog telecasts of conventional cable television. Consequently, the "subscription" as used in the prior art refers to the capability of selecting from a list a single unit of content such as a movie or video. Heretofore, VOD systems have not had a capability of packaging programming at a single price such that a system subscriber can also be a program package subscriber to enable the package subscriber to view any program in the subscribed package without further cost. Current systems do not have the capability of causing particular package access to be dependent upon subscriptions to other packages or contingent upon a particular type or level of service.

Therefore, there is a need in the art for a method and apparatus for providing subscription-on-demand services, dependent subscription services and contingent services for an interactive information distribution system. There is also a need to provide these services using equipment having a significant portion of the computing power contained within a service provider head end system such that a

terminal for the subscriber's home can be manufactured relatively inexpensively.

SUMMARY OF THE INVENTION

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The disadvantages heretofore associated with the prior art are overcome by the present invention of a method and apparatus for providing subscription-on-demand (SOD) services for an interactive information distribution system, where the system provides distributed computing resources using a relatively inexpensive subscriber terminal. The invention is embodied in a combination of software, which provides a so-called "navigator", and hardware, including subscriber equipment and service provider equipment that is interconnected by a communications network. The graphical user interface functionality is distributed between the service provider equipment and subscriber equipment. Such distribution provides an enjoyable, real time interactive session that allows the consumer to rapidly navigate through a plethora of menus to find particular information which the consumer desires to view. In addition, a non-subscriber of a particular SOD service is quickly identified and provided the opportunity to, through the use of a graphical user interface, subscribe to the programming provided by the system.

Using the inventive equipment, a consumer is capable of further subscribing to packages of on-demand programming, i.e., SOD services, through manipulation of the graphical user interface. The system provides certain packages of on-demand programming, i.e., children's programming, that a consumer may elect to subscribe to for a single price. As such, through manipulation of the menus, the consumer selects a programming package, becomes a subscriber to that package and is billed accordingly. Thereafter, the subscriber may view any program in the package without additional cost. Although predefined programming packages are generally available for selection, a consumer may optionally create a personal SOD service by selecting

programs for a personal package that can then be subscribed to as any other programming package.

Consequently, the invention differs from the prior art from both an architectural standpoint and data management
5 standpoint. Together these innovations provide a complex price and data capacity management infrastructure necessary to offer a consumer friendly, interactive approach to subscribing to a class of data or service content. This service content might be grouped by any logical association
10 such as a series of movies or other program content. The SOD service concept of having a single price for a package of programming removes the payment commitment challenge ordinarily posed by the prior art as a barrier to viewing each item of content.

15 Furthermore, the subscription-on-demand technique can be expanded to provide dependent subscription services and contingent services. Using dependent subscriptions, the system only permits a user to subscribe to particular additional subscription services (extended services) if the
20 user already subscribes to certain other services (base services), i.e., a user may subscribe to a premium cable channel's video-on-demand service (an extended service) only if that user is a subscriber to the premium cable channel service (a base service), or the subscriber may only
25 subscribe to a particular SOD subscription (extended service) if that user is a subscriber to some other SOD subscription service. If the user is not eligible for the extended service, the user may be provided an opportunity to subscribe to both the base service and the extended service.
30 Alternatively, the user may be directed to contact their cable operator to subscribe to the appropriate base service.

Additionally, the subscription items can be bundled such that, if a user subscribes to particular subscriptions, they receive a third subscription free, i.e., if a user
35 subscribes to two premium children's cable channels, they receive a free (or discounted) children's video-on-demand subscription.

Using contingent services, the system interfaces directly with a cable operator's customer management system (CMS). As such, the interactive system maintains a database of the cable operator's customer services such that a user
5 may order certain interactive products and content contingent upon the type and level of service that the user has subscribed to with the cable operator. The interaction of the interactive information distribution system with the CMS allows the interactive system to update the CMS if a
10 subscriber subscribes to additional cable services.

BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily
15 understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 depicts a high level block diagram of an interactive information distribution system containing the present invention;

20 FIG. 2 depicts a block diagram of an illustrative subscriber's terminal within the system of FIG. 1;

FIGS. 3A, 3B, 3C and 3D together depict a flow diagram of a routine representing the software that is executed within the system of FIG. 1 to provide the
25 subscription-on-demand services of the present invention;

FIG. 4 depicts an illustrative menu structure for selecting a subscription-on-demand service;

FIG. 5 depicts a menu structure used to select a subscription item that is a subset of the
30 subscription-on-demand service;

FIG. 6 is a menu depicting titles of programming within a specific category within said subscription on demand service;

FIG. 7 is a title information screen;

35 FIG. 8 is a menu that allows a consumer to subscribe to a selected subscription-on-demand service;

FIG. 9 is a menu that provides an input structure for a master PIN number.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures.

5 DETAILED DESCRIPTION

The invention is a method and apparatus that provides a subscription-on-demand (SOD) service for an interactive information distribution system. Throughout the following
10 description the term "SOD service" is defined as the capability of a consumer to subscribe to packages of programming at a pre-defined price and those programs within a subscribed package can be viewed, on-demand, without further cost to the subscriber. As such, a consumer (i.e.,
15 a viewer having a system account number) can request, through manipulation of a graphical user interface, to subscribe to a package of programming, i.e., children's programming, at a fixed price. Thereafter, any program within the package can be viewed at anytime, i.e.,
20 on-demand, without further charge. Optional viewing time restrictions and the like can be implemented to limit package content viewing only during predefined time periods or, if viewing outside the time period is desired, an additional fee is charged to the subscriber's account.
25 Additionally, dependent subscription services are subscriptions that are accessible (dependent) upon a subscriber having previously subscribed to other SOD services or cable services and contingent services are services that are only available to subscribers that have
30 only subscribed to particular other services.

Although the SOD service of the present invention can be implemented and executed using a number of different types of information distribution systems, the preferred embodiment is used in combination with the interactive
35 information distribution system hardware described in commonly assigned U.S. patent application serial number 08/984,710, filed December 3, 1997, and hereby incorporated herein by reference. However, the specific hardware

arrangement is considered illustrative of the type of system with which the invention is used. Use of the invention within other information distribution system hardware arrangements that facilitate distributed computing resources
5 between the service provider head end and the subscriber's terminal is considered within the scope of the invention.

FIG. 1 depicts a high level block diagram of the illustrative information distribution system 100 that incorporates the present invention. The system 100 contains
10 service provider equipment 102, a communications network in the form of a cable transport subsystem 104 and subscriber equipment 106_n , where n is an integer greater than 0. The service provider equipment 102 contains an information
15 server 108 which is typically a parallel processing computer containing at least one central processing unit 110 and associated memory 112. U.S. patent number 5,671,377, issued September 23, 1993 and U.S. patent number 5,579,527, issued November 26, 1996, which are hereby incorporated herein by
20 reference, describe a server that is capable of operating in the capacity of information server 108. The server 108 interacts with the data storage device 114 (e.g., a disk drive array) that generally stores the subscriber content (e.g., video data) that will be recalled and transmitted to the subscriber equipment 106. Additionally, within the
25 service provider equipment 102 is a video session manager 122 that provides session control of the information flowing to and from the server 108. The video session manager 122 contains its own central processing unit (CPU) 124 and associated memory 126 that provides functionality for the
30 graphical user interfaces through which the consumer interacts with the system. The CPU 124 is part of a session control manager 125 that controls a plurality of modems 127 that facilitate communication with the subscriber equipment. Other subsystems of the service provider equipment include a
35 network manager 142 and a back office subsystem 144. These subsystems maintain certain databases of information that enable the system to accurately control system access, subscription package definitions, and subscriber/consumer

profile and billing. The network manager 142 is coupled to a customer management system (CMS) 150 within the cable operator equipment 152. As such, the network manager maintains a database 154 containing specific customer
5 subscription information pertaining to a customer's type of service (e.g., basic cable, extended basic cable, and the like), level of service and premium channel subscription information. This database is used to facilitate dependent subscriptions and contingent services.

10 The information server 108 is coupled to the video session manager 122 via data path 116, synchronization clock path 118, and control path 120. The server 108 provides data streams that are destined for consumers on path 116 and a synchronization clock on path 118. The specific data
15 streams are provided in response to requests for information (e.g., menu applets, video programs, and other content material) from the video session manager 122 on path 120. These data streams are packetized and modulated onto a carrier that is compatible with the transmission
20 requirements of the network 104.

The video session manager 122 accomplishes all of the transmission interface requirements of the system 100 as well as provides graphical user interface support. Specifically, the video session manager 122 is coupled
25 through the modems 127 to subscriber equipment via a forward information channel 132, a forward command channel 133 and a back channel 134. All three of these channels are supported by the cable transport subsystem 104. The video session manager 122 contains a modulator for modulating the server
30 data streams onto one or more carrier frequencies for transmission on the forward information channel 132. Additionally, modems 127 within the video session manager 122 send control information via the forward command channel and receive control information via the back channel.
35 Moreover, a conventional cable television signal source 128 is optionally coupled to the forward information channel via a signal coupler 130. In operation, the video session manager 122 responds to requests from the subscriber

equipment 106 for interactive menus and data streams by requesting the server 108 to provide such information, then communicating that information to the requesting subscriber equipment 106. The video session manager 122, as discussed
5 below, also ensures that the subscriber equipment 106 is authorized to receive the requested information.

The cable transport subsystem 104 can be any one of a number of conventional broad band communications networks that are available such as a fiber optic network, a
10 telephone network, existing cable television network and the like. For example, if the network is a hybrid fiber-coax network, the transport technique used in both forward channels may be modeled after the moving pictures expert group (MPEG) transport protocol for the transmission of
15 video data streams. In general, the transport mechanism for both the forward channels and transport information to the subscriber equipment must be able to carry unidirectional, asynchronous packetized data such as that defined in the MPEG video and audio signal transmission protocol, and the
20 like. There are a number of such transport protocols available.

The subscriber equipment 106 receives the requested data streams from the forward information channel, demodulates the streams and processes them for display on
25 the display device 140 (e.g., a conventional television). In addition, the terminal 136 accepts commands from a remote control input device 138 or other input device to facilitate consumer interaction with the system. These commands are formatted, compressed, modulated, and transmitted through
30 the network 104 to the video session manager 122. Typically, this transmission is accomplished through the back channel 134. These commands are preferably transmitted through the same network used to transmit information to the subscriber equipment. However, the back channel coupling
35 the subscriber equipment to the server may be a separate network, e.g., a forward information channel through a television cable network and a back channel through a telephone network. The telephone network could also support

the forward control channel. The video session manager 122 interprets each command set from the terminal through the back channel and instructs the information server to perform certain functions to implement the consumer/subscriber request.

FIG. 2 depicts a block diagram of the terminal 136 which contains a transceiver 200, a central processing unit (CPU) 212 and a display driver 222. Of course, the functionality of the terminal 136 can be embedded within a single consumer electronics product such as a receiver circuit within a television. As such, the description of a separate terminal should be considered illustrative of the type of subscriber equipment that may be used to implement the present invention.

Within the set top terminal 136, the CPU 212 is supported by random access memory (RAM) 220, read only memory (ROM) 218 and various support circuits 216 such as clocks, power supply, and infrared receiver and the like. The transceiver 200 contains a diplexer 202, a back channel transmitter 208, an information channel receiver 204, a command channel receiver 210, an information decoder 206, a conventional television signal receiver 224, and a multiplexer 226. The diplexer 202 couples the three channels carried by a single cable within the network to the transmitter and receivers of the terminal. Each receiver 204 and 210 contains a tuner, amplifiers, filters, a demodulator and a depacketizer. As such, the receivers tune, downconvert, and depacketize the signals from the cable network in a conventional manner. The information channel receiver 204 contains a conventional QAM demodulator such as a model BCM3115 manufactured by the Broadcom Corporation. Other such demodulators are well known in the communications art and could be used in this application. However, this particular QAM demodulator also contains a built in "out-of-band" QPSK demodulator for handling command and control data carried by the forward command channel. As such, a single integrated circuit demodulator processes

consumer/subscriber requested information (audio and video) as well as command data.

The decoder 206 processes the data packets carrying consumer/subscriber requested information produced by the QAM demodulator into useable signals for the end user display, e.g., television, home studio, video recorder and the like. The decoder 206 is coupled to a dynamic random access memory (DRAM) to facilitate decoding of the data packets and processing of command programs, as shall be discussed below. The signals for display are conventionally processed by a display driver 222 to produce composite video as well as conventional television signals, e.g., modulated onto channel 3 or 4 using the NTSC standard modulation.

The conventional cable signal receiver 224 contains a tuner and an analog (NTSC) demodulator. A multiplexer 226 couples the demodulated analog or decoded video signal to the display driver 222. Of course, the NTSC demodulator can be replaced with a PAL or SECAM standard demodulator, as needed.

The demodulated QPSK signal provides command and control information to the CPU 212 for generating certain graphics and control information regions upon a television screen. The CPU is, for example, a model 68302 processor manufactured by Motorola. This processor, operating in combination with the decoder 206 as well as a continuously available video signal from the information channel, produces screen-displayed buttons, icons and graphical regions with which a consumer interacts using the remote control. Without the video signal, the terminal 136 does not produce any display, i.e., the displays are actively generated in real-time as needed to facilitate certain navigational and interface functions.

Specifically, a joy stick on the remote control 138 selectively highlights certain predefined regions on the television screen. To perform such highlighting, a reference region is always highlighted when a menu is first displayed. From that reference region, direction vectors produced by the joy stick are interpreted by the CPU 212 to

highlight a region lying in the direction in which the joy
stick was moved. When a desired selectable icon is
highlighted, the consumer depresses a "select" key on the
remote that sends an infrared signal to an infrared receiver
5 (a support circuit 216). This receiver sends the select
command to the CPU 212 for interpretation. The selected
region is generally associated with a function. If the
function is a request for specific information or requires a
change in the menu, the CPU 212 formats the command and
10 sends it through the back channel transmitter 208 for
transmission to the video session manager 122. If the
command is a function that is handled locally such as volume
control, the CPU 212 implements the function within the
terminal 136.

15 Since the session control commands are implemented by
the video session manager 122 and not the terminal 136
alone, the number of available session control commands is
infinite. Utilization of such distributed computing
resources enables the most powerful processing to be
20 centrally located in the video session manager 122 and the
CPU in the terminal 136 can be of relatively limited power.
Consequently, all the subscriber terminals 136 that are
connected to a service provider head end 102 can rely on the
computing power of the video session manager 122. For
25 example, the CPU in the video session manager 122 is a model
68040 processor that is available from Motorola Inc. A
particular hardware implementation of the video session
manager is described in detail in commonly assigned U.S.
patent application serial number 08/984,710, filed December
30 3, 1997 and hereby incorporated herein by reference.

Each command menu is implemented by executing an
"applet", as described below. The applets control both
information sessions, e.g., the presentation of video to the
television screen, and navigator functions, e.g., the menus
35 that facilitate selection of a video program as well as
subscriber on demand services. As such, particular commands
include, but are not limited to, information or menu
navigation commands, movies start at beginning, movies start

at the middle, play, stop, rewind, forward, pause and the like. These presentation and navigation control commands are sent via a back channel transmitter 208 using binary phase shift key (BPSK) modulation. Additionally, the CPU in
5 the subscriber terminal implements certain local commands such as increment or decrement the volume, channel change and on/off.

The invention is implemented as one or more interrelated "applets" which, when taken together form the
10 interactive graphical user interface that facilitates the SOD service of the present invention. The applets are transmitted for the most part, to the terminal via the forward information channel. Certain information used by particular applets is transmitted to the terminal via a data
15 stream propagated through the forward command channel. As such, the data stream carrying the applet is demodulated, the applet extracted and the applet's information decoded prior to execution that displays a menu on the display device. The detailed process by which an applet is
20 downloaded and used to produce a menu is disclosed in commonly assigned U.S. patent application number 08/984,427, filed December 3, 1997 and hereby incorporated herein by reference.

FIGS. 3A, 3B and 3C together depict an overall flow
25 diagram of an illustrative implementation of the SOD service 300 as executed on both the video session manager CPU and the subscriber terminal CPU. FIGS. 3A and 3B are divided into three columns, namely: a subscriber action column 302, a subscriber equipment process 304, and a service provider
30 equipment process 306. FIGS. 4-9 depict various menu screens that a SOD service subscriber or a non-SOD service subscriber (i.e., a general consumer of cable services) would be presented with while either accessing SOD services or becoming a new subscriber for SOD services. For the
35 following description, it is assumed that the consumer is already a subscriber of general cable system services (i.e., the consumer has an account number) and now desires to subscribe to additional SOD services or utilize previously

subscribed SOD services. To provide a comprehensive understanding of the SOD services, the various menu screens of FIGS. 4-9 are referred to as the flow diagram spanning FIGS. 3A, 3B and 3C is described below.

5 The process 300 begins at step 308 and continues to step 310. At step 310, the terminal recalls a terminal identification number and a PIN from memory and sends the number to the service provider equipment. As described in commonly assigned U.S. patent application number 08/738,343,
10 filed October 29, 1996, to provide security and limit programming access, each terminal of the interactive information distribution system is generally assigned a terminal identification (TID) number or code, each subscriber household account has a defined master personal
15 identification number (master PIN), and each subscriber in a household may have a personal identification number (subaccount PIN). The TID provides security to identify whether a subscriber terminal is permitted access to the system at all, while the master PIN and subaccount PIN
20 define the level of service that a given subscriber is permitted to access. In addition to the TID, a master PIN may be associated with a subset of subaccounts each having an associated PIN. The assignment and utilization of master PIN and subaccount PINs is described in commonly assigned
25 U.S. patent application number 08/738,343, filed October 29, 1996 and hereby incorporated herein by reference. In general, the terminal identification number and both the master and the subaccount PINs are used in providing the SOD service of the present invention.

30 At step 312, the video session manager 122 validates the PIN and TID authorization by comparing the transmitted TID and PIN to a PIN and TID stored in the video session manager memory. If the transmitted TID and PIN are not in the memory, the video session manager sends, at step 314, a
35 menu applet that creates a display to inform the subscriber that the PIN or TID is invalid. If the TID and PIN are found to be valid, at step 316, the video session manager

sends a menu applet to the terminal that will permit access to additional system programming.

To facilitate selection of an SOD service, a menu is presented at step 320 to the subscriber on their television screen. As illustratively shown in FIG. 4, the menu structure may be defined by a grid or list or, in the example shown, a pie-shaped menu 400. Various services may be selected by highlighting and selecting any one of the "pie" sections 402, 404, 406, or 408. Whenever a menu selection is made, the system downloads an applet corresponding to that section and either launches a new menu that provides further options for the subscriber or displays a selected program (e.g., starts playing a movie).

To select SOD services, the user highlights section 408 that may be, for example, a children's program SOD service known as "OnSet Kids" (OnSet is a trademark of DIVA Systems Corporation of Menlo Park, California). In such a service, a user can subscribe to unlimited access to any of the children's programs offered under the subscription package "OnSet Kids". More generally, the subscription packages may consist of a collection of programs (or a collection of subscription packages) having a common point of interest, e.g., sports, cooking, travel, automotive, educational, children's programming, home improvement, soap operas, network prime time television broadcasts, music videos, and the like. Subscription packages are alternatively customized by a subscriber at the time of subscription.

For the illustrative menu example of FIG. 4, the subscriber is assumed to have selected, at step 322, the SOD service of section 408 that is associated with the children's programming subscription. Once a section is selected, the terminal sends, at step 324, an option request corresponding to the selected menu option to the session manager 122.

At step 326, the system determines whether the consumer/subscriber has a subscription for the selected service and/or has the base subscription or service for a dependent/contingent service.

FIG. 3D depicts the process used to determine subscription authorization. At step 384, the process queries whether the subscriber is a subscriber of the selected SOD service. To determine such subscription service authorization, the account number of the subscriber is compared to a subscription account number database in the network manager. If the subscriber is authorized to access the selected service (the SOD service of option 408 in FIG. 4), the process proceeds to point B of FIG. 3B.

10 Alternatively, if authorization for the selected service is not found, the process proceeds to step 386. At step 386, the process queries whether the selected SOD service is a dependent or contingent service. If the query of step 386 is negatively answered, the process proceeds to point A in

15 FIG. 3C wherein the subscriber is allowed to subscribe to the Selected SOD service. However, if the selected service is a contingent or dependent service, the process proceeds to step 388.

At step 388, the account number of the subscriber is compared to information in the network manager database regarding the subscriber's cable and other services (e.g., type of cable service, level of cable service, number of premium cable channels, the type of premium cable channels, type of other SOD services and the like). If the subscriber

20 is found to be a current subscriber of the base service or subscription, the process proceeds to point A of FIG. 3C to enable the subscriber to subscribe to the selected SOD service. However, if the subscriber is not a subscriber of the base service or subscription, then the process proceeds

30 to point A of FIG. 3C to enable the subscriber to subscribe to the base service or subscription. At step 328, the video session manager sends an applet to the terminal to enable the terminal to produce a category menu at step 330. FIG. 5 depicts an exemplary category display 500 for a

35 children's program subscription, e.g., OnSet Kids. The depicted menu 500 shows a list 502 of selectable categories. Each category in the list 502 represents a particular class

of programming, i.e., programming that is related in some way.

At step 332, the subscriber selects a category within the category menu and, at step 334, the terminal sends a category request to the video session manager. After receiving a category selection in step 336, the video session manager sends an applet for a title menu to the terminal. At step 338, the terminal decodes and executes the applet to display a title menu. FIG. 6 depicts an exemplary menu list 600 having a list of titles that are associated with the selected category, in this case, Sesame Street.

For some SOD services, category menus may not be used and the process would move directly from point B to step 336. For example, if the requested SOD service is a video-on-demand service that is related to a particular premium cable channel, once the system identifies the subscriber as a subscriber to the underlying service, e.g., a premium cable channel, then the subscriber is provided with the titles of the movies that are available on-demand from that premium channel. Thus, the title menu is sent in step 336.

When the subscriber selects a title in step 340, the title selection, e.g., a program identification (PID), is sent to the video session manager. After receiving a title selection, the video session manager determines, at step 344, the title price. The price of the programming selected from the title menu is determined by the video session manager sending a price request to the network manager. The network manager performs a search of its pricing database and returns a price of either zero or non-zero. A non-zero price is returned, for example, if the subscription is limited to a restricted time window or the subscription is a dependent subscription that is not available to customers that do not meet a particular service level or type criteria. For example, the OnSet Kids children's programming subscription service may be limited to viewing from 6 A.M. to 6 P.M. and, the request is being made outside of that time window. As such, any request by a subscriber

outside of the window is charged a nominal fee, i.e., the subscriber is provided an "a la carte" menu as described below with respect to step 354.

If the price that is returned to the video session manager is zero dollars (the query of step 346 is affirmatively answered), then the video session manager sends, at step 348, an applet for a display of a title information screen. At step 350, the terminal displays a title information screen indicating the viewing price is zero dollars and also provides the subscriber with a start option so that the subscriber may commence viewing of the program. FIG. 7 is an exemplary title information screen 700 showing information about the program that was selected as well as providing a start option as shown as button 702. Additionally, a preview clip may be executed and depicted for the user by selecting the icon 704.

If, however, the network manager returns a non-zero price to the video session manager, then the video session manager sends, at step 352, an applet for a second type of title information screen. At step 354, the terminal creates a screen informing the subscriber of the reason for the non-zero price and also presents the user with an "a la carte" purchase option. The subscriber will then be able to purchase and view the a la carte selection or return to a previous menu.

If, at step 326 of FIG. 3A, the service provider equipment determines that the consumer does not have an active subscription, e.g., does not have a subscription to the selected subscription package or to an underlying service to enable a dependent or contingent service, the process proceeds along path A to step 358 of FIG. 3C. At step 358, the video session manager sends an applet for a subscription information screen. The subscription information screen applet is decoded and executed by the terminal at step 356 to create a subscription information screen. The subscription information screen describes the subscription offering to the non-subscriber and then presents a sign-up screen through which the user can

interactively subscribe for the service. Alternatively, the subscription information screen may only inform the subscriber that the SOD service that was requested is a dependent or contingent service and that the cable system operator must be contacted to subscribe to the base service.

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FIG. 8 depicts an exemplary screen 800 for interactively requesting a subscription-on-demand service, i.e., offers the subscriber an option to purchase a subscription. If the customer is required to purchase a premium cable channel to facilitate a dependent service, then the screen would offer the customer an opportunity to subscribe to the premium channel. If the subscriber declines (step 360) the subscription offer, the terminal then sends, at step 362, a refusal signal to the session manager. In response to the refusal, the process returns (step 364) to point C prior to step 316 in FIG. 3A. If, however, a system subscriber elects to purchase a subscription, the terminal sends, at step 366, an acceptance signal. In response to the acceptance signal, at step 368, the session manager requests a master PIN as a confirmation of the subscriber's capability to make a subscription purchase. As such, a person having only a subaccount PIN is not capable of subscribing to a subscription-on-demand service or a service that permits dependent services. To facilitate the subscription confirmation, the session manager sends an applet for a master PIN request screen. At step 370, the terminal decodes the applet and displays the master PIN request screen.

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FIG. 9 depicts an exemplary master PIN confirmation entry screen 900. The screen 900 contains a field 902 where the subscriber can enter a master PIN. The master PIN is entered at step 372 and, at step 374, the master PIN is sent to the session manager. After the master PIN is received, at step 376, the video session manager verifies the master PIN as valid. To verify the validity of the PIN, the video session manager compares the entered PIN to the PIN in its memory. If the master PIN is invalid, the subscriber is given one or more further opportunities to correctly enter

the master PIN, then the process proceeds to step 378 where the process continues at point C prior to step 316 of FIG. 3A. If the PIN is valid, the routine proceeds to step 380 where the video session manager updates the subscription database stored in the network manager with the account information of the new subscriber to the selected subscription service. If the subscriber has selected a new service or subscription, e.g., an additional premium cable channel, the subscriber's information may also be sent to the cable operator's customer management system. After updating the subscription database, the routine updates, at step 382, the administrative system such that the interactive information distribution system's billing system is updated with the new subscriber's account information. Once subscribed, the process proceeds from step 382 to step 328 of FIG. 3B where the system provides the new subscriber an opportunity to utilize the newly subscribed service.

The present invention implements subscription-on-demand services and dependent services by having the computer resources needed for the service to be distributed between the subscriber equipment and the service provider equipment. To implement the service, the terminal need only decode and execute simple applets to produce various interactive displays and send simple information requests. The service provider equipment performs the significant computing for menu generation, security handling, and subscription processing. As such, the terminal can be relatively inexpensive, making the overall system economically feasible.

The interactive structure of the inventive subscription-on-demand system enables flexible subscription packages to be created. For example, a hierarchical subscription package structure can be produced that has various levels of access. The following is an illustrative example of a hierarchical package structure for sporting events:

SPORTS

FOOTBALL

COLLEGE
 PRO
 BASKETBALL
 COLLEGE
 5 MENS
 WOMENS
 PRO
 MENS
 WOMENS
 10 GOLF
 HOCKEY

and so on

Under this hierarchy, a consumer may subscribe to SPORTS and receive access to all sports programming available for a predefined price. However, those that desire only to have access to, for example, men's professional basketball would subscribe only to that particular programming selection at a predefined price. Such a hierarchical arrangement can be divided into any number of levels, e.g., specific teams, or grouped into various packages, e.g., all professional sports. Additionally, the invention can be expanded to enable consumers to create their own personal SOD service by selecting their favorite programs or program classes for grouping into an SOD package such that a single price can be paid to access all the selected programming over a predefined period of time, e.g., a predefined price for accessing the selected programming for a month. As such, dynamically defined subsets of content can be created as the personal SOD packages. The programming is selected through manipulation of interactive menus (generated using menu applets as described above) and the program identification codes (PIDs) for the selected programming are stored in the subscription database with the consumer's account number (and/or PIN or TID, if needed). As such, the subscriber can access their personal SOD service at any time and without further payment. At the end of the period, the service would be renewable such that the subscriber would not have to reenter the selection at the end of each period.

Additionally, the use of dependent subscriptions also permits the subscriptions to be bundled into fixed packages containing a plurality of services, e.g., N services. As such, when a subscriber subscribes to a specified number of
5 subscription services, e.g., M subscriptions, out of a total N services, the subscriber is provided the remaining services for free (or at a discounted rate). The invention tracks the subscriptions of each subscriber and when a certain number is obtained in, for example, a particular
10 category (e.g., children's programming) the remaining children's programming services are made available to the subscriber for no extra cost or for a discounted fee. As such, the system performs as if the subscriber specifically subscribed to the additional services even though they have
15 not specifically done so. To facilitate the bundled service, the system updates the subscriber database in the network manager as well as the customer management system in the cable operator equipment to maintain a record of all the services and subscriptions that any given subscriber
20 presently uses.

Although various embodiments which incorporate the teachings of the present invention have been shown and described in detail herein those skilled in the arts can readily devise many other varied embodiments that still
25 incorporate these teachings.

What is claimed is:

1. In an interactive information distribution system
5 containing service provider equipment and subscriber
equipment that is interconnected by a communications
network, a method of providing a subscription-on-demand
service for an interactive information distribution system
comprising the steps of:
 - 10 packaging a number of on-demand programs into a
programming packages; and
enabling a subscriber to access any on-demand program
within a subscribed programming package on an on-demand
basis, wherein the programming packages are arranged in an
15 hierarchical format having subsets of programming packages
within a programming package to enable a viewer to subscribe
to a programming package subset without subscribing to an
entire programming package.
- 20 2. The method of claim 1 further comprising the step of:
enabling a consumer to select a programming package and
subscribe to the selected programming package for a
predefined price and thereby become said subscriber.
- 25 3. The method of claim 1 wherein a subscriber is limited to
on-demand access to on-demand programs within the subscribed
programming package only during predefined time periods
without incurring an additional fee.
- 30 4. The method of claim 1 wherein said on-demand programming
within said programming package is defined by the
subscriber.
5. The method of claim 1 wherein a consumer selects a
35 programming package and subscribes thereto by manipulating a
graphical user interface.

6. A method of providing a subscription-on-demand service for an interactive information distribution system comprising the steps of:

providing a programming selection menu through which a
5 subscriber selects programming for a personal subscription-on-demand service;

selecting programming to define said personal subscription-on-demand service;

storing programming identification codes associated
10 with said selected programming and a subscriber identification number;

enabling said subscriber, through use of said subscriber identification number, to access said personal subscription-on-demand service by paying a single predefined
15 price for access to the programming identified by the programming identification codes for a predefined period.

7. The method of claim 14 wherein said subscriber identification number is one of a personal identification
20 number, a terminal identification number, or an account number.

8. In an interactive information distribution system containing service provider equipment and subscriber
25 equipment that is interconnected by a communications network, a method of providing dynamic pricing for information that is supplied by the interactive information distribution system comprising the steps of:

selecting information through interaction with said
30 subscriber equipment, where the information is being requested for delivery from the service provider equipment to the subscriber equipment;

transmitting the information selection to said service provider equipment;

35 determining, within said service provider equipment, whether the subscriber equipment that has requested the information is eligible for a discount price with respect to the selected information;

if eligible, then sending a discount price quote to the subscriber equipment for display to the subscriber;

otherwise, sending an a la carte price quote to the subscriber equipment for display to the subscriber.

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9. The method of claim 8 further comprising:

making a purchase request based upon the price quote displayed to the subscriber through manipulation of the subscriber equipment;

10 transmitting the selected information from the service provider equipment to the subscriber equipment.

10. The method of claim 8 wherein the information is a movie.

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11. The method of claim 8 wherein the discount price is zero.

12. The method of claim 8 wherein the service provider
20 equipment comprises a database that correlates subscribers identification to discounted programs.

13. The method of claim 8 wherein the discount price is based upon purchasing a subscription package.--.

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14. In an interactive information distribution system containing service provider equipment and subscriber equipment that is interconnected by a communications
30 network, a method of providing a subscription-on-demand service for an interactive information distribution system comprising the steps of:

packaging a plurality of on-demand programs into a first programming package;

35 packaging a plurality of on-demand programs into a second programming package;

relating said first programming package to said second programming package to cause said first programming package to be dependent upon said second programming package; and

enabling a subscriber to subscribe to said first programming package on an on-demand basis so long as the subscriber has subscribed to the second programming package.

5 15. The method of claim 14 further comprising the step of:
enabling a consumer to select a programming package and subscribe to the selected programming package for a predefined price and thereby become said subscriber.

10 16. The method of claim 14 wherein said enabling step further comprises the steps of:

enabling said subscriber to subscribe to said first or second programming packages so long as the subscriber has subscribed to certain cable or subscription services.

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17. The method of claim 14 wherein a consumer selects a programming package and subscribes thereto by manipulating a graphical user interface.

20 18. The method of claim 14 wherein said first and second programming packages form a programming bundle and said enabling step automatically subscribes the subscriber to said first programming package so long as the subscriber has subscribed to the second programming package.

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19. In an interactive information distribution system containing service provider equipment and subscriber equipment that is interconnected by a communications network, a method of providing a subscription-on-demand
30 service for an interactive information distribution system comprising the steps of:

sending from said service provider equipment to said subscriber equipment a first menu applet;

35 decoding and executing said first menu applet within said subscriber equipment to display a first interactive graphical user interface;

selecting, through manipulation of the first interactive graphical user interface, a subscription option;

sending a selection signal indicative of said selected subscription option from said subscriber equipment to said service provider equipment;

determining, within said service provider equipment, if
5 the subscriber is a current subscriber to said service identified by said selection signal or if the subscriber is a current subscriber to another service upon which said service identified by said selection signal is dependent or contingent;

10 if the subscriber is said current subscriber, sending a second menu applet from said subscriber equipment to said service provider equipment;

decoding and executing said second menu applet within said subscriber equipment to display a second interactive
15 user interface through which the subscriber can select a subscription program for viewing;

if said subscriber is not said current subscriber, sending a third menu applet from said subscriber equipment to said service provider equipment; and

20 decoding and executing said third menu applet within said subscriber equipment to display a third interactive user interface through which the subscriber can become a subscriber to a service that enables the subscriber to subscribe the selected service.

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20. The method of claim 19 wherein second menu applet is connected to other menu applets that provide interactive displays of categories of services, titles of programs available in each category, and program pricing for each
30 tile.

21. The method of claim 19 further comprising the step of:
if a new subscription is created, updating a subscription database within said service provider equipment
35 to identify the subscriber as a subscriber to the selected service.

22. The method of claim 19 further comprising the step of:

if a new service is subscribed, updating a customer management system database within a cable operator equipment to identify the subscriber as a subscriber to the new service.

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23. The method of claim 19 wherein the third menu applet produces a display screen that informs the subscriber to contact a cable operator to subscribe to a service that enables the subscriber to subscribe the selected service.

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24. A method for providing subscription-on-demand services within an interactive information distribution system comprising the steps of:

15 associating a plurality of programming packages as a programming bundle;

identifying a number of programming packages within said programming bundle that a subscriber has subscribed;

20 when the number exceeds a threshold value, the subscriber is automatically subscribed to all the programming packages in said programming bundle.

25. Apparatus for providing subscription-on-demand services within an interactive information distribution system comprising:

25 service provider equipment containing an information server and a video session manager;

30 subscriber equipment containing a subscriber terminal and a display unit, where the service provider equipment is connected to the subscriber equipment by a communications network; and

35 said video session manager sends a plurality of executable menu applets to said subscriber terminal, said terminal executes each of said menu applets to generate interactive graphical user interface displays through which a subscriber selects a service; the subscriber terminal sends a service request to said session manager for processing; if the subscriber is a subscriber to services from which the selected service depends, the subscriber can subscriber to said selected service; if said subscriber is

not said current subscriber, the subscriber can become a subscriber to a service that enables the subscriber to subscribe to the selected service.

5 26. The apparatus of claim 25 wherein the subscriber terminal decodes and executes the applets that are sent by the session manager to produce said interactive graphical user interface displays and sends to the video session manager selection signals indicative of a selected option
10 within said interactive graphical user interface displays.

27. The apparatus of claim 25 wherein said video session manager, to provide security and system administration, accesses a personal identification database, a terminal
15 identification database, and a subscriber database that are contained in a network manager.

28. The apparatus of claim 25 wherein the subscriber database communicates with a customer management system
20 within cable operator equipment.

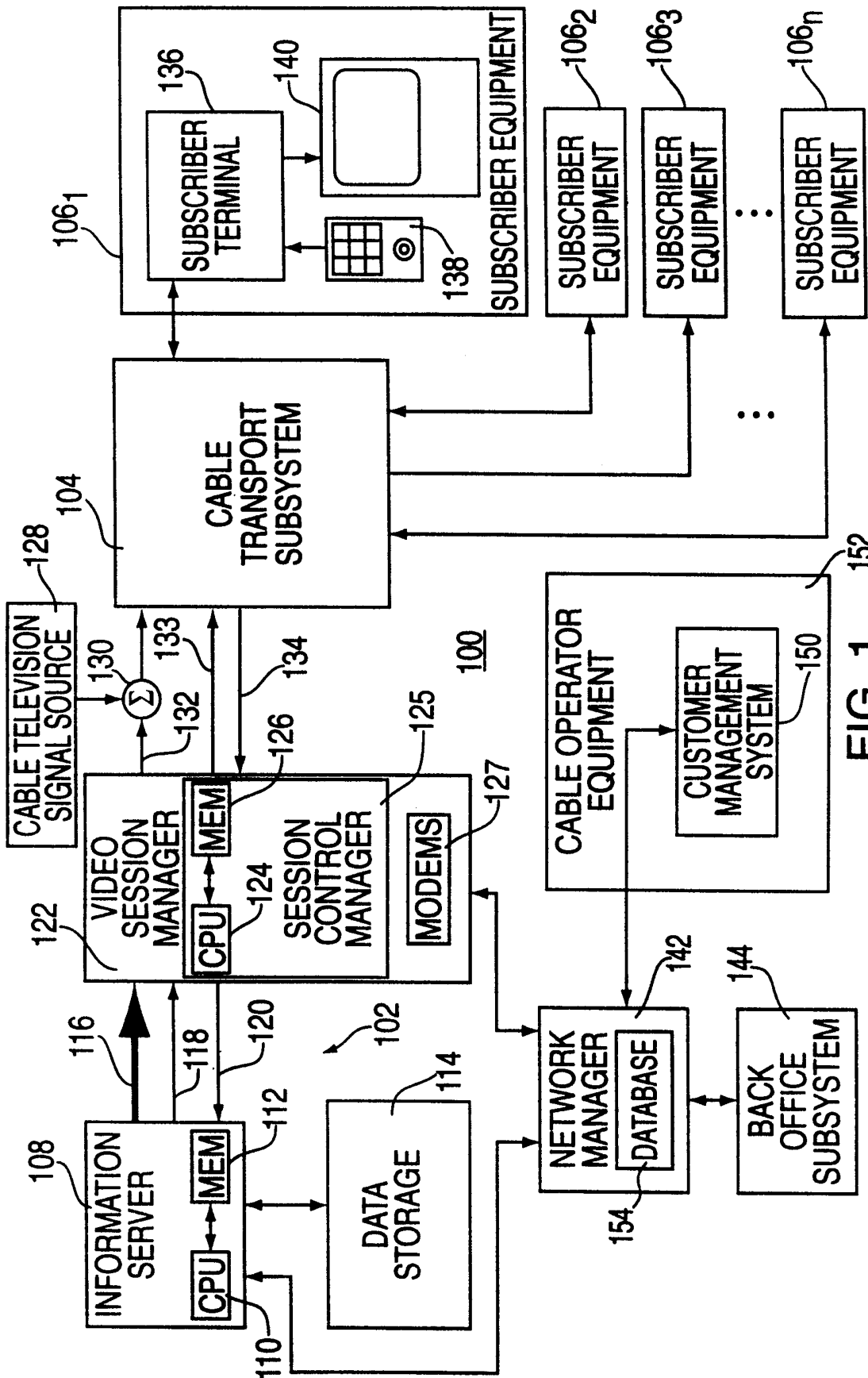


FIG. 1

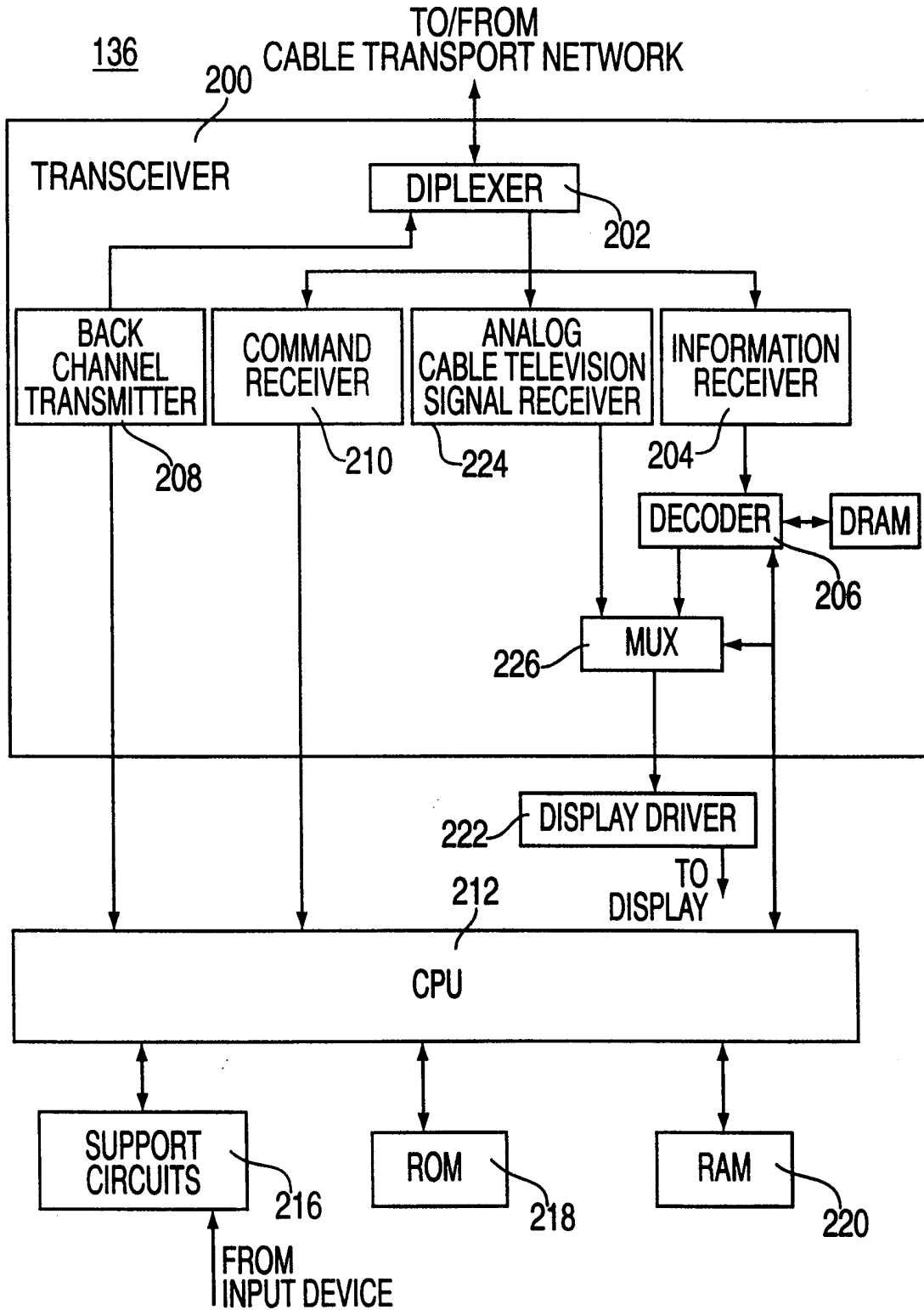


FIG. 2

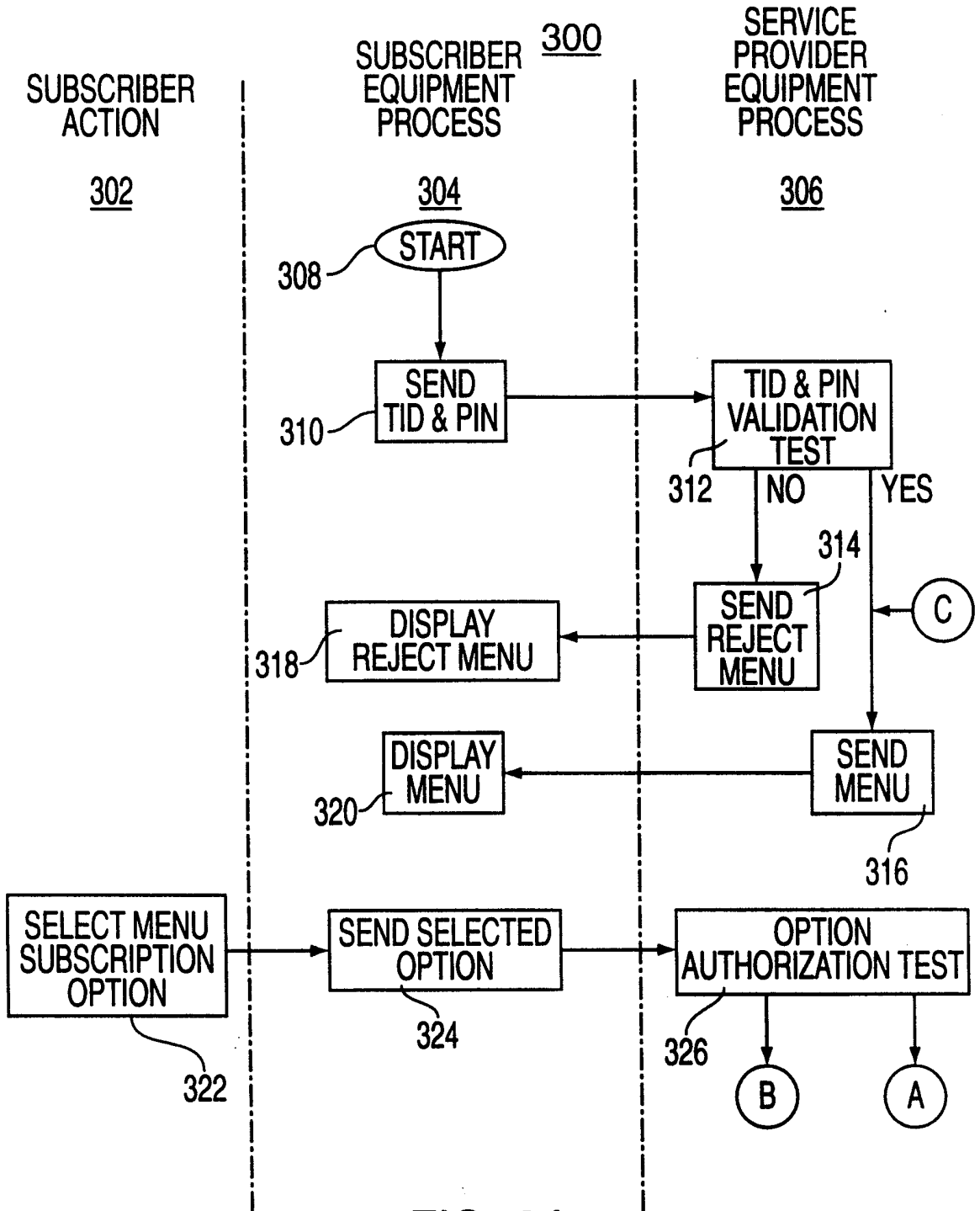


FIG. 3A

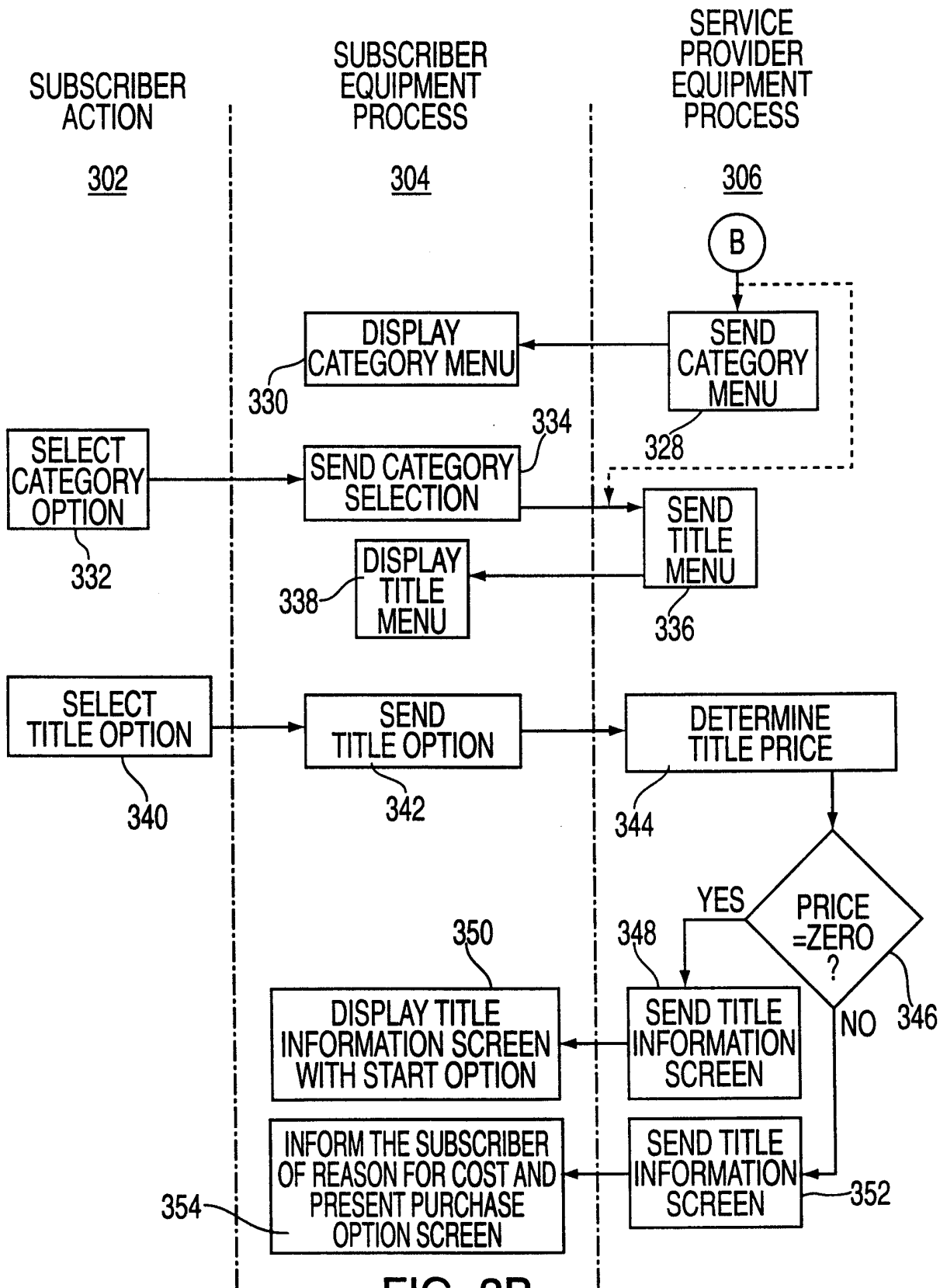


FIG. 3B

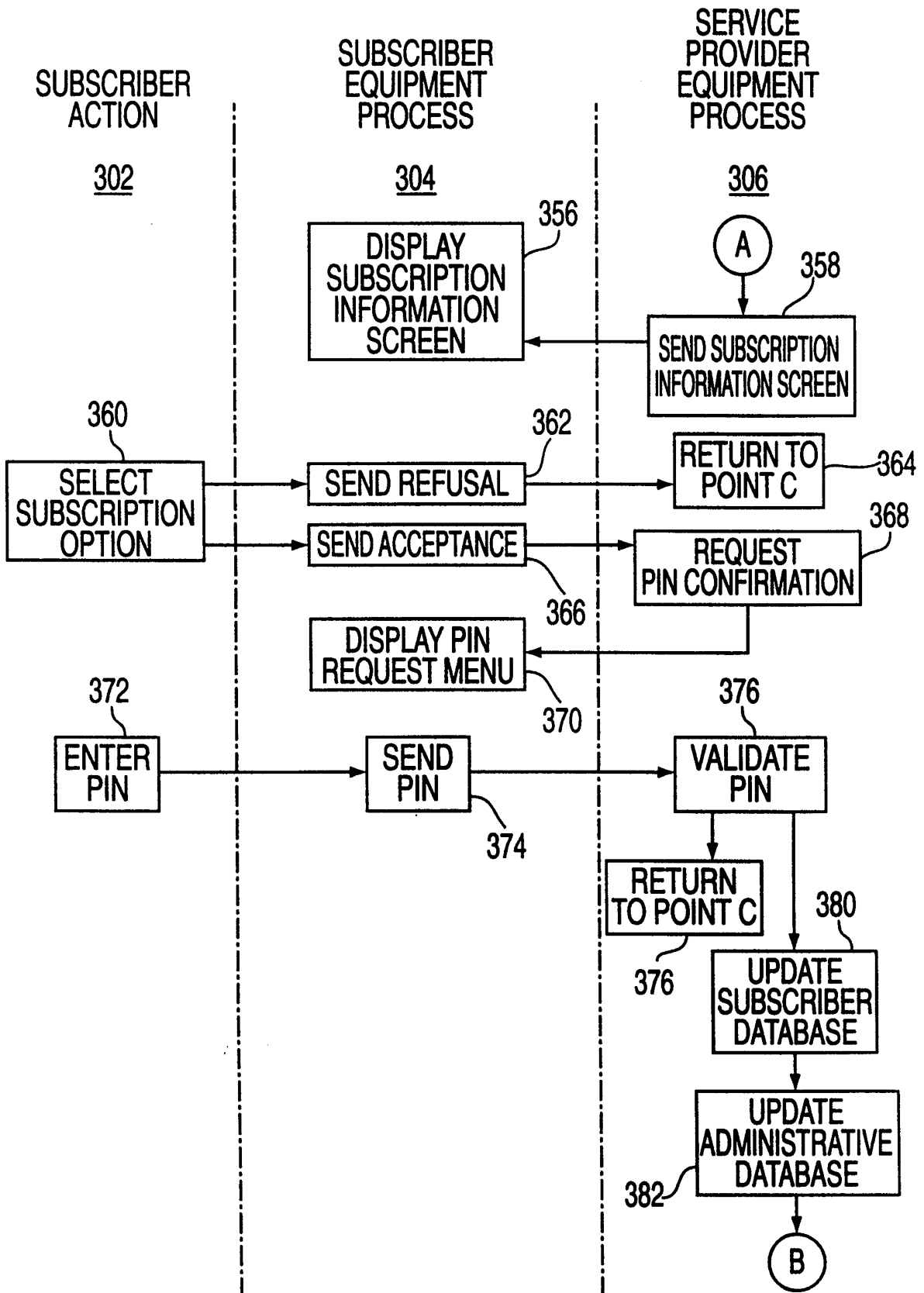


FIG. 3C

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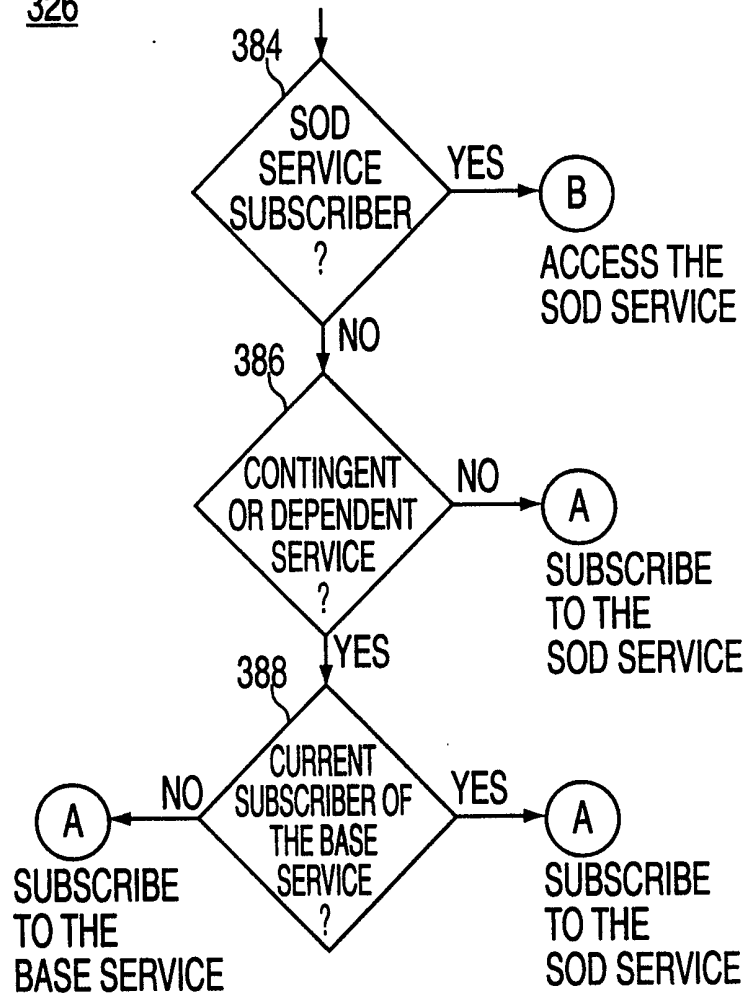


FIG. 3D

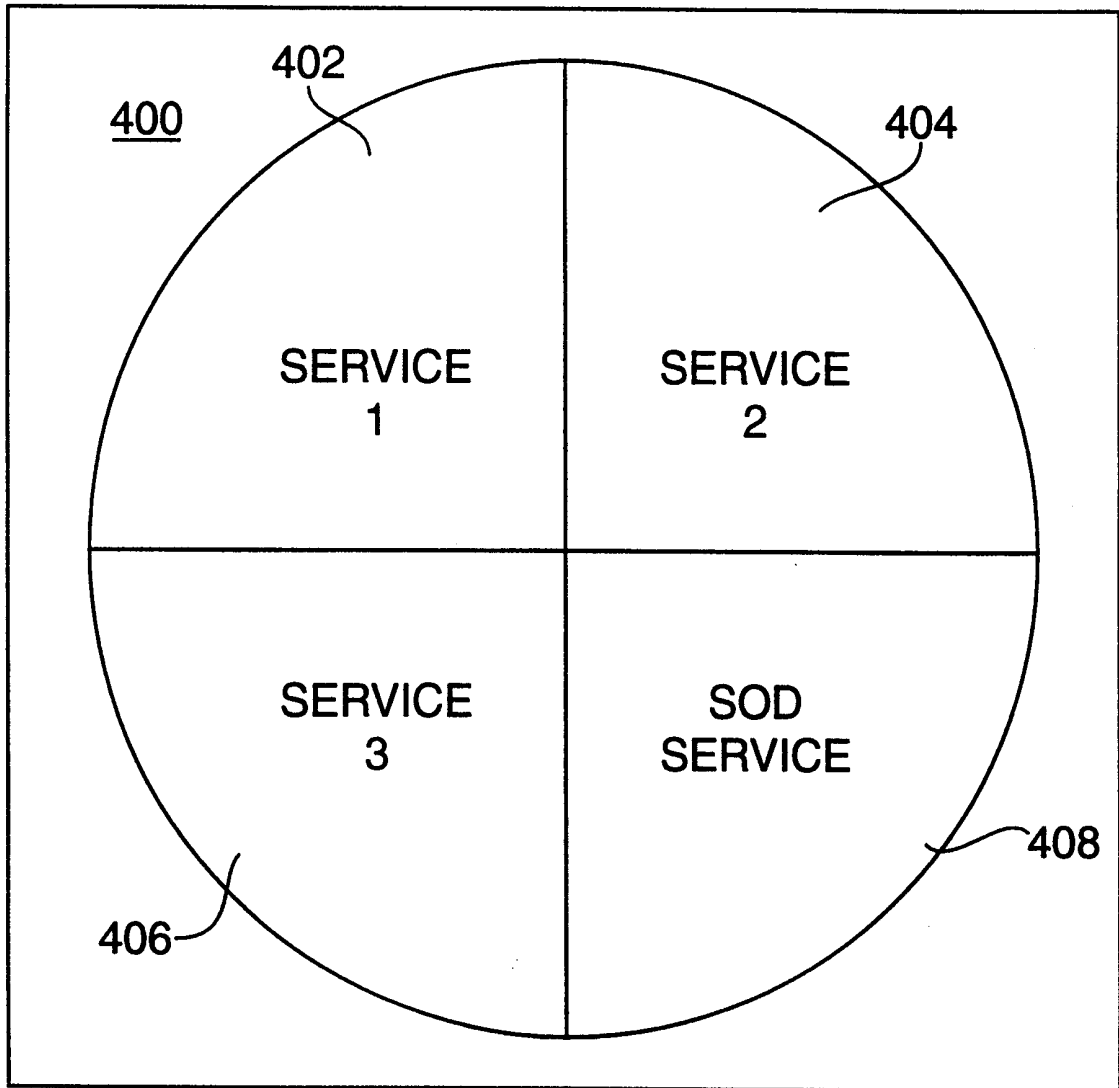


FIG. 4

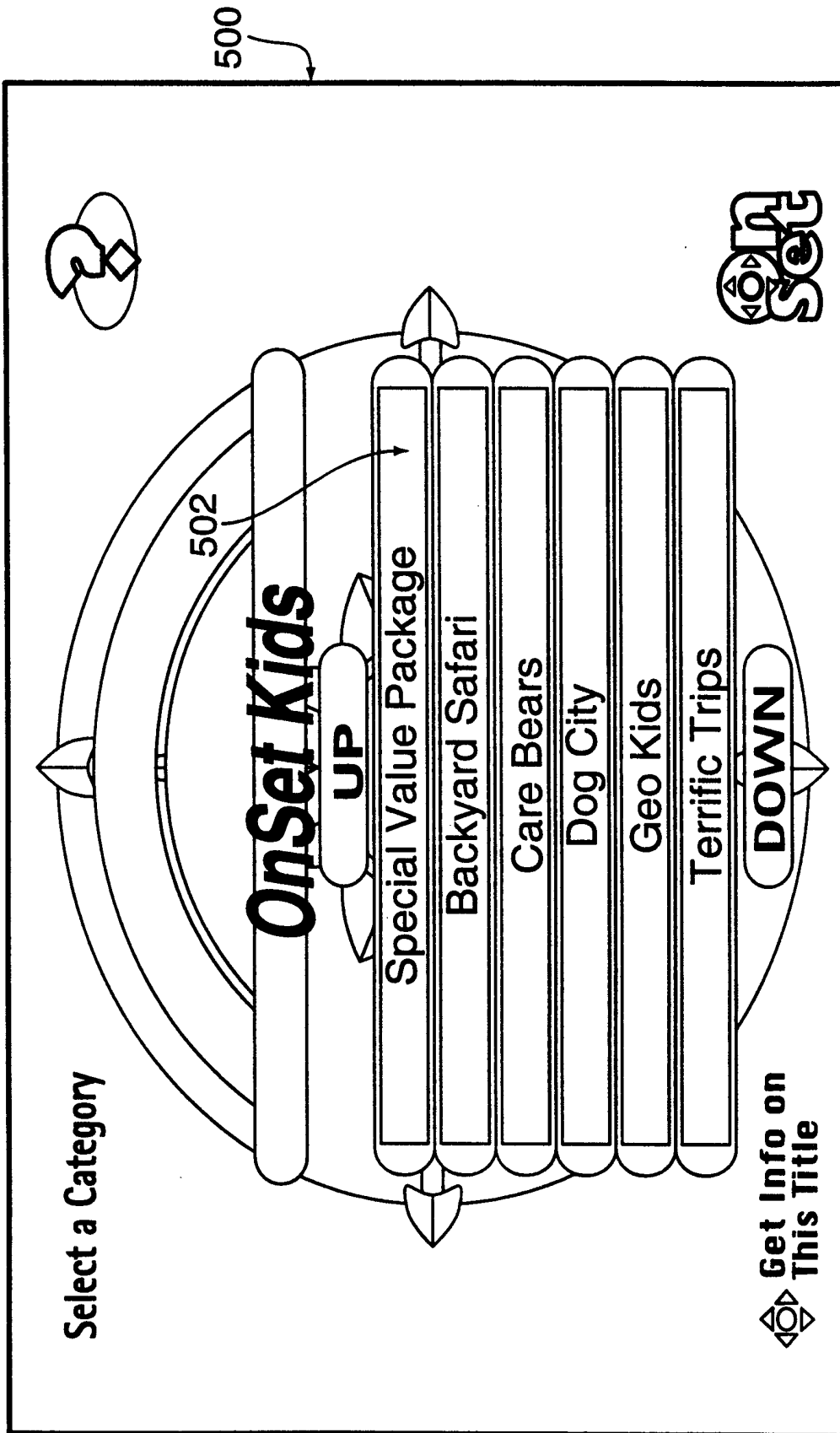


FIG. 5

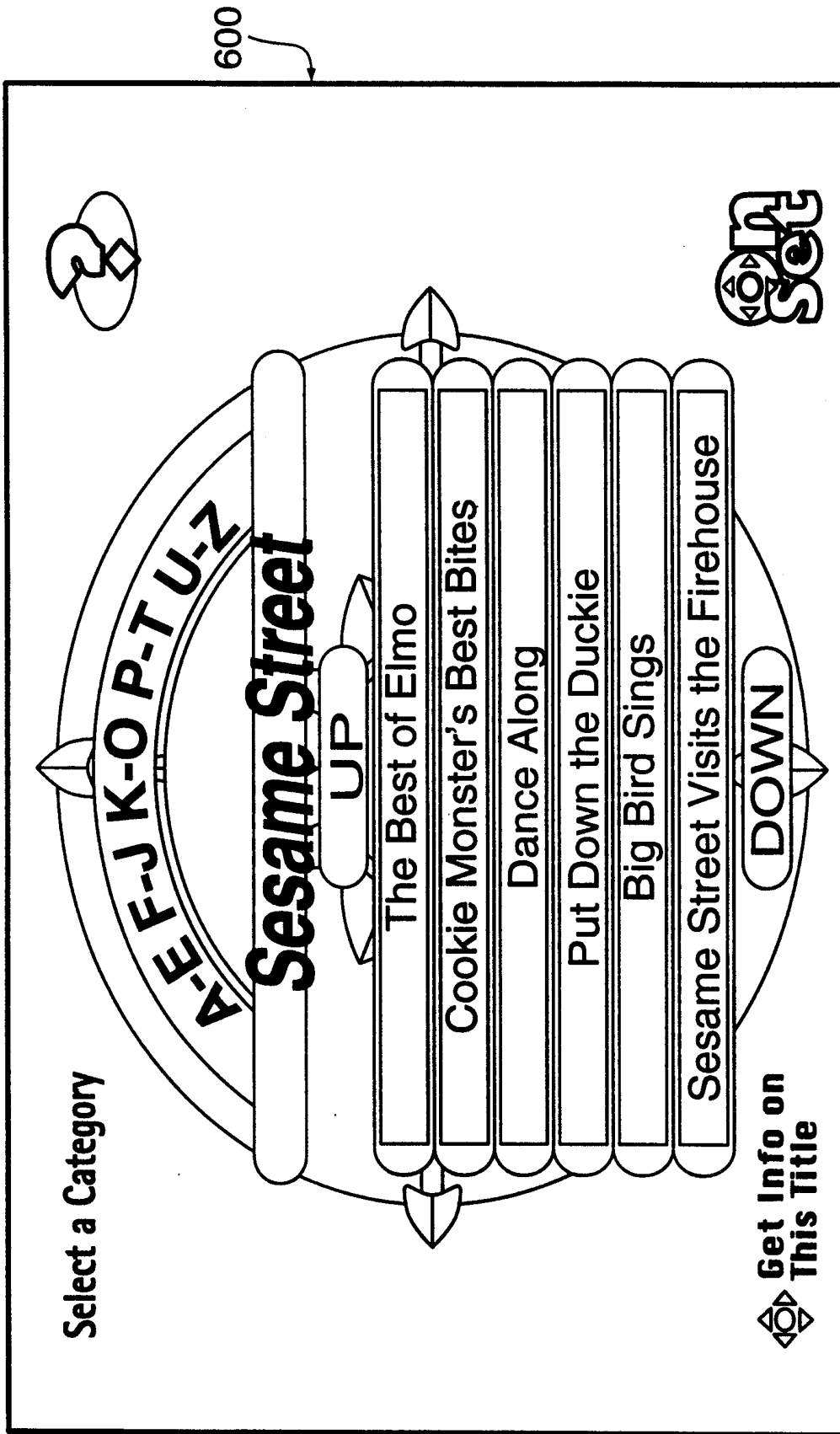


FIG. 6

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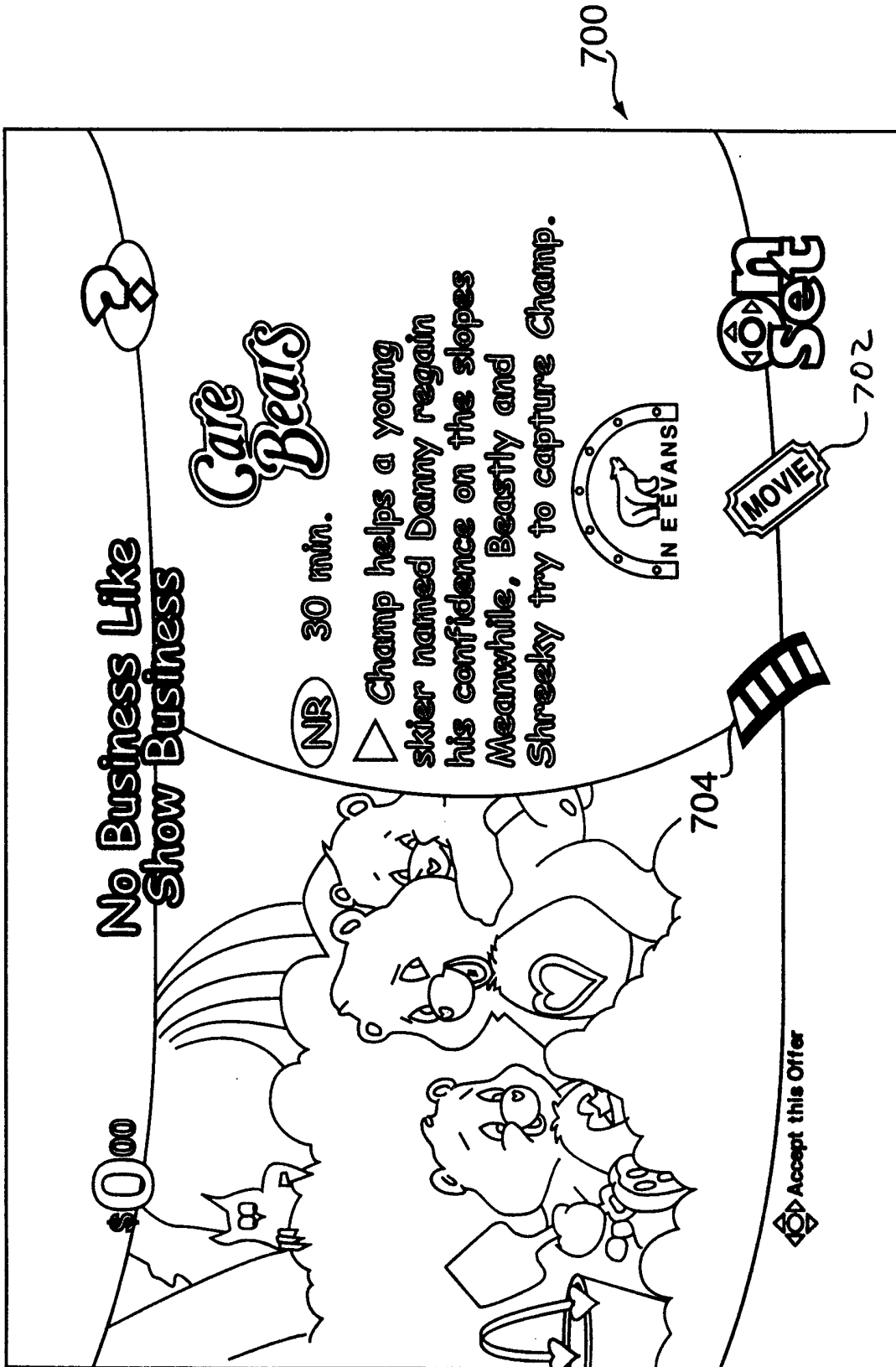


FIG. 7

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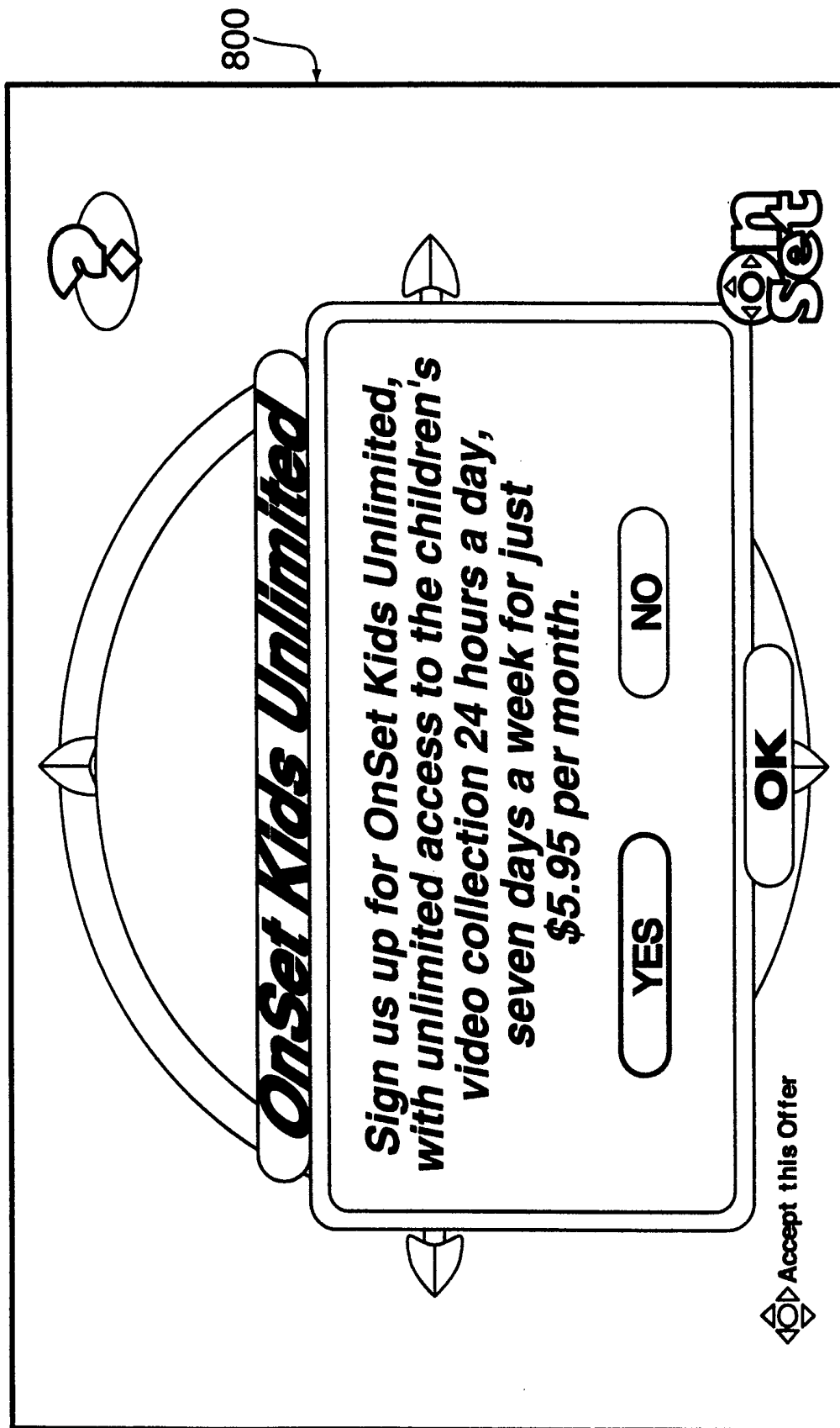


FIG. 8

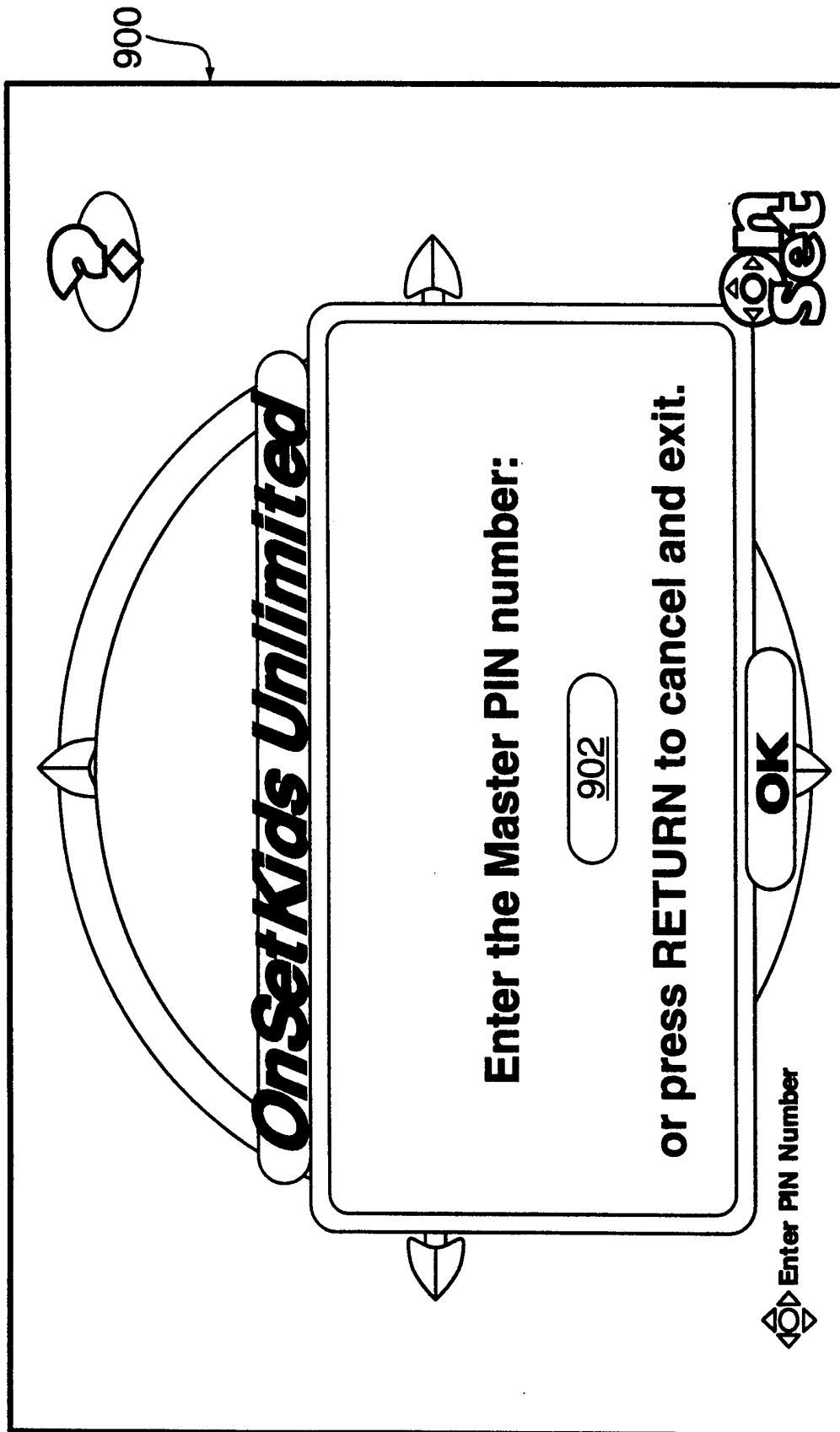


FIG. 9

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/11936

A. CLASSIFICATION OF SUBJECT MATTER IPC 6 H04N7/173		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC 6 H04N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 585 866 A (DARATA PAUL ET AL) 17 December 1996 (1996-12-17) column 7, line 57 - column 8, line 37 column 9, line 29 - column 10, line 9 column 11, line 61 - column 13, line 4 column 15, line 21 - column 19, line 67 column 24, line 61 - column 27, line 18 column 28, line 38 - column 30, line 22 column 33, line 20 - line 67 figures 1-42 ---	1-7, 14-23, 25-28
X	EP 0 833 511 A (MATSUSHITA ELECTRIC IND CO LTD) 1 April 1998 (1998-04-01) page 6, line 20 - page 7, line 32 page 8, line 2 - page 13, line 21 table 1 figures 1-15 ---	6-13
--- / ---		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search <p style="text-align: center; font-weight: bold;">6 September 1999</p>	Date of mailing of the international search report <p style="text-align: center; font-weight: bold;">13/09/1999</p>	
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center; font-weight: bold;">Van der Zaal, R</p>	

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 99/11936

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>K. HARDER: "DIGITALES FERNSEHEN UND MULTIMEDIA. BEGRIFFE, TECHNOLOGISCHE PROBLEME, PERSPEKTIVEN" FERNSEH UND KINOTECHNIK, vol. 50, no. 1, 1 January 1996 (1996-01-01), pages 41-45, XP000555569 Heidelberg, DE ISSN: 0015-0142 the whole document -----</p>	1-4, 24

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information on patent family members

International Application No

PCT/US 99/11936

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