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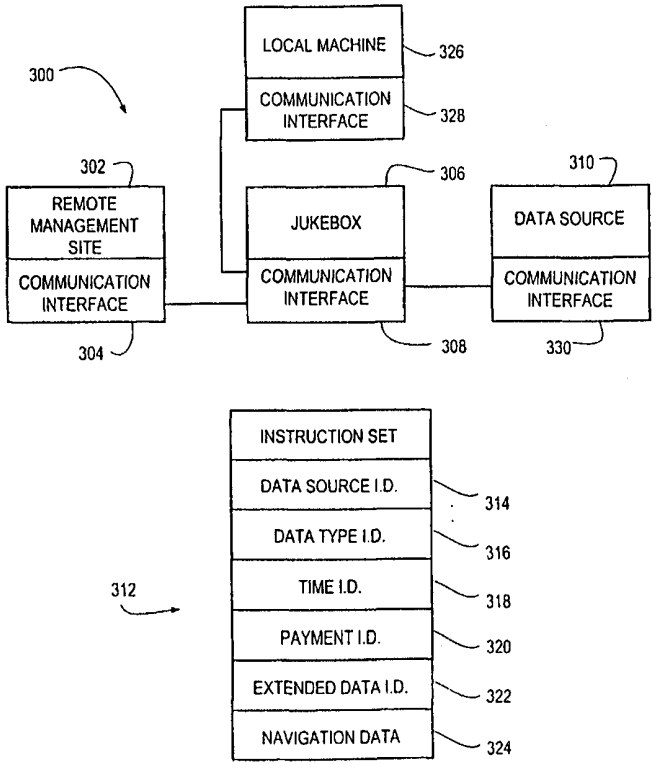
(54) Title: AUTOMATED DOWNLOADING COMPUTER JUKEBOX

(57) Abstract

A method of operating a computer jukebox and an automated computer jukebox are presented. An instruction set is transmitted to a computer jukebox. The instruction set includes, for example, a data source identifier, a data type identifier, and a time identifier. The data source identifier indicates the data repository from which the jukebox will download data, the data type identifier indicates the particular song to download, and the time identifier specifies when the jukebox will download the song. For example, the data source identifier may be an Internet web site Uniform Resource Locator (URL), the song identifier may be a song title, and the time identifier may specify an absolute time reference (e.g., 2 P.M.). According to the instruction set, the jukebox connects through a communication interface to the data source identified by the data source identifier. The jukebox then downloads the song identified by the song title, and stores the song in its memory for future play. In addition, the instruction set may include a payment identifier. As an example, the payment identifier may represent a credit card number or predetermined account number and billing information (for example, name, address, expiration date, and the like) that allows the jukebox to pay for the songs it will download. The instruction set may also include a series of navigation commands, particularly useful for navigating a web site, that lead the jukebox through a web site song downloading set of screens.



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TITLE OF THE INVENTION

# AUTOMATED DOWNLOADING COMPUTER JUKEBOX

## CROSS-REFERENCE TO RELATED APPLICATIONS

This application takes the benefit of United States Provisional Patent Application Serial No. 60/123,809, titled Improved System for Managing a Plurality of Computer Jukeboxes, filed 3/11/1999, which is incorporated herein by reference in its entirety.

## BACKGROUND OF THE INVENTION

The present invention relates to computer jukeboxes. In particular, the present invention relates to a computer jukebox capable of retrieving songs in an automated fashion and from song distribution systems typically requiring user input.

Mechanical jukeboxes that play vinyl records are almost extinct. The growth in digital technology has allowed jukeboxes to evolve from mechanically complex devices capable of playing a handful of songs on 45 RPM records, to compact disc based digital jukeboxes capable of playing hundreds of songs, to sophisticated downloading jukeboxes capable of retrieving, from a song database, any desired selection of songs in digital format and storing the songs for as long as desired on a rewritable non-volatile storage device. A downloading jukebox is disclosed, for example, in U.S. Pat. No.

5,848,398 to Martin, et al, which is incorporated by reference herein in its entirety.

The Internet has undergone explosive growth in recent years, connects users worldwide, and is now a source of information on virtually every topic. The Internet lends itself naturally to high speed distribution of digital information including compressed song or music data. For example, the MP3 compression format, without significant degradation in sound quality, allows a vast reduction in the storage space and transfer time required to digitally encode, store, and transmit a song.

Recognizing the potential for strong Internet sales of music, some companies have proposed secure systems for downloading songs over the Internet. Downloading songs from secure systems is typically a more complex process than connecting a jukebox to a database and initiating a download. Instead, the secure systems typically require some user interaction to select one or more songs, pay for the songs (e.g., provide a credit card number), and finally download the songs.

Even though great progress has been made in downloading jukebox technology, the requirements of recent song distribution systems are beyond the

capabilities of typical downloading jukeboxes. A vast resource of song data thus remains inaccessible to downloading jukeboxes. Furthermore, a mechanism for automating the selection of songs, the payment for the songs, and the downloading of the songs by the downloading jukebox is needed.

A need exists in the industry for an automated computerized downloading jukebox capable of retrieving songs even from song distribution systems typically requiring user input.

## BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide a computer jukebox capable of downloading song data in an automated fashion from remote song databases. The computer jukebox may thereby update its selection of songs on a periodic or non-periodic basis without human intervention.

It is another object of the present invention to provide a computer jukebox that is capable of downloading song data from remote song databases in conjunction with (e.g., before or after) completing a commercial transaction for the song. The computer jukebox may thereby download music even from data sources that would

ordinarily be inaccessible to the jukebox. A commercial transaction is not always required however. For example, independent artists may promote their music by allowing their songs to be stored on the jukebox for no fee.

It is another object of the present invention to provide a computer jukebox that is capable of downloading song data from Internet web sites and that is further capable of successfully completing any commercial transaction necessary to allow download access to the song. The computer jukebox may then have access through the Internet to a growing number of web sites offering a wide variety of songs for downloading.

The present invention provides a method of operating a computer jukebox, and an automated computer jukebox. The method first transmits an instruction set to a computer jukebox. The instruction set includes, for example, a data source identifier, a song identifier, and a time identifier. The data source identifier indicates the data repository from which the jukebox will download data, the song identifier indicates the particular song to download, and the time identifier indicates when the jukebox will download the song.

As an example, the data source identifier may be an Internet web site Uniform Resource Locator (URL), the

song identifier may be a song title, and the time identifier may be an absolute time reference (e.g., 2 P.M.). As a more specific example, the data source identifier may be the URL for an Internet database to which the jukebox may connect to obtain song, artist, CD title, and other information. The jukebox receives the instruction set and stores it in memory for processing. According to the instruction set, the jukebox connects through a communication interface to the data source identified by the data source identifier. The jukebox connects at at least one time specified by the time identifier (if the time identifier is a time window or range, the jukebox may connect at any time within the range). The jukebox then downloads the song identified by the song title, and stores the song in its memory for future play.

The instruction set may include more than a single data source identifier, song title, or time identifier. As an example, the instruction set may include many different song identifiers representing multiple songs to be downloaded by the jukebox. Similarly, the instruction set may include multiple data source identifiers that select alternate or backup data sources to which the jukebox may connect to download particular songs. The

instruction set may further include an extended data identifier recognized by the jukebox for downloading additional information including, for example, song title, album name, album title, album graphics, release date, and artist name.

In addition, the instruction set may include a payment identifier. As an example, the payment identifier may represent a credit card number and billing information that allows the jukebox to pay for the songs it will download. The instruction set may also include a series of navigation commands that the jukebox may use, for example, to navigate through a secure web site distribution.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a block diagram showing the interaction between a remote management station, a jukebox, and a data source.

Figure 2 shows a high level flow diagram of the steps executed by an automated downloading jukebox system.

Figure 3 illustrates a detailed block diagram of a downloading computer jukebox system.

## DETAILED DESCRIPTION OF THE INVENTION

Turning to Figure 1, that figure shows a high level block diagram 300 of the interaction between a remote management site 302 (including a communication interface 304), a computer jukebox 306 (including a communication interface 308), and a data source 310 (including a communication interface 330). Also illustrated is a local machine 326 (e.g., a general purpose computer installed at the jukebox location) that includes a communication interface 328.

Exemplary implementations of a jukebox and a data source are provided below with respect to Figure 3. Also illustrated in Figure 1 is an instruction set 312. The instruction set 312 includes a data source identifier 314, a song identifier 316, and a time identifier 318. The instruction set 312 also includes a payment identifier 320, an extended data identifier 322, and a navigation data record 324.

The remote management site 302 may, for example, be a computer system installed at a remote route operator's site. As examples, the communication interfaces 304 and 308 may be serial (e.g., modem), parallel, network (e.g., T1, LAN), manual transportation of data (using any portable data storage device including, for example,

portable disks and disk drives), or Radio Frequency (RF) interfaces. The remote management site 302 prepares the instruction set 312 for transmission to the jukebox 306.

The instruction set 312 preferably includes the data source identifier (DSI) 314, the data type identifier (DTI) 316, and the time identifier (TI) 318. As noted above, however, the instruction set 312 may also include one or more of a payment identifier (PI) 320, an extended data identifier (EDI) 322, and navigation data (ND) 324. The DSI 314 indicates one or more sources of data to which the jukebox 306 will connect in order to download songs, advertisements, or other information. To that end, the DSI 314 may be, for example, a single telephone number, a set of telephone numbers, or a web site URL, including an HTTP or FTP protocol indicator.

The DTI 316 identifies one or more particular songs, advertisements, or other data to download. For example, the DTI 316 may be a text string containing a song name, a unique serial number corresponding to a song or advertisement, or the like. The TI 318 indicates to the jukebox 306 when to contact the information source 310 and download the data. For example, the TI 318 may indicate an absolute time (e.g., 3 P.M.), a relative time (e.g., in 1 hour), or a time window (e.g., between 1 A.M.

and 4 A.M.). Multiple TIs 318 may be transmitted to different jukeboxes 306 to stagger access to a particular data source to eliminate overloading of the data source.

The PI identifies a source of payment, if required, that the data source 310 may charge in return for providing the songs for downloading. Thus, for example, the PI may be a credit card number and billing verification information, a purchase order number, an electronic credit signature, or the like.

The EDI 322 indicates to the jukebox 306 whether or not to download additional data. For example, the EDI 322 may include commands that direct the jukebox to download additional information from the data source 310 (when available) including, for example, one or more of a song title, album name, album title, album graphics, release date, and artist name.

The ND 324 provides the jukebox 306 with commands or actions to perform in order to navigate Internet web sites, menus, selection screens, and the like. Thus, for example, when the data source 310 requires a user to enter a username and password in text boxes, and click on an "OK" button, the ND 324 may supply the username, the password, the number of "tabs" (or any other desired keystrokes) required to select the text boxes and then

select the OK button. More sophisticated jukeboxes may accept an ND 324 that sets forth the screen positions of the text boxes and OK button, and that provides the indication to perform virtual mouse clicks, mouse movements, or keyboard activations. As another example, when the data source 310 requires a user to navigate menus by letter choices, the ND 324 may provide a string of menu choice letters that the jukebox 306 will provide once connected to the data source 310.

Turning now to Figure 2, that figure shows a flow diagram 400 of the steps executed by an automated downloading jukebox system. At step 402, the remote management site transmits to the computer jukebox an instruction set. At step 404, the computer jukebox receives the instruction set and connects to the data source (step 406) at the indicated time.

Note however, that at step 412, the location owner may provide his own instruction set, or edit the instruction set received at step 404. In addition, any patron selections (discussed below) may be added to the instruction set at this time. As noted above, the jukebox may navigate and interact with the data source (step 408), for example to make menu selections or provide payment information, prior to downloading the

desired song at step 410.

Turning next to Figure 3, that figure shows a data source 11 for songs, advertisements, and other data, that connects remotely located jukeboxes such as a jukebox 13. Each jukebox 13 may be implemented as a computer based system having sophisticated audio production capability wherein each computer jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The storage unit 93 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

The data source 11 communicates with each computer jukebox 13 using a transmission link 15. The data source 11 (which may be, for example, a laptop computer or may which represent the manual transportation of data as noted above) and each jukebox 13 use respective modems 17 and 19 to maintain communication on the transmission link 15. The data source 11 and the jukebox 13 may communicate using other interfaces, however. For example, the communication interface may be implemented as a high-speed network connection, wireless transmission system, and the like.

The data source 11 may store and transmit other

information, including song titles, album name, artist names, video and graphic information over the transmission link 15 to the computer jukebox 13. In one implementation, the data source 11 includes a host computer 21 which maintains a master library 23 of songs and associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may take the form of a read-write optical storage device. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

Each computer jukebox 13 plays songs and displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 27. The song library 91 contains all of the currently available song selections and associated pictorial graphics for the jukebox 13. The storage unit 93 also stores a catalog 95 that may be used as an index into the local song library 91.

The jukebox 13 includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. The

microprocessor 121A operates in accordance with the software program contained in the ROM 121B and/or the RAM 121C. For example, one of the software programs may be the Netscape Navigator™ web browser that gives the jukebox internet browsing, downloading, and general communication abilities. The processing circuit 121 may also be coupled to a decompression circuit (not shown) or may perform decompression using a software algorithm for decoding, for example, MP3 compression. The processing circuit interprets the instruction set 312 as noted above for automated operation of the jukebox 13.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been

input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

In an alternative embodiment of the present invention, the computer jukebox 306 is locally managed. Thus, for example, the owner of the location at which the computer jukebox 306 is installed may connect to the jukebox using a local machine 326 and its communication interface (e.g., serial port, parallel port, network connection, or the like). The location owner may thereby directly control which additional songs and advertisements the computer jukebox 306 downloads by providing its own instruction set.

In yet another embodiment, the patron may provide data selection input that, for example, selects songs from a list of songs available for download from various data sources and displayed by the jukebox 306. The jukebox 306 then forms the instruction set appropriate for downloading the patron selection. An additional charge may be collected for this service by the jukebox 306, for example, before the jukebox 306 connects to the data source 310 and downloads the data. Alternatively,

the jukebox may store the instruction set or the song requested by the patron in a list for later processing (for example, possible modification by the remote management site or the local operator). The jukebox 306 may then connect during non-peak or non-business hours to the data source 310.

In conjunction with the patron data selection feature just described, the jukebox 306 may operate in a data source searching mode. In the searching mode, the jukebox 306 connects to any preselected list of data sources and downloads a list of songs, advertisements, or other digital data that may be downloaded from each data source. The jukebox 306 may then display all of the digital data available for download, and accept patron input as noted above.

The present invention thereby provides an automated jukebox that may connect to and download information from data sources that typically require user interaction. The jukebox may download music, for example, from relatively complex data sources including Internet web sites. The remote management site may automate the jukebox operations by preparing and transmitting an instruction set to the jukebox.

While particular elements, embodiments and

applications of the present invention have been shown and described, it is understood that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing teaching. It is therefore contemplated by the appended claims to cover such modifications and incorporate those features which come within the spirit and scope of the invention.

What is claimed is:

1. A method of automating the operation of a downloading computer jukebox, the method comprising:

generating an instruction set comprising a data source identifier and a data type identifier;

storing the instruction set at a computer jukebox;

connecting the computer jukebox through a communication interface to a data source identified by the data source identifier; and

downloading data identified by the data type identifier from the data source.

2. The method of claim 1, further comprising the step of transmitting to a computer jukebox the instruction set.

3. The method of claim 1, wherein the step of generating comprises generating an instruction set comprising a plurality of data type identifiers.

4. The method of claim 1, wherein the data source identifier is an Internet web site data source

identifier.

5. The method of claim 1, wherein the step of generating an instruction set further comprises generating a payment identifier.

6. The method of claim 2, wherein the step of transmitting comprises transmitting from a remote management site.

7. The method of claim 1, wherein the step of generating an instruction set further comprises generating an extended data identifier, and wherein the step of downloading further comprises downloading extended data specified by the extended data identifier.

8. The method of claim 7, wherein the extended data identifier specifies at least one of song title, album name, album title, album graphics, release date, and artist name.

9. The method of claim 1, wherein the instruction set further comprises a time identifier, and wherein the step of connecting the computer jukebox occurs at at least one

time specified by the time identifier.

10. An automated downloading computer jukebox comprising:

a communication interface for connecting to a remote location;

a processor; and

memory coupled to the processor, the memory storing:

an instruction set comprising a data source identifier and a data type identifier; and

instructions for connecting the computer jukebox through the communication interface to a data source identified by the data source identifier and instructions for downloading data identified by the data type identifier from the data source.

10. The jukebox of claim 9, wherein the instruction set comprises a plurality of data type identifiers.

11. The jukebox of claim 9, wherein the data source identifier is an Internet web site data source identifier.

12. The jukebox of claim 9, wherein the instruction set

further comprises a payment identifier.

13. The jukebox of claim 9, wherein the instruction set further comprises an extended data identifier.

14. The jukebox of claim 13, wherein the memory further comprises instructions for downloading extended data specified by the extended data identifier.

15. The jukebox of claim 14, wherein the extended data identifier specifies at least one of song title, album name, album title, album graphics, release date, and artist name.

16. The jukebox of claim 9, wherein the instruction set further comprises a time identifier, and wherein the memory further comprises instructions for determining at least one time specified by the time identifier to connect the computer jukebox to the data source identified by the data source identifier.

17. The jukebox of claim 9, wherein the memory further comprises instructions for connecting over the communication interface through an Internet web browser.

18. A method of automating the operation of a downloading computer jukebox, the method comprising:

generating at a computer jukebox an instruction set comprising a data source identifier and a data type identifier;

connecting the computer jukebox through a communication interface to a data source identified by the data source identifier; and

downloading data identified by the data type identifier from the data source.

19. The method of claim 18, further comprising the step of accepting patron data selection input at the computer jukebox.

20. The method of claim 19, further comprising the step of downloading data identified by the patron data selection input.

21. The method of claim 19, further comprising the step of editing the patron data selection prior to the downloading step.

22. The method of claim 19 wherein the connecting step further comprises connecting over the communication interface through an Internet web browser.

FIG. 1

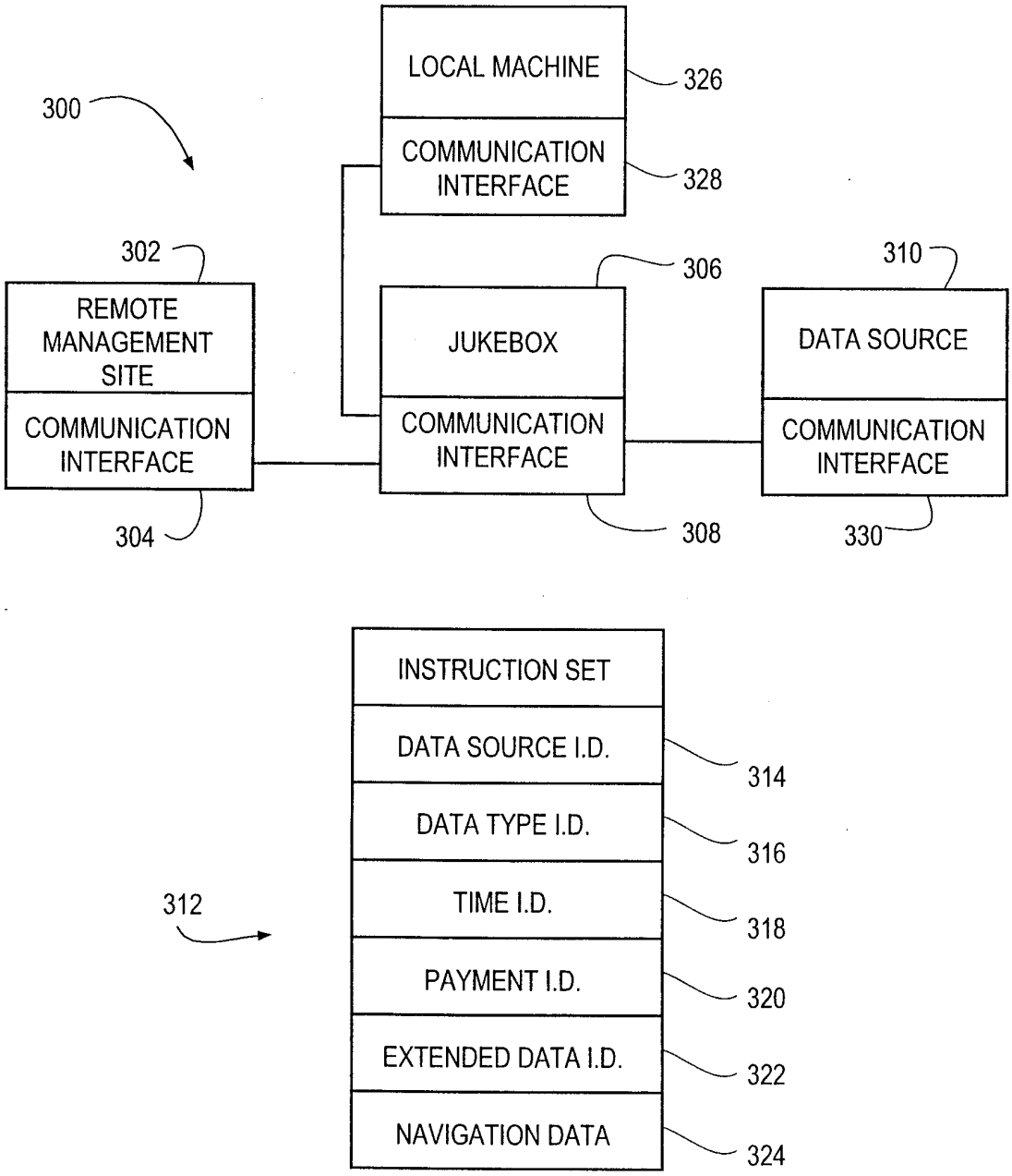

LOCAL MACHINE
326
300
COMMUNICATION INTERFACE
328
302
306
310
REMOTE MANAGEMENT SITE
JUKEBOX
DATA SOURCE
COMMUNICATION INTERFACE
COMMUNICATION INTERFACE
COMMUNICATION INTERFACE
304
308
330
INSTRUCTION SET
DATA SOURCE I.D.
314
DATA TYPE I.D.
316
312
TIME I.D.
318
PAYMENT I.D.
320
EXTENDED DATA I.D.
322
NAVIGATION DATA
324

FIG. 2

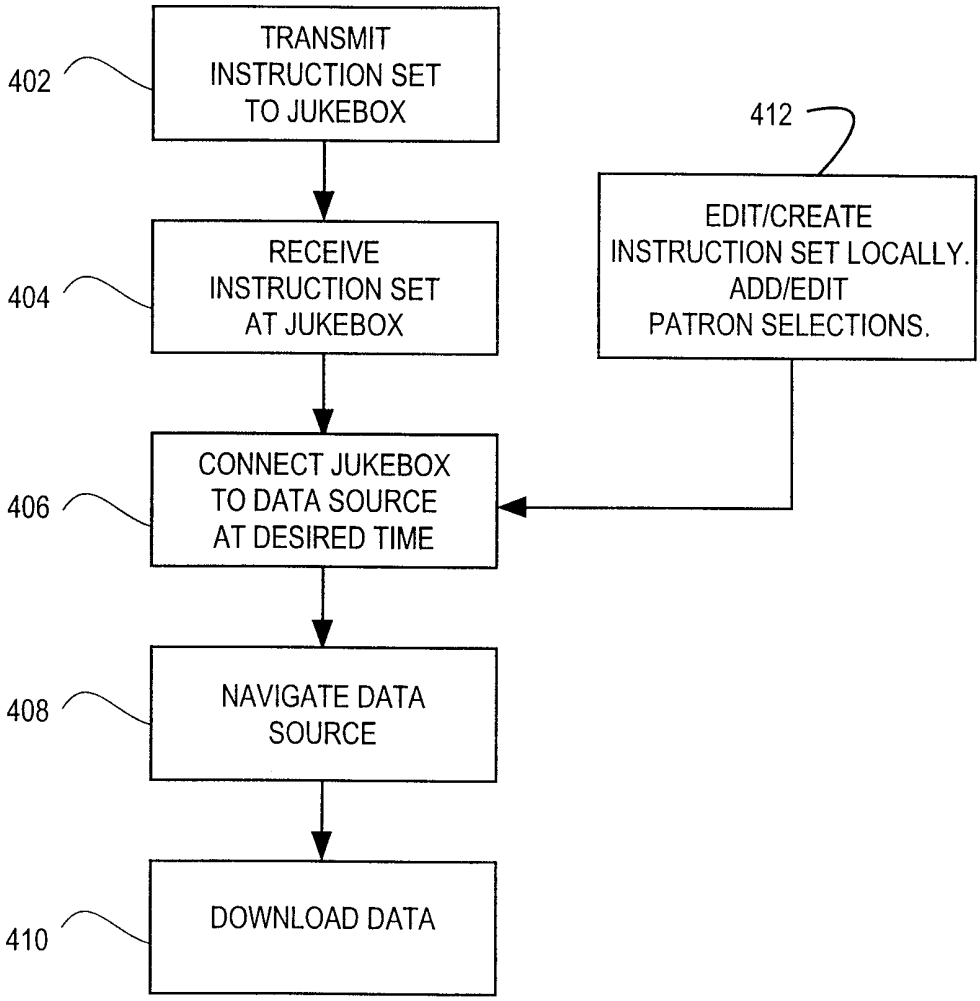
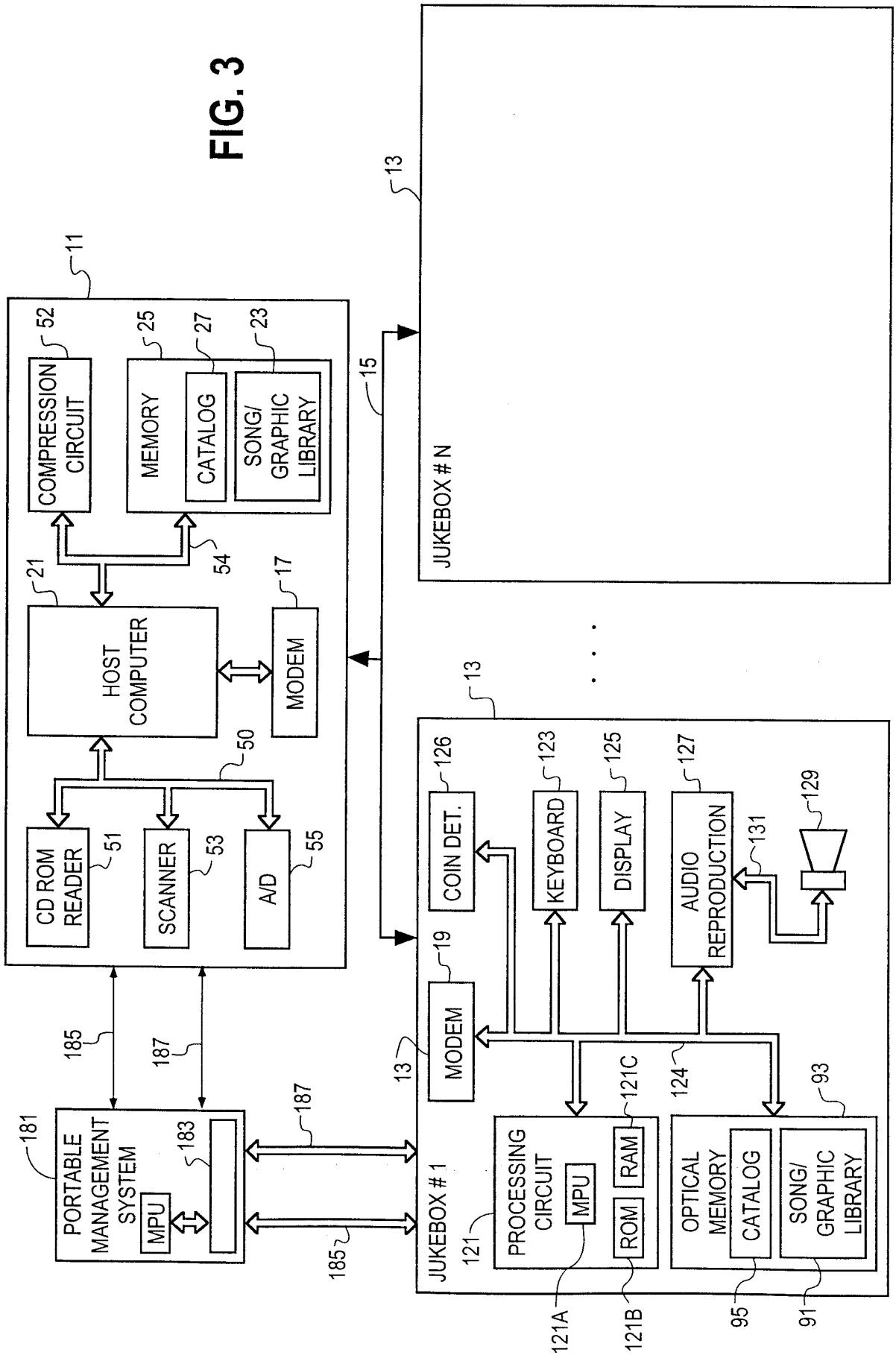

402
TRANSMIT INSTRUCTION SET TO JUKEBOX
404
RECEIVE INSTRUCTION SET AT JUKEBOX
406
CONNECT JUKEBOX TO DATA SOURCE AT DESIRED TIME
408
NAVIGATE DATA SOURCE
410
DOWNLOAD DATA
412
EDIT/CREATE INSTRUCTION SET LOCALLY. ADD/EDIT PATRON SELECTIONS.

FIG. 3


11
52
COMPRESSION CIRCUIT
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27
23
MEMORY
CATALOG
SONG/ GRAPHIC LIBRARY
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JUKEBOX # N
21
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KEYBOARD
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MPU
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121C
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