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(54) **Title:** SYSTEMS AND METHODS FOR IMPLEMENTING DYNAMIC BANKS OF SUBCHANNELS FOR BROADCAST OR STREAMED CONTENT SERVICES ("FEATURED FAVORITES")

(57) **Abstract:** Systems and methods are presented for a broadcast or streamed content receiver receiving a plurality of program channels with defined banks of subset channels, to display the banks on the radio receiver, and to receive dynamic updates of channel bank content. In exemplary embodiments, the channels in a given bank can be determined by commonality as to defined categories, user interest, user preferences, and/or content provider. In exemplary embodiments of the present invention, channels in one or more defined banks can be buffered to facilitate smart user scanning within such defined banks.

IN THE PATENT CO-OPERATION TREATY
PATENT APPLICATION
FOR
SYSTEMS AND METHODS FOR IMPLEMENTING DYNAMIC
BANKS OF SUBCHANNELS FOR BROADCAST OR STREAMED CONTENT
SERVICES (“Featured Favorites”)

TECHNICAL FIELD:

The present application relates to broadcast and receiver technology, and in particular to systems and methods for implementing and supporting user preference selected and dynamically updated banks of channels, thus providing a user with easier access to content of specific interest.

CROSS-REFERENCE TO RELATED APPLICATIONS:

This application claims the benefit of U.S. provisional application Serial No. 61/572,332, filed July 14, 2011, which is hereby incorporated herein by reference. Related subject matter is also disclosed and claimed in PCT/US2012/025091, the entire contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Broadcast or streaming audio content delivery systems, such as, for example, Sirius XM Radio or the like, offer numerous channels of content to users. In general, although some effort is made to group channels of similar content in banks or bands, users with varied and eclectic tastes will often end up listening to a subset of channels spread across the entire available channel lineup.

For example, in the XM digital satellite radio service, the following is the channel lineup as of March, 2012:

Channel Number - Channel Name

2 - Sirius XM Hits 1

- 3 - Top 20 on 20
- 4 - 40s on 4
- 5 - 50s on 5
- 6 - 60s on 6
- 7 - 70s on 7
- 8 - 80s on 8
- 9 - 90s on 9
- 10 - The Pulse
- 11 - KIIS-FM
- 12 - Z-100
- 13 - LITE-FM
- 14 - Pop 2K
- 15 - Studio 54 Radio
- 16 - The Blend
- 17 - Sirius XM Love
- 18 - Limited Engagements
- 19 - Elvis Radio
- 20 - E Street Radio
- 21 - Underground Garage
- 22 - Pearl Jam Radio
- 23 - Grateful Dead Channel
- 24 - Radio Margaritaville
- 25 - Classic Rewind
- 26 - Classic Vinyl
- 27 - Deep Tracks
- 28 - The Spectrum
- 29 - Jam On
- 30 - The Loft
- 31 - The Coffee House
- 32 - The Bridge
- 33 - 1st Wave
- 34 - Lithium
- 35 - Sirius XMU
- 36 - Alt Nation
- 37 - Octane
- 38 - Boneyard
- 39 - Hair Nation
- 40 - Liquid Metal

- 41 - Faction
- 42 - The Joint
- 44 - HipHop Nation
- 45 - Shade 45
- 46 - Backspin
- 47 - The Heat
- 48 - Heart and Soul
- 49 - Soul Town
- 50 - The Groove
- 51 - BPM
- 52 - Electric Area
- 53 - Sirius XM Chill
- 56 - Willies Roadhouse
- 57 - Nashville
- 58 - Prime Country
- 59 - The Highway
- 60 - Outlaw Country
- 61 - Bluegrass Junction
- 63 - The Message
- 64 - Praise
- 66 - Watercolors
- 67 - Real Jazz
- 68 - Spa
- 69 - Escape
- 70 - BB Kings Bluesville
- 71 - Siriusly Sinatra
- 72 - On Broadway
- 74 - Met Opera Radio
- 75 - Sirius XM Pops
- 76 - Symphony Hall
- 78 - Kids Place Live
- 79 - Radio Disney
- 80 - Book Radio
- 81 - Doctor Radio
- 82 - Radio Classics
- 84 - ESPN Radio
- 85 - ESPN Xtra
- 86 - Mad Dog Radio

87 - Fantasy Sports Radio
88 - NFL Radio*
89 - MLB Network Radio
90 - NASCAR Radio*
91 - College Sports Nation
92 - NHL Home Ice
93 - PGA Tour Network
94 - IZOD Indy Car
96 - Laugh USA
97 - Blue Collar Radio
98 - The Foxxhole
99 - Raw Dog Comedy
100 - Howard 100*
101 - Howard 101*
102 - Playboy Radio*
103 - Spice Radio*
104 - Sirius XM Stars Too
105 - The Virus
106 - Road Dog Trucking
107 - Sirius XM Stars
108 - OutQ
109 - COSMO Radio
110 - Martha Stewart Radio*
111 - Oprah Radio
112 - CNBC
113 - Bloomberg Radio
114 - FOX News
115 - CNN
116 - HLN
117 - MSNBC
118 - BBC World Service
119 - C-SPAN Radio
120 - WRN
121 - Sirius XM Public Radio
122 - NPR Now
123 - PRX
124 - POTUS
125 - Sirius XM Patriot

126 - FOX News Radio
127 - Sirius XM Left
128 - The Power
129 - Catholic Channel
131 - Family Talk
132 - BOS/PHI/PIT
133 - NY
134 - DC/BAL/ATL
135 - CHI/DET
136 - MIA/TB
137 - DFW/HOU/PHX
138 - STL/MSP/LSV
139 - SF/SEA/SDG
140 - LA
141 - HUR Voices
143 - BYU Radio
144 - Korea Today
145 - Inspirate
146 - Cristina Radio
147 - En Vivo
148 - CNN en Espanol
149 - ESPN Deportes Radio
150 - Caliente
151 - The Verge
152 - Air Musique
153 - Sur La Route
154 - XM Scoreboard
155 - Canada 360
156 - Radio Parallele
157 - Calendrier Sportif
158 - Quoi de Neuf
159 - ATN
163 - WCGI-FM
160 - Laugh Attack
164 - Sixx Sense
165 - Extreme Talk
166 - Americas Talk
167 - ReachMD

168 - TALK Radio
169 - FOX Sports Radio
175 - MLB en Espanol
176 – 189 MLB Play by Play Channels
190 – 210 Play by Play Channels
212 -222 NHL Play by Play Channels
225 – 239 Premier Play by Play Channels (NFL, NCAA, Nascar)*

Xtra Channels:**

310 - Rock and Roll Hall of Fame Radio (Xtra Channel)**
313 - RockBar (Xtra Channel)**
316 - Sirius XM Comes Alive (Xtra Channel)**
319 - Classic College Radio (Xtra Channel)**
340 - Tiesto's Club Life Radio (Xtra Channel)**
350 - Red White & Booze (Xtra Channel)**
360 - Yoga (Xtra Channel)**
370 - SportsCenter (Xtra Channel)**
400 - Carlin's Corner (Xtra Channel)**
403 - Dirty Dog (Xtra Channel)**
406 - UCB Radio (Xtra Channel)**
500 - Viva (Xtra Channel)**
503 - La Mezcla (Xtra Channel)**
506 - Flow Nación (Xtra Channel)**
510 - Aguila (Xtra Channel)**
520 - Latidos (Xtra Channel)**
523 - Caricia (Xtra Channel)**
530 - Luna (Xtra Channel)**
533 - Rumbón (Xtra Channel)**
540 - La Kueva (Xtra Channel)**
560 - RadioFórmula México (Xtra Channel)**
569 - Playboy Radio en Español (Xtra Channel)**

* = Requires XM Premier subscription

** = Requires Xtra-compatible radio, such as the XM Edge

As can readily be seen, with over 170 channels, individual users may regularly listen to one or two channels from each band of channels, such as, for

example, 80s on 8, 90s on 9, Deep Tracks 27, The Joint 42, BBC World Service 118, Oprah Radio 111, C-Span 119, and Laugh Attack 160. These regularly used channels are spread across the entire 170+ spectrum of channels.

In a typical use of a radio receiver capable of receiving multiple channels, such as an XM capable satellite radio receiver, a content provider may assign featured channels to a set of preset channels, so that a particular channel can be quickly selected by a user for live play by simply selecting from a menu of such preselected channels. While this menu of preselected channels ("channel bank") can provide a wide assortment of channels, it (i) is generally infrequently refreshed to reflect the latest lineup changes, (ii) fails to consider user preferences, or (iii) fails to update based on seasonal or promotional periods. If there is no subset of desired channels, the user is then forced to search for channels. Although, as noted, channels may be grouped together by category, a user still must perform an extra step of searching through uninteresting channels to find his or her personal "wheat amongst the chaff."

In most receivers, a user may select certain channels as favorites for ease of access. However, such a user may not be aware of certain promotional/season events/channels, new channels, or other channels of interest without having to search the full list of channels.

What is thus needed in the art are convenient methods and apparatus for providing a user with the channels he or she genuinely wishes to listen to without requiring that he or she to search for them across an ever expanding spectrum of available channels.

SUMMARY OF THE INVENTION

In exemplary embodiments of the present invention, a significant improvement to the listening experience can be facilitated via a radio receiver, or other user device, by providing the user with a dynamically updated bank of channels. Such a channel bank can provide the user with easier access to content of interest, and can, for example, be based on (i) user selections of one or more channels in a favorites list, or for example, (ii) promotional information. A new bank of channels can, for example, also list other topically related channels that the user may enjoy. For

example, during the December holiday season, a “Holiday” themed favorites bank can be defined to include channels then currently playing holiday music, such as, for example, “Holiday Traditions”, “Country Christmas”, “Radio Hanukkah”, and “Holiday Pops” named/themed channels. Because such channels are seasonal, only temporarily play holiday content, and can often be spread across an entire multi-channel broadcast offering, they are often hard for a user to find, particularly in an automotive driving environment. By providing them all in one bank, they can easily be located and enjoyed.

In exemplary embodiments of the present invention a user can also be provided with a dynamically updated “getting started” bank. Such a bank can be specifically designed to assist new users or attract new users in finding appealing content, targeting a specific demographic or topical interest. For example, if it is known that a user is a sports fan who attended a particular university, a sports themed bank of channels could contain those channels carrying the collegiate conference games of the user’s alma matter.

In exemplary embodiments of the present invention a user can have the ability to initiate a content scanning operation within a Featured Favorites bank whereby tracks (e.g., songs, news/talk segments, etc.) previously aired and buffered for a plurality of designated channels can be played in succession from start through a few seconds for each track (or optionally live for certain designated channels), until the user halts such scanning and listens to the full track where the user stopped the scanning.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects of the invention, its nature, and various features will become more apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference characters may refer to like parts throughout, and in which::

FIG. 1 depicts an example of a broadcast or streamed content delivery system in accordance with an exemplary embodiment of the present invention;

FIG. 2 depicts exemplary end-to-end delivery of exemplary Featured Favorite TDS files and messages content in accordance with an exemplary embodiment of the present invention;

FIG. 2A depicts exemplary TDS message framing and SDTP packet multiplexing in accordance with an exemplary embodiment of the present invention;

FIG. 3 depicts a radio receiver or other user device configured to receive broadcast or streamed content in accordance with an exemplary embodiment of the present invention;

FIGS. 4-22 depict exemplary user interfaces for navigating broadcast or streamed content in accordance with exemplary embodiments of the present invention; and

FIG. 23 depicts an exemplary SDI-List message in accordance with an exemplary embodiment of the present invention.

Throughout the drawing figures, like reference numbers will be understood to refer to like elements, features and structures.

DETAILED DESCRIPTION OF THE INVENTION

Exemplary embodiments of the present invention relate to an operation of a broadcast or streamed content receiver that provides an ordered subset of channels that can be updated dynamically to provide a user with an aggregation of topically related channels and can be based on a user's preferences. The feature is sometimes hereinafter referred to as "Featured Favorites."

In a radio receiver or other device capable of receiving multiple broadcast or streamed content channels, each channel can be aggregated into a set of groups (based on some identified commonality, such as, for example, musical genre, sporting event, news, etc.). Because the content of the respective channels in broadcast or streamed content transmissions is varied and numerous, it may be advantageous for a user to select a set of channels and place them in a favorites list for ease of access. For example, a user may prefer certain channels that feature a similar musical genre such as, for example, AltNation or Sirius XMU. By selecting such channels as favorites, a user can more easily select a channel from a subset of channels.

Several exemplary embodiments according to the present invention are described herein. Briefly, a radio receiver or other user device can be configured for Featured Favorites operation that enables it to receive at least one broadcast stream or streamed content (e.g., metadata, audio, and/or video) that comprises a plurality of different content channels. The radio receiver can designate a bank that includes a channel or multiple channels from among the plurality of broadcast or streamed channels, and can list the designated channel(s) from the user interface. The user interface can, for example, include a physical button on the radio receiver interface, or in a menu interface, by which a user can access such designated channels.

A Featured Favorites operation can avoid limitations of services and products that seek to provide a user with a static or predetermined list of channels without any dynamically updated content that the user might enjoy. An exemplary Featured Favorites operation can further avoid the disadvantages of attempts to promote certain channels without consideration of the individual user's preferences. Featured Favorites can thus provide an optimal balance of content promotion and user personalization, which is a particularly useful functionality for products that feature a wide variety of music, talk, news, and sports content, where such content can be received from one or more streams and from diverse sources. In an exemplary example of a Satellite Digital Audio Radio Service ("SDARS"), or similar programming service, Featured Favorites can make radio receivers, user devices and other products increasingly attractive to consumers, while also leveraging additional commercial value from a unique broadcast pipe of diverse curated content such as an SDARS in general, and the Sirius XM SDARS services in particular.

In exemplary embodiments of the present invention, a Featured Favorite operation can also include Smart Favorite™ support. As described in PCT/US2012/025091 filed on 2/14/2012 (the "Tune Start" application), a Smart Favorite™ channel is a channel designated for maintenance by a user device in a background Instant Replay (IR) Buffer. When selecting a Smart Favorite™ channel, the radio receiver or user device can start playing the currently aired track (e.g., song, news segment, talk segment, etc.) from the channel at the beginning of the track, instead of from the current real-time or live position due to it having been buffered in the BIR buffer. This capability of Smart Favorite™ channels is sometimes known as the "Tune Start™" feature. Alternatively, a Smart Favorite™ channel can also be

tuned to live content (based on, for example, content type, channel type, user selection, or other criterion). Regardless of whether the selected Smart Favorite™ channel plays live content or from a buffered track, after tuning a user can manually skip back to the start of a buffered track. The buffer may hold a plurality of tracks depending on the track durations and the capacity of the channel's buffer. Additionally, a user has the ability to initiate a content scanning operation whereby tracks (e.g., songs, news/talk segments, etc.) previously aired and buffered for a plurality of designated channels can be played in succession from the start for a few seconds for each track (or optionally live for certain designated channels), until the user halts the scanning and continues to enjoy the full track on which the user stopped the scan.

Overview of Exemplary System Architecture

Exemplary embodiments of the present invention are next described herein with reference to a satellite digital audio radio service (SDARS) that is transmitted to various receivers by one or more satellites and/or terrestrial repeaters. It is to be understood that the source content stream(s) used in connection with a Featured Favorite operation in accordance with the present invention can be broadcast, streamed or otherwise transmitted using other content delivery systems (e.g., other digital audio broadcast (DAB) systems or high definition (HD) radio systems, or two-way Internet Protocol (IP) system), as well as other wireless or wired methods for signal transmission. Further, it is to be understood that the source content stream(s) used in connection with a Featured Favorite operation in accordance with the present invention can be received by various user devices.

Fig. 2 illustrates exemplary end-to-end delivery of Featured Favorites data according to exemplary embodiments of the present invention. Beginning at the top right of the figure there is a Featured Favorites TDS encoder which can, for example, pass a Featured Favorites TDS file to a feeder, which in turn passes Featured Favorites TDS messages to an SDTP packet composer which can, for example, output SDTP packets for transmission over a communications network, for example. On the receiving end of the network the SDTP packets are received as shown in the bottom portion of Fig. 2 beginning at the bottom left. It is noted that Fig. 2, being an end-to-end delivery depiction, has both the transmit side from the

broadcaster/content provider's perspective and the receive side from the user's perspective.

Continuing with the bottom portion of Fig. 2, a Message Producer receiver receives SDTP packets and provides them to an SDTP packet parser. The SDTP packet parser hands off Featured Favorites TDS messages extracted from the SDTP packets to the receiver, or a portion thereof adapted to interpret the TDS messages, and create a Featured Favorites TDS message file therefrom. This file, in turn, can be provided to a TDS decoder, which can then use the relevant information to create and display to a user of the receiver Featured Favorites as described herein.

Fig. 2A shows exemplary TDS message framing, as well as exemplary SDTP packet multiplexing, according to exemplary embodiments of the present invention. As noted above, an exemplary Featured Favorites TDS file and TDS messages can be incorporated in SDTP packets, as shown in Fig. 2 and as shown in detail in Fig. 2A.

Next described, with reference to FIG. 3, is an exemplary receiver that can be used in connection with various exemplary embodiments of the present invention. Receiver 14 preferably comprises an antenna 54 for receiving, for example, an SDARS signal and/or other broadcast, or otherwise transmitted streams, a tuner 56, baseband signal processing components indicated generally at 58, a system controller 68, a multi-service multiplexer MUX 60 and memory, among other components. As stated above, exemplary embodiments of the present invention can be implemented in other types of user devices that can receive content (e.g., metadata and/or audio and/or video delivered by broadcast or streaming) such as mobile telephones, personal computers, personal data assistants, portable computing devices, different types of receivers, and so on.

With further reference to FIG. 3, receiver 14 preferably comprises three receiver arms for processing the SDARS broadcast stream received from two satellites 12, 16 and terrestrial repeater 17, as indicated by demodulators 62, 64, 66. These can be demodulated, combined and decoded, for example, via signal combiner 69 in combination with SDRAM 70, and demultiplexed to recover channels from the SDARS broadcast stream, as indicated by signal combining module 69 and service demultiplexer module 72. Processing of a received SDARS broadcast

stream is described in further detail in commonly owned U.S. Pat. Nos. 6,154,452 and 6,229,824, the entire contents of which are hereby incorporated herein by reference. Conditional access module 74 can optionally be provided to restrict access to certain demultiplexed channels. For example, each receiver 14 in an SDARS system can be provided with a unique identifier allowing for the capability of (i) individually addressing each receiver 14 over-the-air to facilitate conditional access, such as enabling or disabling services, or (ii) providing custom applications such as individual data services or group data services. The demultiplexed service data stream can, for example, be provided to system controller 68 from multi-service multiplexer 60.

Exemplary User Interface And User Interaction

Figures 4-22, next described, illustrate various exemplary screenshots that can be used in connection with a Featured Favorites functionality according to exemplary embodiments of the present invention.

Figs. 4 and 5 show a user playing a song on Channel 33, entitled "Radi Radio" by Elvis Costello. They also show one of two available banks of favorites, the other bank shown in Fig. 5. Hence the displayed legend "Favs 1 of 2" and "Favs 2 of 2" in Figs. 4-5, respectively. Figs. 6-19, next described, shows additional exemplary screens where there are six sets of favorites, being the first two sets of Figs. 4-5, with an additional four sets, some of which are "Featured favorites" as described above.

In Fig. 6 and Fig. 7, the user continues to listen to "Radio Radio" on Channel 33 as she flips through the available favorite screens. Fig. 7 shows the third bank of favorites, and also displays, according to an exemplary embodiment of the present invention, an indication of a "Featured Favorite" (which does not appear on the earlier 2 "regular" favorite banks shown in Figs. 4-6. Thus, in Fig. 7, as well as in Fig. 8, is an information button alerting the user to the fact that there are Featured Favorites available, here, namely "Holiday Music." Fig. 8 shows the same screen of Fig. 7 except that here the user has selected one of the Featured Favorites (see the blue rectangle surrounding Channel 17's icon) and has selected Channel 17, "Holly" -- a Christmas channel. This plays the song "Christmas Saravejo 12/24", by Trans-Siberian Orchestra. Fig. 9 depicts the blurb that explains what "Holly" is all about,

and Fig. 10 shows the aftermath of pressing the “x” at the top right of the blurb window in Fig. 9.

Thus, with reference to Fig. 10, is the user continues to listen to the song on Channel 17, and sees the regular listening screen. Fig. 11 shows the user having cycled through the favorites banks again to see the fourth of sixth favorite screens, and now he can see another Featured Favorite - “New Year’s Resolutions” which is a collection of channels that programming has decided relate particularly to the New Years’ time of year. In Fig. 12 the user continues to listen to the Holly channel but now sees a blurb regarding the “New Year’s Resolutions” Featured Favorite bank of channels. Upon pressing the X at the upper right of the Featured Favorite blurb in Fig. 13 the user returns to the listening screen, and sees the fourth set of favorites and the Featured Favorites “New Year’s Resolution” being shown but without its informational blurb. Finally, Fig. 14 shows the fifth bank of favorites and there is here a new Featured Favorites entitled “Super Bowl.” To find out what Super Bowl provides, a user can press on the information screen and see the blurb as provided in Fig. 15. Upon pressing the X on that blurb the user returns to the “Favs 5 of 6” screen and continues to listen to the Christmas song on Channel 17, Holly, namely Christmas Saravejo 12/24”, by Trans-Siberian Orchestra. Finally, by clicking the right arrow at the bottom right of Fig. 16 the user moves to the sixth and final favorites screen where the Featured Favorite here presented is entitled “Upbeat Music” which, of course, has a number of channels associated with it. By pressing on the “Upbeat Music” words, for example, or on an informational icon, for example, a user sees the blurb which explains why there is a Featured Favorite known as Upbeat Music – it relates to getting the “spring back in your step with some of the most uptempo music channels Sirius XM offers.” Upon a user touching the X in the upper right of the blurb box, the user returns to the 6 of 6 favorites screen as shown in Fig. 18, and as can be seen is still listening to the Trans-Siberian Orchestra on Channel 17.

Figures 20-22 show conventional favorites in Fig. 20 under the Rock category, as well as two screens which feature Featured Favorites, namely “Holiday Music” and “New Year’s Resolutions”, as described above.

Exemplary System Overview And Featured Favorites Functionality

In exemplary embodiments of the present invention, exemplary service transmission channels can provide payload content, such as, for example, audio clips of music, talk and other information and entertainment content, and "Table Data Service" (TDS). The TDS data can be used to transmit information on the banks. Banks can be named, so that a receiver capable of displaying featured bank names, can display the names. Banks can also be accompanied with text descriptions to provide further information to the user. Multiple arrangements of a bank can be defined for the radio receiver supporting different maximum numbers of channels per bank. Thus each bank arrangement can be optimized to include the channels and placement order best for different target products.

As noted, a user can define his or her own preset banks of channels consisting of personal favorites. However, a content provider, for example, can also define such banks, implemented as presets, that include related channels (e.g., Featured Favorites) and broadcast such banks of channels to radio receivers 14 (as shown in Figs. 1 and 3). For example, pressing a Favorites bar on a current Now Playing screen can produce a screen displaying a list of favorite channel sets, while audio continues playing on the then tuned channel. The favorite channel sets can include both user defined channel banks, such as, for example, "User Favorites" and "User Favorites 2" as well as system or service defined channel banks, such as, for example, "Holiday Music" and "Rock Essentials." Consider the "Holiday Music" channel bank, provided by a service provider or system, for example. During the December holiday season SDARS and other audio and radio service providers produce a number of holiday channels, including, for example, traditional Christmas music, country Christmas music, a Hanukkah channel, a classical holiday music channel, etc.. While SDARS listeners enjoy this content, a common user complaint is the difficulty of finding these temporary channels, inasmuch as they tend to be spread out across the lineup, crossing multiple channel categories. Using Featured Favorites, a content provider can thus define a preset bank called "Holiday Music" that can group all of these temporary and seasonal channels together, such bank only appearing in the list of preset banks during December, for example. If a user selects Holiday Music, she will see all of these channels at a glance, and can easily tune to any of them.

Other uses for Featured Favorites can include, for example, a single bank to find temporary and long-term artist channels such as, for example, channels dedicated to Pearl Jam, McCartney, Springsteen, Elvis, and so forth. Alternatively, a bank might include a collection of easy listening channels from multiple categories, jazz, pop, classical, country, to make it easy to find something if a user is that kind of mood. In addition, "celebrity" banks can be provided that cater to the Howard Stern, Martha Stewart, or Oprah fan. Such channel banks can be defined dynamically, broadcasting their definitions to radio receivers, so that they can be added, deleted, and modified at any time. As an example of a rock-oriented channel bank, "Rock Essentials" can be selected from the list of channel banks, which enables a user device to generate, for example, a "now playing" screen showing a defined bank of ten rock channels, and begin playing one of them, or, for example continue playing the then current channel, and not change the currently playing channel when selecting a new bank; i.e. no channel change until the user explicit picks one from the bank.

In exemplary embodiments of the present invention, metadata provided for each Featured Favorites bank can include, for example, but need not be limited to, title of the bank; description of the bank contents and/or purpose; imagery associated with the bank (e.g., a logo); specifications that indicate the radio receiver capabilities required for displaying a particular bank (e.g., range of number of displayable channels in the radio receiver's preset bank required to be allowed to display the bank, and/or channels or channel groups that must be tunable by the radio receiver to be allowed to display the bank), priority of the bank (e.g., which banks should be displayed to the user if the radio receiver is capable of displaying a limited set of preset banks); and duration of the bank (e.g., allowable start and/or stop dates to display the bank to the user).

Channel banks can be prioritized, for example, so that radio receivers capable of showing fewer Featured Favorites banks than are then being broadcast can, for example, show the subset of banks considered most important by the content provider. Further, the arrangement of channels within a bank can also be prioritized, and the number of channels can be limited by the ability of the radio receiver or by subscription. For example, if a radio receiver is in a limited trial period, where the

subscription to every channel is not available, the radio receiver may display only banks and channels then available to the unit.

In exemplary embodiments of the present invention, channel banks can be defined, broadcast, edited, and removed from broadcast whenever desired, thus leveraging dynamic update capabilities. Therefore, whereas one Featured Favorites bank might be kept active for a year, another might only be launched for a few weeks during a promotional period. Dynamic updates to Featured Favorite banks are advantageous to the user experience by providing up to date content and/or information.

In exemplary embodiments of the present invention channel banks can be classified as to a broad purpose (e.g. for convenience in channel access, for optimizing Smart Favorites Content Scanning, or both). Additionally, channel banks can be tagged with topics or subtopics so that a radio receiver can prioritize access to banks, or, for example, create banks based on each user's historical listening interests. In exemplary embodiments of the present invention a user's favorites list or individual preference information can be used to create one or more Feature Favorites banks for that user. Additionally, the receiver could select which received Feature Favorites banks are prioritized for presentation to the user based on their match to the user's interests (e.g. by Topics associated with the Featured Favorites, or by constituent channels within the Featured Favorites that match channels favored by the user).

For example, if AltNation is listed in the user's favorites list, a Feature Favorites bank can, for example, include other channels from the "Rock" musical genre.

Exemplary Methods of Operation

An exemplary method for implementing Featured Favorites involves receiving information from the source content stream. Radio receiver 14 (FIG. 3) can receive data from a source content stream including a "Table Data Service" (TDS). The TDS data can include, for example, some or all of the following: Featured Favorites Bank Order, Featured Favorites Bank ID, Featured Favorites Bank Sequence, Featured Favorites Bank Title – Short, Featured Favorites Bank Title – Long, Featured Favorites Bank Title – Verbose, Featured Favorites Bank Description, Featured

Favorites Bank Purpose, Featured Favorites Bank - Arrangement 1, Featured Favorites Bank - Arrangement 2, Featured Favorites Bank - Arrangement 3, and Featured Favorites Bank - Arrangement 4. These data fields and their contents are next described.

Featured Favorites Bank Order provides the order of banks. Radio receivers with a limited Featured Favorites banks capacity of n banks that also do not provide the user with a method of selecting which banks they want to keep, can, for example, present the first n eligible banks from the list to the user, and ignore the rest. The order can be provided through the data service as an integer assigned to each Featured Favorites bank, with each bank uniquely numbered from 0 to $N-1$, where N is the total number of banks defined by the service.

Featured Favorites Bank ID allows the radio receivers to unambiguously match an updated bank with a previously saved bank. This can be particularly important if an exemplary product allows the user to previously select some subset of banks for ongoing use, so the updates can be applied against the correct stored banks.

Featured Favorites Bank Sequence provides a means for receivers to determine if there has been a change to any bank, and if so, which specific bank(s) were changed.

Featured Favorites Bank Title – Short, Featured Favorites Bank Title – Long, and Featured Favorites Bank Title – Verbose all provide information on the name of the Featured Favorites bank. Because of various user interfaces of the radio receivers have various limitations, the source data stream may provide multiple variations of essentially the same data.

Featured Favorites Bank Description provides an optional text description for each bank. This information may be of use to the user. The amount of data displayed may also be limited by the user interface of the radio receiver.

Featured Favorites Bank Purpose can be a feature which assigns bank with a particular purpose. A bank may be assigned with the purpose of convenience, where the bank serves to make access to a topical group of channels easy for the user to access. A bank may be assigned with the purpose of scanning, where the

bank is optimized to maximize its use for the Content Scanning capability when the channels are designated as Smart Favorites.

Featured Favorites Bank - Arrangement 1, Featured Favorites Bank - Arrangement 2, Featured Favorites Bank - Arrangement 3, and Featured Favorites Bank - Arrangement 4 are examples of providing a different set and/or order of preset channels within the same bank. The various arrangements relate to differing capabilities of receivers, which can be limited by, for example, content, memory (e.g., RAM, HDD, flash or other storage media), or by some other means. Each arrangement can provide different channels and/or numbers of channels within a particular channel bank. It is preferable that at least one arrangement matches the capability of the radio receiver. However, if no arrangement matches the receiver's capability, then the particular bank may be ignored. If multiple arrangements fit the capabilities of the radio receiver, the radio receiver can, for example, select the first matching arrangement. Generally, however, it is expected that a receiver will match only one of the arrangements.

For example, consider a "Welcome to SXM" bank that includes an assortment of music, talk, news, and sports channels most likely create a positive first impression for the largest trial automotive audience segment. For a ten-channel version of this bank, the version can include 4 music channels, 2 news channels, 2 talk channels, and 2 sports channels, appearing in that logical order within the bank. However, for a six-channel arrangement, it can include, for example, 3 music channels, 1 news channel, 1 talk channel, and 1 sports channel. The six-channel arrangement is thus not simply a truncated version of the ten-channel arrangement; rather, each arrangement includes channels designed to meet the goal of the bank, but selected and ordered to match the capabilities of the radios using them.

Alternatively, if receiver is not able to display as many channels as are in a particular bank (i.e., a six channel bank on a receiver with a four channel display limit), the device can ignore the extra channels (i.e. truncate the list). Thus, in some exemplary embodiments, a single arrangement can be defined for a bank, with all receivers using that arrangement and simply truncating the presets they cannot show. However, in other embodiments, a multiple arrangement capability can be used, which allows a content provider to optionally craft arrangements of a given bank that are more finely tuned to the radios or receivers that will display them, and

thereby eliminate scenarios where some radios must truncate a fixed list of presets in a Featured Favorites bank.

In exemplary embodiments of the present invention the method described above can be further modified to include Featured Favorites banks that are defined and displayed based on one or more of a user profile and user behavior. Thus, for example, a selection of which Featured Favorites banks are to be defined and displayed can, for example, be based on user preferences as to types of programming, demographic information, user surveys, user profile, user selection of channels, user stickiness to channels metrics, and/or other criteria. In exemplary embodiments of the present invention this determination can be done by the receiver itself, thus obviating the need for an uplink.

Receiver Management and User Interactions

As noted above, Featured Favorites operation can involve receiving information from a content stream or source, where the featured favorites information is encoded as metadata. For example, a receiver resident application can receive the complete set of all Featured Favorites banks and metadata from the broadcast data service, and passed from the Module to the Host application through messages provided through the Module. The radio receiver may ignore Featured Favorites banks that do not match the capabilities of the radio receiver. If there are multiple Featured Favorite banks that match the capability of the radio receiver, the selection of which banks to be displayed may be determine the content provider (by method of prioritization, etc.), by the radio receiver, or by the user interface may allow the user to select which bank to display.

The radio receiver may also store the Featured Favorite bank information in the non-volatile memory (e.g., RAM, HDD, flash or other storage media) of the device, so the banks are available after a power cycle. The radio receiver may also monitor for changes to the Feature Favorites banks, including changes to channel lineup, order, or deletion.

The supported Featured Favorites banks are provided to the user as part of overall product management of presets. There are many different methods for bank management, so presentation can vary from product to product. One method may be for the user to navigate by cycling through the list of banks. Other exemplary

methods include a radio receiver that provides user favorites as an extension to category navigation may add the Featured Favorites as additional “category” lists following the user favorites list as the user navigates through categories, a radio receiver with a traditional automotive “bank” button to cycle through preset banks can add the Featured Favorites as banks reached after cycling through the user preset banks, a radio receiver that provides a scrollable list of user-named favorites lists may add the names of the Featured Favorites banks to the end of the list, or a radio receiver may provide a dedicated scrollable list of the names of the Featured Favorites banks. In exemplary embodiments of the present invention a radio receiver can, for example, provide a higher level navigation method allowing the user to select either a list of user presets or Featured Favorites. Once inside of a bank list, the user interface may list the channels within the bank. The user may also select Content Scanning within the bank. With the Smart Favorite™ support, Content Scanning with Tune Start™ provides for a better user experience.

As noted above, an “Arrangement” is an ordered set of channels for a bank, along with constraints on the number of presets per bank that must be supported by a product for that product to use the Arrangement.

In exemplary embodiments of the present invention, Up to four Arrangements can be defined for a given bank. This can allow, for example, a programming team to optionally define different Arrangements (i.e., lists of channels) to target different classes of products based on their maximum number of supported presets per bank. In exemplary embodiments of the present invention, all Arrangements of a given bank can be mutually exclusive in their use. Thus, for example, one Arrangement could be used for radios supporting less than 10 presets per bank, and another for radios supporting 10 or more presets per bank, but for a given bank each radio would use only one Arrangement suitable for its UI and ignore the other Arrangements.

As an example of this capability, one can consider a “Welcome to SXM” bank that includes an assortment of music, talk, news, and sports channels most likely create a positive first impression for the largest trial automotive audience segment. For a 10-channel Arrangement of this bank, a given service could, for example, include 4 music channels, 2 news, 2 talk, and 2 sports channels, appearing in that logical order within the bank. However, for a 6-channel Arrangement there might be

included 3 music, 1 news, 1 talk, and 1 sports channel. The 6-channel Arrangement is thus not simply a truncated version of the 10-channel arrangement. Rather, each Arrangement can include channels designed to meet the goal of the bank, but selected and ordered to match the capabilities of the radios using them.

Each Arrangement, if present, can, for example, comprise an Array of 2 to 34 entries containing the following UINT16 elements in the order shown, and illustrated in Fig. 23, for example:

RMAX – Only products supporting RMAX or fewer presets per bank can, for example, be allowed to use this Arrangement. A value of 0x3FF (1023) indicates no maximum is applicable. A value of 0 means all receivers shall ignore this Arrangement. RMAX is always present in the Arrangement array.

RMIN – Only products supporting at least RMIN presets per bank can, for example, be allowed to use this Arrangement. A value of 0 indicates no minimum is applicable. RMIN is always present in the Arrangement array.

SID_LIST – A list of SIDs, identifying the channels in the bank, listed in the order they should be presented in the bank. The number of entries in the SID_LIST can range from 0 to 32.

Operationally, where multiple Arrangements are provided for a given bank, the ranges of presets-per-bank defined by RMAX/RMIN can, for example, be non-overlapping, so that at most one Arrangement will match the capability of a given receiver. However, it is possible that no Arrangements match the capability of a receiver (i.e., the receiver's presets-per-bank do not fit within any of the Arrangements' RMAX/RMIN ranges), and that bank can therefore be completely ignored by the receiver, for example.

In exemplary embodiments of the present invention, a receiver can, for example, support at most one of the Arrangements provided for a given bank, observing the following policy requirements: (i) only an Arrangement for which the receiver's supported maximum presets per bank fit within the range specified by RMAX and RMIN can be used by the receiver; (ii) only one Arrangement per bank can be supported. (In the unexpected case that more than one Arrangement could be supported, the receiver can support only the first Arrangement determined to be

supported in such an exemplary system.); and (iii) if no Arrangements are supported by the receiver, the entire bank can be ignored.

In exemplary embodiments of the present invention, a product can display a list of channels in the bank in the order specified in the Arrangement SID_LIST. If the supported Arrangement contains fewer channels than the maximum presets-per-bank supported by the product, the product shall display the unused preset slots as unassigned. If the supported Arrangement contains more channels than the maximum presets-per-bank supported by the product, the product shall ignore the channels beyond the presets-per-bank supported by the product.

Exemplary Pseudocode For Processing Arrangements

In exemplary embodiments of the present invention, code implementing the following pseudocode can, for example, be used to process arrangements on a receiver-resident application, module or processor, for example:

RPRESETS = The total number of presets per bank supported by the product.

SIDCOUNT = The Total number of SIDs included in the Arrangement SID List
(This is equal to the number of elements in the arrangement Array, minus 2)

```

IF ((RMAX == 0x03F) OR (RPRESETS <= RMAX)) THEN
  IF ((RMIN==0) OR (RPRESETS >= RMIN)) THEN
    StoreSIDList()
  ELSE
    Product ignores this Arrangement
  ENDIF
ELSE
  Product ignores this Arrangement
ENDIF

```

/* Note: If RMAX==0x000, the Arrangement is also ignored, but this is handled in the first IF statement since RPRESETS is always > 0) */

```

FUNCTION StoreSIDList()
  IF (SIDCOUNT > RPRESETS) THEN

```

```
        Store the first RPRESETS number of SIDs from the list as the bank channels
ELSEIF (SIDCOUNT < RPRESETS) THEN
    Store all the SIDs from the list as the bank channels, leaving left over presets in this bank
unassigned
ELSE
    Store all the SIDs from the list as the bank channel (all presets assigned)
ENDIF
ENDFUNCTION
```

The above-presented description and figures are intended by way of example only and are not intended to limit the present invention in any way except as set forth in the following claims. It is particularly noted that persons skilled in the art can readily combine the various technical aspects of the various elements of the various exemplary embodiments that have been described above in numerous other ways, all of which are considered to be within the scope of the invention.

WHAT IS CLAIMED:

1. A method of receiving transmitted content, comprising:
receiving at a receiver a plurality of program channels from at least one transmitted content stream;
receiving data from said content stream, wherein said data includes definitions of one or more subsets of channels;
displaying said groupings at the receiver; and
dynamically updating at least one of said groupings and the contents of said groupings.
2. The method of claim 1, wherein the receiver determines which banks to display based on at least one of instructions included in said data, bank display capacity of the receiver and user preferences.
3. The method of claim 2, wherein said user preferences include one or more of user designation of a channel as a favorite, user profile, user listening history and user's demographics.
4. The method of claim 1, wherein the receiver stores the received content of each designated channel in the bank in a buffer;
receiving a command to initiate a scan function;
in response to the command, scanning at least a subset of the plurality of program channels by successively playing a selected amount of content for each channel in the subset bank;
wherein, if a scanned channel is a designated channel, playing back a selected amount of corresponding content in the buffer from a selected play point.
7. The method of claim 2, wherein the receiver stores the received content of each designated channel in the bank in a buffer;
receiving a command to initiate a scan function;
in response to the command, scanning at least a subset of the plurality of program channels by successively playing a selected amount of content for each channel in the subset bank;

wherein, if a scanned channel is a designated channel, playing back a selected amount of corresponding content in the buffer from a selected play point.

8. The method of claim 1, wherein receiving comprises receiving the at least one transmitted content stream from at least one of a wireless transmission, a wireline transmission, a radio program communication, a television program communication, a cable television program communication, streaming via the internet, digital audio broadcast (DAB), a unicast, a multicast, a broadcast, a cellular communication, and a satellite communication.
9. The method of claim 1, wherein the bank of channels includes seasonally available channels.
10. The method of claim 1, wherein the designation at the receiver of banks to display is determined by the capabilities of the radio receiver.
11. The method of claim 1, wherein the number of channels in the bank is determined by the capabilities of the radio receiver.
12. Apparatus for receiving and displaying banks of channels, comprising:
 - a system controller;
 - a channel decoder in communication with the system controller, the channel decoder arranged to a plurality of program channels from at least one transmitted content stream, wherein said content stream includes information on one or more banks grouping a subset of channels;
 - a memory in communication with the system controller; and
 - a user interface in communication with the system controller, wherein the system controller, in response to a directive designating one or more of the banks grouping a subset of channels for display.
13. The apparatus of claim 12, wherein the system controller in response to a directive designating one or more of the banks for buffering, stores content of each designated channel in the memory; and wherein the system controller, in response to user input, changes a currently tuned channel to a different channel of the bank of channels.
14. The apparatus of claim 13, wherein the memory comprises one or more buffers.
15. Apparatus for receiving and playing transmitted content, comprising:
 - a system controller;

a channel decoder in communication with the system controller, the channel decoder arranged to a plurality of program channels from at least one transmitted content stream, wherein said content stream includes information on one or more banks grouping a subset of channels;

a memory in communication with the system controller; and

a user interface in communication with the system controller,

wherein the system controller, in response to a directive designating one or more of the banks for buffering, stores content of each designated channel in the memory;

wherein the system controller, in response to user input, scans at least a subset of the bank by successively playing a selected amount of content for each channel in the subset.

16. The apparatus of claim 15, wherein the memory comprises one or more buffers.
17. The apparatus of claim 15, wherein the selected play point is determined based on configuration data provided for respective ones of the designated channels.
18. The apparatus of claim 15, wherein if a scanned channel is not a designated channel, then playing a selected amount of the live content of that channel currently being received.
19. The apparatus of claim 15, wherein the system controller scanning of at least a subset of the designated channels comprises:
 - (a) playing a portion of the oldest track in each of the scanned designated channels,
 - (b) playing a portion of the next oldest track in each of the scanned designated channels,
 - (c) repeating (b) until the newest stored track in each of the scanned designated channels is played,
 - (d) playing a current play point in the currently received track corresponding to each of the scanned designated channels, and
 - (e) repeating any of (a) through (d), as to any content not yet played, until scanning is stopped.
20. The apparatus of claim 15, further comprising during the play back of the selected amount of a designated channel, the system controller implementing

at least one of fast forward, pause, resume, rewind, skip track forward, skip track backward and skip to live playback of the channel, in response to user input.

FIG. 1

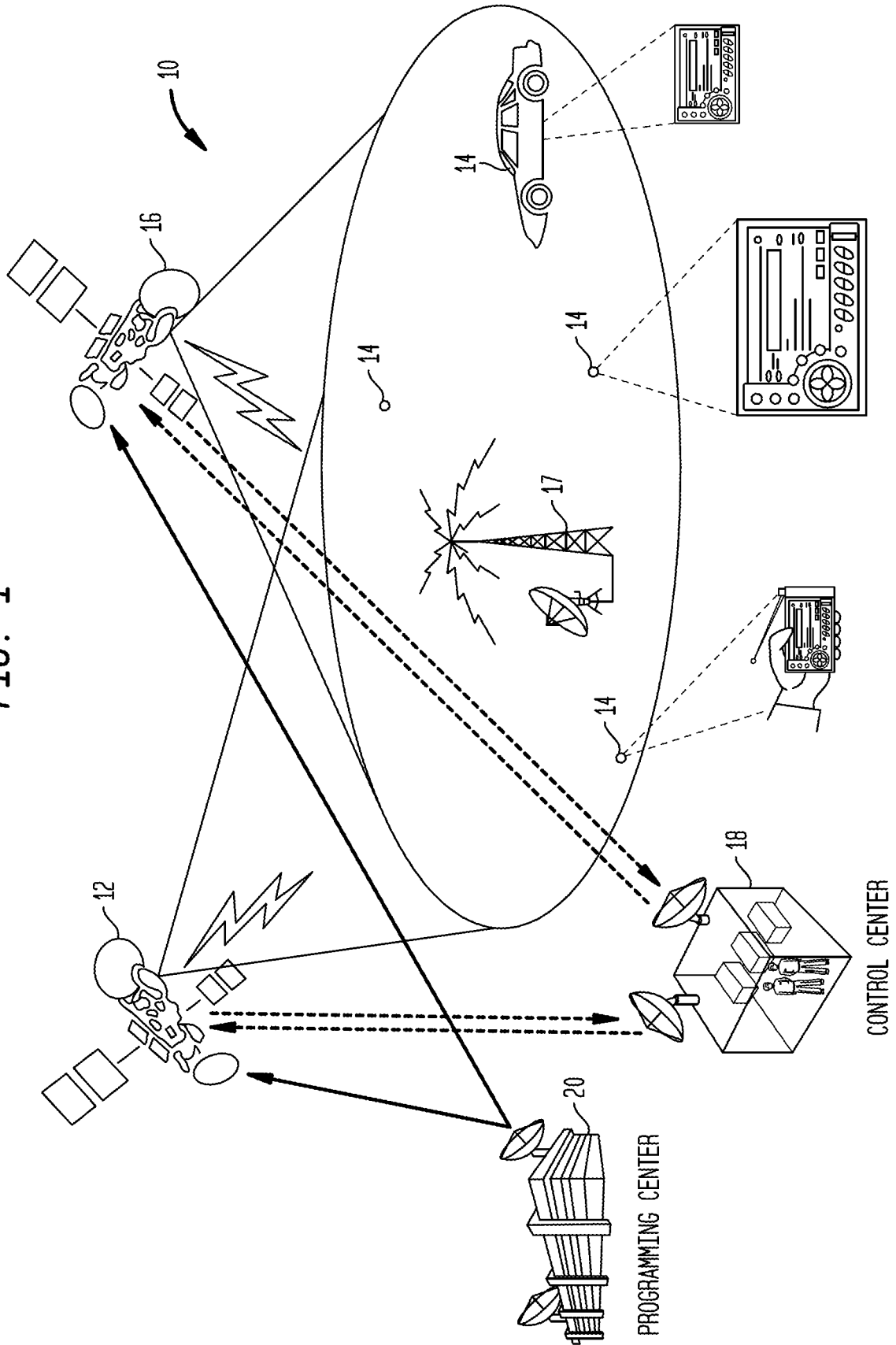
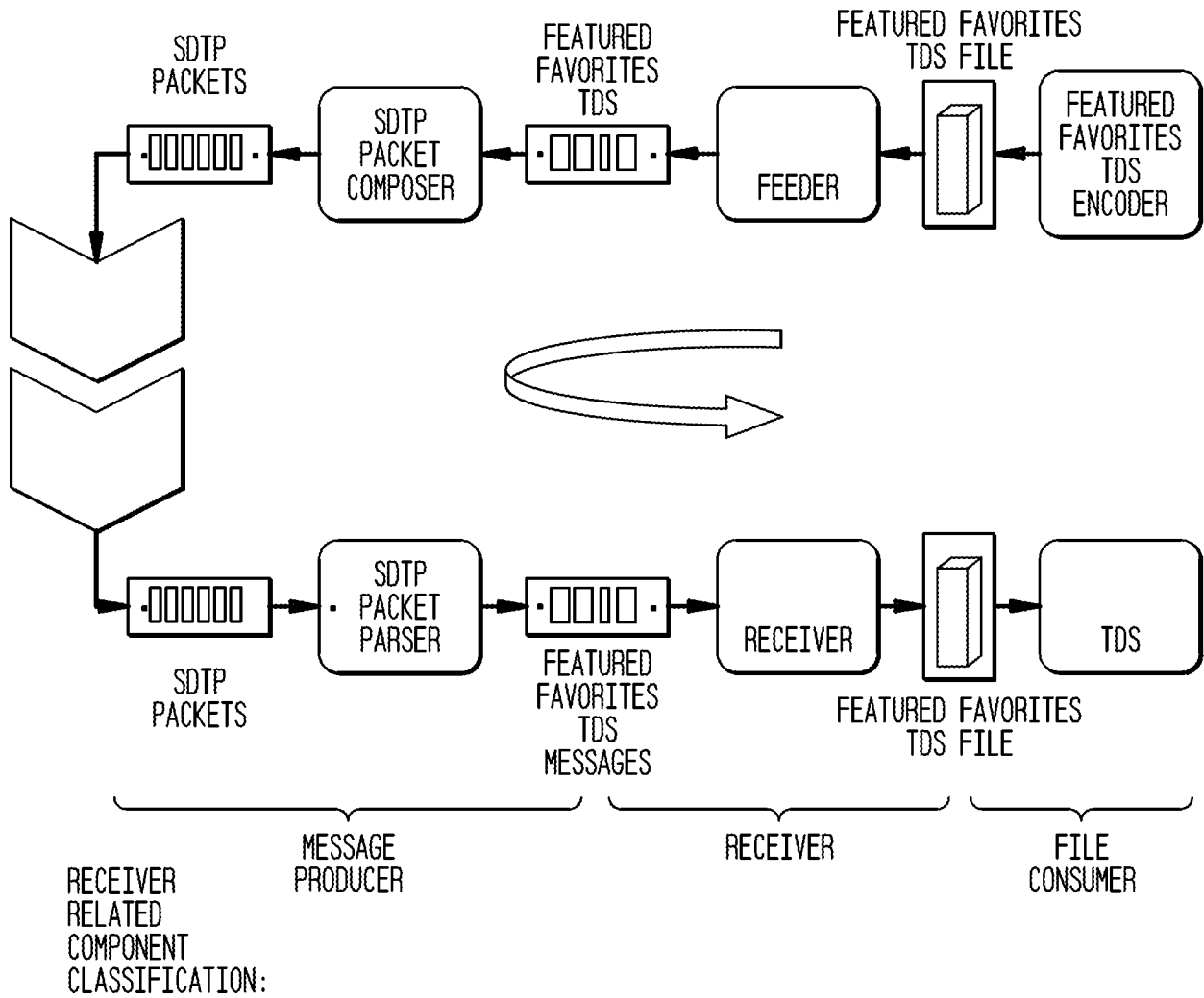
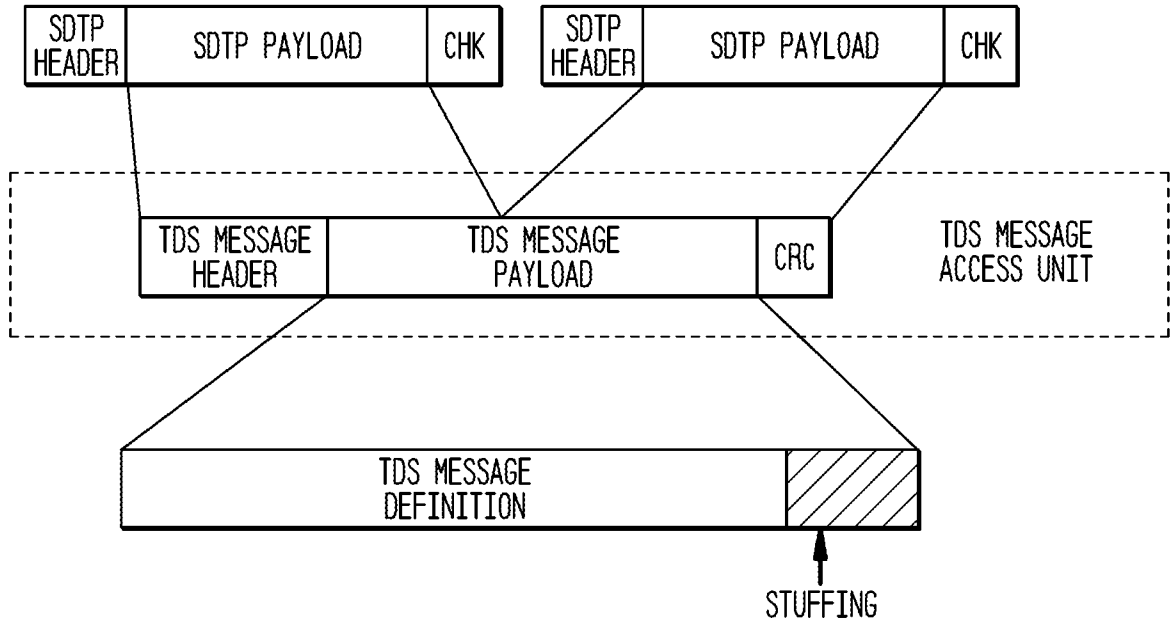


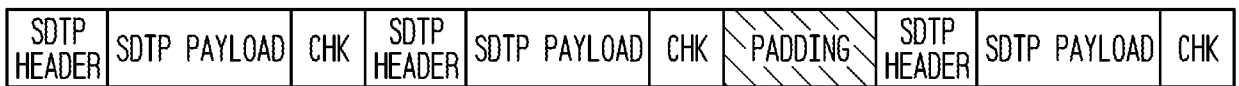
FIG. 2
END-TO-END DELIVERY



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FIG. 2A



TDS MESSAGE FRAMING



SDTP PACKET MULTIPLEXING

FIG. 3

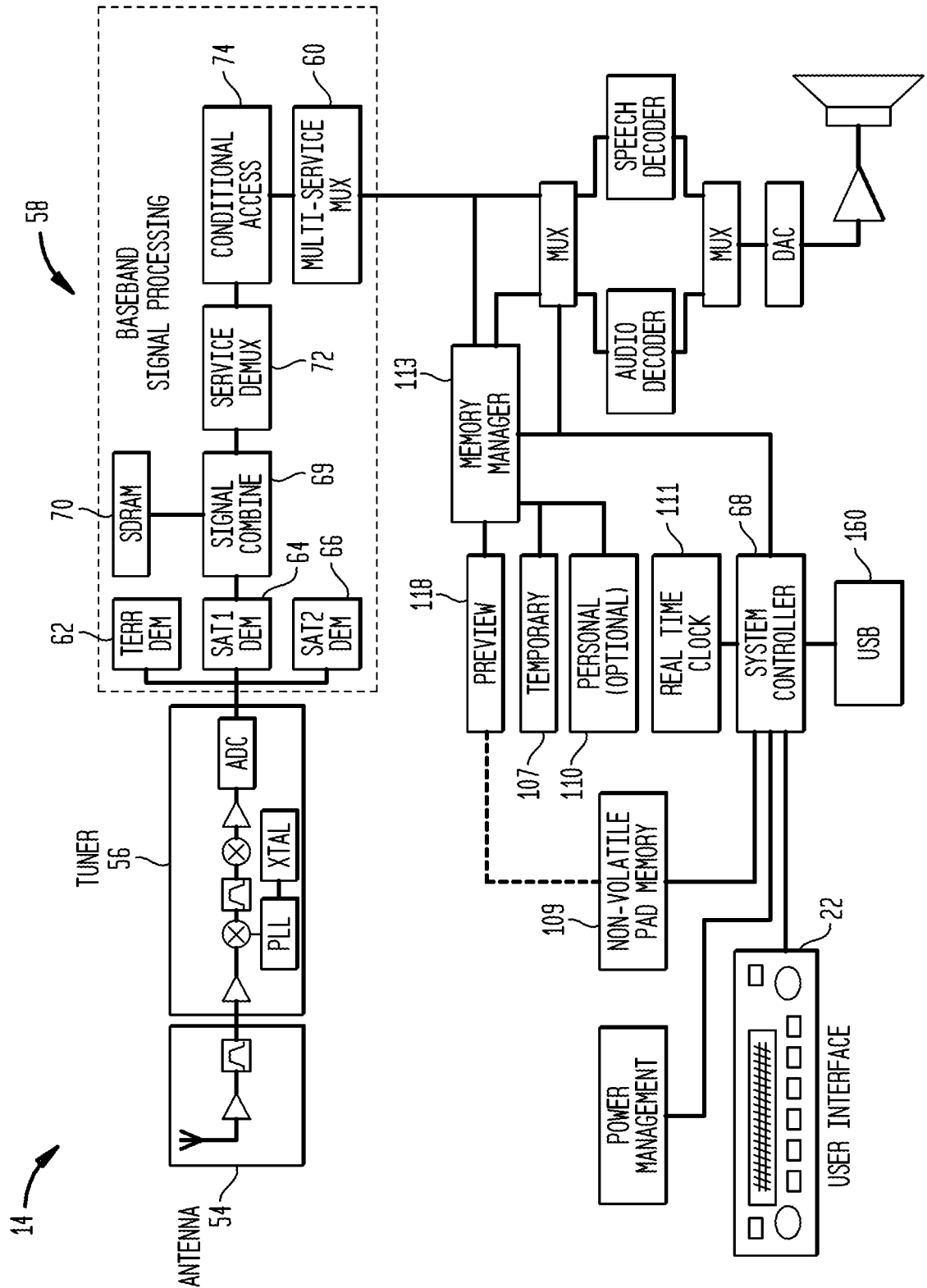


FIG. 4

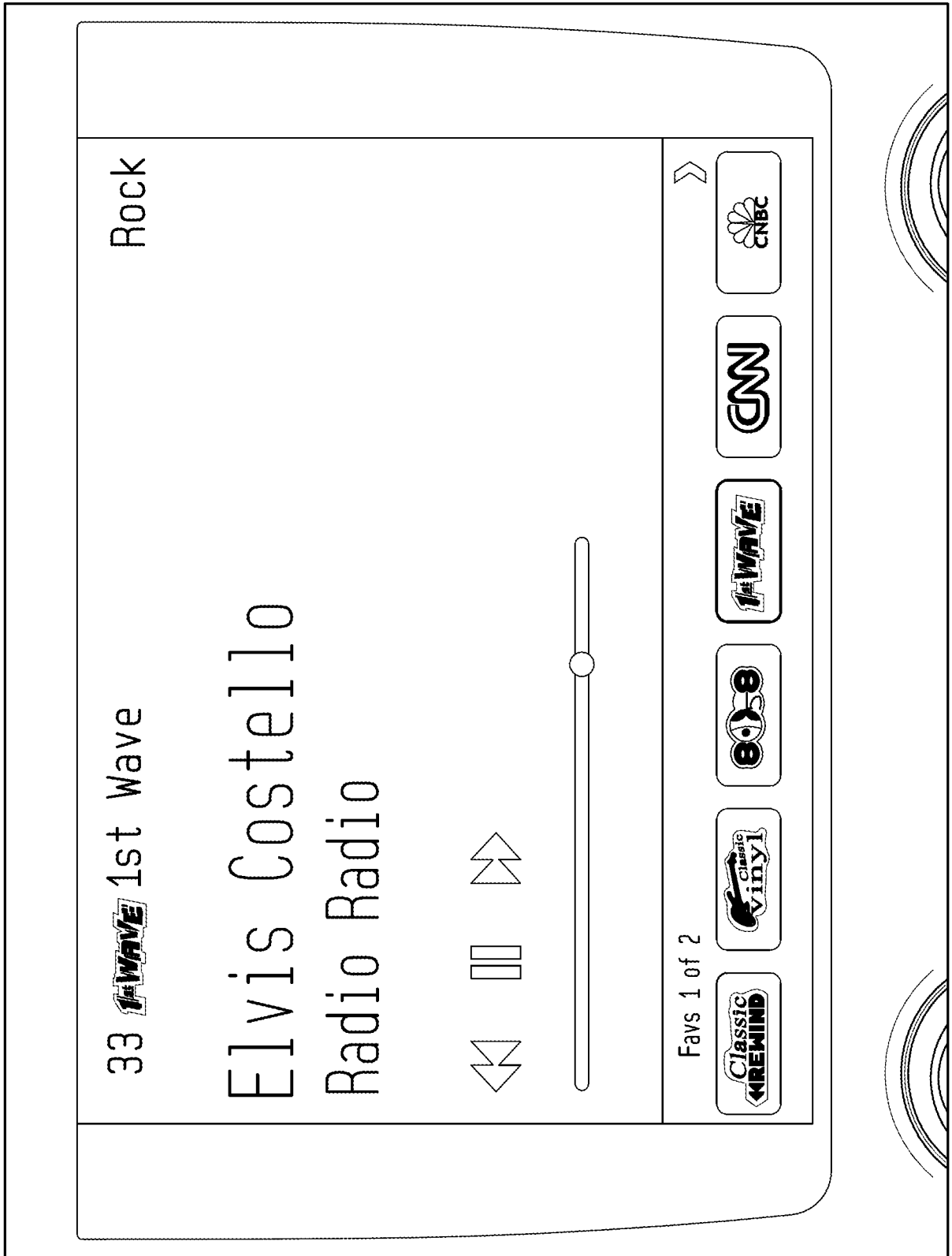


FIG. 5

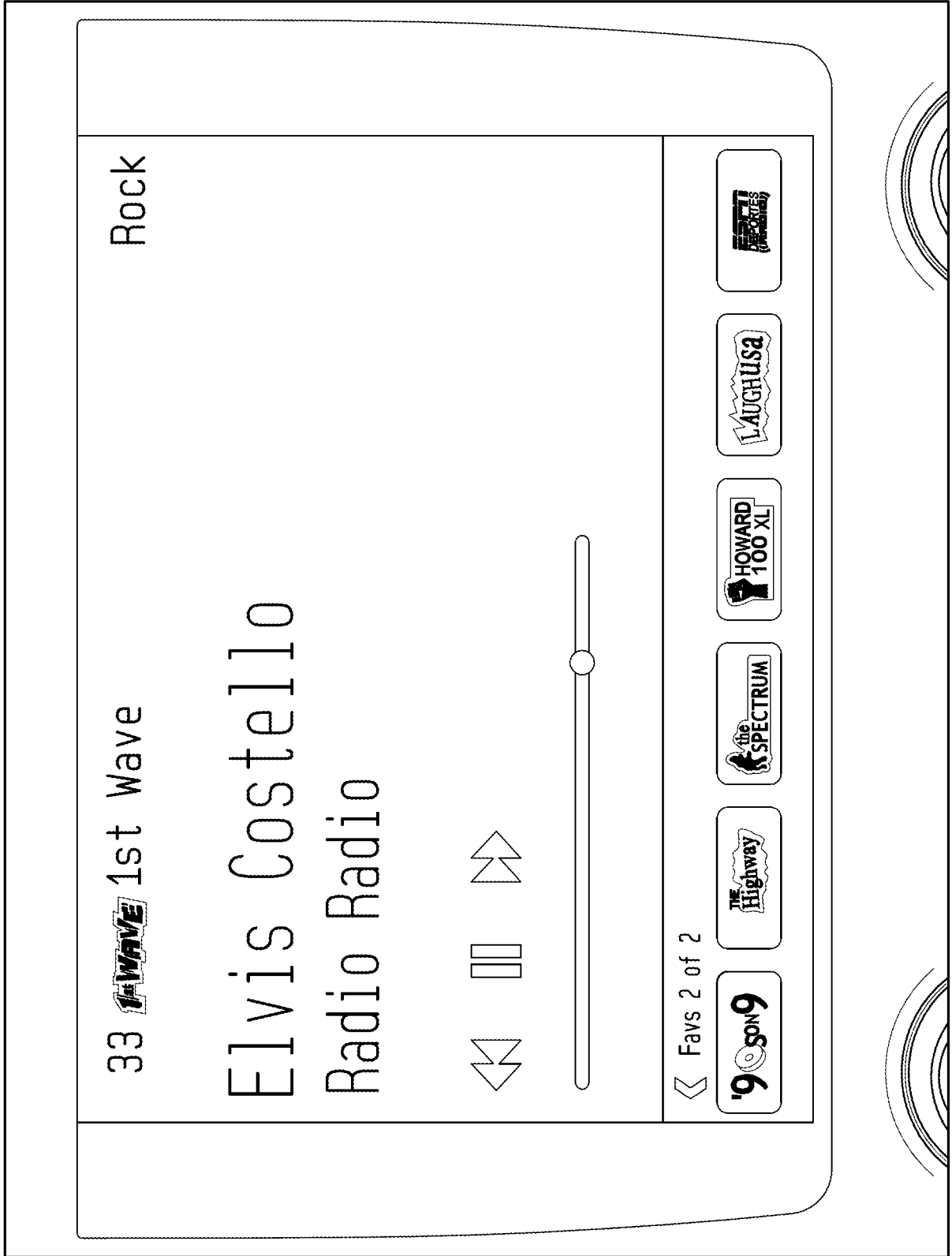


FIG. 6

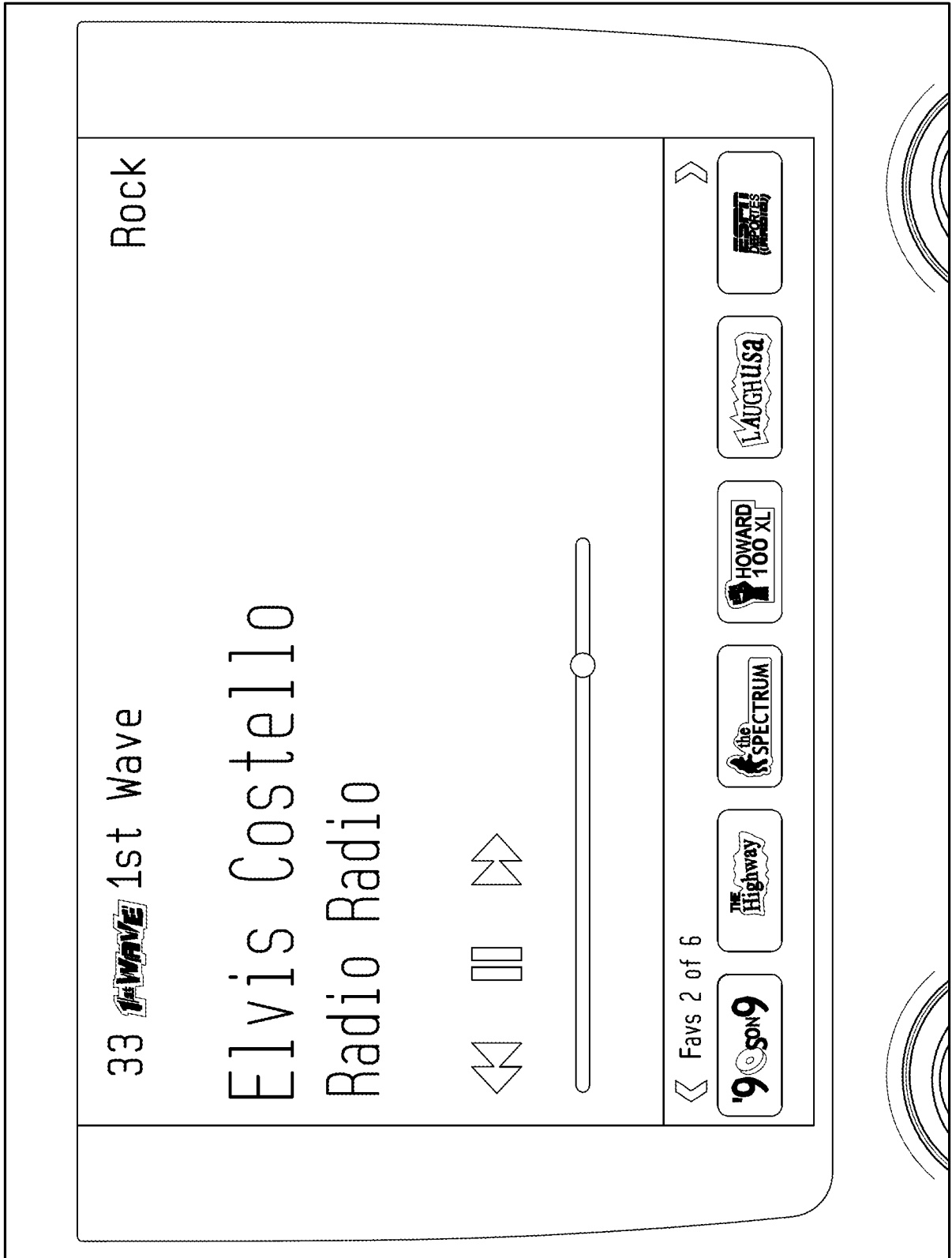


FIG. 7

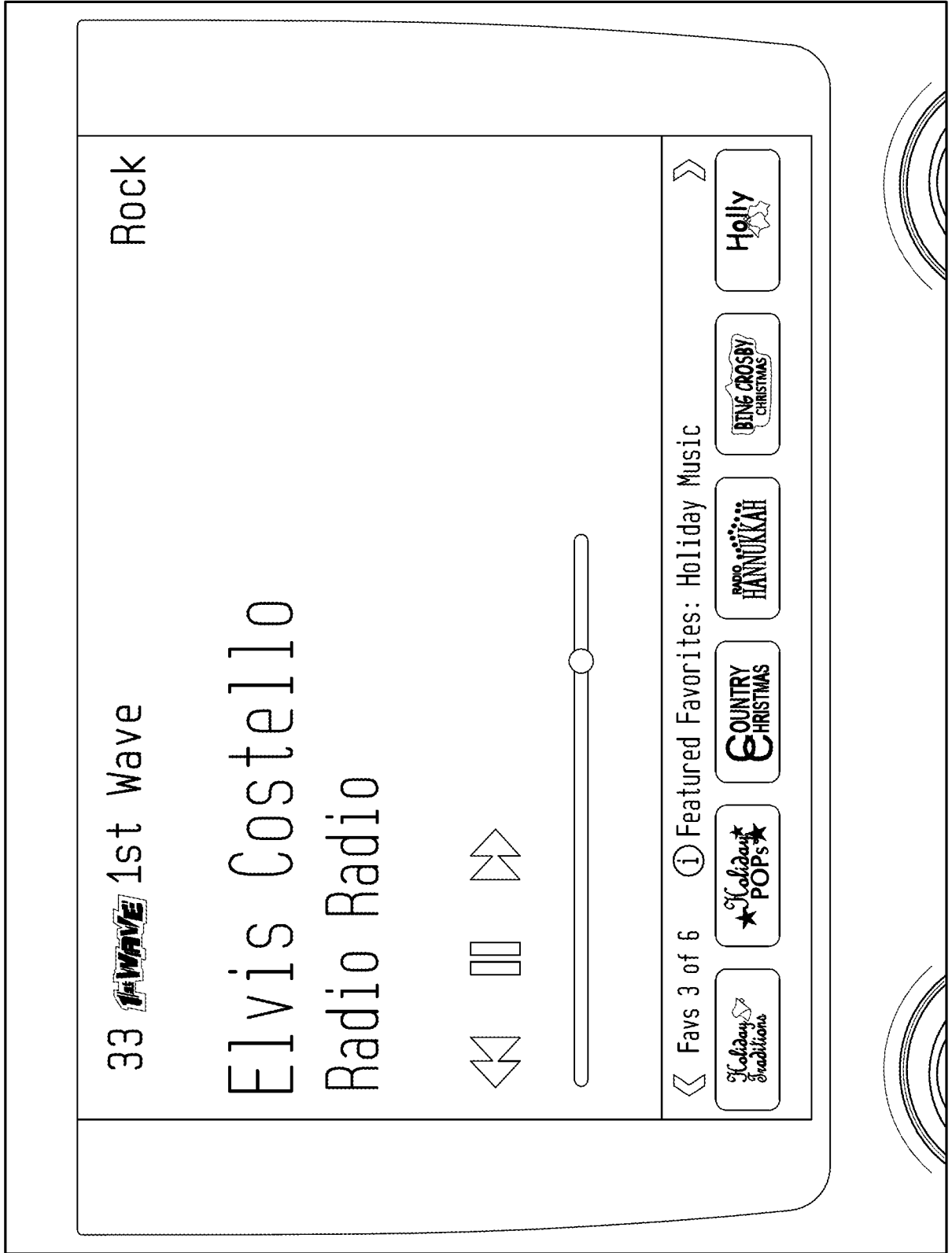


FIG. 8



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FIG. 9

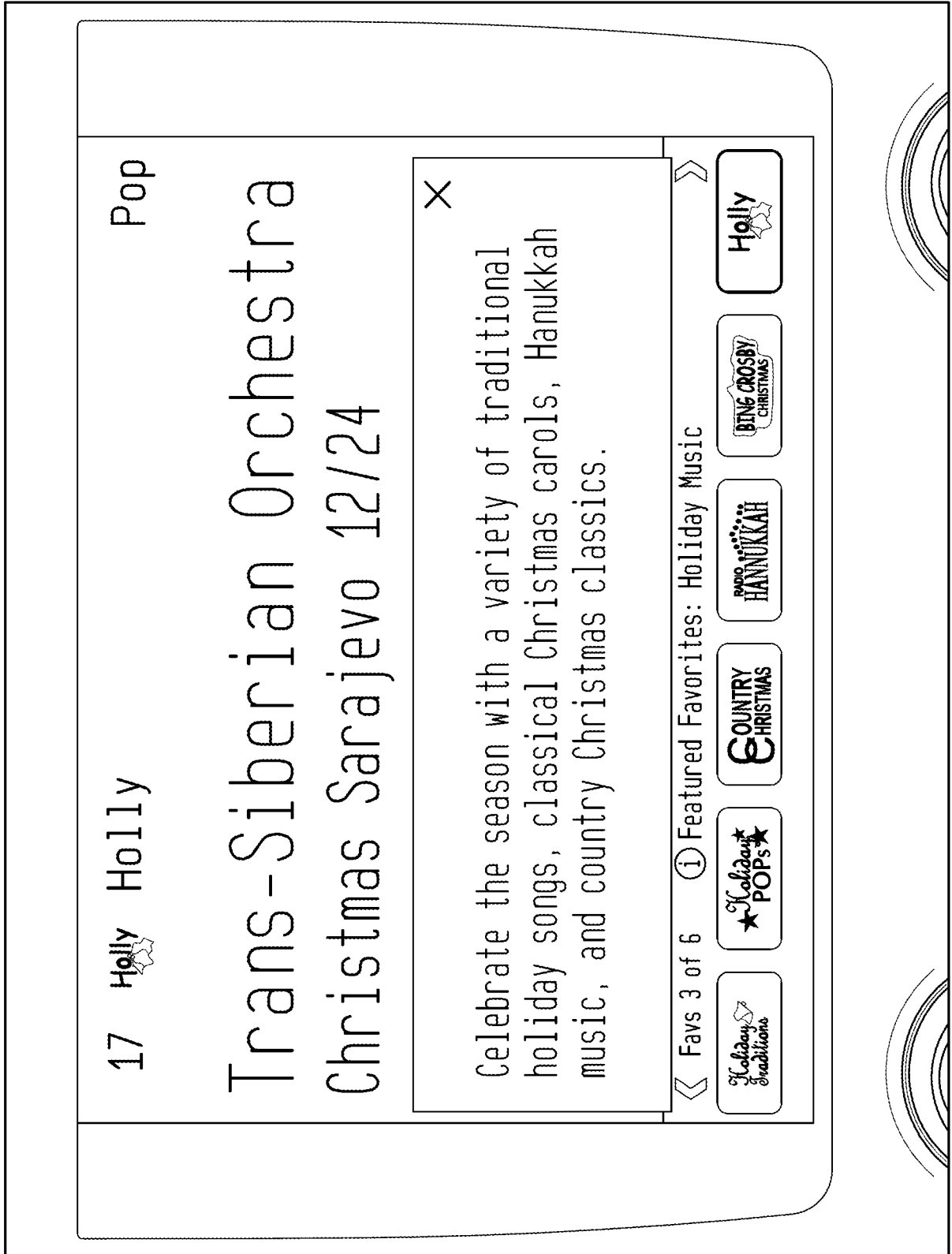


FIG. 10



FIG. 11



FIG. 12

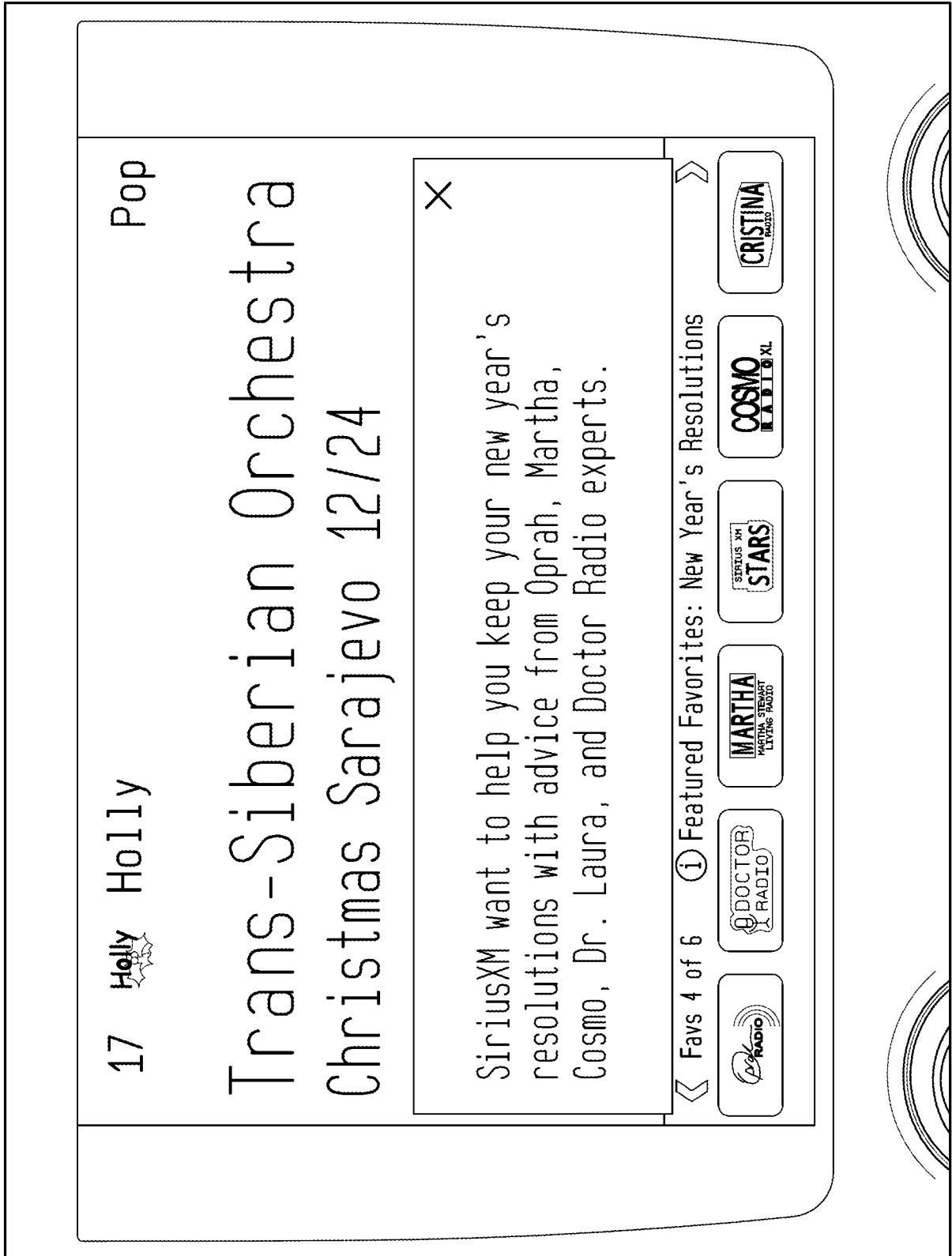


FIG. 13

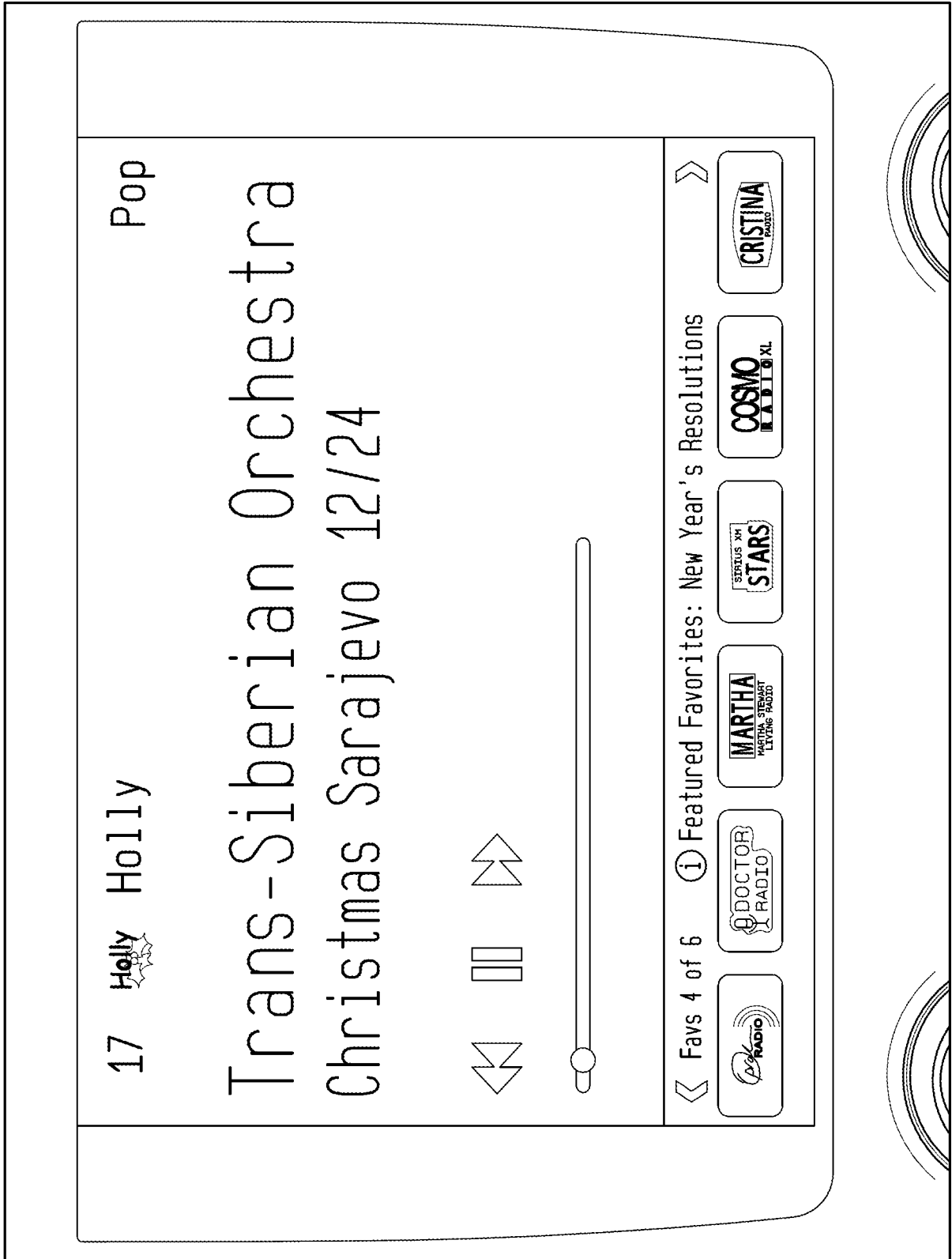


FIG. 14

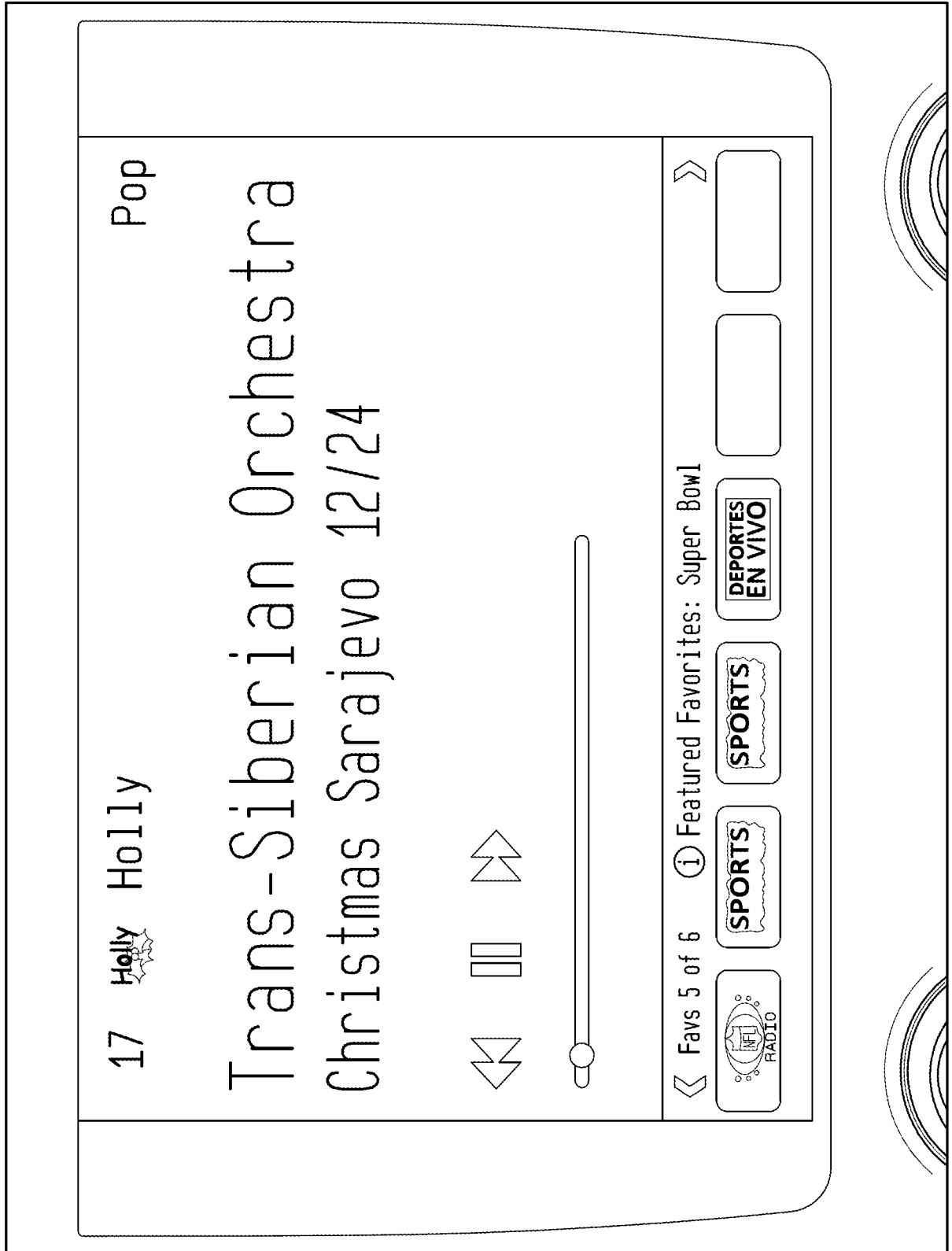


FIG. 15

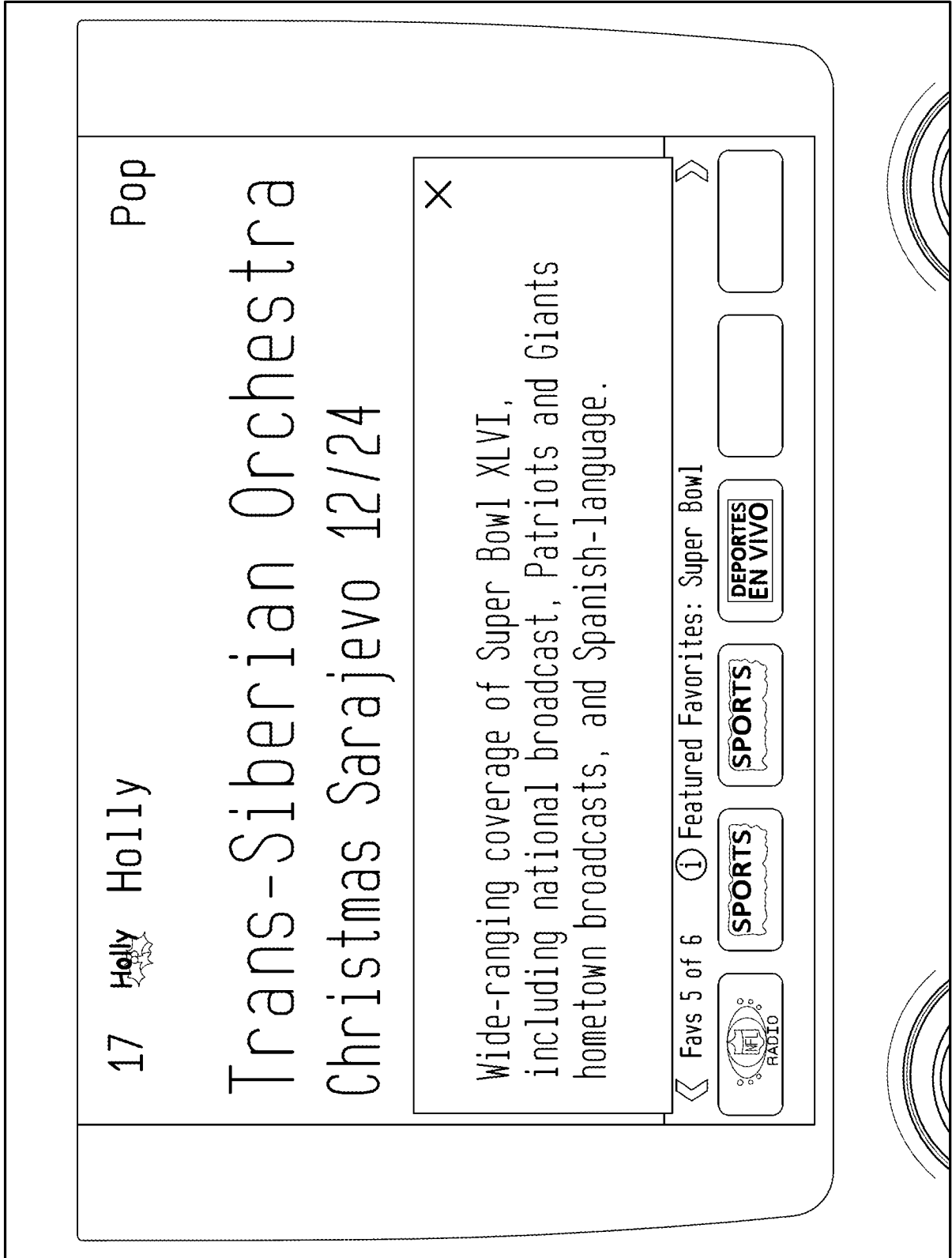


FIG. 16



FIG. 17

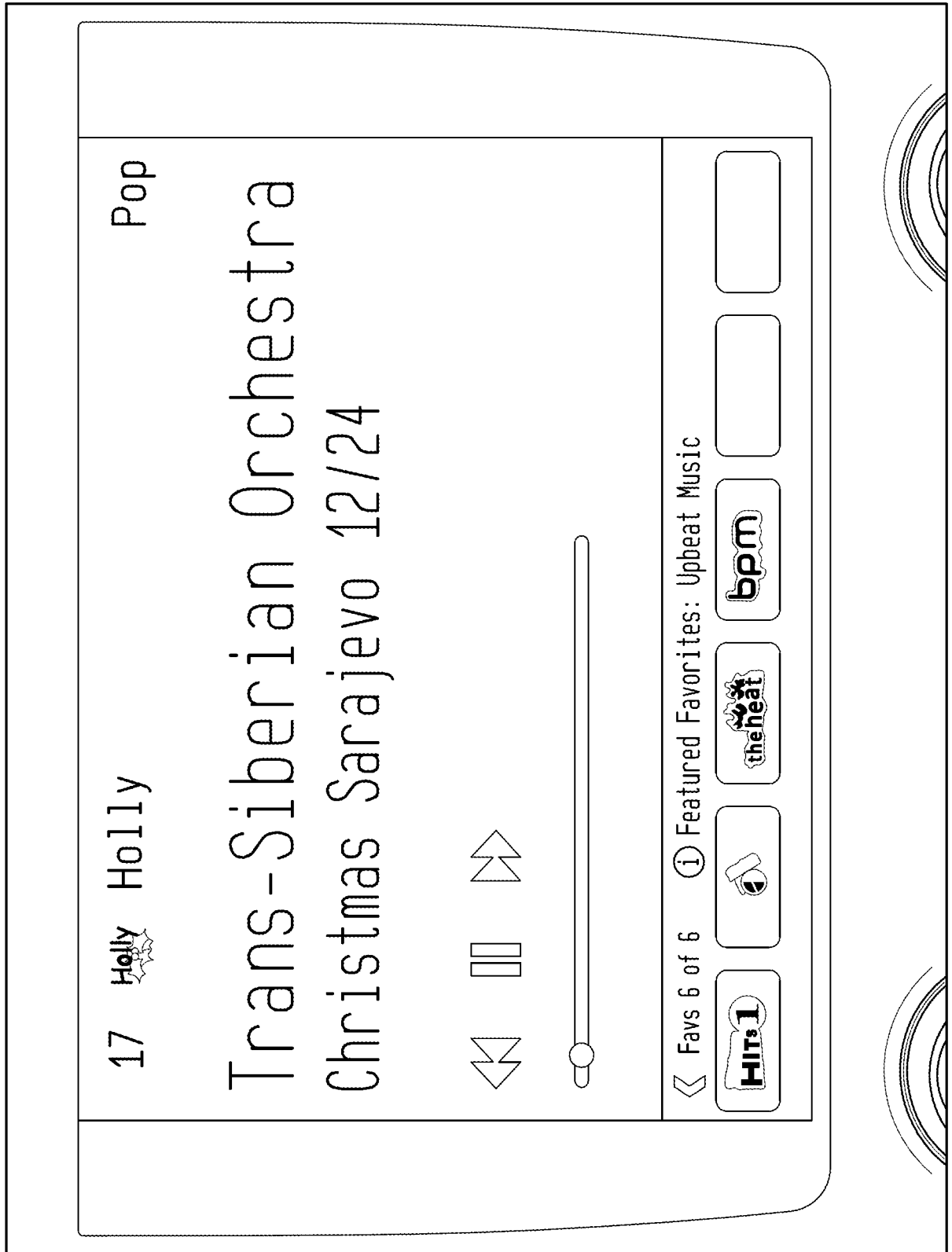


FIG. 1B

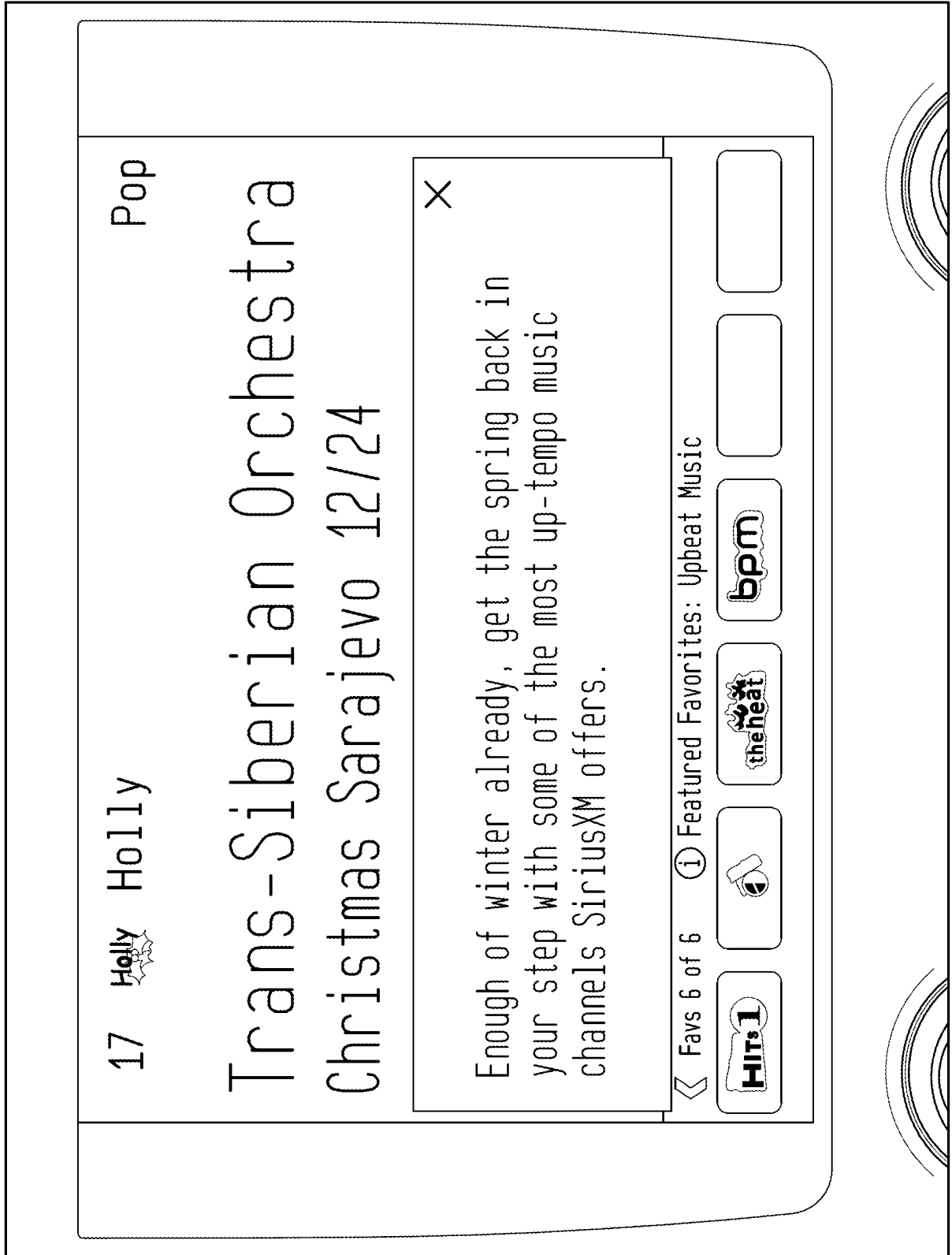


FIG. 19



FIG. 20

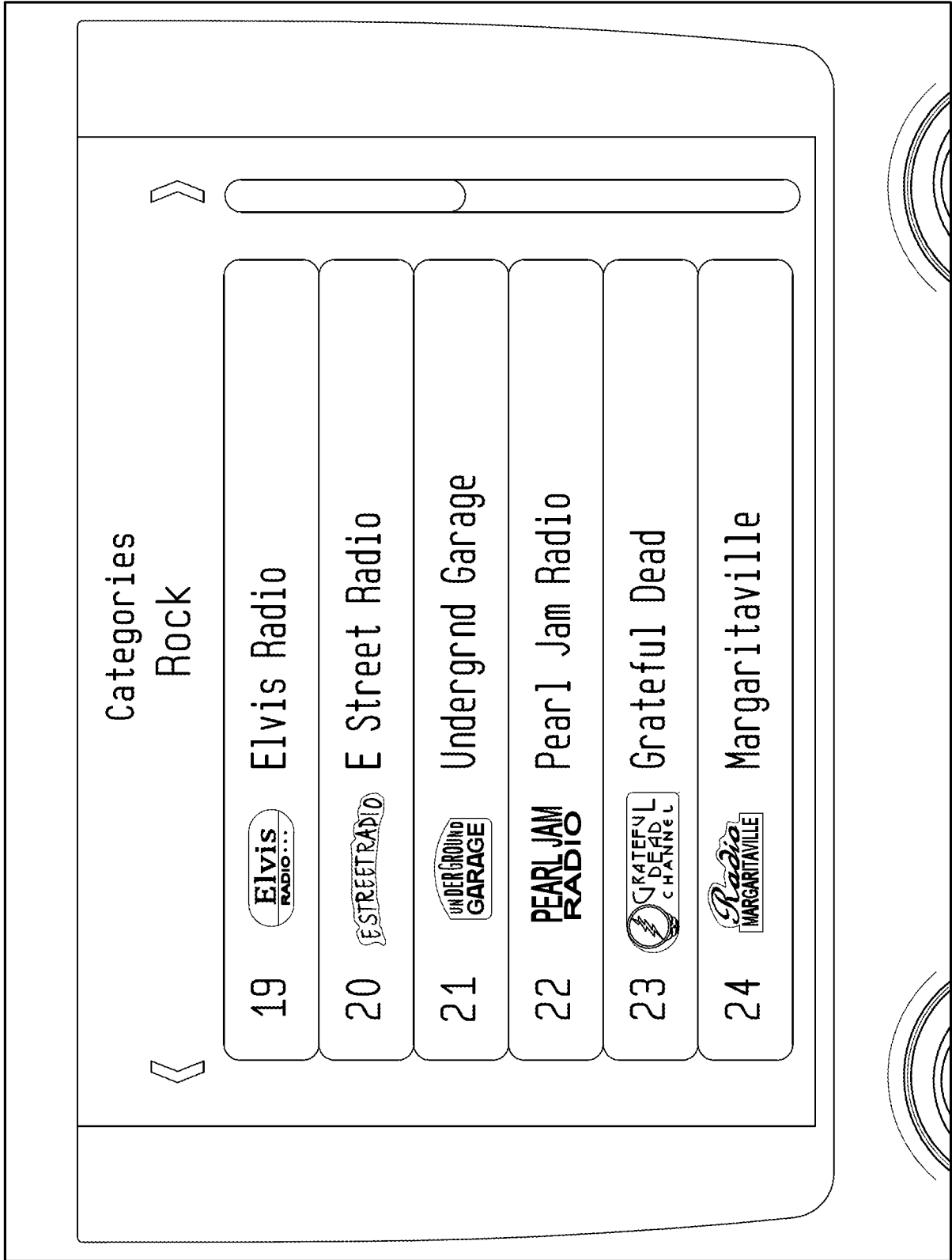


FIG. 21

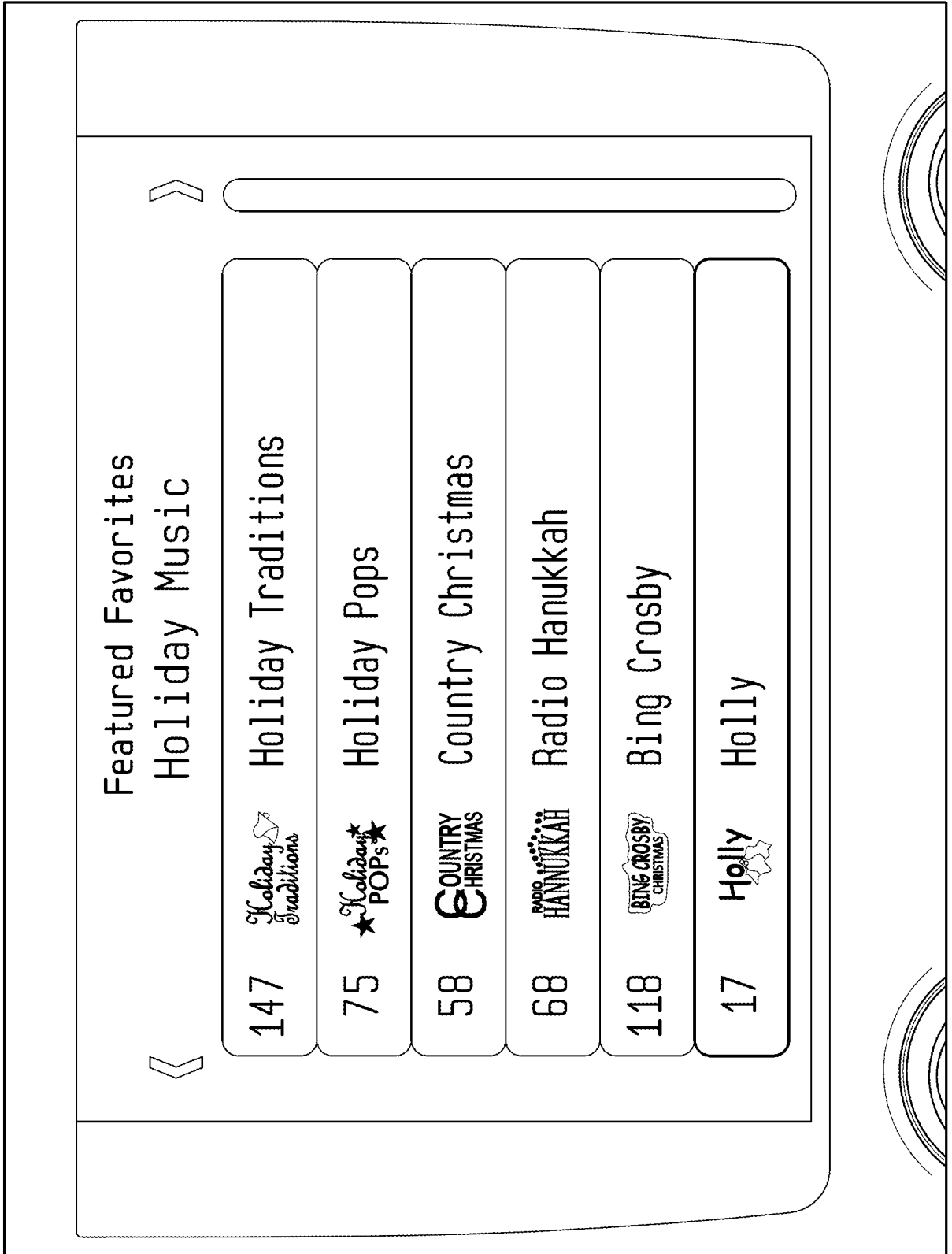


FIG. 22

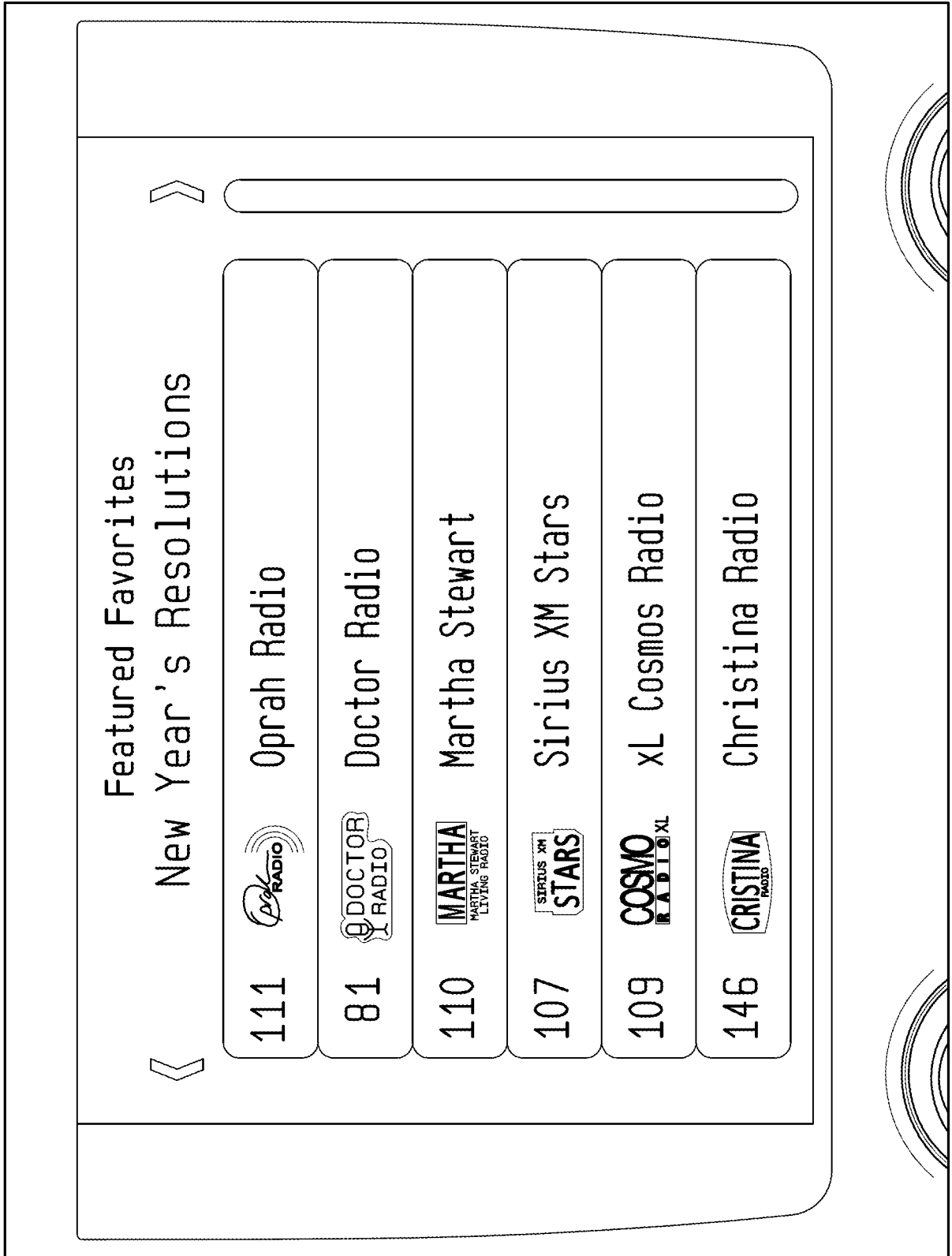


FIG. 23

