

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR: IRA MARLOWE

5 TITLE: MULTIMEDIA DEVICE INTEGRATION SYSTEM

SPECIFICATION

10 BACKGROUND OF THE INVENTION

RELATED APPLICATIONS

15 This application is a continuation-in-part of U.S. Patent Application Serial No. 11/071,667, filed March 3, 2005, now U.S. Patent No. _____, which is a continuation-in-part of U.S. Patent Application Serial No. 10/732,909 filed December 10, 2003, now U.S. Patent No. _____, which is a continuation-in-part of U.S. Patent Application Serial No. 10/316,961 filed December 11, 2002, now U.S. Patent No. _____, the entire disclosures of which
20 applications are each expressly incorporated herein by reference.

FIELD OF THE INVENTION

25 The present invention relates to a multimedia device integration system. More specifically, the present invention relates to a multimedia device integration system for integrating after-market components such as satellite receivers, CD players, CD changers, digital media devices (*e.g.*, MP3 players, MP4 players, WMV players, Apple iPod devices, portable media centers, and other devices), Digital Audio Broadcast (DAB) receivers, auxiliary audio sources, video devices (*e.g.*, DVD players), cellular telephones, and other devices for use with
30 factory-installed (OEM) or after-market car stereo and video systems.

RELATED ART

Automobile audio systems have continued to advance in complexity and the number of options available to automobile purchasers. Early audio systems offered a simple AM and/or FM tuner, and perhaps an analog tape deck for allowing cassettes, 8-tracks, and other types of tapes to be played while driving. Such early systems were closed, in that external devices could not be easily integrated therewith.

With advances in digital technology, CD players have been included with automobile audio systems. Original Equipment Manufacturers (OEMs) often produce car stereos having CD players and/or changers for allowing CDs to be played while driving. However, such systems often include proprietary buses and protocols that do not allow after-market audio systems, such as satellite receivers (e.g., XM satellite tuners), digital audio broadcast (DAB) receivers, digital media players (e.g., Apple iPod, MP3, MP4, WMV, etc.), CD changers, auxiliary input sources, video devices (e.g., DVD players), cellular telephones, and the like, to be easily integrated therewith. Thus, automobile purchasers are frequently forced to either entirely replace the OEM audio system, or use same throughout the life of the vehicle or the duration of ownership. Even if the OEM radio is replaced with an after-market radio, the after-market radio also frequently is not operable with an external device.

A particular problem with integrating after-market audio and video systems with existing car stereo and video systems is that signals generated by both systems are in proprietary formats, and are not capable of being processed by the after-market system. Additionally, signals generated by the after-market system are also in a proprietary format that is not recognizable by

the car stereo or video system. Thus, in order to integrate after-market systems with existing car stereo and video systems, it is necessary to convert signals between such systems.

It known in the art to provide one or more expansion modules for OEM and after-market car stereos for allowing external audio products to be integrated with the car stereo. However, such expansion modules only operate with and allow integration of external audio products manufactured by the same manufacturer as the OEM / after-market car stereo. For example, a satellite receiver manufactured by PIONEER, Inc., cannot be integrated with an OEM car radio manufactured by TOYOTA or an after-market car radio manufactured by CLARION, Inc. Thus, existing expansion modules only serve the limited purpose of integrating equipment by the same manufacturer as the car stereo. Thus, it would be desirable to provide an integration system that allows any audio device of any manufacture to be integrated with any OEM or after-market radio system. Further, radio-frequency (RF) transmitters and cassette tape adapters have been developed for allowing music from a device external to a car radio, such as a portable CD player, to be played through the car radio using the FM receiver or the cassette deck of the radio. However, such systems are often prone to interference, and do not provide high fidelity.

Moreover, it would be desirable to provide an integration system that not only achieves integration of various audio and video devices that are alien to a given OEM or after-market car stereo or video system, but also allows for information to be exchanged between the after-market device and the car stereo or video system. For example, it would be desirable to provide a system wherein station, track, time, and song information can be retrieved from the after-market device, formatted, and transmitted to the car stereo or video system for display thereby, such as

at an LCD panel of the car stereo or on one or more display panels of a car video system. Such information could be transmitted and displayed on both hardwired car stereo and video systems (e.g., radios installed in dashboards or at other locations within the car), or integrated for display on one or more software or graphically-driven radio systems operable with graphical display panels. Additionally, it would be desirable to provide a multimedia device integration system that allows a user to control more than one device, such as a CD or satellite receiver and one or more auxiliary sources, and to quickly and conveniently switch between same using the existing controls of the car stereo or video system. Still further, it would be desirable to provide a multimedia device integration system that allows for wireless integration of portable devices for use with car audio and/or video systems, wherein full remote control of the portable device is provided at the controls of the car system.

Accordingly, the present invention addresses these needs by providing a multimedia device integration system that allows a plurality of after-market devices, such as CD players, CD changers, digital media devices (e.g., MP3 players, MP4 players, Apple iPod, WMV players, portable media centers, and other devices), satellite receivers, DAB receivers, auxiliary input sources, video devices (e.g., DVD players), cellular telephones, or any combination thereof, to be integrated into existing car stereo and video systems while allowing information to be displayed on, and control to be provided from, the car stereo or video system.

SUMMARY OF THE INVENTION

The present invention relates to a multimedia device integration system. One or more after-market audio devices, such as CD players, CD changers, digital media devices (*e.g.*, MP3 players, MP4 players, WMV players, Apple iPod devices, portable media centers, and other devices), satellite receivers (*e.g.*, XM or Sirius receivers), digital audio broadcast (DAB) receiver, or auxiliary input sources, can be connected to and operate with an existing stereo system in an automobile, such as an OEM car stereo system or an after-market car stereo system installed in the automobile. The integration system connects to and interacts with the car stereo at any available port of the car stereo, such as a CD input port, a satellite input, or other known type of connection. If the car stereo system is an after-market car stereo system, the present invention generates a signal that is sent to the car stereo to keep same in an operational state and responsive to external data and signals. Commands generated at the control panel are received by the present invention and converted into a format recognizable by the after-market device. The formatted commands are executed by the after-market device, and audio therefrom is channeled to the car stereo. Information from the after-market device is received by the present invention, converted into a format recognizable by the car stereo, and forwarded to the car stereo for display thereby. The formatted information could include information relating to a CD or MP3 track being played, channel, song, and artist information from a satellite receiver or DAB receiver, or video information from one or more external devices connected to the present invention. The information can be presented as one or more menus, textual, or graphical prompts for display on an LCD display of the radio, allowing interaction with the user at the radio. A docking port may be provided for allowing portable external audio devices to be connected to the interface of the present invention.

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