A cable 118 includes a connector for interface with head unit 120 and an interface for a selected handheld electronic device 124. In one embodiment a signal processor is fully integrated within the cable. It is contemplated that this cable is customized and possible even co-branded with an OEM's handheld electronic device.
BACKGROUND OF THE INVENTION

1. Field of the invention.

The invention relates in general to methods and devices for system interfaces and, more particularly, embodiments of the present invention relate to vehicle mounted electronic system interfaces.

2. Description of the Prior Art.

Existing system interfaces are not without their shortcomings. A major shortcoming of typical vehicle system interface is its lack of flexibility vis-a-vis different systems. For instance, existing systems might allow a user to use an iPod® brand media storage music system in a car but such systems would not allow the user to use a competing system using the same interface.

Music players, especially digital music players, MP3, that provide selective listening to downloaded audio material on the music player are sometimes
UNIVERSAL MOBILE ELECTRONICS INTEGRATOR

RELATED APPLICATIONS

[0001] This application claims priority from provisional patent application serial number 60/863,414 filed October 30, 2006, the entirety of which is hereby expressly incorporated for all that it teaches.

BACKGROUND OF THE INVENTION

1. **Field of the invention.**

[0002] The invention relates in general to methods and devices for system interfaces and, more particularly, embodiments of the present invention relate to vehicle mounted electronic system interfaces.

2. **Description of the Prior Art.**

[0003] Existing system interfaces are not without their shortcomings. A major shortcoming of typical vehicle system interface is its lack of flexibility vis-a-vis different systems. For instance, existing systems might allow a user to use an iPod® brand media storage music system in a car but such systems would not allow the user to use a competing system using the same interface.

[0004] Music players, especially digital music players, MP3, that provide selective listening to downloaded audio material on the music player are sometimes
provided with a cradle or a docking system to hold them upright. However, these cradles are often not designed for vehicles where drivers and passengers have a need, especially on long distance driving, to operate these players. Other portable devices do not even have docking system. Although the cradle of the claimed invention is applicable to portable devices such as personal digital assistant, global positioning system devices, cell phones, digital video disk monitors, television screens, monitor for electronic games, tablet personal computers and portable satellite radios. Some docking systems for the music player are weighted to keep the music players in place. Some of the cradles use suction cup, adhesives, adhesive tapes or screws. It is therefore an object of this invention to provide a cradle that would not have unsightly cords. It is also an object of this invention to provide a cradle with adjusters to accommodate the different types of portable devices or different models of the same portable device such as the different models of the music players.

[0005] As indicated above, lack of universality is problematic for a number of reasons, most notable is the users need to acquire and keep available for use many competing devices. The devices can be both costly and more importantly cumbersome and difficult to maintain and use in an environment where space and convenience are at a premium. In response to such pressures, industry has made a number of attempts to resolve the problem. One such attempt was to provide a port which could be placed in a vehicle's glove compartment. Another solution was to drill into the dashboard and allow a wire to protrude which could be attached to an iPod. Another popular solution was to rely on a wireless transmitter to transmit from the device directly to the
radio. Elegant in its simplicity and inexpensive to design and build, the transmitters lack the ability to transmit with sound quality that is equivalent to the wired system.

[0006] Therefore there is a need for a single system that allows multiple devices to seamlessly interface with a resident electronic device in a vehicle.

**BRIEF SUMMARY OF THE INVENTION**

[0007] The present invention has been developed in response to the current state of the art, and in particular, in response to the aforementioned problems and other problems and needs that have not been fully or completely solved by currently available systems. Thus, it is an overall object of the present invention to effectively resolve at least the problems and shortcomings identified herein. In particular, it is an object of the present invention to provide a system that will allow a user to dock entertainment, navigational, diagnostic, and monitoring systems in a single port, with complete transparency to the user.

[0008] A preferred embodiment of the universal docking port according to the present invention comprises a system including an integrated circuit including an integral memory component; an adapter; a signal carrying cable; a head unit; a wireless radio frequency transmitter including a user interface; a wireless radio frequency receiver. The adapter includes a first side and a second side interconnected by said signal carrying cable, the second side is configured
to detachably physically interconnect with the integrated circuit; and the wireless radio
frequency transmitter is situated proximal to the wireless radio frequency receiver and
the radio frequency receiver is operationally interfaced with the signal carrying cable;
and the integrated circuit and the head unit are operationally interconnected.

[0009] In another embodiment the system provides a first side of an adapter that
is configured to detachably physically interconnect with the head unit. In another
embodiment the radio frequency transmitter is operationally configured to control at
least one function of the integrated circuit including an integral memory component.

[0010] In another embodiment a universal interface system is provided the system
includes an electrically powered solid state electronic device; at least one
electromechanical radiation transmitting device; a system interface; and an adapter. The
electrically powered solid state electronic device includes a user interface; a
communications protocol component; and the electrically powered solid state electronic
device is operatively interconnected with at least: the electrical power source; the
electromechanical radiation transmitting device; and the adapter. The electrically
powered solid state electronic device includes a power intake component configured to
accept electrical power from the electrical power source and the electrically powered
solid state electronic device includes at least one receiving component that can receive a
first electromagnetic radiation signal via an electrically conductive wire from the adapter.
The adapter includes at least one conveying component capable of conveying the first
electromagnetic radiation signal, via a first electrically conductive transmission
component to the electrically powered solid state electronic device, the first electromagnetic radiation signal relies on data from a storage component which stores data that is relevant to the electrically powered solid state electronic device and data from an interface component that is operatively interfaced with the system interface through a second electrically conductive transmission component, and the electrically powered solid state electronic device, includes at least one conversion component that can convert the first electromagnetic radiation signal into at least one output signal which can be conveyed to the electromechanical radiation transmitting device.

[0011] In another embodiment the present invention provides a system comprising a first handheld electronic device adapter, connector for interface with head unit, connector configured interface with handheld electronic device, selected handheld electronic device, receptacle port for connector to head unit, head unit, signal processor, a cable. The cable is integral with the signal processor, and the cable operationally interfaces, via the receptacle port for connection to the head unit and the interface with handheld electronic device, the head unit and the handheld electronic device.

[0012] In another embodiment of the system, the signal processor is configured to process signals specific to a handheld electronic device. The signal processor optionally is configured to process signals from a wireless device.

In another embodiment the system includes a single adapter that provides physical and signal compatibility between a plurality of handheld electronic devices and a head unit.
The system may also allow for a plurality of handheld electronic devices to simultaneously convey signal to the head unit and the signals may be handled on a priority sequence, or may be parsed and handled in a temporally distributed sequence, as for instance where telephone calls will be presented in the order which they were received, or another order. Or where telephone calls will be will be delayed while certain reports or songs are playing on the radio, or certain songs or content will be held in memory while a phone call is taken.

In another embodiment the first handheld electronic device is a telephone and the second handheld electronic device is a navigation aid or Internet browser. The head unit may be part of a consumer electronic device.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention provides its benefits across a broad spectrum of user interfaces with electronic devices in a vehicle environment. While the description which follows hereinafter is meant to be representative of a number of such applications, it is not exhaustive. As those skilled in the art will recognize, the basic apparatus taught herein can be readily adapted to many uses. This specification and the claims appended hereto should be accorded a breadth in keeping with the scope and spirit of the invention being disclosed despite what might appear to be limiting language imposed by the requirements of referring to the specific examples disclosed.

Referring particularly to the drawings for the purposes of illustrating the invention and its presently understood best mode only and not limitation:
Fig. 1 is a view of a preferred embodiment of a universal with a single adapter for multiple handheld electronic devices;

Fig. 2 is a view of a preferred embodiment of customized adapters, one for each handheld electronic device; and

Fig. 3 is a preferred embodiment of a customized integral cable compatible with a single handheld electronic device and a head unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings wherein like reference numerals designate identical or corresponding parts throughout the several views. It is to be understood that the drawings are diagrammatic and schematic representations of various embodiments of the invention, and are not to be construed as limiting the invention in any way. The use of words and phrases herein with reference to specific embodiments is not intended to limit the meanings of such words and phrases to those specific embodiments. Words and phrases herein are intended to have their ordinary meanings, unless a specific definition is set forth at length herein.

A first handheld electronic device 100
A second handheld electronic device 102
A third handheld electronic device 104
A universal adapter 106
A remote control 108
A signal carrying cable H O
A first handheld electronic device adapter 106A
A second handheld electronic device adapter 106B
A third handheld electronic device adapter 106C

Signal processor 112
Head unit connection wires 114

Cable 118 with integral signal processor, specific to selected handheld electronic device 118
Connector for interface with head unit 120
Connector for interface with handheld electronic device 122
Selected handheld electronic device 124
Receptacle port for connector to head unit 126
Head unit 128

Referring particularly to Fig. 1, where a first, second, and third handheld electronic device 100, 102, and 104 such as, for example, an MP3 player, a cellular telephone, a GPS receiver, or the like. A universal adapter 106 is provided, the universal adapter 106 provides circuitry that can process the signal from a plurality of handheld electronic devices 100, 102, and 104 and translate the signal into a form that is readily decodable by the handheld electronic device head unit. A remote control 108 unit allows a user to control the handheld electronic device or the device associated with the head unit or both.
Referring to FIG 2.wherein 100-104 are a handheld electronic devices such as, for example, an MP3 player, a cellular telephone, a GPS receiver, or the like. Each of the handheld electronic devices requires a different adapter 106A-C by reason of having differing physical dimensions and electronic signal formats. Adapter 106A is associated with handheld electronic device 100. Likewise, adapters 106B and 106C are associated with handheld electronic devices 102 and 104 respectively.

Referring now to FIG. 3, yet another embodiment of the present invention is disclosed. In this embodiment a single cable 118 is disclosed. The cable 118 includes a connector for interface with head unit 120 and an interface for a selected handheld electronic device 124. In one embodiment a signal processor is fully integrated within the cable 126. It is contemplated that this cable is customized and possible even co-branded with an OEM's handheld electronic device.

The signal processor 126 circuits are specially adapted to receive unique electronic signal input from the respective associated handheld electronic devices 104. Each handheld electronic device generates electronic signals in a particular device format that is unique to that particular handheld electronic device. The inventor recognized that converting these unique device format electronic signals to a standard format that is independent of the particular handheld electronic device from which they originated together with other features of the present invention would greatly facilitate the integration of handheld electronic devices into other electronic systems. Such a standard electronic output can be transmitted through a standard
docking member connection to a standard cable connector. Electronic signals to the respective handheld electronic devices are converted by this electronic circuitry from a standard format to the specific device formats that are required by the respective devices. The

Control units, commonly referred to as "heads" 128, are typically mounted in vehicles and on other substrates for purposes of controlling at least the audio and/or video systems in a vehicle or elsewhere. The interface on the head 128 is configured to receive the physical 120 connector for interface with head unit 128. The heads may be integrated into other systems such as vehicle operating systems, alarms, warnings, and the like, so that they are controlled by or at least integrated with the head. Each vehicle manufacturer, for example, usually produces its own heads.

For purposes of reliability, performance, capacity, and security it is generally preferred that there be a physical conductor connected between the cable circuit and the base element. See, for example, standard cable 126. For remote or difficult installation, however, it may be desirable to use a wireless connection (not shown). For purposes of this specification and the claims appended hereto, unless otherwise indicated the phrase "standard connection" is intended to and shall include all connections between cable circuits, including antennas, standard cable connectors and standard docking member connections. Also, in a wireless installation base element may become primarily a holder for the docking member, which may be permanently or temporarily mounted wherever desired so long as it is within wireless range. The antenna that is associated with the docking member circuit in a wireless
installation may be associated with the base element, the docking member, or elsewhere, as may be desired. The cable circuits and docking member circuits include the capability to transmit signals in a wireless installation.

Preferably, both the electronic input and output signals that flow through connectors are all standardized. The electronic input and output that flows through connector pair is unique to the head. The inventor realized that conversion of input and output electronic signals to a predetermined standard, which applies between cable circuits and docking member circuits and, however matched, substantially minimizes the number of docking members that are required. Without such standardization, each individual handheld electronic device would require a connecting member for each individual head style. That is, to accommodate handheld electronic device there would have to be a separate docking member for each of head. According to the present invention, the cables and associated cable circuits must be changed to accommodate each different head, but this is considerably less expensive than providing a docking member for each head style.

This connecting station method has several advantages. It has a removable connect which allows for a user to switch between virtually any mobile electronic devices connecting them to the vehicle's electronic components.

The wiring for this device is concealed, optionally, behind the vehicle's body except for a connector which allows the connection to connect to the wiring.

By using this method any mobile electronic device is able to connect to a vehicle's electronic components with the corresponding interchangeable connector and maintain a
look of being seamlessly integrated into the vehicle by having the wiring concealed behind the body of the vehicle.

This device is able to achieve its results by threading the wiring through a hole either pre-existing or drilled into the body of the vehicle where the device is to be placed. Once the wiring is threaded through the hole it is then connected to at least one, and potentially all of the vehicle's electronics. The connector at the opposite end of the wiring sticks out of an aperture while the wiring itself is concealed, optionally, behind the body of the vehicle. The connector allows one connect to the wiring previously installed. The dock itself can contain a circuit board to allow for the transfer of any and all data from the mobile electronic device to vehicles electronics or visa versa, should one be needed. Once the dock is connected to the wiring, it then achieves the result of giving the device a seamlessly integrated look. The dock itself is interchangeable at any time, allowing any device to connect to the vehicles electronics via the stationary wiring and an appropriate dock.

There are alternative ways for this device to achieve the same results.

- In can be place in any type of vehicle including a car, train, plane, automobile, motorcycle, boat, submarine, space vehicle, etc.
- It can be located in any position in the vehicle: dashboard, between the seats, on the floor, in the doors, the sideways, the ceiling, exterior body, etc.
- The circuit board need not have to be attached to the dock, it is just housed within the dock
- The dock can be made of plastic, metal, wood, or any other material suitable for holding a mobile electronic device.

- The connector on the circuit board which connects the mobile electronic device to the circuit board can be located anywhere in the dock and have as many as are needed in order to connect to the mobile electronic device.

- Any amount of connectors can be used in order to transfer the data from the mobile electronic device to the electronic components of the vehicle.

- The electronic components of the vehicle can be the stereo, monitors, on board computer, etc.

- The dock itself could be molded into the vehicles body in such a way as to make a part of the vehicle and can either be as one piece or still have the dock interchangeable.

- The housing for the dock and the circuit board can be concealed directly behind the body of a vehicle but still allow for access to the circuit board and/or the connector for connecting the mobile electronic device to. This could be achieved by having a concealed opening where the dock or housing for the circuit board along with the circuit board resides. Through the concealed opening the dock and/or the circuit board or just connector can change out for the corresponding mobile electronic device.

Another embodiment of the present invention includes a vehicle comprising an occupant region, and a component region wherein the regions are adjacent one another. With respect to the vehicle an essential requirement is that the vehicle be
capable of accommodating an occupant. The vehicle itself may take the form of any
powered or non-powered vehicle that can accommodate an occupant; this could include
an automobile, aircraft, marine vessel or other vehicle. This embodiment of the present
invention further includes an electrically powered solid state electronic device that
straddles the occupant region. A battery or electrical generating device would be possible
examples. The component region draws electrical power from a source outside said
occupant region and is configured to receive electromagnetic radiation, likely in the form
of a signal which may subsequently be converted into an electromagnetic or
electromechanical radiation signal which may be perceived. Wherein said solid state
electronic device further includes a user interface including a data input region. The data
input component may use a tactile based unit, this could include a touch screen, which
may include a fingerprint reader or other authenticating element, and the interface may be
visual based, or audio based. In all likelihood there will be at least one embodiment
which includes multiple interfaces. Additionally, a first electrical component including a
communications protocol is included as well as a signal source for, and in operative
connection with, at least one electromechanical radiation transmitting device and a
system interface. Additionally, a cable having a first end and a second end, wherein the
first end is in electrical contact with the solid state electronic device and the second end
terminates with the system interface, which is substantively immovably disposed within
the occupant region of the vehicle and is within 3 meters, 2.5 meters, 2, meters, 1.5
meters, 1 meter or .5 meters of said seat. It is further contemplated that different
interfaces may be placed strategically throughout the occupant region and at varying
distances from the occupant. Additionally, the cable includes at least two electrically conductive wires.

In another embodiment the system includes an adapter component having a first side and a second side, wherein the first side operatively forms an electrical connection with said system interface and the second side of the adapter component is configured to connect to at least one electronic data storage device using data interface which is on the electronic data storage device, wherein said electronic data storage device includes a user interface, and the adapter component includes a communications protocol operative to permit at least partial emulation of the electronic data storage device user interface on the solid state electronic device.

In another embodiment the system includes at least one electronic data storage device including at least one communication protocol; and an electrical component including an dynamic sensing protocol wherein said electrical component is capable of sensing the presence of at least one electronic data storage device in electrical contact with the system interface, and after sensing the presence of the at least one electronic data storage device, the electrical component dynamically queries the electronic data storage device or devices and ascertains sufficient data concerning the communications protocol of the electronic data storage device or devices to allow the interface to transmit electrical signals through an electrically conductive medium from the at least one electronic data storage device to the solid state electronic device, wherein said solid state electronic device, at least partially, emulates the user interface of the electronic data storage device
and the solid state electronic device converts at least a portion of the data transmitted from the electronic data storage device to the solid state electronic device to a signal which is configured to ultimately provide a signal to an electromechanical transmitting device.

Another embodiment of the system a resilient, molded, substantially non-conducting polymeric material including a first side and a second side wherein the second side includes a first region and a second region, said first region including at least one fastening device and a second region including an aperture, and a cable including a first end and second end and at least two electrically conductive wires therein, wherein said aperture receives the first end of said at least two electrically conductive wires and said wire is operatively connected to an electronic interface which is integrally affixed to said first side and said electronic interface is operative to accommodate an first electronic device and said first electronic device is configured to transmit electromagnetic signals to a second electronic device attached to the at least two electrically conductive wires at the second end of said cable, and said electronic interface is adjacent to an integral discontinuity, wherein said discontinuity is operative to provide a retaining characteristic for at least one of the following, an electronic device and a molded electronic device retaining element.

In another embodiment, an electronic media storage device dock is accessibly mounted in the occupant region. The electronic media storage device interfaces with the dock. The dock is operatively connected with at least one media presentation component. In this
paragraph media presentation component shall be understood to mean one or more
speakers and optionally one of more viewing screens. More specifically, an iPod like
memory storage is interfaced with the dock and the media content is delivered to the
vehicle occupants. In a specific embodiment the dock can accommodate music and video
versions of iPod like devices, and the dock is interfaced with a component that is
interfaced with a transmitting system and the system allows the user to purchase/acquire
and download multimedia material using the iPod like device as a storage system. Thje
material that has been downloaded then may be enjoyed or may be stored for future
enjoyment, or both. In another embodiment the same docking port also allows a PDA or
personal data assistant to be interfaced with the docking port. In such a case the PDA
user's schedule, email, etc could be viewed on a screen within the vehicle. This could be
coupled with voice recognition software so as to obviates teh need for a vehicle operator to
read the email but would allow the operator to listen the email and respond to the email
by speaking. The PDA may also include a databood such as Zagat® or the yellow pages
which would allow a user to identify nearby establishments which would be of interest to
a vehicle operator or to others. A GPS (satellite or terrestrial based navigation system)
containing data device could also be used to provide data which would aid in navigation.
In another embodiment the present invention provides a method for interfacing a plurality
of handheld electronic devices with a single head unit using only a single adapter 106.

In another embodiment the docking station is situated so as to be out of direct
sunlight. In another embodiment the dock is mounted out of sight, so as to reduce the
likelihood of thieves stealing the memory storage device. Location include a ceiling
mounted docking station which is accessible by a cover that opens by swinging downward between about 15 and 90 degrees and more preferably about 45 degrees. The cover has a docking portion on a side away from the hinge side. The memory storage device is placed in the docking bay with the aid of gravity. Thereafter the cover is closed and the memory storage device is out of sight. A similar set-up could be used in the vehicle's door or counsel area. Similarly, an aperture could be provided which would substantially accommodate the memory storage device thus removing it from sight. Consistent with the invention the aperture would be sized to accommodate the largest anticipated device and would be associated with a plurality of adapters which would allow smaller devices to fit snugly within the aperture.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What has been described are preferred embodiments in which modifications and changes may be made without departing from the spirit and scope of the accompanying claims. Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.
Claims

I claim:

1. A system comprising:
   an integrated circuit including an integral memory component;
   an adapter;
   a signal carrying cable;
   a head unit;
   a wireless radio frequency transmitter including a user interface;
   a wireless radio frequency receiver;
   wherein the adapter includes a first side and a second side interconnected by
   said signal carrying cable, the second side is configured to detachably physically
   interconnect with the integrated circuit; and
   the wireless radio frequency transmitter is situated proximal to the wireless radio
   frequency receiver and the radio frequency receiver is operationally interfaced
   with the signal carrying cable; and the integrated circuit and the head unit are
   operationally interconnected.

2. The system of claim 1, wherein the first side is configured to detachably
   physically interconnect with the head unit.
3. The system of claim 1, wherein the radio frequency transmitter is operationally configured to control at least one function of the integrated circuit including an integral memory component.

4. A universal interface system comprising:
   an electrically powered solid state electronic device;
   at least one electromechanical radiation transmitting device;
   a plurality of system interfaces; and
   an adapter
wherein the electrically powered solid state electronic device includes:
   a user interface;
   a communications protocol component;
   and the electrically powered solid state electronic device is operatively interconnected with at least the electrical power source, the electromechanical radiation transmitting device, and the adapter;
   the electrically powered solid state electronic device includes a power intake component configured to accept electrical power from the electrical power source and the electrically powered solid state electronic device includes at least one receiving component that can receive a first electromagnetic radiation signal via an electrically conductive wire from the adapter;
   the adapter includes at least one conveying component capable of conveying the first electromagnetic radiation signal, via a first electrically conductive transmission component to the electrically powered solid state electronic device, the first
electromagnetic radiation signal relies on data from a storage component which stores data that is relevant to the electrically powered solid state electronic device and data from an interface component that is operatively interfaced with the system interface through a second electrically conductive transmission component, and

the electrically powered solid state electronic device, includes at least one conversion component that can convert the first electromagnetic radiation signal into at least one output signal which can be conveyed to the electromechanical radiation transmitting device.

5. A system comprising:

a first handheld electronic device adapter;
a connector for interface with head unit;
a connector configured interface with handheld electronic device;
a selected handheld electronic device;
a receptacle port for connector to head unit;
a head unit;
a signal processor; and
a cable

wherein the cable is integral with the signal processor, and the cable operationally interfaces, via the receptacle port for connection to the head unit and the interface with handheld electronic device, the head unit and the handheld electronic device.
6. The system of claim 5, wherein the signal processor is configured to process signals specific to a handheld electronic device.

7. The system of claim 5, wherein the signal processor is configured to process signals from a wireless device.

8. The system of claim 5 wherein a single adapter provides physical and signal compatibility between a plurality of handheld electronic devices and a head unit.

9. The system of claim 8 where the plurality of handheld electronic devices may simultaneously convey signal to the head unit and the signals may be handles on a priority sequence, or may be parsed.

10. The system of claim 5, wherein the first handheld electronic device is a telephone and the second handheld electronic device is a navigation aid or Internet browser.

11. The system of claim 8 wherein the head unit is part of a consumer electronic device.