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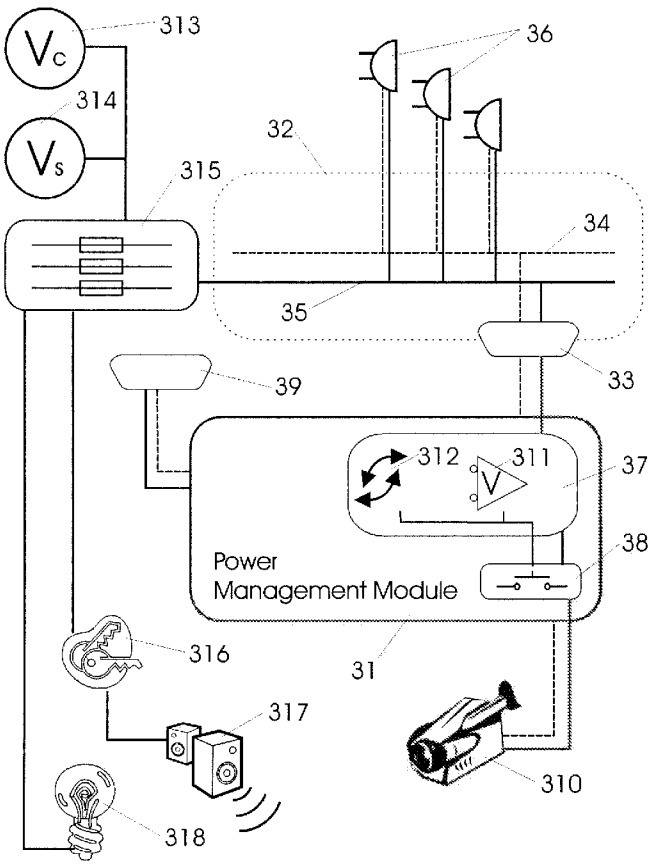

(57) Abstract: Video event recorders are coupled to a vehicle power source via an on-board diagnostic system including its power bus, data bus, and scanner port connector. A video event recorder is provided with a power input configured to connect to a standard ODB-II connector. Systems further include an extension cable between the connector and the vehicle event record to accommodate mounting needs associated with each. In advanced embodiments, both OBD power and data networks are coupled to the vehicle event recorded such that data relating to vehicle diagnostic systems can be captured along with video data in response to a triggering event. In addition, some embodiments are provided with special detection mechanism to determine the use state of a vehicle and adjust application of power accordingly. Thus an "in-use" detector is coupled to the vehicle and/or OBD systems to help conserve and regulate power usage.

WO 2008/058222 A2

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POWER MANAGEMENT SYSTEMS FOR AUTOMOTIVE VIDEO EVENT RECORDERS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to United States non-provisional patent application no. 11/593,682 filed on November 7, 2006, the entirety of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The following disclosure is related generally to data and power distribution networks for on-board, automotive diagnostic systems, and more specifically to smart power management systems that provide power to on-board diagnostics networks and connected video event recorders.

[0003] In an automobile or other vehicle the capacity of the electrical system to supply electrical power depends on whether the engine is running. When the engine is not running, electrical power is supplied by the automobile battery which can become run down or depleted in a relatively short time. However, when the engine is running, electrical power is supplied by the automobile's alternator. Leaving the headlamps on while the engine is not running tends to completely drain the battery in only a few hours, whereas, the headlamps may be left on indefinitely when the engine is running. The alternator supplies ample energy to the headlamps while at the same time providing energy to recharge the battery. Accordingly, automotive systems and devices which consume electrical power should be designed and installed with a view towards appropriate power usage and availability.

[0004] It is quite well known in the automotive arts to couple non-essential electrical subsystems in series with an ignition key or switch. This ensures that power is cut-off to non-essential subsystems when the ignition switch is 'off'. When a vehicle operator leaves a car and takes the keys, these non-essential electrical loads are necessarily disconnected.

[0005] It is, however, sometimes desirable for some systems to remain powered even when the ignition system is "off". For example, power remote door lock systems require

a continuous power supply to remain operative. Accordingly, such systems are not coupled to the electrical power supply via the ignition, but rather, via a circuit which remains energized at all times.

[0006] Certain new advanced electronic systems are now being made available for automotive use. One important new system is known as a "video event recorder". Video event recorders are being deployed in service and fleet vehicles in a manner so that a video record relating to vehicle use is electronically stored for review or analysis at a later time. A primary example of these systems is the installation of digital video recorders in police cruisers or patrol vehicles. A police cruiser is frequently in a situation in which a video record would be quite useful, such as for evidence of a crime or infraction. Increasingly fleet vehicles are being equipped with video event recorder systems to protect these important corporate assets.

[0007] Presently, state-of-the-art video recorders are installed so they receive power via a 'hardwired' or direct, un-switched connection to an automotive electrical power supply. This enables the video system to capture video images even when the ignition switch is 'off' and the key has been removed from the vehicle. However, the amount of energy consumed by a video event recorder can be significant. Indeed, it is possible for a constantly powered video system to completely drain an automobile battery in a short period of time (a few days or less).

[0008] Typically, an automotive battery supplies a large current to start the engine and is then immediately recharged from the alternator. Thus, the design of an automotive battery is typically optimized to supply a very large current in a short burst and then be recharged or 'topped off' shortly thereafter. The battery is designed with the assumption that it is normally in a "fully charged" state. It is possible to design a battery for efficient operation at reduced charge levels. For example, a typical yacht battery , sometimes known as a "deep cycle" battery is designed to supply power for an extended period while discharge to a very low level. While it would be possible to use a deep cycle type battery in a vehicle having an always-on video event recorder, the extra cost, weight, and maintenance would make such an option less that ideal.

[0009] Another approach known in the art is to connect a video event recorder to the power supply via the ignition switch. When the switch is "off" , the video event recorder no longer consumes electrical power and remains inoperative until the ignition is reactivated. Unfortunately, this leaves the video event recorder without power at times

when it would be desirable to have power. For instance, it may be desirable to activate the video event recorder anytime someone is in the vehicle, even if the ignition is off. Differences in the configuration of the ignition switch of vehicles of different makes and models make these kinds of installations more difficult and costly.

[0010] An alternative approach is to connect the video event recorder to the automotive power supply via an independent switch. The switch may be operated independently of the ignition switch, so that the video recorder can be operated when needed. However such manual type switch couplings suffer from a great number of inconveniences and difficulties which need not be enumerated here.

[0011] It would therefore be desirable to provide a system which permits efficient coupling to a vehicle's power system, that does not overload a supply by consuming power during times when the system cannot sufficiently provide power, and further to cooperate with standard equipment available in all models of vehicles.

SUMMARY OF THESE INVENTIONS

[0012] It is a primary object of the invention to provide methods and apparatus for coupling a video event recorders to an automotive-type power supply systems.

[0013] It is an object of these inventions to provide electrical coupling and power management for video event recorders.

[0014] It is a further object to provide power supply couplings for video event recorders in conjunction with on-board diagnostic systems.

[0015] It is an object of these inventions to provide switched power supply couplings to reduce power consumption when a vehicle is in a stand-by or non-use mode.

[0016] In some versions, it is an object to provide power management where switching is coupled to the charging state of a supply system.

[0017] In alternative versions, it is an object to provide power management where switching is coupled to detected vehicle motion.

[0018] The above, and other, objects and advantages are achieved by the methods and apparatus disclosed herein. In accordance with the principles of the present invention, a primary function of these systems to provide advanced means of providing power to video event recorders.

[0019] In particular, a video event recorder is coupled to an automotive power supply via an on-board diagnostics system (OBD) power bus, such as the commonplace OBD-II

bus. An on-board diagnostics system typically includes a connector, also called a scanner port, that includes at least one lead or connection intended to supply power to a scanner or other device when it is attached. In accordance with the principles of the present invention, a video event recorder may be connected to such an on-board diagnostics system scanner port and, more specifically, to the power lead or connection. Advantageously, scanner ports are widely available in most recent automobiles and include a standard OBD connector. Accordingly, an interconnecting cable of sufficient length and having appropriate male "D"-type connectors may be used connect the OBD scanner port to the video event recorder which may be mounted at or around a vehicle windscreen.

[0020] In preferred embodiments of the invention, a power management module is included between the OBD system and the video event recorder to regulate and control power used by the video event recorder. The power management module includes means to determine when a vehicle is in "in-use" or is in a "standby" operational mode. When a vehicle is "in-use" the power management module provides to power the video event recorder enabling it to be used. Conversely, when a vehicle is "standing by" the power management module reduces or cuts power to the video event recorder to reduce power consumption; thus preserving battery life. This is especially important when the vehicle is in a standby mode for extended periods.

[0021] Vehicle operational status may be determined using various indicators. In many vehicles, the voltage level on the power supply system implicitly indicates whether or not the engine is running. Thus, in one embodiment of the present invention, a voltage measurement comparison is used to determine the operational mode and to switch power to the video event recorder accordingly. In alternative embodiment of the present invention, a motion sensor is used to determine whether or not the vehicle is still. If no motion is sensed for an extended period of time, the vehicle is assumed to be in a standby mode. However, if motion is detected, the power management system determines that the vehicle is "in-use" and power is supplied to the video event recorder.

[0022] In yet another embodiment of the present invention, a power management module listens to the OBD data bus for certain specified data traffic. When the specified data traffic is present, the power management module determines that the vehicle is 'in-use' and provides power to the video data recorder.

[0023] Finally, in a most preferred embodiment of the invention one or more of the above-mentioned techniques are used in combination to determine a vehicles operational status.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0024] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims and drawings where:

Figure 1 is an illustration of major system components and their relation with vehicle systems;

Figure 2 is a block diagram showing major elements and their couplings with cooperating elements; and

Figure 3 is schematic diagram to further illustrate the electrical relationship between coupled systems.

GLOSSARY OF SPECIAL TERMS

[0025] Throughout this disclosure, reference is made to some terms which may or may not be exactly defined in popular dictionaries as they are defined here. To provide a more precise disclosure, the following terms are presented with a view to clarity so that the true breadth and scope may be more readily appreciated. Although every attempt is made to be precise and thorough, it is a necessary condition that not all meanings associated with each term can be completely set forth. Accordingly, each term is intended to also include its common meaning which may be derived from general usage within the pertinent arts or by dictionary meaning. Where the presented definition is in conflict with a dictionary or arts definition, one must consider context of use and provide liberal discretion to arrive at an intended meaning. One will be well advised to error on the side of attaching broader meanings to terms used in order to fully appreciate the entire depth of the teaching and to understand all intended variations.

[0026] Video Event Recorder—A video event recorder (VER) is a system that captures data in response to a triggering event. The captured data relates to the use and performance of the vehicle and includes images from a digital video camera as well as numeric measurements or other data from vehicles sensors.

[0027] On-board diagnostics system—An on-board diagnostics system (OBD) is a standard electrical network provided and used in the automotive industry for data and power distribution and sharing. A common implementation found in most cars is known as OBD-II. However, as used herein OBD is meant as a general term including various standards, both commercial and consumer, of data and power distribution networks used in vehicles.

[0028] "D"-type connector—A "D"-type connector is an electrical connection means including parts which may have a mechanical interlocking system. A plurality of electrical connections are made when the mating parts are coupled together.

[0029] "In-use" Detector—An in-use detector is a system or device to determine the operational state or mode of a vehicle preferably the detector determines that the vehicle is in one of a plurality of mutually exclusive states, including "in-use" and "stand-by" modes.

PREFERRED EMBODIMENTS OF THESE INVENTIONS

[0030] In accordance with each of preferred embodiments of these inventions, apparatus for power management in vehicle event recording systems are provided. It will be appreciated that each of the embodiments described include an apparatus and the apparatus of one preferred embodiment may be different than the apparatus and method of another embodiment.

[0031] In a first embodiment of the invention, a video event recorder is coupled and connected to an on-board diagnostic system scanner port. Newly manufactured vehicles are now mandated to include an on-board diagnostic system. These systems generally include an electrical access port into which a diagnostic type scanner tool may be plugged. The connector associated with this port, herein referred to as a "D"-type connector, is generally located under the dashboard at the left-hand or driver's side. A video event recorder provided with an electrical cable suitable for extending from a mounting position at or about a windscreen to the under dashboard location, and a suitable mating "D"-type connector, may be coupled to a standard on-board diagnostic system. The video event recorder benefits from such installations because it can receive both power and data from the on-board diagnostic system.

[0032] Accordingly a first preferred embodiment is an automotive electrical power management system with an electrical power source (car battery), an on-board diagnostics system, and a video event recorder. The video event recorder's power input is electrically connected to a part of an on-board diagnostic system power bus. The OBD power bus, in turn, is coupled to the electrical power system of the vehicle.

[0033] Because the preferred location for mounting a video event recorder camera and the location of an on-board diagnostic system scanner port connector are predefined and not readily adjustable, the system include an electrical cable which extends between these two locations. For all practical cases, at least 8 inches must be allocated between a video event recorder and an OBD scanner port. Accordingly, the invention includes the embodiments in which a video event recorder is separated from an on-board diagnostic system "D" connector by eight or more inches of cable.

[0034] In some embodiments of the invention, a video event recorder coupled to an OBD scanner port receives power from the port without regard to data from the OBD system data network. In more advanced embodiments of the invention, a video event recorder is coupled to an OBD system and receives both power and data therefrom. Thus, depending on the configuration of the video event recorder, a cable support just power coupling or both data and power coupling. That is, a cable may be as simple as having only one lead power pin (typically pin 16) of the OBD scanner port. However, in a preferred embodiment, the cable supports data and power couplings. As such, these cables include a plurality of leads such as various data buses, power supply line, and electrical ground which may be arranged in accordance with an OBD standard. Cameras mounted behind a windscreen near the rearview mirror would typically require a cable of a few feet in length. For professional and tidy installations, it is preferred that the cable be installed to cooperate with the interior design of a vehicle operator/passenger compartment, such as by routing the cable behind, around or near interior trim features.

[0035] Because installations of a video event recorder as described above uses the port otherwise provided for a scanner or OBD, it is desirable to provide an auxiliary port for the scanner. Otherwise, it might be necessary to disassemble or partially disinstall the video event recorder and its related systems to make the OBD system accessible to a scanner. Thus, in some preferred embodiments of the invention, an auxiliary port is provided such that a scanner tool may be simultaneously coupled to the on-board diagnostics system. However, in some vehicles this can be problematic. Because the

video event recorder is arranged to appear to the OBD system as a scanner, i.e. some embodiments of the video event recorder are configured to communicate on the OBD data buses in a manner which emulates a scanner. The presence of a "second" scanner e.g. the real scanner, can cause protocol conflicts. Accordingly, a preferred embodiment of the invention includes means to detect the presence of a scanner tool and to disable data communications in the video event recorder for communications on the OBD buses when the scanner is being used. Note it is not necessary to disable the power applied to the video event recorder and the camera may be configured to continue to capture video despite the presence of a scanner tool.

[0036] While the embodiments presented above are quite useful in their base form, they may be further improved by inclusion of a power management module. A power management module may be disposed between the on-board diagnostic system and a the video event recorder. The power management module operates to detect whether a vehicle is in-use or in a standby mode and applies or removes power from the video event recorder. In a perfect embodiment, a power management module includes a connector or for connection to the OBD scanner port. A second cable runs from the power management module to the video event recorder. It is thus possible to mount the power management module in a safe location under the dashboard of the vehicle. A preferred mounting point is near the on-board diagnostic system scanner port.

[0037] In preferred embodiments of the invention, a power management module comprises an "in-use" detector and a switch. The "in-use" detector is configured to determine whether a vehicle is in an active operational state or conversely in a standby state. The "in-use" detector has a binary output coupled to drive or toggle the switch. Coupled between power supply line of power supply line of the on-board diagnostic system and the power input of the video event recorder.

[0038] The "in-use" detector provides a signal to the switch which causes power to be applied or removed from the video event recorder camera based on the detected operational state of the vehicle.

[0039] The "in-use" detector may include a portion to sense physical parameters of the vehicle and/or on-board diagnostic systems and to compare a measured value of a parameter with a prescribed threshold value. Based on the comparison, the switch is set appropriately.

[0040] In one preferred embodiment, an "in-use" detector is arranged as a voltage sensor coupled to the vehicle power source by way of the on-board diagnostic system. Automobile electrical systems are quite standard the world over. In general, nearly all vehicles used a 12V direct current power supply. A standard automotive Pb/acid battery comprises six cells each connected in series with the others typically produces between about 1.9 and 2.1V. This is determined by the battery chemistry. To charge these batteries, a voltage is applied that is a bit higher than that produced by the battery. As a result a reverse current flows into and charges the battery. An automobile electrical system generally includes an alternator charging system which produces about 14V which is applied to the battery "high" potential side. When the charging system is active, the entire power supply system remains at about 14V at all times. Thus the voltage of a car's electrical system will be about 12V when a car is not running (stand-by) and about 14V when running (in-use). Accordingly, the voltage of an automobile power supply may provide an indication of whether the engine is running.

[0041] In a second preferred embodiment, an "in-use" detector is comprises a motion sensor. The motion sensor is not part of the on-board diagnostic system but rather is provided as part of the power management module. Motion sensors can be configured to detect and respond to very slight motion. Such as motions caused by merely opening a door of a vehicle. Thus entry into the vehicle may set the vehicle in an "in-use" state and consequently results in power being applied to the VER. While a vehicle is in motion on roadway a motion detector will continue to indicate that the vehicle is being used.

[0042] In a third embodiment, the "in-use" detector monitors data traffic on the on-board diagnostic system data buses. If a certain prescribed type of data traffic is detected, the detector determines that the vehicle is in use. Similarly, when the data buses is silent or some other prescribed form of data traffic is found. The detector concludes that vehicle is in a "stand-by" state. In response to either of these determinations, the "in-use" detector may provide a driving signal to set a power switch position according to the detected use state. Thus, activity on the on-board diagnostic system data buses may be used to provide an indication as to the use state of a vehicle.

[0043] While each of these "in-use" detection schemes described above may provide certain benefit individually, they may be used in combination with each another provide an even more effective system. It is therefore anticipated that "in-use" detectors may

detect or measure a plurality of physical measurements which are used to determine an operational mode of the vehicle.

[0044] A more detailed understanding of the invention may be realized with reference to the figures appended hereto which include reference numerals associated with the various important elements. In particular, Figure 1 illustrates major system elements of an illustrative system of the invention. The battery of electrical cells 1 stores electrical energy when a vehicle engine is not running; or while the vehicle is in a 'standby' mode. An alternator type electrical generator 2 connected to a vehicle's engine produces electricity when the engine is running. Together, the battery and alternator and their respective supporting systems, voltage regulator for example make up the DC power source for automobiles.

[0045] A power line 3 is coupled to an on-board diagnostics system OBD represented in the Fig. 1 by its connector symbol 4. An OBD system includes both a power distribution network/bus 5 and a data network/bus 6.

[0046] A power management module 7 is interfaced directly with to OBD system. Thus, the OBD power and data buses may be controlled and managed by the power management module. The power management module includes "in-use" detector 8, determines when the vehicle is in use and is actively being operated or is idle or in standby. This determination may be accomplished in various ways. Including a power source voltage detection system, a motion detector system, and an OBD data traffic detection system. Alternative forms of "in-use" detection systems are also possible.

[0047] The power manager module is coupled to video event recorder 9 and provides power only at appropriate times. For example, when the vehicle is parked and at rest for long periods, it is not useful for the video event recorder to continue to consume power. Accordingly, the power manager module disconnects power to the video event recorder. When the power management module determines the vehicle has entered into an in-service or "in use" status, the power management module provides the video event recorder with appropriate power and data connections. In addition, the power management module may further include auxiliary OBD interface port 10 to provide scanner tools easy access to the OBD system while the power management module and video event recorder remain installed.

[0048] Figure 2 is a simplified block diagram of a vehicle power and data network which may be useful in gaining a better understanding of various possible types of

connection to a vehicle power source 21. A power source includes a battery type electrical storage system 22 and a power generation means or charger system 23. Are connected to a vehicle's power supply most electrical devices by way of a fuse box 24. The fuse box distributes power to various vehicle subsystems using a plurality of distinct electrical circuits. While nearly all systems are connected by way of the fuse box, in special circumstances it may be desirable to "hardwire" a device to the power source. For instance, an alarm system 25 is more tamperproof if the fuse box is bypassed, because it would remain operable even if a thief attempts to disable it at the electrical junction/fuse box.

[0049] Most vehicle subsystems are connected to the power source in series with the vehicle ignition switch 26 so that power is cut off to these subsystems whenever the ignition is in an 'off state. A stereo system 27 is a good example of an automotive electrical appliance which is preferably not operated when the ignition is off. A stereo left on could easily consume all available power and run a battery down completely. In contrast, some electrical devices are better left operable without regard for the state of the ignition system. Dome light 28 provides a certain additional safety system which should be available even when a key is not in the ignition.

[0050] Most modern production automobiles now include an on-board diagnostics system as standard equipment. OBD system reads 29 includes both data buses and a power bus. Because power bus of an OBD system is needed even when the ignition switch is 'off,' an OBD power bus is connected directly to the fuse box. This makes power available to OBD coupled systems at all times without regard to the state of the ignition switch. An important element of these systems is a power management module 210. A power management module is coupled to OBD system including the power bus and data buses. In preferred embodiments, a power management module is plugged into the standard scanner port connector under the dashboard in most cars.

[0051] A power management module comprises an "in-use" detector 211 which determines whether or not the vehicle is in use. Power is provided to a video event recorder 212 along extension cable 213 responsive to such determinations. The "in-use" detector includes subsystems to detect certain physical conditions and to provide a signal to a switch which couples OBD power bus to the video event recorder.

[0052] Because these systems may be plugged into the only available scanner port, their presence may interfere with access easy to the OBD port. Accordingly, it may be

advantageous to include as part of a power management module, an additional physical connector as an OBD interface or auxiliary scanner port 214.

[0053] The schematic diagram of Figure 3 further illustrates primary elements and couplings between the primary elements of a system in accordance with the present invention. A most important element is the power management module 31. The power management module is designed and engineered to couple with the standard diagnostic buses widely used in automobile industries including those known as OBDII 2. These power management and OBD systems may be physically joined at a common connector 33, typically a 16 pin "D" connector, and may support several data bus protocols on various pins (for example on pin 6, 10, 14, 15) grounded contacts, and a single power supply bus 35 on pin 16. This coupling is easily achieved without disrupting any of the many OBD coupled systems 36. The power management module is comprised of three main subsystems including an "in-use" detector 37, a switch 38, and an auxiliary port 39.

[0054] The "in-use" detector is arranged to detect if a vehicle is "in use". When an "in-use" condition is detected, the "in-use" detector operates the switch to connect power from the OBD system to the video event recorder 310. The "in use" detector may detect an "in-use" condition in several alternative or cooperative ways. In a first method, the "in-use" detector includes a comparator 311 having one input coupled to the OBD power bus and one input coupled to a reference voltage. The comparator has an output coupled to the switch. When a vehicle is "standing by", or not in use, the voltage on the power supply bus is approximately 12 V. When the engine is running, the charging system produces about 14 V. If a reference voltage of about 13 V may be selected for a reference comparator input. When an engine is moving the comparator will drive the switch to provide power the video event recorder. It has been found via experimentation that 13.2 volts is a particularly effective threshold because some vehicle batteries have a voltage a bit higher than 12 but rarely if ever above 13.2 volts.

[0055] It is not necessary to use the charging voltage of the power supply to determine if the car is being used. Sometimes it is advantageous to determine a vehicle is "in-use" state upon detection of motion. Accordingly, some versions of the power management modules include a motion sensor 312. Even slight movements can be used to trigger power up of a video event recorder. When a vehicle remains motionless for an extended period, it may be determined that the vehicle is in a stand-by state and power from the OBD to the video event recorder may be interrupted or switched off. The switch and is

disposed between the OBD power bus and the video event recorder and is driven by signals from the "in-use" detector so that power to the video event recorder may be interrupted when the vehicle is not in use.

[0056] An auxiliary scanner port 39 may be included in preferred embodiments of the power management module systems. It is highly desirable to provide a tidy installation for video event recorders which leaves the vehicle and all its systems unimpaired and fully functional. Therefore it is an important aspect of preferred embodiments that a standard OBD scanner port be available is driven by signals from the "in-use" detector is arranged between . To effect this, these systems include a physical connector into which a standard OBD scanner may be inserted without removing either the power management module or the video event recorder. However, it is not only the physical connector which must be provided but also a bit of logic management. Because conflicts may arise when two scanners are present on an OBD system, a mechanism is included to interrupt data communicates with the VER whenever a scanner is present in the auxiliary port. In this way, the OBD system only "sees" a single scanner at any given time.

[0057] One will now fully appreciate how video event records are best couple to automotive power supply systems. Although the present inventions have been described in considerable detail with clear and concise language and with reference to certain preferred versions thereof including best modes anticipated by the inventors, other versions are possible. Therefore, the spirit and scope of the invention should not be limited by the description of the preferred versions contained therein, but rather by the claims appended hereto.

CLAIMS

What is claimed is:

1. An automotive electrical power management system comprising:

a DC electrical power source;

an on-board diagnostics system coupled to the DC electrical power source to receive power; and

a video event recorder having a power input electrically coupled to said on-board diagnostic system power bus.

2. The automotive electrical power management system of claim 1, wherein the on-board diagnostic system comprises an OBD-II system, and the power management system further comprises a cable that couples the video event recorder power supply line to pin 16 of an OBD-II bus.

3. The automotive electrical power management system of claim 2, wherein said cable couples the video event recorder to at least one data bus of the OBD-II system.

4. The automotive electrical power management system of claim 2, said video event recorders further comprise an auxiliary connector adapted to accept a standard OBD-II scanner.

5. The automotive electrical power management system of claim 1, further comprising a power management module, said power management module electrically coupled between the on-board diagnostics system and the video event recorder.

6. The automotive electrical power management system of claim 5, wherein said power management module comprises an auxiliary connector adapted to receive therein a standard OBD-II scanner.

7. The automotive electrical power management system of claim 5, wherein said power management module comprises a detector configured to determine whether a vehicle is in use and provide power to the video event recorder responsive to the determination.

8. The automotive electrical power management system of claim 7, wherein said power management module is an under-dash mountable unit.

9. The automotive electrical power management system of claim 7, said detector is configured determine whether the vehicle is in use by sensing at least one physical parameter of the vehicle or OBD-II system and comparing the sensed value with a predetermined threshold value.

10. The automotive electrical power management system of claim 9, wherein the sensed physical parameter includes a voltage level on the vehicle power bus.

11. The automotive electrical power management systems of claim 9, wherein the sensed physical parameter includes motion of the vehicle.

12. The automotive electrical power management systems of claim 9, wherein the power management module is configured to maintain power to the video event recorder for a minimum predetermined turn-off delay.

13. The automotive electrical power management systems of claim 9, wherein the detector comprises a comparator having one input coupled to the DC electrical power source and one input coupled to a reference voltage.

14. The automotive electrical power management systems of claim 13, wherein the power predetermined threshold value is 13.2 volts.

15. The automotive electrical power management systems of claim 9, wherein the detector monitors the OBD system to detect the presence of a predetermined type of data traffic.

16. The automotive electrical power management systems of claim 9, wherein the detector is a combination of two or more motion sensors, voltage sensors, and data traffic sensors.

17. The automotive electrical power management system of claim 4, wherein the power management system is configured to disable data communications to and from the camera unit when a scanner connected to the auxiliary port.

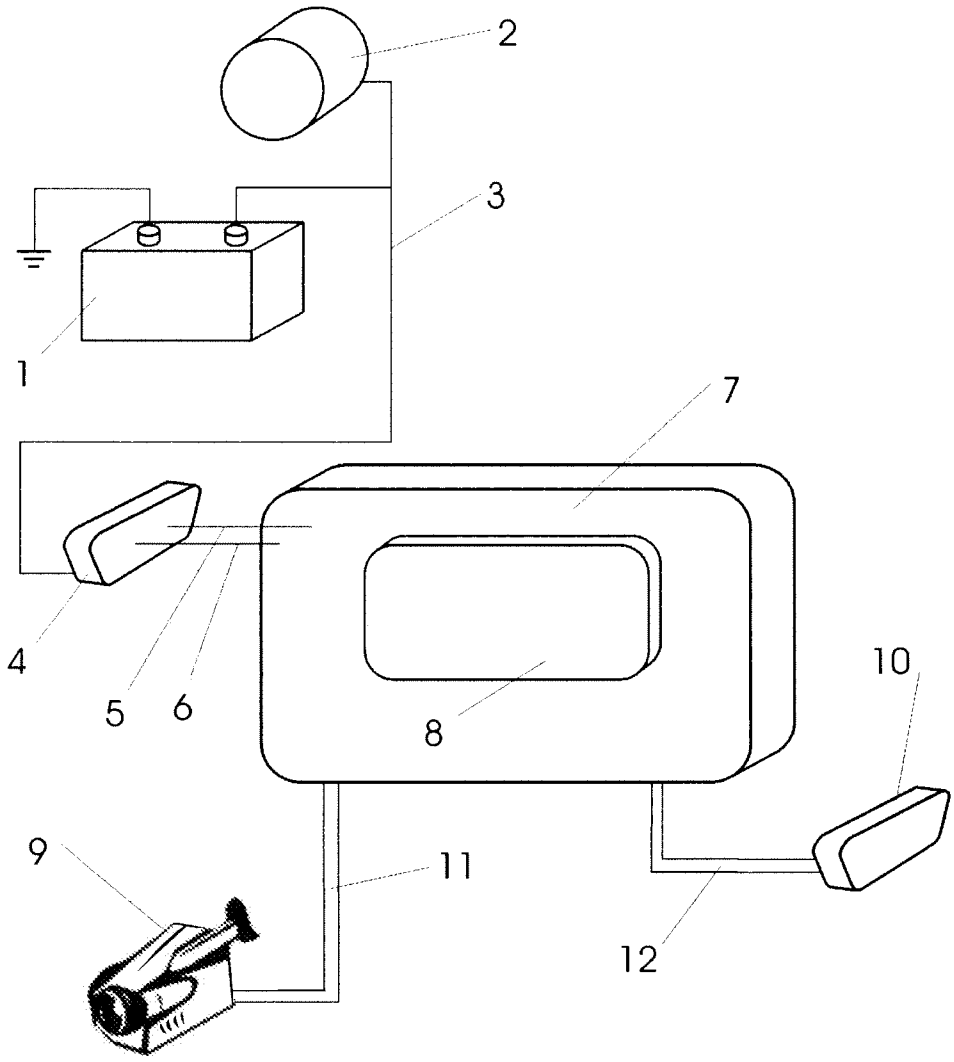

FIG. 1

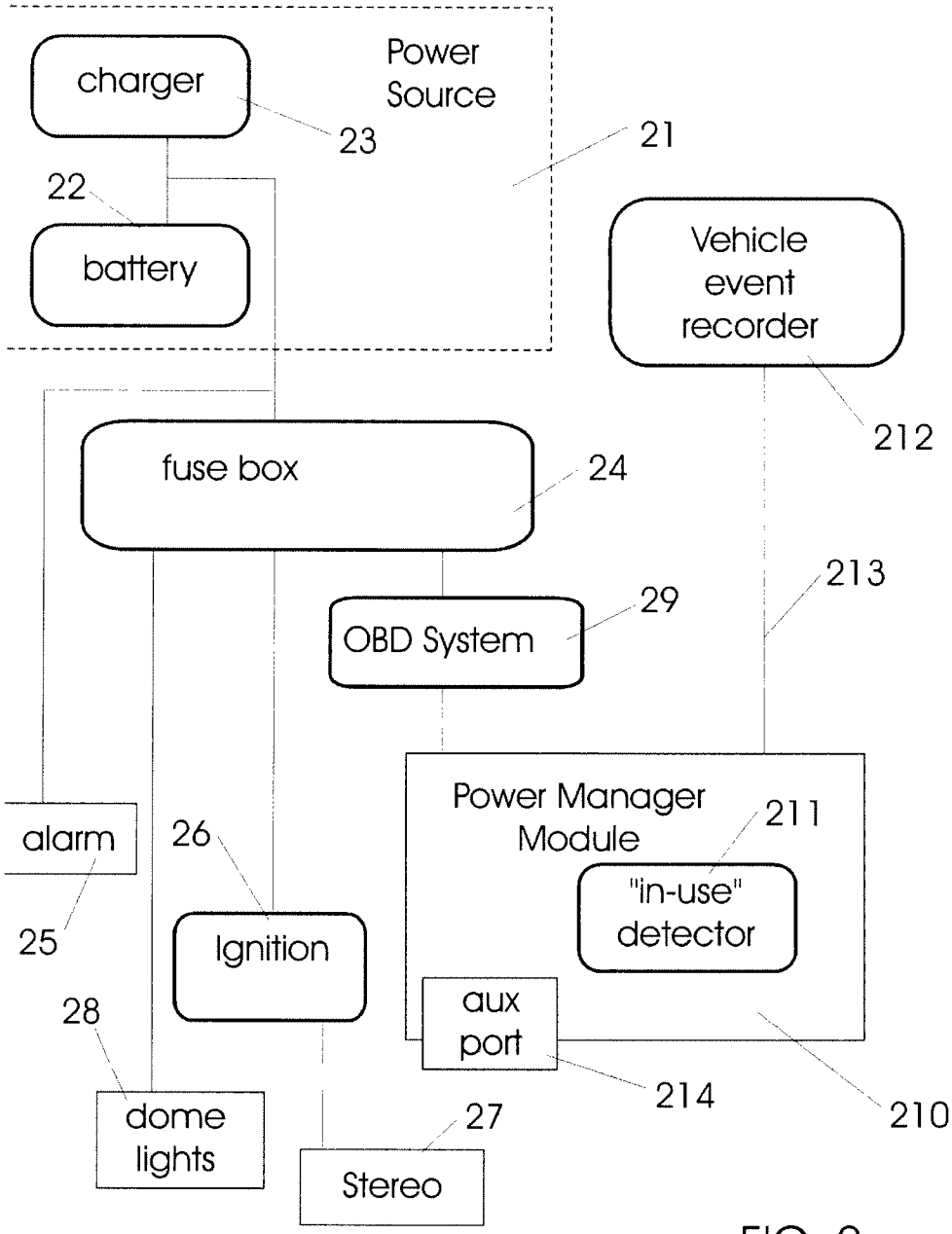
charger
Power Source
23
21
22
battery
Vehicle event recorder
212
fuse box
24
213
29
OBD System
Power Manager Module
211
alarm
26
"in-use" detector
25
Ignition
28
aux port
214
210
dome lights
27
Stereo

FIG. 2

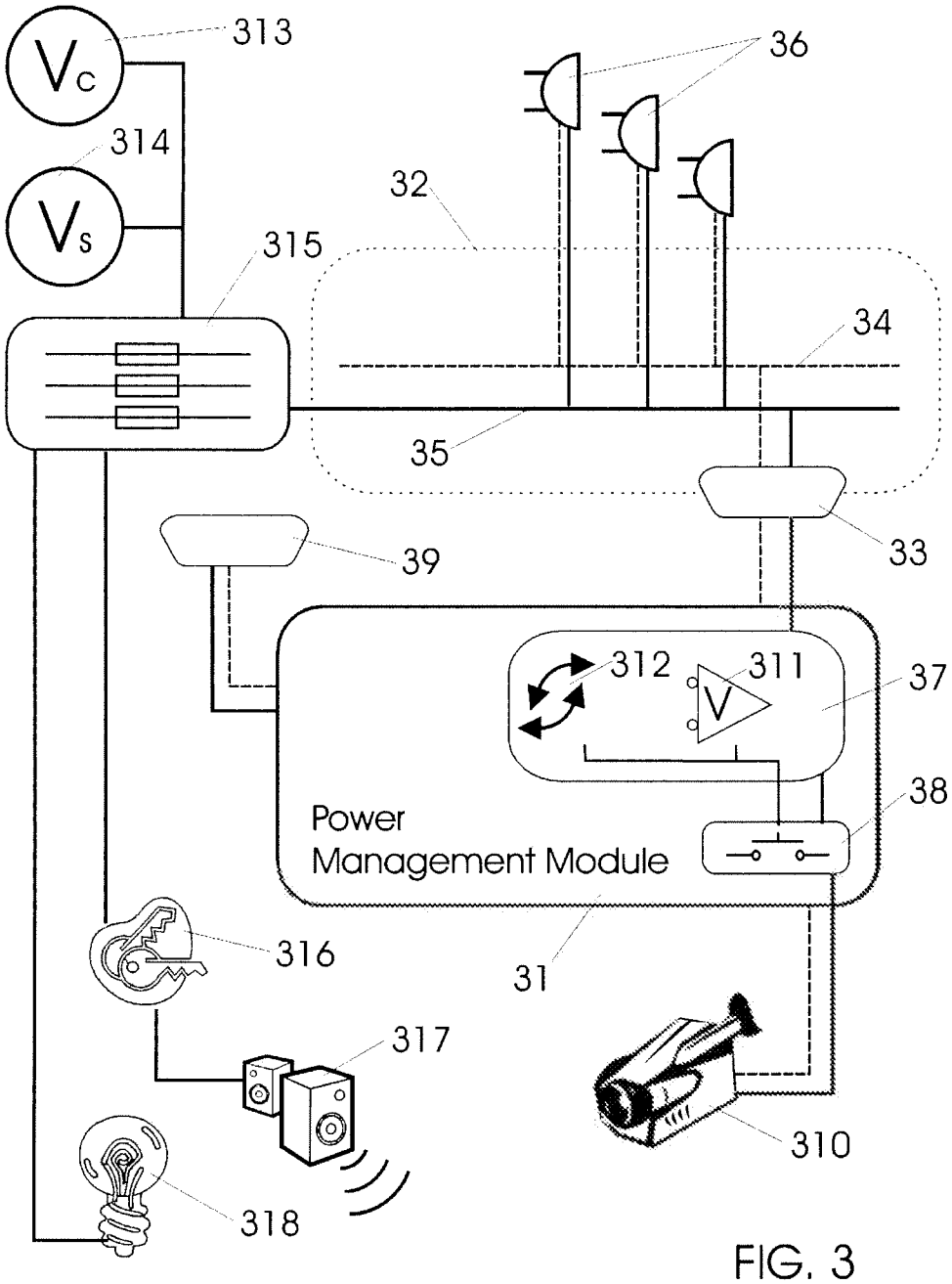
313
Vc
314
Vs
315
36
32
34
35
33
39
312
311
37
38
Power
Management Module
316
31
317
318
310

FIG. 3