US007808375B2

(12) **United States Patent**
Bertness et al.

(10) **Patent No.: US 7,808,375 B2**
(45) **Date of Patent: *Oct. 5, 2010**

(54) **BATTERY RUN DOWN INDICATOR**

(75) Inventors: **Kevin I. Bertness**, Batavia, IL (US); **Nick McMahan**, Bolingbrook, IL (US)

(73) Assignee: **Midtronics, Inc.**, Willowbrook, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 288 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/099,826**

(22) Filed: **Apr. 9, 2008**

(65) **Prior Publication Data**

US 2008/0252437 A1 Oct. 16, 2008

Related U.S. Application Data

(60) Provisional application No. 60/923,661, filed on Apr. 16, 2007.

(51) **Int. Cl.**
B60Q 1/00 (2006.01)

(52) **U.S. Cl.** **340/455**

(58) **Field of Classification Search** 340/455, 340/636.1, 636.15, 990, 988; 324/426
See application file for complete search history.

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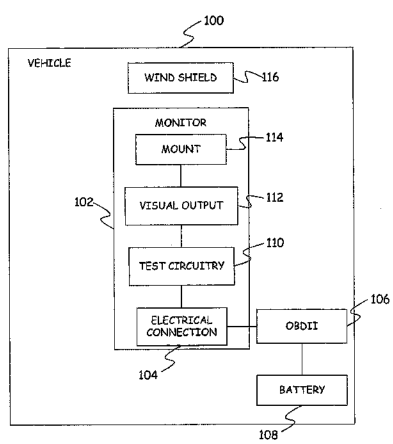
Primary Examiner—Phung Nguyen
(74) *Attorney, Agent, or Firm*—Westman, Champlin & Kelly, P.A.

(57) **ABSTRACT**

An automotive vehicle battery monitor includes an electrical connection configured to electrically couple to an electrical system of the vehicle. An output provides a visual indication related to a condition of the battery. A mount mounts the output at a location at which the output is visible from outside of the vehicle.

20 Claims, 3 Drawing Sheets



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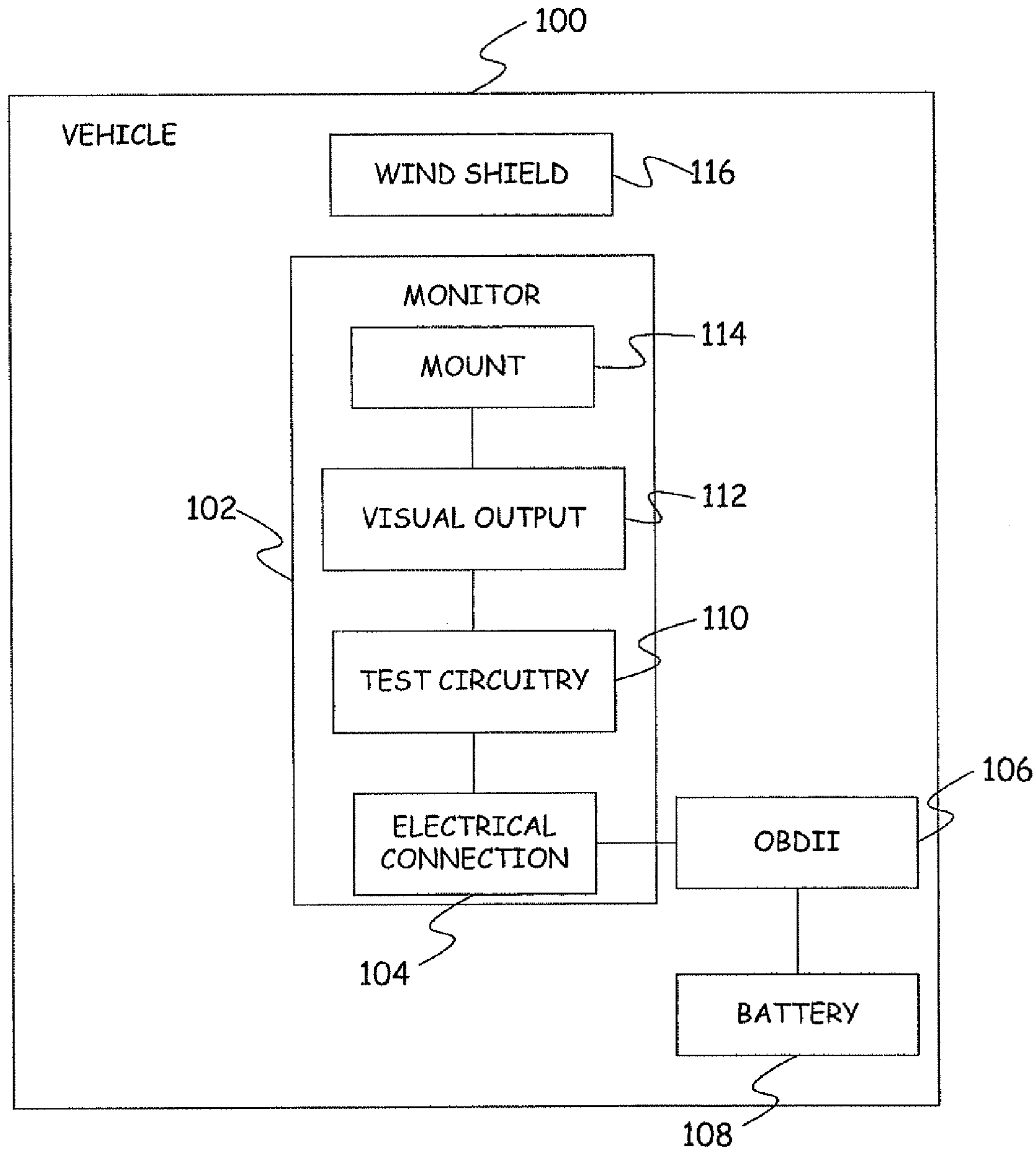
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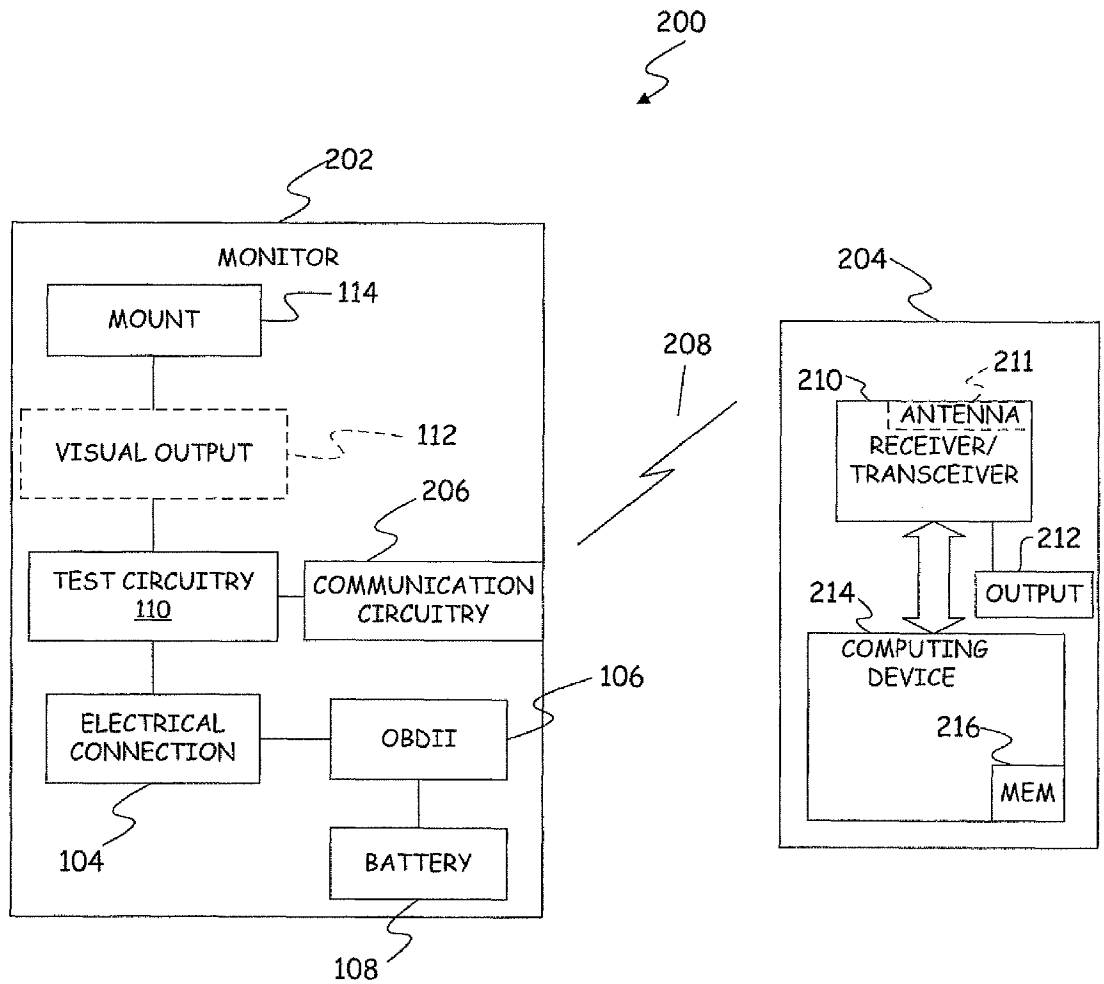
OBDII
106
104
BATTERY
108

FIG. 1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OBDII
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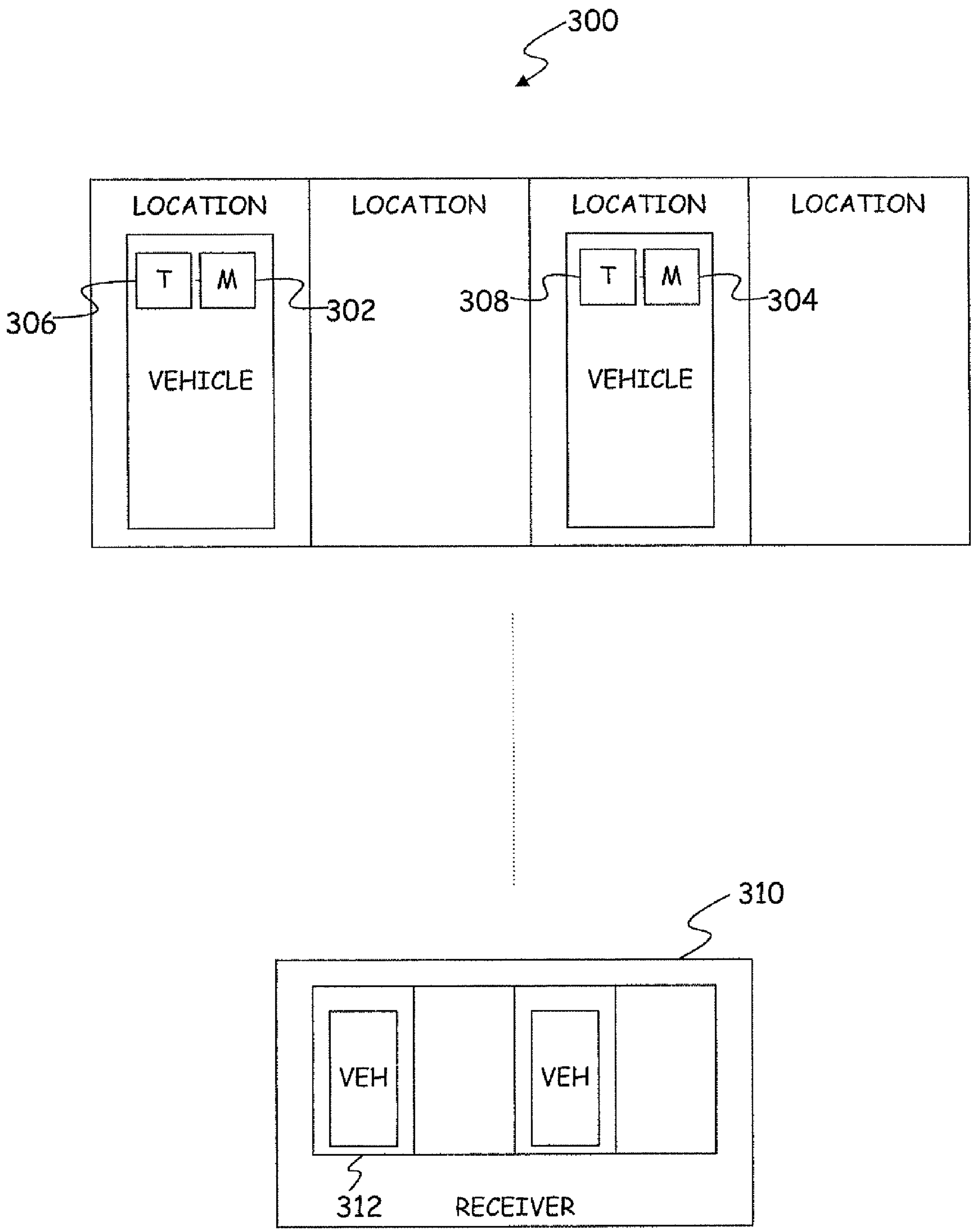
104
BATTERY
108
208
204
210
211
ANTENNA
RECEIVER/ TRANSCEIVER
212
OUTPUT
214
COMPUTING DEVICE
216
MEM

FIG. 2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302
308
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310
VEH
VEH
312
RECEIVER

FIG. 3

BATTERY RUN DOWN INDICATOR

The present application is based on and claims the benefit of U.S. provisional patent application Ser. No. 60/923,661, filed Apr. 16, 2007, the content of which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

The present embodiments relate to automotive vehicles. More specifically, the present embodiments relate to monitoring batteries of automotive vehicles.

Various types of automotive vehicle battery monitors are known. Midtronics, Inc. and Dr. Keith S. Champlin have pioneered a number of technologies shown, for example, in U.S. Pat. No. 3,873,911, issued Mar. 25, 1975, to Champlin; U.S. Pat. No. 3,909,708, issued Sep. 30, 1975, to Champlin; U.S. Pat. No. 4,816,768, issued Mar. 28, 1989, to Champlin; U.S. Pat. No. 4,825,170, issued Apr. 25, 1989, to Champlin; U.S. Pat. No. 4,881,038, issued Nov. 14, 1989, to Champlin; U.S. Pat. No. 4,912,416, issued Mar. 27, 1990, to Champlin; U.S. Pat. No. 5,140,269, issued Aug. 18, 1992, to Champlin; U.S. Pat. No. 5,343,380, issued Aug. 30, 1994; U.S. Pat. No. 5,572,136, issued Nov. 5, 1996; U.S. Pat. No. 5,574,355, issued Nov. 12, 1996; U.S. Pat. No. 5,583,416, issued Dec. 10, 1996; U.S. Pat. No. 5,585,728, issued Dec. 17, 1996; U.S. Pat. No. 5,589,757, issued Dec. 31, 1996; U.S. Pat. No. 5,592,093, issued Jan. 7, 1997; U.S. Pat. No. 5,598,098, issued Jan. 28, 1997; U.S. Pat. No. 5,656,920, issued Aug. 12, 1997; U.S. Pat. No. 5,757,192, issued May 26, 1998; U.S. Pat. No. 5,821,756, issued Oct. 13, 1998; U.S. Pat. No. 5,831,435, issued Nov. 3, 1998; U.S. Pat. No. 5,871,858, issued Feb. 16, 1999; U.S. Pat. No. 5,914,605, issued Jun. 22, 1999; U.S. Pat. No. 5,945,829, issued Aug. 31, 1999; U.S. Pat. No. 6,002,238, issued Dec. 14, 1999; U.S. Pat. No. 6,037,751, issued Mar. 14, 2000; U.S. Pat. No. 6,037,777, issued Mar. 14, 2000; U.S. Pat. No. 6,051,976, issued Apr. 18, 2000; U.S. Pat. No. 6,081,098, issued Jun. 27, 2000; U.S. Pat. No. 6,091,245, issued Jul. 18, 2000; U.S. Pat. No. 6,104,167, issued Aug. 15, 2000; U.S. Pat. No. 6,137,269, issued Oct. 24, 2000; U.S. Pat. No. 6,163,156, issued Dec. 19, 2000; U.S. Pat. No. 6,172,483, issued Jan. 9, 2001; U.S. Pat. No. 6,172,505, issued Jan. 9, 2001; U.S. Pat. No. 6,222,369, issued Apr. 24, 2001; U.S. Pat. No. 6,225,808, issued May 1, 2001; U.S. Pat. No. 6,249,124, issued Jun. 19, 2001; U.S. Pat. No. 6,259,254, issued Jul. 10, 2001; U.S. Pat. No. 6,262,563, issued Jul. 17, 2001; U.S. Pat. No. 6,294,896, issued Sep. 25, 2001; U.S. Pat. No. 6,294,897, issued Sep. 25, 2001; U.S. Pat. No. 6,304,087, issued Oct. 16, 2001; U.S. Pat. No. 6,310,481, issued Oct. 30, 2001; U.S. Pat. No. 6,313,607, issued Nov. 6, 2001; U.S. Pat. No. 6,313,608, issued Nov. 6, 2001; U.S. Pat. No. 6,316,914, issued Nov. 13, 2001; U.S. Pat. No. 6,323,650, issued Nov. 27, 2001; U.S. Pat. No. 6,329,793, issued Dec. 11, 2001; U.S. Pat. No. 6,331,762, issued Dec. 18, 2001; U.S. Pat. No. 6,332,113, issued Dec. 18, 2001; U.S. Pat. No. 6,351,102, issued Feb. 26, 2002; U.S. Pat. No. 6,359,441, issued Mar. 19, 2002; U.S. Pat. No. 6,363,303, issued Mar. 26, 2002; U.S. Pat. No. 6,377,031, issued Apr. 23, 2002; U.S. Pat. No. 6,392,414, issued May 21, 2002; U.S. Pat. No. 6,417,669, issued Jul. 9, 2002; U.S. Pat. No. 6,424,158, issued Jul. 23, 2002; U.S. Pat. No. 6,441,585, issued Aug. 17, 2002; U.S. Pat. No. 6,437,957, issued Aug. 20, 2002; U.S. Pat. No. 6,445,158, issued Sep. 3, 2002; U.S. Pat. No. 6,456,045; U.S. Pat. No. 6,466,025, issued Oct. 15, 2002; U.S. Pat. No. 6,465,908, issued Oct. 15, 2002; U.S. Pat. No. 6,466,026, issued Oct. 15, 2002; U.S. Pat. No. 6,469,511, issued Nov. 22, 2002; U.S. Pat. No. 6,495,990, issued Dec. 17, 2002; U.S. Pat. No. 6,497,209, issued Dec. 24, 2002; U.S.

Pat. No. 6,507,196, issued Jan. 14, 2003; U.S. Pat. No. 6,534,993; issued Mar. 18, 2003; U.S. Pat. No. 6,544,078, issued Apr. 8, 2003; U.S. Pat. No. 6,556,019, issued Apr. 29, 2003; U.S. Pat. No. 6,566,883, issued May 20, 2003; U.S. Pat. No. 6,586,941, issued Jul. 1, 2003; U.S. Pat. No. 6,597,150, issued Jul. 22, 2003; U.S. Pat. No. 6,621,272, issued Sep. 16, 2003; U.S. Pat. No. 6,623,314, issued Sep. 23, 2003; U.S. Pat. No. 6,633,165, issued Oct. 14, 2003; U.S. Pat. No. 6,635,974, issued Oct. 21, 2003; U.S. Pat. No. 6,707,303, issued Mar. 16, 2004; U.S. Pat. No. 6,737,831, issued May 18, 2004; U.S. Pat. No. 6,744,149, issued Jun. 1, 2004; U.S. Pat. No. 6,759,849, issued Jul. 6, 2004; U.S. Pat. No. 6,781,382, issued Aug. 24, 2004; U.S. Pat. No. 6,788,025, filed Sep. 7, 2004; U.S. Pat. No. 6,795,782, issued Sep. 21, 2004; U.S. Pat. No. 6,805,090, filed Oct. 19, 2004; U.S. Pat. No. 6,806,716, filed Oct. 19, 2004; U.S. Pat. No. 6,850,037, filed Feb. 1, 2005; U.S. Pat. No. 6,850,037, issued Feb. 1, 2005; U.S. Pat. No. 6,871,151, issued march 22, 2005; U.S. Pat. No. 6,885,195, issued Apr. 26, 2005; U.S. Pat. No. 6,888,468, issued May 3, 2005; U.S. Pat. No. 6,891,378, issued May 10, 2005; U.S. Pat. No. 6,906,522, issued Jun. 14, 2005; U.S. Pat. No. 6,906,523, issued Jun. 14, 2005; U.S. Pat. No. 6,909,287, issued Jun. 21, 2005; U.S. Pat. No. 6,914,413, issued Jul. 5, 2005; U.S. Pat. No. 6,913,483, issued Jul. 5, 2005; U.S. Pat. No. 6,930,485, issued Aug. 16, 2005; U.S. Pat. No. 6,933,727, issued Aug. 23, 200; U.S. Pat. No. 6,941,234, filed Sep. 6, 2005; U.S. Pat. No. 6,967,484, issued Nov. 22, 2005; U.S. Pat. No. 6,998,847, issued Feb. 14, 2006; U.S. Pat. No. 7,003,410, issued Feb. 21, 2006; U.S. Pat. No. 7,003,411, issued Feb. 21, 2006; U.S. Pat. No. 7,012,433, issued Mar. 14, 2006; U.S. Pat. No. 7,015,674, issued Mar. 21, 2006; U.S. Pat. No. 7,034,541, issued Apr. 25, 2006; U.S. Pat. No. 7,039,533, issued May 2, 2006; U.S. Pat. No. 7,058,525, issued Jun. 6, 2006; U.S. Pat. No. 7,081,755, issued Jul. 25, 2006; U.S. Pat. No. 7,106,070, issued Sep. 12, 2006; U.S. Pat. No. 7,116,109, issued Oct. 3, 2006; U.S. Pat. No. 7,119,686, issued Oct. 10, 2006; and U.S. Pat. No. 7,126,341, issued Oct. 24, 2006; U.S. Pat. No. 7,154,276, issued Dec. 26, 2006; U.S. Pat. No. 7,198,510, issued Apr. 3, 2007; U.S. Ser. No. 09/780,146, filed Feb. 9, 2001, entitled STORAGE BATTERY WITH INTEGRAL BATTERY TESTER; U.S. Ser. No. 09/756,638, filed Jan. 8, 2001, entitled METHOD AND APPARATUS FOR DETERMINING BATTERY PROPERTIES FROM COMPLEX IMPEDANCE/ADMITTANCE; U.S. Ser. No. 09/862,783, filed May 21, 2001, entitled METHOD AND APPARATUS FOR TESTING CELLS AND BATTERIES EMBEDDED IN SERIES/PARALLEL SYSTEMS; U.S. Ser. No. 09/880,473, filed Jun. 13, 2001; entitled BATTERY TEST MODULE; U.S. Ser. No. 10/042,451, filed Jan. 8, 2002, entitled BATTERY CHARGE CONTROL DEVICE; U.S. Ser. No. 10/109,734, filed Mar. 28, 2002, entitled APPARATUS AND METHOD FOR COUNTERACTING SELF DISCHARGE IN A STORAGE BATTERY; U.S. Ser. No. 10/112,998, filed Mar. 29, 2002, entitled BATTERY TESTER WITH BATTERY REPLACEMENT OUTPUT; U.S. Ser. No. 10/263,473, filed Oct. 2, 2002, entitled ELECTRONIC BATTERY TESTER WITH RELATIVE TEST OUTPUT; U.S. Ser. No. 10/310,385, filed Dec. 5, 2002, entitled BATTERY TEST MODULE; U.S. Ser. No. 10/462,323, filed Jun. 16, 2003, entitled ELECTRONIC BATTERY TESTER HAVING A USER INTERFACE TO CONFIGURE A PRINTER; U.S. Ser. No. 10/653,342, filed Sep. 2, 2003, entitled ELECTRONIC BATTERY TESTER CONFIGURED TO PREDICT A LOAD TEST RESULT; U.S. Ser. No. 10/441,271, filed May 19, 2003, entitled ELECTRONIC BATTERY TESTER; U.S. Ser. No. 09/653,963, filed Sep. 1, 2000, entitled SYSTEM AND METHOD FOR CONTROLLING

POWER GENERATION AND STORAGE; U.S. Ser. No. 10/174,110, filed Jun. 18, 2002, entitled DAYTIME RUNNING LIGHT CONTROL USING AN INTELLIGENT POWER MANAGEMENT SYSTEM; U.S. Ser. No. 10/258,441, filed Apr. 9, 2003, entitled CURRENT MEASURING CIRCUIT SUITED FOR BATTERIES; U.S. Ser. No. 10/681,666, filed Oct. 8, 2003, entitled ELECTRONIC BATTERY TESTER WITH PROBE LIGHT; U.S. Ser. No. 10/748,792, filed Dec. 30, 2003, entitled APPARATUS AND METHOD FOR PREDICTING THE REMAINING DISCHARGE TIME OF A BATTERY; U.S. Ser. No. 10/783,682, filed Feb. 20, 2004, entitled REPLACEABLE CLAMP FOR ELECTRONIC BATTERY TESTER; U.S. Ser. No. 10/791,141, filed Mar. 2, 2004, entitled METHOD AND APPARATUS FOR AUDITING A BATTERY TEST; U.S. Ser. No. 10/864,904, filed Jun. 9, 2004, entitled ALTERNATOR TESTER; U.S. Ser. No. 10/867,385, filed Jun. 14, 2004, entitled ENERGY MANAGEMENT SYSTEM FOR AUTOMOTIVE VEHICLE; U.S. Ser. No. 10/896,834, filed Jul. 22, 2004, entitled ELECTRONIC BATTERY TESTER; U.S. Ser. No. 10/897,801, filed Jul. 23, 2004, entitled SHUNT CONNECTION TO A PCB FOR AN ENERGY MANAGEMENT SYSTEM EMPLOYED IN AN AUTOMOTIVE VEHICLE; U.S. Ser. No. 10/958,821, filed Oct. 5, 2004, entitled IN-VEHICLE BATTERY MONITOR; U.S. Ser. No. 10/958,812, filed Oct. 5, 2004, entitled SCAN TOOL FOR ELECTRONIC BATTERY TESTER; U.S. Ser. No. 11/008,456, filed Dec. 9, 2004, entitled APPARATUS AND METHOD FOR PREDICTING BATTERY CAPACITY AND FITNESS FOR SERVICE FROM A BATTERY DYNAMIC PARAMETER AND A RECOVERY VOLTAGE DIFFERENTIAL, U.S. Ser. No. 60/587,232, filed Dec. 14, 2004, entitled CELLTRON ULTRA, U.S. Ser. No. 11/018,785, filed Dec. 21, 2004, entitled WIRELESS BATTERY MONITOR; U.S. Ser. No. 60/653,537, filed Feb. 16, 2005, entitled CUSTOMER MANAGED WARRANTY CODE; U.S. Ser. No. 11/063,247, filed Feb. 22, 2005, entitled ELECTRONIC BATTERY TESTER OR CHARGER WITH DATABUS CONNECTION; U.S. Ser. No. 60/665,070, filed Mar. 24, 2005, entitled OHMMETER PROTECTION CIRCUIT; U.S. Ser. No. 11/141,234, filed May 31, 2005, entitled BATTERY TESTER CAPABLE OF IDENTIFYING FAULTY BATTERY POST ADAPTERS; U.S. Ser. No. 11/143,828, filed Jun. 2, 2005, entitled BATTERY TEST MODULE; U.S. Ser. No. 11/146,608, filed Jun. 7, 2005, entitled SCAN TOOL FOR ELECTRONIC BATTERY TESTER; U.S. Ser. No. 60,694,199, filed Jun. 27, 2005, entitled GEL BATTERY CONDUCTANCE COMPENSATION; U.S. Ser. No. 11/178,550, filed Jul. 11, 2005, entitled WIRELESS BATTERY TESTER/CHARGER; U.S. Ser. No. 60/705,389, filed Aug. 4, 2005, entitled PORTABLE TOOL THEFT PREVENTION SYSTEM, U.S. Ser. No. 11/207,419, filed Aug. 19, 2005, entitled SYSTEM FOR AUTOMATICALLY GATHERING BATTERY INFORMATION FOR USE DURING BATTERY TESTER/CHARGING, U.S. Ser. No. 60/712,322, filed Aug. 29, 2005, entitled AUTOMOTIVE VEHICLE ELECTRICAL SYSTEM DIAGNOSTIC DEVICE, U.S. Ser. No. 60/713,168, filed Aug. 31, 2005, entitled LOAD TESTER SIMULATION WITH DISCHARGE COMPENSATION, U.S. Ser. No. 60/731,881, filed Oct. 31, 2005, entitled PLUG-IN FEATURES FOR BATTERY TESTERS; U.S. Ser. No. 60/731,887, filed Oct. 31, 2005, entitled AUTOMOTIVE VEHICLE ELECTRICAL SYSTEM DIAGNOSTIC DEVICE; U.S. Ser. No. 11/304,004, filed Dec. 14, 2005, entitled BATTERY TESTER THAT CALCULATES ITS OWN REFERENCE VALUES; U.S. Ser. No. 60/751,853, filed Dec. 20, 2005, entitled BATTERY MONITORING SYSTEM; U.S. Ser. No. 11/304,004, filed Dec. 14, 2005, entitled BATTERY TESTER WITH CALCULATES ITS OWN REFERENCE VALUES; U.S. Ser. No. 60/751,853, filed Dec. 20, 2005, entitled BATTERY MONITORING SYSTEM; U.S. Ser. No. 11/352,945, filed Feb. 13, 2006, entitled BATTERY TESTERS WITH SECONDARY FUNCTIONALITY; U.S. Ser. No. 11/356,299, filed Feb. 16, 2006, entitled CENTRALLY MONITORED SALES OF STORAGE BATTERIES; U.S. Ser. No. 11/356,436, field Feb. 16, 2006, entitled ELECTRONIC BATTERY TESTER WITH RELATIVE TEST OUTPUT; U.S. Ser. No. 11/356,443, filed Feb. 16, 2006, entitled ELECTRONIC BATTERY TESTER WITH NETWORK COMMUNICATION; U.S. Ser. No. 11/410,263, filed Apr. 24, 2006, entitled QUERY BASED ELECTRONIC BATTERY TESTER; U.S. Ser. No. 11/498,703, filed Aug. 3, 2006, entitled THEFT PREVENTION DEVICE FOR AUTOMOTIVE VEHICLE SERVICE CENTERS; U.S. Ser. No. 11/507,157, filed Aug. 21, 2006, entitled APPARATUS AND METHOD FOR SIMULATING A BATTERY TESTER WITH A FIXED RESISTANCE LOAD; U.S. Ser. No. 11/511,872, filed Aug. 29, 2006, entitled AUTOMOTIVE VEHICLE ELECTRICAL SYSTEM DIAGNOSTIC DEVICE; U.S. Ser. No. 11/519,481, filed Sep. 12, 2006, entitled BROAD-BAND LOW-CONDUCTANCE CABLES FOR MAKING KELVIN CONNECTIONS TO ELECTROCHEMICAL CELLS AND BATTERIES; U.S. Ser. No. 60/847,064, filed Sep. 25, 2006, entitled STATIONARY BATTERY MONITORING ALGORITHMS; U.S. Ser. No. 11/638,771, filed Dec. 14, 2006, entitled BATTERY MONITORING SYSTEM; U.S. Ser. No. 11/641,594, filed Dec. 19, 2006, entitled METHOD AND APPARATUS FOR MEASURING A PARAMETER OF A VEHICLE ELECTRONIC SYSTEM; U.S. Ser. No. 11/711,356, filed Feb. 27, 2007, entitled BATTERY TESTER WITH PROMOTION FEATURE; which are incorporated herein in their entirety.

Typically, the battery monitor, or tester, is connected to the vehicle battery when the vehicle fails to start. In some instances, the battery monitor is part of the vehicle electrical system such as a voltmeter, which is mounted on the dash of the vehicle. In such automotive vehicle battery monitors, the voltage measurement output, for example, is visible only from within the vehicle. Further, such automotive vehicle battery monitors provide a user-viewable output only after the user has performed an initial action, such as inserting a key into an ignition slot of the vehicle and turning it to an ON position.

SUMMARY OF THE INVENTION

In one embodiment, an automotive vehicle battery monitor includes an electrical connection configured to electrically couple to an electrical system of the vehicle. An output provides a visual indication related to a condition of the battery. A mount mounts the output at a location at which the output is visible from outside of the vehicle. In another embodiment, the automotive vehicle battery monitor communicates the vehicle battery condition information, along with vehicle identification information and/or vehicle location information, to a central receiver.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a simplified block diagram showing an automotive vehicle battery monitor in accordance with one embodiment.

FIG. **2** is a simplified block diagram showing an automotive vehicle battery monitoring system in accordance with one embodiment.

FIG. **3** is a simplified block diagram showing how automotive vehicle batteries can be monitored from a remote location.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

The present embodiments relate to monitors of the type used to monitor a condition of a storage battery of an automotive vehicle.

There are many applications in which a large inventory of vehicles are maintained for extended periods of time. For example, on a new or used car lot, vehicles used by rental agencies, and others. In such applications, the battery of the vehicle may discharge while being stored. When this happens, the discharged battery is typically not noticed until service personnel, or customers, attempt to start the vehicle. This can often be inconvenient and requires the battery to be replaced or recharged.

The present embodiments provide an automotive vehicle battery monitor which includes an electrical connection configured to electrical couple to an electrical system of the automotive vehicle. An output is provided which provides a visual indication related to a condition of the battery. A mount is configured to mount the output at a location at which the output is visible from outside of the vehicle. This allows the condition of the vehicle battery to be observed by simply visually reviewing the inventory of automotive vehicles. In various embodiments, the visual indication can be any type of visual indication, the electrical connection can be any type of electrical connection and the mount can be any type of mount. Further, in various embodiments, the condition of the battery can be any type of battery condition. Additionally, in some embodiments, the battery monitor output can be viewed from a remote location.

FIG. **1** is a simplified block diagram showing an automotive vehicle battery monitor **102** in accordance with one example embodiment. The automotive vehicle battery monitor is shown as being positioned within an automotive vehicle **100** and includes an electrical connection **104** configured to couple to an on-board diagnostic II (OBDII) connection **106** of the vehicle **100**. OBDII connections are known in the art and are used to couple to the OBDII databus of modern vehicles. Such a databus can be used to retrieve information related to various parameters, such as engine parameters, of the vehicle. Additionally, the OBDII connection **106** provides a connection to the vehicle battery **108**. Through the electrical connection **104**, battery test circuitry **110** tests, or otherwise determines a condition of the battery **108**. For example, this can be battery voltage. The test circuitry **110** controls a visual output **112**. For example, the visual output **112** can be a light emitting diode (LED). In one example configuration, the LED can be controlled to blink in a certain pattern to provide an indication related to the condition of the battery **108**. For example, if the battery voltage is above 12.4 volts, the LED is off. However, below 12.4 volts, the LED blinks four times over a predetermined time period, at 12.3 volts, the LED blinks 3 times over the time period. Similarly, at 12.2 volts or less, the LED blinks 2 times over the time period. Below 12.1 volts, the LED blinks one time over the time period. The blinking can be, for example, 25 to 50 milliseconds on and 500 milliseconds off.

The connection to the OBDII system of the vehicle can, in some configurations, be preferential to connecting to a cigarette lighter or the like of the vehicle. For example, some vehicles do not have a cigarette lighter connection whereas all modern mass produced vehicles include an OBDII connection. Further, this connection uses an industry standard coupling.

In general, the circuitry of the monitor **102** uses very little power. In some embodiments, the circuitry of the monitor is "asleep" and periodically "wakes up," and blinks the LED in short bursts. As noted above, by counting blinks, or other visual indication, the monitor **100** can be used as a voltmeter. Further, preferably, the monitor is built using relatively low cost components and a relatively simple circuit design so that it can be easily implemented in all the vehicles at a particular installation.

Mount **114** can be any appropriate mount including, for example, a simple case designed to rest on the dash of the vehicle. In another example, a suction cup or other adhesive is provided such that the visual output can be mounted on a windshield **116** of the vehicle **100**.

Although a simple voltage test is described above, in various embodiments other tests may be implemented and the invention is not limited to such a configuration.

In addition to being able to obtain battery voltage from the OBDII connection, the vehicle identification number (VIN) can also be obtained from the OBDII connection. Thus, in some embodiments, the vehicle battery condition output can be sent along with the automobile VIN to a central receiver where a map that associates storage locations and VINs is available. Such an example embodiment is described below in connection with FIG. **2**.

FIG. **2** is a simplified block diagram showing an automotive vehicle battery monitoring system **200** in accordance with one embodiment. The same reference numerals are used in FIG. **2** for elements that are substantially similar to those included in FIG. **1**. Automotive vehicle battery monitoring system **200** includes an automotive vehicle battery monitor **202**, which is similar to monitor **102** of FIG. **1**, and a receiving system **204**, which is capable of receiving information from vehicle battery monitor **202**. It should be noted that, although a single automotive battery vehicle monitor **202** is shown in FIG. **2** in the interest of simplification, system **200** typically includes multiple automotive vehicle battery monitors that all communicate with a central receiving system **204**.

As can be seen in FIG. **2**, monitor **202** includes elements that are similar to those included in monitor **102** (of FIG. **1**), but also includes communication circuitry **206**, which is coupled to test circuitry **110**. Communication circuitry **206** transmits vehicle battery condition and VIN information via communication link **208**, which can be a wireless communication link (such as a radio frequency (RF) link, infrared (IR) link, etc.), to receiving system **204**.

Receiving system **204** can be implemented as desired. In some embodiments, receiving system **204** can comprise only a receiver/transceiver **210** (optionally including an antenna **211**) and an output **212**, which may be a display unit, for example. Components **210** and **212** may be integrated as a single unit or be separate units that are coupled together. In other embodiments, in addition to receiver/transceiver **210** and output **212**, a computing device **214** can be connected to receiver/transceiver **210** such that it can receive the vehicle battery condition and VIN information and utilize a map (stored in memory **216**, for example) that associates storage locations and VINs, and display vehicle location information and corresponding vehicle battery condition information. Any received data can be stored in a database within memory **216** and used as desired. In one implementation, receiving system **204** can be configured to couple into, for example, the

Internet or an Intranet to serve a web page, which contains vehicle location information and corresponding vehicle battery condition information. This allows for vehicle location information and corresponding vehicle battery condition information to be viewable by using any web browser coupled to receiving system **204** through a data network. Battery monitor **202** can be "asleep" and periodically "wake up" to obtain and transmit vehicle battery condition and VIN information.

Instead of providing a receiving system and monitors that are capable of wireless communication, monitors such as **102** of FIG. **1**, which do not include additional communication circuitry such as **206** (FIG. **2**), can be linked to, or integrated with, any suitable separate vehicle location tracking system that includes its own receiving system. In such embodiments, each monitor is configured to provide the respective vehicle battery condition information to a location tracing component (of a vehicle location tracking system) within the vehicle. The vehicle location tracking component in the vehicle, provides its tracking information and the vehicle battery condition information to a central receiving system which, in addition to the vehicle tracking information, is configured to display the respective vehicle battery condition information. FIG. **3** shows a system **300** in which individual vehicle battery monitors **302**, **304** are communicatively linked to vehicle tags **306**, **308**, for example, of a vehicle tracking system. Each vehicle tag **306**, **308** includes, for example, circuitry that identifies vehicle locations and communicates the vehicle location information to a central receiver **310**, which displays the vehicle locations in any suitable format. Further, the circuitry within the vehicle tag **306**, **308** is configured to receive vehicle battery condition information from the respective vehicle battery monitor **302**, **304** and communicate this information for display along with the vehicle location. In FIG. **3**, item **312** denotes the displayed vehicle location and battery condition information. It should be noted that, in the embodiments of automotive battery vehicle monitors shown in FIGS. **2** and **3**, the vehicle battery condition information is communicated to a central location for viewing and therefore the visual output portion of the individual monitors can be eliminated in such embodiments.

Although the focus of the above description is on the preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the disclosure.

What is claimed is:

1. An automotive vehicle battery monitor, comprising:

an electrical connection configured to electrically couple test circuitry to an electrical system of the vehicle, the test circuitry configured to monitor a condition of the battery during storage of the vehicle;

an output, coupled to the test circuitry, configured to provide a visual indication related to the condition of the battery during storage of the vehicle; and

a mount configured to mount the output at a location at which the output is visible from outside of the vehicle.

2. The apparatus of claim **1** wherein the electrical connection is configured to electrically couple to an On-Board Diagnostics (OBD)-II connection of the vehicle.

3. The apparatus of claim **1** wherein the visual output comprises a light emitting diode.

4. The apparatus of claim **1** wherein the test circuitry measures a voltage of the battery.

5. The apparatus of claim **1** wherein the visual output comprises a flashing light source.

6. The apparatus of claim **1** wherein the mount is configured to mount to a windshield of the vehicle.

7. The apparatus of claim **1** wherein the mount comprises a suction cup.

8. An automotive vehicle battery monitor, comprising:

test circuitry configured to connect to an electrical system of the vehicle and to provide vehicle battery condition information and vehicle identification information during storage of the vehicle; and

communication circuitry, coupled to the test circuitry, configured to communicate the vehicle battery condition information and the vehicle identification information to a central receiver during storage of the vehicle.

9. The apparatus of claim **8** wherein the test circuitry is configured to electrically couple to an On-Board Diagnostics (OBD)-II connection of the vehicle.

10. The apparatus of claim **9** wherein the test circuitry is configured to obtain a voltage of the vehicle battery from the OBDII connection of the vehicle.

11. The apparatus of claim **10** wherein the test circuitry is further configured to obtain vehicle identification information from the OBDII connection of the vehicle.

12. The apparatus of claim **8** wherein the central receiver comprises a map that associates the vehicle identification information with vehicle storage location information.

13. The apparatus of claim **12** wherein the central receiver is configured to associate, using the map, the vehicle storage location information with the vehicle battery condition information.

14. The apparatus of claim **13** wherein the central receiver is configured to couple to an Internet connection.

15. The apparatus of claim **14** wherein the vehicle storage location information with the vehicle battery condition information are accessible using a Web browser.

16. The apparatus of claim **13** wherein the central receiver is configured to couple to an Intranet connection.

17. A method comprising:

electrically coupling test circuitry to an electrical system of a vehicle;

obtaining, using the test circuitry, a measurement of the vehicle battery from the electrical system of the vehicle, the obtained measurement indicative of a condition of the vehicle battery; and

providing, using the test circuitry, information related to the condition of the battery to a vehicle storage location tracking system that tracks a vehicle storage location independently of any information provided from the test circuitry.

18. The method of claim **17** wherein the vehicle storage location tracking system is configured to output information related to the condition of the battery in addition to the vehicle storage location information.

19. The method of claim **17** wherein obtaining, using the test circuitry, a measurement of the vehicle battery from the electrical system of the vehicle, comprises obtaining, using the test circuitry, the measurement of the vehicle battery from an On-Board Diagnostics (OBD)-II connection of the vehicle.

20. The method of claim **19** wherein the measurement obtained from the OBDII connection is vehicle battery voltage.

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