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(54) **ELECTRONIC DRIVER LOGGING SYSTEM AND METHOD**

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(52) **U.S. Cl.**
    USPC **455/419**; 455/418
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    See application file for complete search history.

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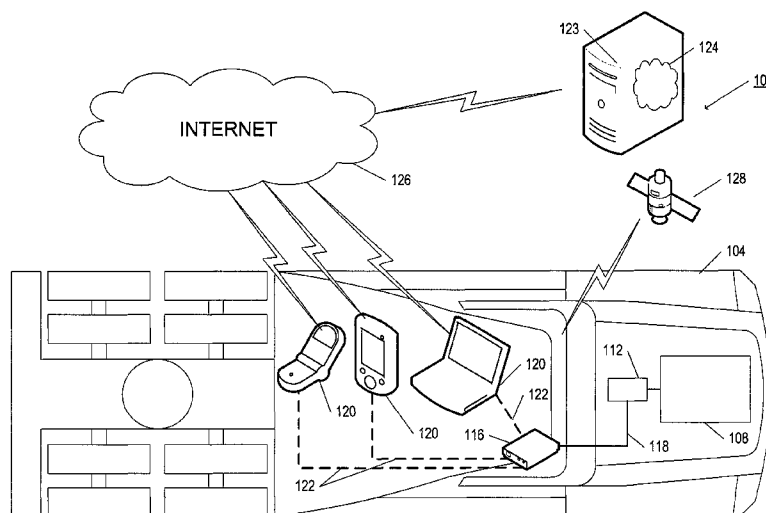*Primary Examiner* — Melody Mehrpour
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(57)   **ABSTRACT**

A system for logging performance of a driver operating a vehicle that has a vehicle information system from which least one vehicle operating parameter may be obtained. The vehicle operating parameter collected through the vehicle information system and operator information collected from a portable device are wirelessly communicated to a remote host through a network such as the Internet.

32 Claims, 10 Drawing Sheets

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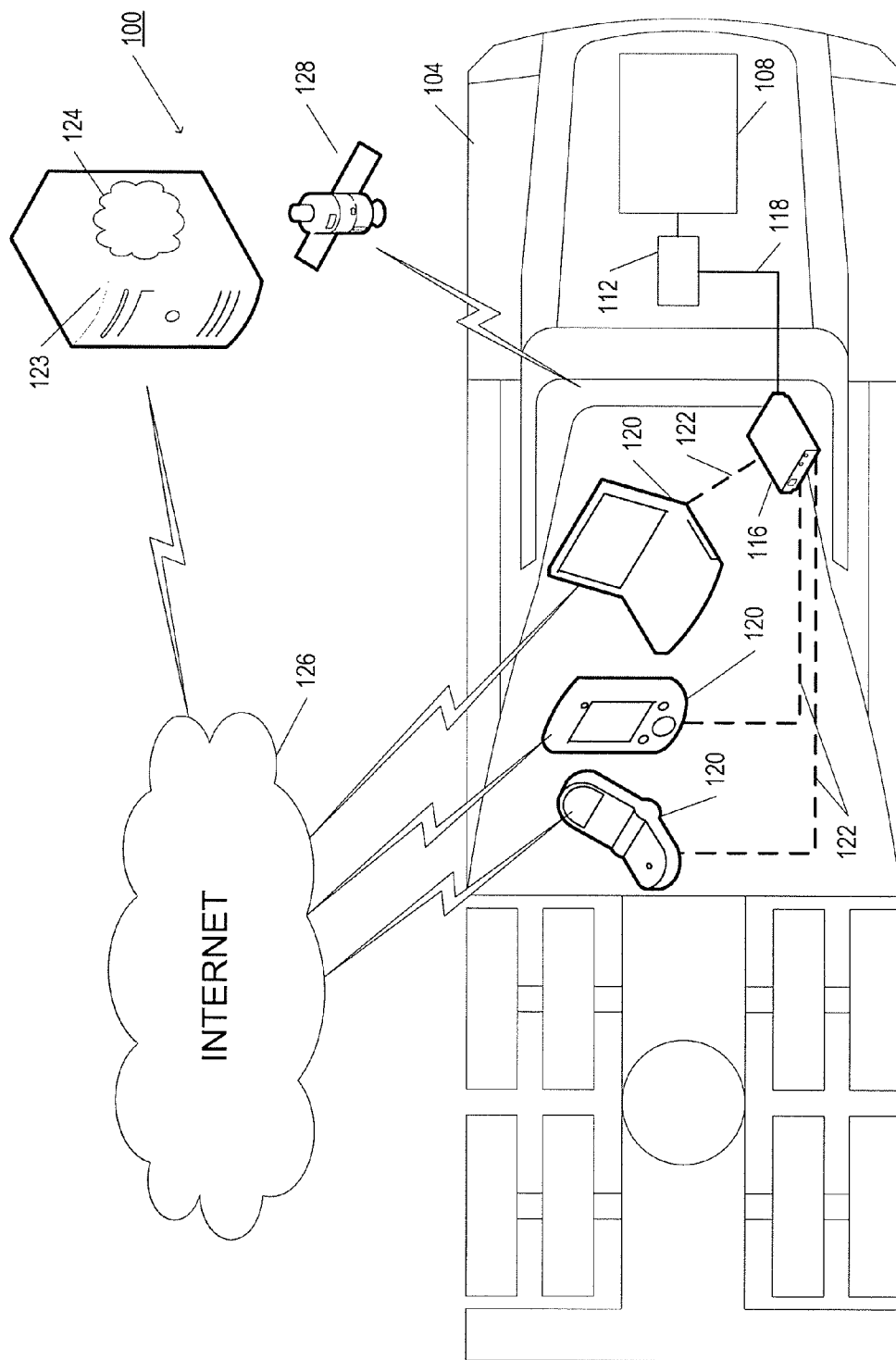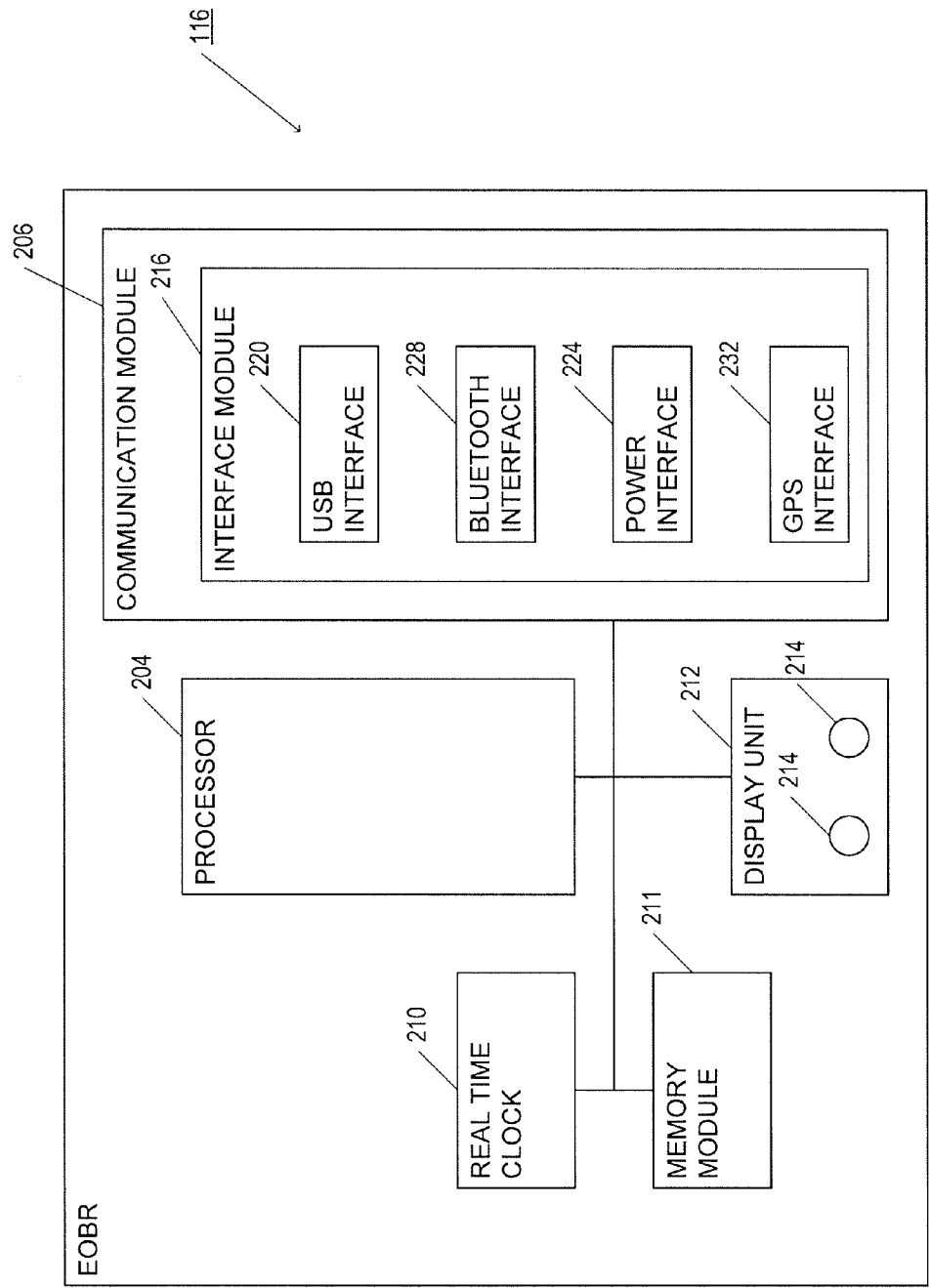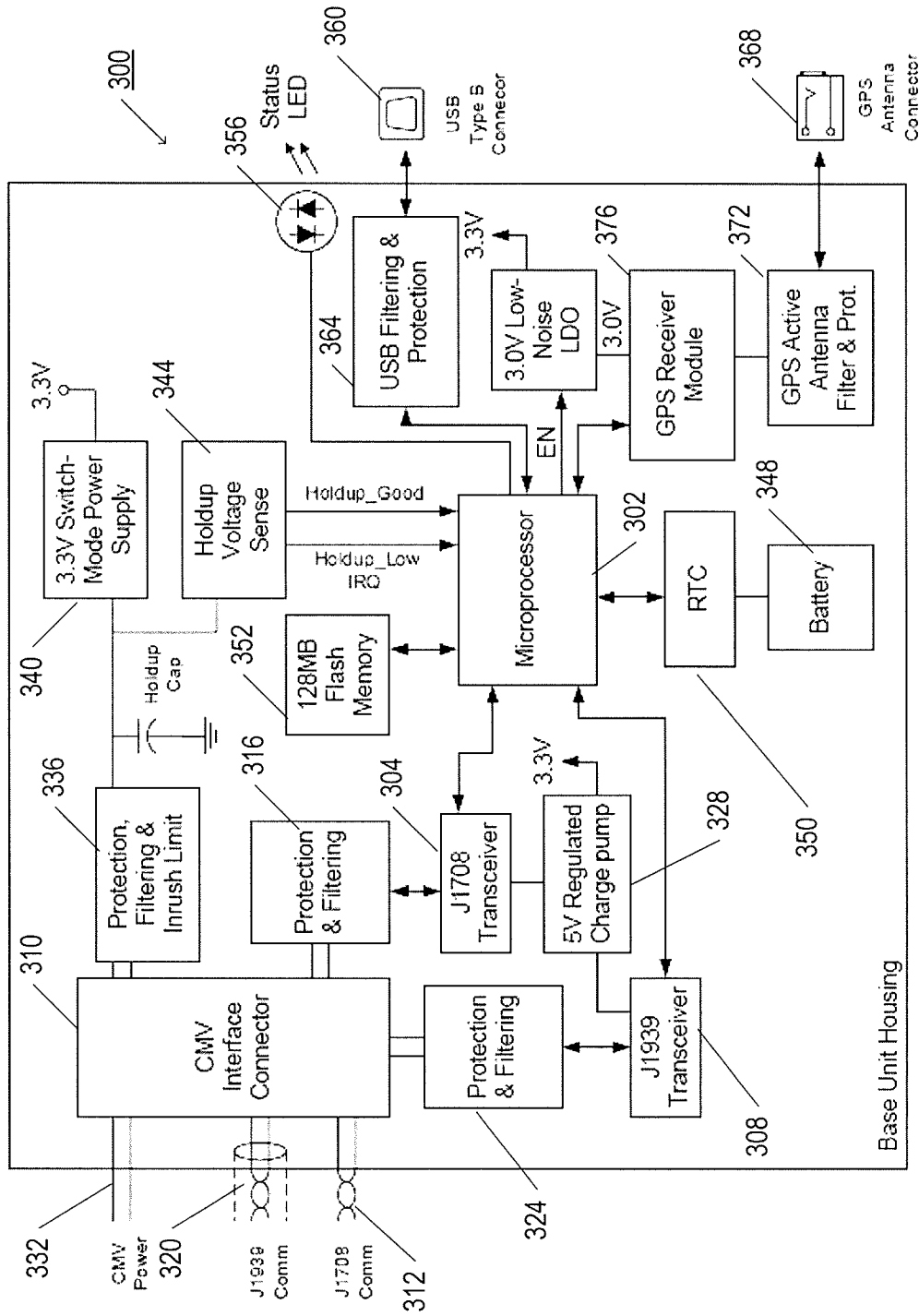
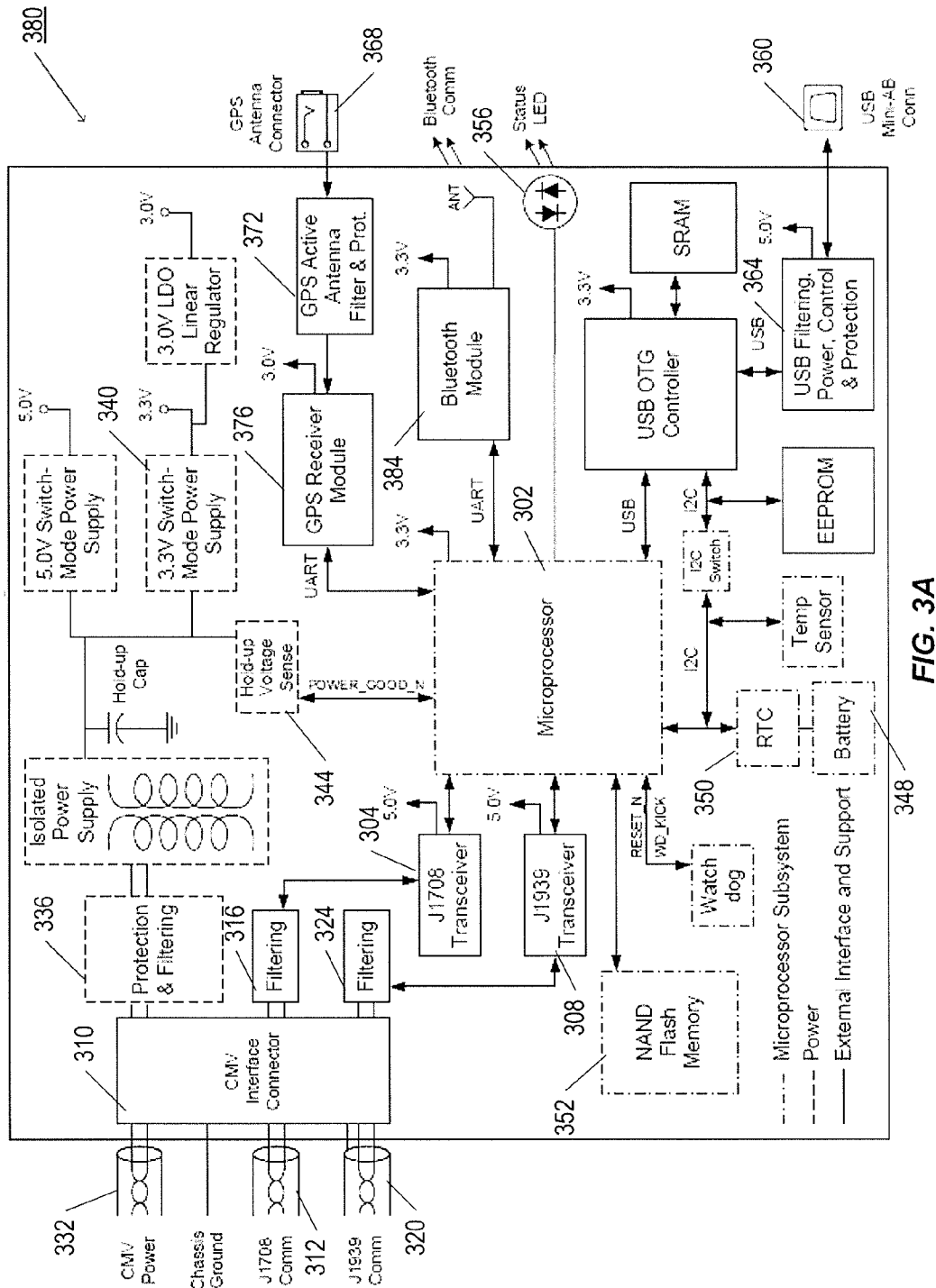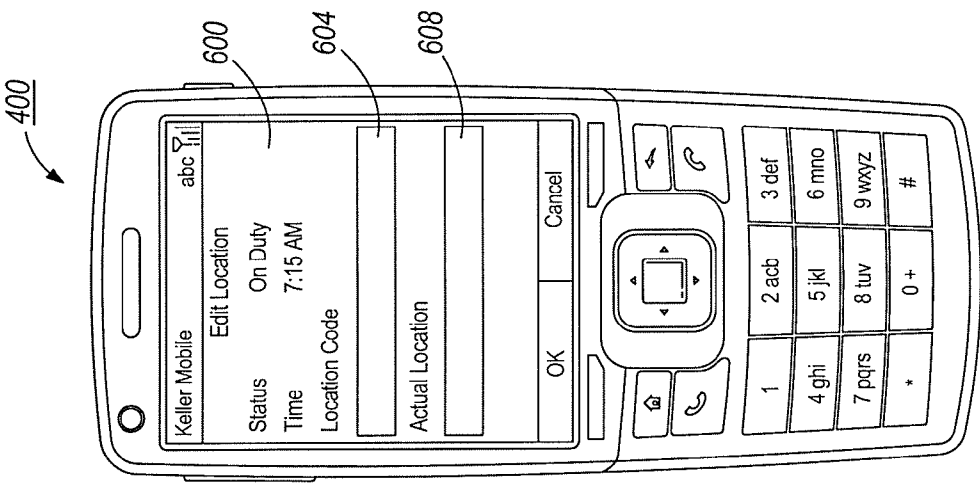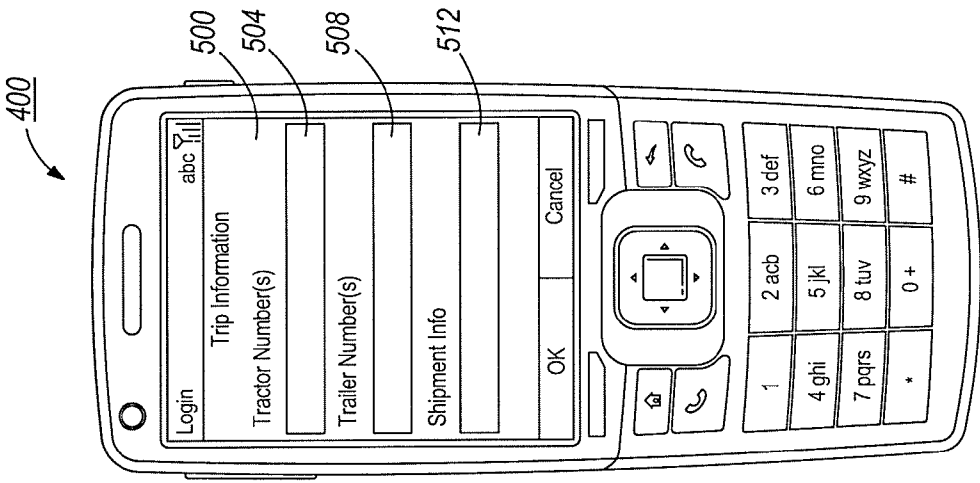* cited by examiner

FIG. 1

FIG. 2

FIG. 3

FIG. 3A

FIG. 6

FIG. 5

FIG. 4

FIG. 9

FIG. 8

FIG. 7

FIG. 12

FIG. 11

FIG. 10

1400

Keller Mobile   abc

Confirm

There are logs missing from
this device.

You may be required to
manually record duty time.

404

Is it OK to continue?

Yes   No

1408

1404

FIG. 14

1300

Login

Download Logs

1316

Log Date	Exists
10/13/2006	No
10/12/2006	No
10/11/2006	No
10/10/2006	No
10/9/2006	No

Check next to log date to create
off-duty log

OK   Download

1320

1304

1312

1308

1324

FIG. 13

400

FIG. 17

FIG. 16

FIG. 15

_1800_

Home	Employees	DQ Files	A&D Files	Accident Files	Training Files	Log Checker	Reports & Forms

◄◄ Back To Previous Page   Switch To Unit Mode

◄ View Employee Log Checker - John Doe
◄ View Employee Log Checker - John Doe
◄ Add Employee Log
◄ View Employee Log Checker - John Doe

Employee Log   △

▷ Change Log - Employee
▷ Change Log - Log Date

View Employee Log - John Doe

_1808_

Log Information   [Edit...]   ☆

Log Date	3/13/2006
Total Miles	0
Driver Type	Property Carrying
Driver Returned/Released From Duty?	No
Off Duty Hours	16.00
Sleeper Hours	0.00
Driving Hours	8.00
On Duty Hours	0.00
Exempt Log?	No

_1804_

Log Summary   ☆

Duty Status	Time	Duration	Rule Set
Off Duty	12:00 AM	3.00	US 60 Hour
Driving	03:00 AM	3.00	US 60 Hour
Off Duty	06:00 AM	7.00	US 60 Hour
Driving	01:00 PM	5.00	US 60 Hour
Off Duty	06:00 PM	6.00	US 60 Hour

Violations   ☒

Locations   [Edit Full List...]   ☒

Team Drivers   [Add New...]   ☒

Receipts   [Add New...]   ☒

FIG. 18

ELECTRONIC DRIVER LOGGING SYSTEM AND METHOD

RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Ser. No. 60/888,458 filed on Feb. 6, 2007, the entire contents of which are incorporated by reference herein.

BACKGROUND

Embodiments of the invention relate to systems and methods for computerized management of operators of commercial vehicles.

Operators of commercial motor vehicles ("CMV's") are required to meet certain specific performance standards and regulations for operating such vehicles. For example, some operators of the CMV's are required to meet hours-of-service regulations.

The U.S. Department of Transportation, Federal Motor Carrier Safety Administration ("FMCSA") has established a comprehensive list of regulations that professional operators of CMV's must comply with. These regulations govern drivers, CMV or trucking companies (sometimes called "carriers") and the CMV's belonging to the carriers. Professional operators must comply with the obligations imposed under federal and state requirements in these areas. The regulations not only include physical and age requirements, but also define the ways an operator can lose his commercial driving privileges. Trucking companies and companies having trucking operations that support their core business are typically required to evaluate and track many aspects of truck operators and their abilities to perform job tasks such as driver qualifications (such as operator licensing and renewal); alcohol and drug testing; accident reporting; driver training; and hiring and screening of applicants.

Many CMV's are equipped with electronic-on-board-recorders to record information relating to the CMV's. The information generally includes names of the carriers, and the U.S. Department of Transportation number of the CMV's. For compliance purposes, operators of the CMV's are also frequently required to collect other relevant information of the drivers such as name, duty status, date and time, locations of the CMV's, and distance traveled. As part of the standards and/or regulations, the operators are required to submit the collected information. Operators frequently submit the collected information on paper. Paper-based processes are often slow. As a result, important compliance information might not be received in time to enforce certain regulatory requirements or to take other relevant actions based on the information.

SUMMARY

Although, various paper-based systems and software are available to assist CMV carriers with some of the areas noted above, such systems are not completely satisfactory. Continued growth and regulation of the carrier industry as well as the increasingly sophisticated logistical mechanisms used to ensure timely and efficient delivery of goods has increased the need of operators to manage their drivers and fleets. As such, it is useful for carriers to have systems available for collecting and communicating information relating to tasks which must be performed under various regulations in order for the company to show that it and its drivers are in compliance. In addition, such information can be used for several management purposes and by the operators of such CMV's.

In one embodiment, the invention provides a logging system that includes a vehicle, a portable device, and a remote host. The vehicle includes a controller and a base unit. The controller is positioned in the vehicle, and monitors one or more operating parameters of the vehicle. The base unit is mounted in the vehicle, and is connected to the controller to receive and store the one or more operating parameters from the device. The portable device, typically carried by the driver, can be coupled to the base unit. Once coupled, the portable device receives identifying information from the driver, receives the one or more operating parameters from the base unit, determines compliance data based, at least in part, on the identifying information and the one or more operating parameters, and wirelessly transmits signals based on the compliance data. The remote host is configured to wirelessly receive the signals from the portable device, and to wirelessly manage the portable device based, at least in part, on the received signals.

In another embodiment, the invention provides a system for logging performance of a driver operating a vehicle. The system includes a base unit, a portable device, and a remote host. The base unit is mounted in the vehicle and is configured to monitor one or more operating parameters of the vehicle. The portable device can be coupled to the base unit to receive identifying information from the driver, to receive the one or more operating parameters from the base unit, to determine compliance data based, at least in part, on the identifying information and the one or more operating parameters, and to wirelessly transmit signals based on the compliance data. The remote host can wirelessly receive the signals from the portable device, and wirelessly manage the portable device based, at least in part, on the received signals.

In yet another embodiment, the invention provides a method for logging performance of a driver operating a vehicle. The method includes receiving identifying information from the driver at a portable device, verifying the identifying information from the driver at the portable device, and receiving one or more operating parameters from the vehicle at the portable device once the identifying information has been verified. The method also includes determining compliance information based, at least in part, on the identifying information and the one or more operating parameters at the portable device, wirelessly transmitting compliance signals indicative of the compliance data from the portable device, and wirelessly receiving the compliance signals at a remote host from the portable device. The method also includes generating managing signals based on the received signals at the remote host, wirelessly transmitting the managing signals from the remote host to the portable device, wirelessly receiving the managing signals at the portable device, and managing performance of the driver and the vehicle based on the received managing signals.

Other aspects of the invention will become apparent by consideration of the detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic illustration of a system structured in accordance with an embodiment of the invention.

FIG. 2 illustrates a base unit of the system in FIG. 1 in a block diagram format.

FIG. 3 is a circuit diagram for one embodiment of the base unit of FIG. 2.

FIG. 3A is a circuit diagram for an alternative embodiment of the base unit of FIG. 2.

FIG. **4** shows a portable device in the form of a smart phone displaying a login screen.

FIG. **5** shows the smart phone of FIG. **4** displaying a trip login screen.

FIG. **6** shows the smart phone of FIG. **4** displaying a location edit screen.

FIG. **7** shows the smart phone of FIG. **4** displaying a time edit screen.

FIG. **8** shows the smart phone of FIG. **4** displaying a status edit screen.

FIG. **9** shows an exemplary status screen of a CMV operated by a CMV driver.

FIG. **10** shows the smart phone of FIG. **4** displaying a plurality of menu functions in the status screen of FIG. **9**.

FIG. **11** shows the smart phone of FIG. **4** displaying a duty status report screen.

FIG. **12** shows the smart phone of FIG. **4** displaying a log detail screen detailing a specific log entry of FIG. **1**.

FIG. **13** shows the smart phone of FIG. **4** displaying a log download screen.

FIG. **14** shows the smart phone of FIG. **4** displaying a confirmation screen

FIG. **15** shows the smart phone of FIG. **4** displaying a logout screen.

FIG. **16** shows the smart phone of FIG. **4** displaying a log submission screen.

FIG. **17** shows the smart phone of FIG. **4** displaying a log submission complete screen.

FIG. **18** shows an exemplary screen of the remote host application of FIG. **1**.

DETAILED DESCRIPTION

Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways.

In one particular embodiment, the invention provides a system for logging performance of a driver operating a vehicle having a vehicle information system from which at least one vehicle operating parameter may be obtained in a performance monitoring process. The vehicle operating parameter collected through the vehicle information system and information such as operator identity from a portable device are wirelessly communicated to a remote host through a network such as the Internet.

FIG. **1** shows a performance monitoring system **100** for use with a commercial motor vehicle ("CMV") **104**. Although the CMV **104** illustrated is a tractor configured to tow a trailer (not shown), the performance monitoring system **100** can also be implemented in other types of CMV's such as construction vehicles and agricultural equipment. The CMV **104** includes an engine **108** that drives the CMV **104**, and is controlled by an electronic control unit ("ECU") **112** that determines operating information or parameters from the engine **108**, and other parts of the CMV **104**. Operating parameters monitored by the ECU **112** include speed, hours of service, operating status, ignition switch status, trip distance, total vehicle distance, and the like.

The performance monitoring system **100** also includes an electronic on-board recorder ("EOBR") base unit **116** that communicates with the ECU **112** through an information bus **118** conforming to standards such as SAE J1939 and SAE J1708 network buses. The base unit **116** has a plurality of

functions including, but not limited to, time keeping and data logging. In one implementation, the base unit **116** records and stores CMV information or data necessary to comply with FMSCA regulations such as those mentioned above from the ECU **112**. The performance monitoring system **100** also includes a portable device **120** such as a mobile phone, a personal-digital-assistant ("PDA"), a laptop computer, or the like, that communicates with the base unit **116**. The base unit **116** communicates with the portable device **120** through a cable or wireless link **122**. The link **122** may be a serial cable, such as a USB cable. Other exemplary links include a wireless personal-area-network such as Bluetooth, and the like. The portable device **120** generally supports multiple platforms such as Windows Mobile 5 cell phones, Pocket PC 2003 (or better) PDA's, and computers such as laptops. The performance monitoring system **100** also includes a remote host server **123** running a remote host application **124** that wirelessly communicates with the portable device **120** via a network such as the Internet, detailed hereinafter. In some embodiments, a global position satellite ("GPS") system **128** also communicates with the ECU **112** and/or the base unit **116** so that information from the GPS system **128** (such as time and location) is available to the CMV **104**. In some embodiments, at least a portion of the information stored in the base unit **116** or information communicated to and from the base unit **116** is encrypted.

FIG. **2** shows the base unit **116** in a block diagram format. As shown, the base unit **116** includes a processor (such as a microprocessor, controller or application-specific-integrated-circuit ("ASIC")) **204**. The base unit **116** also includes a communication module **206**, a real-time clock **210**, and a display unit **212**. In some embodiments, the base unit **116** includes a memory module **211** that stores CMV information. In some embodiments, the display unit **212** includes a plurality of LED's **214** to indicate the status of the base unit **116**, such as, a connection status that indicates whether a portable device has been connected to the base unit **116**, a system status that indicates whether the base unit **116** is properly functioning, a communication status that indicates if signals are communicated between the base unit **116** and the ECU **112**, and a portable device communication status that indicates whether signals are communicated between the base unit **116** and a connected portable device such as the portable device **120**.

In some embodiments, the memory module **211** stores a log of data retrieval history. For example, when a portable device such as the portable device **120** sends a request for data from the base unit **116**, the base unit **116** logs the request, retrieves the data from the memory module **211**, and communicates or delivers the data to the connected device. The memory module **211** also logs other information related to the request, such as the time span over which data was retrieved, the time the data was retrieved or time-stamped, and the size of the data that was delivered. In some embodiments, once the portable device has retrieved the data, the memory area that stored the retrieved data is marked extracted, transmitted, or downloaded, and is re-used, if necessary.

The communication module **206** includes an interface module **216** that includes a plurality of interfaces such as a USB interface **220**, a vehicle power interface **224**, an optional Bluetooth interface **228**, and a GPS interface **232**. In some embodiments, the USB interface **220** includes a B-type USB socket connector into which a USB cable can be inserted to allow the base unit **116** to communicate with devices such as the portable device **120**. The power interface **224** provides power filtering and conditioning to support operations from power obtained from the CMV **104**. Furthermore, the USB

interface **220** also allows the base unit **116** to be field-programmable, that is, the base unit **116** can be reconfigured, modified, or upgraded via the USB interface **220**. The GPS interface **232** supports a connection between an additional GPS board or device and the base unit **116**. In some embodiments, the GPS interface **232** also includes an antenna input to accommodate an antenna that may be required.

FIG. **3** shows an exemplary base unit **300** (**116** of FIG. **2**), wherein like reference numerals refer to like parts. The base unit **300** includes a microprocessor **302** (**204** of FIG. **2**) that processes and outputs data as described. For example, the microprocessor **302** is coupled to first and second transceivers **304**, **308**, respectively, to receive external data. The first transceiver **304** conforms to a J1708 standard, and transmits and receives data through a CMV interface connector **310** (**224** of FIG. **2**), a J1708 communication bus **312**, and a protection and filtering module **316**. The protection and filtering module **316** filters the received data so that data noise can be reduced or eliminated. The protection and filtering module **316** also ensures that the received data has a predetermined amplitude range that is acceptable to the microprocessor **302**. In this way, amplitude surges in data can be detected, and the microprocessor **302** can be protected.

Similarly, the J1939 transceiver **308** transmits and receives data through the CMV interface connector **310**, a J1939 communication bus **320**, and a second protection and filtering module **324**. The second protection and filtering module **324** filters out noise from the received data, and limits an amplitude range of the received data. Both of the transceivers **304** and **308** are regulated by a charge pump **328**. In the embodiment shown, the base unit **300** receives its power from the CMV **104** through the CMV interface connector **310** and a CMV power bus **332**. The power is regulated and surge-protected with a protection, filtering, and inrush limit circuitry **336**, a power supply circuit **340**, and a voltage holdup circuit **344**.

A battery **348** supplies power to the real-time clock ("RTC") **350** (**210** of FIG. **2**) which provides a real-time clock function to allow software to accurately determine a time with a predetermined resolution. In the embodiment shown, the resolution is 1 ms. In some embodiments, the RTC **350** is required to remain operational while the CMV **104** does not provide power to the base unit **300**.

In the embodiment shown, a flash memory **352** (**211** of FIG. **2**) is connected to the microprocessor **302** to log a data retrieval history as described earlier. The flash memory **352** also logs other information related to the request, such as the time span over which data was retrieved, the time the data was retrieved or time-stamped, and the size of the data that was delivered. The microprocessor **302** also displays the status of the base unit **300** with a plurality of status light-emitting-diodes **356** (**212** of FIG. **2**). The base unit **300** also includes a USB type B connector **360** (**220** of FIG. **2**) to transmit and receive data through a USB connector of an external portable device. The received data is also filtered and protected with a USB protection and filtering module **364**. To receive a GPS signal, the base unit **300** also includes a GPS antenna connector **368** (**232** of FIG. **2**) to be connected to a GPS antenna. Data received through the GPS antenna connector **368** is similarly filtered and protected with a GPS protection and filtering module **372**. A GPS receiver module **376** then prepares the received data for further processing by the microprocessor **302**.

FIG. **3A** shows an alternative embodiment of a base unit **380** (**116** of FIG. **2**), wherein like numerals refer to like parts. The base unit **380** includes the CMV interface connector **310** that connects to the CMV power bus **332**, and communicates

to the ECU **112** (of FIG. **1**) with the J1708 communication bus **312** and the J1939 communication bus **320**, via the first and second transceivers **304**, **308**, respectively. The microprocessor **302** processes and outputs data from the first and second transceivers **304**, **308**. In the embodiment shown, the base unit **380** also includes the flash memory **352**, and a Bluetooth interface **384** (**228** of FIG. **2**) that communicates with the mobile devices **120** that are capable of Bluetooth wireless communications. Also, the USB interface **360**, as shown, includes a USB Mini-AB connector.

FIG. **4** shows an example of the portable devices **120** in the form of a smart phone **400** displaying a login screen **402**. In such cases, the smart phone **400** wirelessly connects to the base unit **116** via Bluetooth or other wireless connections, or is wired to the base unit **116** via one or more cables. The smart phone **400** includes a display **404** and generates a graphical user interface on the display **404**. The graphical user interface prompts operators for information and displays information such as an hours-of-service of a particular operator and other information, as detailed hereinafter. The smart phone **400** also includes an input keyboard **408** to allow operators to enter operator or driver, and trip information. The display **404**, as shown in FIG. **4**, via a software application installed in the smart phone **400** shows the login screen **402**, and prompts the operator for login or identifying credentials such as identity or username at a username entry **412** and a password at a password entry **416**. Once the username and the password have been entered and verified, the CMV driver or operator starts a performance monitoring process. Initially, if there is no log entry attributed to the operator, the portable device **120** attempts to establish a network connection with the remote host application **124**. In turn, the remote host application **124** verifies the identifying credentials, detailed hereinafter. After the remote host application **124** has verified the identifying credentials, the remote host application **124** passes back via a return parameter a validation signal to the portable device **120**.

As shown in FIG. **5**, after receiving a validation signal from the remote host application **124**, the smart phone **400** (via the software application), in a trip login screen **500**, prompts the operator for trip information such as a tractor identification number at a tractor number entry **504**, a trailer number at a trailer number entry **508**, and shipment information at a ship-ment info entry **512**. Similarly, as shown in FIG. **6** in a location edit screen **600**, the operator is prompted for a location code at a entry **604**, and/or an actual location at entry **608**.

FIG. **7** shows a time edit screen **700**. Once logged on, the operator is also allowed to edit a time entry **704**, and/or a location entry **708** in the time edit screen **700**. FIG. **8** shows a status edit screen **800** in which the operator is allowed to add a new duty by selecting a new duty entry **804** using the display **404** and the keyboard **408**. After selecting the new duty entry **804**, a status screen appears that allows the operator to further modify or update the status of his or her activities (for example, in sleeper, driving, and the like), detailed hereinaf-ter.

After CMV **104** is in motion, e.g., traveling down a road, the ECU **112** monitors the distance traveled. As shown in an exemplary status screen **900** of FIG. **9**, once the CMV **104** has traveled a predetermined amount of time and/or distance, it is assumed the CMV **104** is being driven to a desired destination rather than, for example, being moved from one parking spot to another. Subsequently, the smart phone **400** displays a current status in the status field **904** to reflect changes in the operator status (now "driving"). After the CMV arrives at a destination and stops, the smart phone **400** prompts the opera-

tor for a new destination location in the location entry **708** (of FIG. **7**). This information is then stored in the memory module **211**.

As shown in FIG. **10**, the status screen **900** also includes a menu tab **1002**. When the menu tab **1002** is activated, the smart phone **400** displays a menu **1003**. In the embodiment shown, the menu **1003** includes a "Records" option **1004**, a "Reports" option **1008**, a "Team Driver" option **1012**, a "Team Driver Share" option **1016**, and a "File" option **1020**. In some embodiments, the "Records" option **1004** allows a driver to access records such as trip information, employee rules, and the like, and also allows a driver to download records, certify and submit logs, identify unassigned driving periods, and edit log locations, detailed hereinafter. In some embodiments, the "Reports" option **1008** allows a driver to generate or access information such as, for example, duty status, daily hours, failure reports such as vehicle failure reports, and location codes, some of which are detailed hereinafter. The "File" option **1020** allows a driver to change his or her password, enter the performance monitor process into a road-side inspection mode, and check for updates such as trip updates, rule set updates, and the like.

When a driver activates the "Report" option **1008** and selects to display the duty status, the smart phone **400** displays the duty status as discussed, as shown in an exemplary duty status report screen **1104** of FIG. **11**. In the embodiment shown, the duty status report screen **1104** summarizes all entries collected thus far. When the operator activates a "Detail" tab **1108** on the duty status report screen **1104**, the smart phone **400** displays details of the entries, as shown in a log detail screen **1204** of FIG. **12**. In the embodiment shown, the status report screen **1108** lists information such as log date, tractor, trailer, shipment, driver type, time zone, rule set, and distance traveled.

In some cases, a regulation enforcement officer can ask a CMV driver for his or her driving logs for a predetermined number of days, such as, for example, seven days, prior to the day of inquiry, or for a predetermined amount of time, such as, for example, 168 hours, prior to the time of inquiry. However, when the smart phone **400** is new, the smart phone **400** may not have been configured to include existing logs of a particular driver and/or a particular CMV. When the logs of interest are not stored in the smart phone **400**, a CMV driver can use the smart phone **400** to download the logs of interest from other places, such as, for example, the remote host server **123** via the Internet, and/or from the base unit **116**.

FIG. **13** shows the smart phone of FIG. **4** displaying a log download screen **1300** which prompts a user to download one or more logs to the smart phone **400**. Particularly, in the embodiment shown, the log download screen **1300** includes a log date column **1304** which lists a plurality of logs **1308** that are available for download, and their corresponding dates. Each of the available logs **13** has a corresponding check box **1312** to accept an input selection from a user. In the embodiment shown, logs **1308** from the last few days are available to be downloaded to the smart phone **400**. In other embodiments, logs from additional periods of time are also available to be downloaded to the smart phone **400**. The log download screen **1300** also includes an "Exists" column **1316** which indicates whether each of the logs **1308** in the log date column **1308** exists, or has already been stored in the smart phone **400**. In the embodiment shown, none of the available logs **1308** is stored in the smart phone **400**. Once a user has checked one or more of the check boxes **1312** and tabbed a download button **1320**, the selected logs are downloaded to the smart phone **400**.

If the user tabs an OK button **1324** or the download button **1320** without selecting any of the logs **1308**, the user is required to confirm that the user has elected not to store any of the available and downloadable logs **1308** to the smart phone **400**. FIG. **14** shows the smart phone of FIG. **4** displaying a confirmation screen **1400**. In the embodiment shown, the confirmation screen **1400** indicates that logs are missing, and prompts the user to select between a "Yes" tab **1404** which confirms no logs are downloaded, and a "No" tab **1408** which returns the display **404** from screen **1400** back to screen **1300**.

When a CMV driver logs out of the performance monitoring process, he or she is given an option of submitting any available logs in a certification process. In this way, the CMV driver can legally submit the logs for regulation compliance purposes. Particularly, FIG. **15** shows the smart phone of FIG. **4** displaying a logout screen **1500** of the certification process on the smart phone **400**. The logout screen **1500** includes an "Actual Time Off Duty" dialog box **1504** allowing the CMV driver to select an actual time that the CMV driver is off duty. In the embodiment shown, the CMV driver has selected to complete the submission "Now" in the dialog box **1504**. Other options of the dialog box **1504** include, but are not limited to, one hour, two hours, and the like. The additional time allows the CMV driver to conduct a post trip inspection, for example. After selecting a time for the dialog box **1504**, the CMV driver has to manually select on the logout screen **1500** to certify and submit logs by tapping a certify check box **1508**, and/or to retain the logs in the smart phone **400** by tapping a retain check box **1512**. After selecting to certify the logs and/or to retain the logs, the CMV driver then taps an "OK" tab **1516** to continue the certification process, or a "Cancel" tab **1520** to cancel the certification process.

After the driver has tapped the OK tab **1516** to continue the certification process, the smart phone **400** displays a plurality of logs that are available for submission and certification. FIG. **16** shows the smart phone **400** of FIG. **4** displaying an exemplary log submission screen **1600** which lists an available log in a log list box **1604**. When the CMV driver taps a "Submit" tab **1608**, the smart phone **400** submits the available logs listed in the log list box **1604** and indicates that the certification process is complete. FIG. **17** shows the smart phone **400** of FIG. **4** displaying an exemplary log submission complete screen **1700**.

FIG. **18** shows an exemplary screen **1800** of the remote host application **124**. Once the log is received at the remote host application **124**, the remote host application **124** stores and calculates parameters such as hours-of-service information of the operator and alerts the operator or the carrier of any violations of predetermined FMCSA rules. For example, a log summary area **1804** lists all duty entries the operator submitted through the portable device **120**. A log information area **1808** lists other driver and vehicle parameters collected. The remote host application **124** thus can rearrange the entries collected and generates different reports as needed. Furthermore, if an operator has a non-compliance violation, the remote host application **124** will also transmit a signal back to the portable device **120** to alert the operator of the violation.

In the embodiment shown, the log information area **1808** lists a plurality of log entries, such as, for example, a "Log Date" indicating a log date of the received log, a "Total Miles" indicating a total mileage driven by the operator, a "Driver Type" indicating a type of qualifications or restrictions on a driver, for example, whether the driver is licensed to drive a property-carrying vehicle or a passenger-carrying vehicle or restrictions apply based on the type of shipment or cargo, a "Drive Returned/Release From Duty" indicating whether the

operator has returned from duty or the operator has been released from duty, an "Off Duty Hours" identifying an amount of time that the CMV driver is off duty, a "Sleeper Hours" indicating an amount of time that the CMV driver has been on sleeper hours, a "Driving Hours" indicating an amount of time that the CMV driver has been driving for the trip, an "On Duty Hours" indicating an amount of time that the CMV driver has been on duty, and an "Exempt Log" indicating if the submitted log can be exempted from logging. Similarly, the log summary area **1804** summarizes log entries for a trip administered by the CMV driver. For example, the summary area **1804** lists entries such as, for example, a duty status, a time, a duration, and a rule set used by the CMV driver. In the embodiment shown, the rule set is "US 60 hour." The CMV driver was off duty from 12:00 AM to about 3:00 AM for about three hours. Afterwards, the CMV driver was driving from 3:00 AM to about 6:00 AM for about three hours. The CMV driver was again off duty from 6:00 AM to about 01:00 PM for about seven hours, and drove from 01:00 PM to about 06:00 PM for about six hours. As such, the CMV driver drove for a total of about eight hours, as displayed in the Driving Hours entry of the log information area **1808**. The screen **1800** is also expandable to display other information such as, violations, locations (which indicates locations the CMV driver has traveled during the trip), team drivers (which indicates a list of operators involved in the trip), and receipts (which indicates a list of receipts collected during the trip).

Various features and aspects of embodiments of the invention are set forth in the following claims.

What is claimed is:

1. A logging system for a commercial motor vehicle ("CMV") operated by a driver, the logging system comprising:

a non-portable base unit including a processor and non-transitory computer-readable medium and configured to be located in the CMV, to be connected to a controller monitoring at least one operating parameter of the CMV, and to receive and store the at least one operating parameter from the controller in the non-transitory computer-readable medium;

a portable device configured to be coupled to the base unit, to receive identifying information from the driver, to receive the at least one operating parameter from the base unit stored in the non-transitory computer-readable medium of the base unit, to determine compliance data based, at least in part, on the identifying information and the at least one operating parameter, and wirelessly transmit signals based on the compliance data, the portable device having a display and, configured to generate a graphical user interface on the display; features to prompt the driver for the identifying information and trip information, features to display a current status of the CMV based, at least in part, on the identifying information and the trip information, to list a plurality of logs based, at least in part, on the received operating parameter, the identifying information, and the trip information, and to list at least one log unavailable in the portable device; and

a remote host configured to wirelessly receive the signals based on the compliance data, the identifying information, and the trip information from the portable device and to wirelessly manage the portable device based, at least in part, on the received signals;

the base unit storing the at least one operating parameter when the portable device is decoupled from the base unit.

2. The system of claim **1**, wherein the portable device comprises at least one of a computer, a personal-digital-assistant ("PDA"), and a smart phone.

3. The system of claim **1**, wherein the portable device is wirelessly coupled to the base unit via at least one of a personal area network connection and a cellular connection.

4. The system of claim **1**, wherein the trip information includes at least one of a tractor identification, trailer number, shipment information, and location code.

5. The system of claim **1**, wherein the portable device is further configured to list at least one of a log date, driver type, time zone, rule set, and distance traveled by the CMV on the display.

6. The system of claim **1**, wherein the compliance data includes an hour-of-service log of the driver.

7. The system of claim **1**, wherein the portable device is configured to selectively download the at least one log unavailable in the portable device.

8. The system of claim **1**, wherein the portable device is further configured to generate the graphical user interface to prompt the driver for a new destination location when the CMV reaches a destination based, at least in part, on information from the controller and the base unit.

9. The system of claim **1**, wherein the remote host is further configured to generate an alert for noncompliant performance of the driver.

10. The system of claim **1**, wherein a controller-area-network bus couples the base unit to the controller.

11. The system of claim **1**, wherein the remote host is configured to wirelessly transmit signals indicative of a type of operating parameter to be monitored by the base unit.

12. The system of claim **1**, wherein the remote host is configured to wirelessly communicate with the portable device via the Internet.

13. A system for logging performance of a driver operating a commercial motor vehicle ("CMV"), the system comprising:

a non-portable base unit including non-transitory computer-readable medium and configured to be mounted in the CMV to receive at least one operating parameter from the CMV, and to store the at least one operating parameter in the non-transitory computer-readable medium; and

a portable device configured to be coupled to the base unit, to receive identifying information from the driver, to receive the at least one operating parameter stored in the non-transitory computer-readable medium from the base unit, to determine compliance data based, at least in part, on the identifying information and the at least one operating parameter, and to wirelessly transmit signals based on the compliance data;

the portable device having a display and configured to generate a graphical user interface on the display, to prompt the driver for the identifying information and trip information, to display a current status of the CMV based, at least in part, on the identifying information and the trip information, to list a plurality of logs based, at least in part, on the received operating parameter, the identifying information and the trip information, and to list at least one log unavailable in the portable device;

the base unit storing the at least one operating parameter when the portable device is decoupled from the base unit.

14. The system of claim **13**, wherein the portable device comprises at least one of a computer, a personal-digital-assistant ("PDA"), and a smart phone.

15. The system of claim **13**, wherein the portable device is wirelessly coupled to the base unit with at least one of a wireless personal area network connection and a cellular connection.

16. The system of claim **13**, wherein the trip information includes at least one of a tractor identification, trailer number, shipment information, and location code.

17. The system of claim **13**, wherein the portable device is further configured to generate the graphical user interface to list at least one of a log date, driver type, time zone, rule set, and distance traveled by the CMV.

18. The system of claim **13**, wherein the compliance data includes an hour-of-service log of the driver.

19. The system of claim **13**, wherein the portable device is configured to selectively download the at least one log unavailable in the portable device.

20. The system of claim **13**, wherein the graphical user interface is further configured to prompt the driver for a new destination location when the CMV reaches a destination based, at least in part, on information from the base unit.

21. The system of claim **13**, wherein the portable device is further configured to generate an alert for noncompliant performance of the driver.

22. The system of claim **13**, wherein the portable device is configured to wirelessly transmit the signals via the Internet.

23. A method for logging performance of a driver operating a commercial motor vehicle ("CMV"), the method comprising:

receiving identifying information and trip information from the driver at a portable device, the portable device including a display and configured to generate a graphical user interface on the display to prompt the driver for the identifying information and the trip information and to display a current status of the CMV based, at least in part, on the identifying information and the trip information;

verifying the identifying information from the driver at the portable device; receiving at least one operating parameter of the CMV at the portable device through a non-portable base unit coupled to the portable device after the identifying information has been verified, the base unit including a processor and non-transitory computer-readable medium and configured to be located in the CMV, to be connected to a controller monitoring the at least one operating parameter of the CMV, and to receive and store the at least one operating parameter in the non-transitory computer-readable medium when the portable device is decoupled from the base unit;

determining compliance data based, at least in part, on the identifying information and the at least one operating parameter at the portable device; wirelessly transmitting

compliance signals indicative of the compliance data from the portable device; wirelessly receiving the compliance signals at a remote host from the portable device;

generating managing signals based on the received signals at the remote host; wirelessly transmitting the managing signals from the remote host to the portable device; wirelessly receiving the managing signals at the portable device; and

managing performance of the driver and the CMV based on the received managing signals by listing on the graphical user interface a plurality of logs based, at least in part, on the at least one operating parameter, the identifying information, and the trip information and listing on the graphical user interface at least one log unavailable in the portable device.

24. The method of claim **23**, wherein the portable device comprises at least one of a computer, a personal-digital-assistant ("PDA"), and a smart phone.

25. The method of claim **23**, further comprising:

prompting the driver for the identifying information and trip information;

displaying a current status of the CMV based, at least in part, on the identifying information and the trip information;

listing a plurality of logs based, at least in part, on the received operating parameters, the identifying information, and the trip information; and

listing at least one log unavailable in the portable device.

26. The method of claim **25**, wherein the trip information includes at least one of a tractor identification, trailer number, shipment information, and location code.

27. The method of claim **25**, further comprising selectively downloading the least one log unavailable in the portable device.

28. The method of claim **23**, further comprising wirelessly coupling the portable device to the vehicle with at least one of a wireless personal area network connection and a cellular connection.

29. The method of claim **23**, further comprising listing at least one of a log date, driver type, time zone, rule set, and distance traveled by the CMV.

30. The method of claim **23**, wherein the compliance data includes hours-of-services of the driver.

31. The method of claim **23**, further comprising prompting the driver for a new destination location when the CMV reaches a destination based, at least in part, on data received from the controller and the base unit.

32. The method of claim **23**, wherein the remote host is configured to wirelessly communicate with the portable device via the Internet.

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