Claims

1. An on-board unit to be mounted on a vehicle, the unit comprising:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function of performing radio communications with an external device,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit determined by the location determination section and to transmit the vehicle location information to the external device with the radio communication section, after starting a normal operation and

wherein the processing unit is configured to, when detecting a stop of the vehicle, transmit vehicle stop information indicating the stop of the vehicle to the external device with the radio communication section and to place the on-board unit into a low power consumption state after the transmission of the vehicle stop information.

2. The on-board unit according to claim 1, wherein the processing unit is configured to detect the stop of the vehicle based on a voltage level on an accessory power supply line of the vehicle.

3. The on-board unit according to claim 1 or 2, wherein the processing unit is configured to, when confirmation completion information generated in response to the vehicle stop information is transmitted from the external device to the radio communication section, receive the confirmation completion information through the radio communication section and to place the on-board unit into the low power consumption state after the processing unit receives the confirmation completion information.

4. The on-board unit according to claim 3, wherein the processing unit retransmits the vehicle stop information to the external device by using the radio communication section, when not receiving the confirmation completion information within a predetermined time period after the transmission of the vehicle stop information.

5. The on-board unit according to claim 4, wherein the processing unit retransmits the vehicle stop information again when the processing unit does not receive the confirmation completion information.

6. The on-board unit according to any one of claims 1 to 5, further comprising:

a switch connected between the processing unit and a battery line receiving a power supply voltage from a

battery of the vehicle,

wherein the power supply voltage is fed to the processing unit from the battery line via the switch, while the normal operation is performed, and

wherein the processing unit places the on-board unit into the low power consumption state by placing the switch into an OFF-state after the transmission of the vehicle stop information.

7. The on-board unit according to claim 2, further comprising:

a switch connected between the processing unit and a battery line receiving a power supply voltage from a battery of the vehicle,

wherein the switch is placed into an ON-state when the voltage level on the accessory power supply line is driven to the power supply voltage, and the power supply voltage starts to be fed to the processing unit by the switch being placed into the ON-state,

wherein the processing unit starts the normal operation when the feeding of the power supply voltage thereto is started, and

wherein the processing unit places the on-board unit into the low power consumption state by placing the switch into an OFF-state after the transmission of the vehicle stop information.

8. An on-board unit to be mounted on a vehicle, the unit comprising:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function of performing radio communications with an external device,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit after starting a normal operation, and

wherein the processing unit is configured to detect a stop of the vehicle based on a voltage level of an accessory power supply line of the vehicle, to transmit vehicle stop information indicating the stop of the vehicle when detecting the stop of the vehicle, and to place the on-board unit into a low power consumption state after the transmission of the vehicle stop information.

9. A vehicle management system, comprising:

an on-board unit to be mounted on a vehicle; and

a host computer,

wherein the on-board unit includes:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function

of performing radio communications with the host computer,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit determined by the location determination section after starting a normal operation and to transmit the vehicle location information to the host computer with the radio communication section, and

wherein, upon reception of the vehicle location information, the host computer stores in a database the location of the on-board unit described in the vehicle location information,

wherein the processing unit is configured to, when detecting a stop of the vehicle, transmit vehicle stop information indicating the stop of the vehicle to the host computer with the radio communication section and to place the on-board unit into a low power consumption state after the transmission of the vehicle stop information, and

wherein, upon reception of the vehicle stop information, the host computer stores in the database data indicating the stop of the vehicle.

10. The vehicle management system according to claim 9, wherein the host computer transmits confirmation completion information to the on-board unit when receiving the vehicle stop information, and

wherein the processing unit of the on-board unit is configured to place the on-board unit into the low power

consumption state after reception of the confirmation completion information via the radio communication section.

11. The vehicle management system according to claim 9 or 10, wherein the processing unit is configured to detect the stop of the vehicle based on a voltage level on an accessory power supply line of the vehicle.

12. A recording medium recording a program which causes a processing unit of an on-board unit mounted on a vehicle to perform steps of:

generating vehicle location information indicating a location of the on-board unit determined by a location determination section included in the on-board unit after the processing unit starts a normal operation to transmit the vehicle location information to an external device with a radio communication section included in the on-board unit; and

when detecting a stop of the vehicle, transmitting vehicle stop information indicating the stop of the vehicle to the external device with the radio communication section; and

placing the on-board unit into a low power consumption state after the transmission of the vehicle stop information.

13. A vehicle management method to be implemented in a vehicle management system including an on-board unit mounted on a vehicle and a host computer, the method comprising:

by a processing unit included in the on-board unit, generating vehicle location information indicating a location of the on-board unit determined by a location determination section included in the on-board unit after the processing unit starts a normal operation to transmit the vehicle location information to the host computer;

storing in a database of the host computer the location of the on-board unit described in the vehicle location information;

detecting a stop of the vehicle;

when detecting the stop of the vehicle, transmitting vehicle stop information indicating the stop of the vehicle to the host computer;

placing the on-board unit into a low power consumption state after the transmission of the vehicle stop information; and

in the host computer, storing data indicating the stop of the vehicle in the database in response to the vehicle stop information.

Claims

1. An on-board unit to be mounted on a vehicle, the unit comprising:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function of performing radio communications with an external device,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit determined by the location determination section and to transmit the vehicle location information to the external device with the radio communication section, after starting a normal operation,

wherein the processing unit is configured to, when detecting a stop of the vehicle, transmit vehicle stop information indicating the stop of the vehicle to the external device with the radio communication section,

wherein the processing unit is configured to, when confirmation completion information generated in response to the vehicle stop information is transmitted from the external device to the radio communication section, receive the confirmation

completion information through the radio communication section and to place the on-board unit into the low power consumption state after the processing unit receives the confirmation completion information.

2. The on-board unit according to claim 1, wherein the processing unit is configured to detect the stop of the vehicle based on a voltage level on an accessory power supply line of the vehicle.

3. The on-board unit according to claim 1, wherein the processing unit retransmits the vehicle stop information to the external device by using the radio communication section, when not receiving the confirmation completion information within a predetermined time period after the transmission of the vehicle stop information.

4. The on-board unit according to claim 3, wherein the processing unit retransmits the vehicle stop information again when the processing unit does not receive the confirmation completion information.

5. The on-board unit according to any one of claims 1 to 4, further comprising:

a switch connected between the processing unit and a battery line receiving a power supply voltage

from a battery of the vehicle,

wherein the power supply voltage is fed to the processing unit from the battery line via the switch, while the normal operation is performed, and

wherein the processing unit places the on-board unit into the low power consumption state by placing the switch into an OFF-state after the transmission of the vehicle stop information.

6. The on-board unit according to claim 2, further comprising:

a switch connected between the processing unit and a battery line receiving a power supply voltage from a battery of the vehicle,

wherein the switch is placed into an ON-state when the voltage level on the accessory power supply line is driven to the power supply voltage, and the power supply voltage starts to be fed to the processing unit by the switch being placed into the ON-state,

wherein the processing unit starts the normal operation when the feeding of the power supply voltage thereto is started, and

wherein the processing unit places the on-board unit into the low power consumption state by placing the switch into an OFF-state after the transmission of the vehicle stop information.

7. An on-board unit to be mounted on a vehicle, the unit comprising:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function of performing radio communications with an external device,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit after starting a normal operation, and

wherein the processing unit is configured to detect a stop of the vehicle based on a voltage level of an accessory power supply line of the vehicle, to transmit vehicle stop information indicating the stop of the vehicle when detecting the stop of the vehicle,

wherein the processing unit is configured to, when confirmation completion information generated in response to the vehicle stop information is transmitted from the external device to the radio communication section, receive the confirmation completion information through the radio communication section and to place the on-board unit into the low power consumption state after the processing unit receives the confirmation completion information.

8. A vehicle management system, comprising:

an on-board unit to be mounted on a vehicle; and

a host computer,

wherein the on-board unit includes:

a location determination section determining a location of the on-board unit;

a processing unit; and

a radio communication section having a function of performing radio communications with the host computer,

wherein the processing unit is configured to generate vehicle location information indicating the location of the on-board unit determined by the location determination section after starting a normal operation and to transmit the vehicle location information to the host computer with the radio communication section, and

wherein, upon reception of the vehicle location information, the host computer stores in a database the location of the on-board unit described in the vehicle location information,

wherein the processing unit is configured to, when detecting a stop of the vehicle, transmit vehicle stop information indicating the stop of the vehicle to the host computer with the radio communication section,

wherein, upon reception of the vehicle stop

information, the host computer stores in the database data indicating the stop of the vehicle

wherein the host computer transmits confirmation completion information to the on-board unit when receiving the vehicle stop information, and

wherein the processing unit of the on-board unit is configured to place the on-board unit into the low power consumption state after reception of the confirmation completion information via the radio communication section.

9. The vehicle management system according to claim 8, wherein the processing unit is configured to detect the stop of the vehicle based on a voltage level on an accessory power supply line of the vehicle.

10. A recording medium recording a program which causes a processing unit of an on-board unit mounted on a vehicle to perform steps of:

generating vehicle location information indicating a location of the on-board unit determined by a location determination section included in the on-board unit after the processing unit starts a normal operation to transmit the vehicle location information to an external device with a radio communication section included in the on-board unit; and

when detecting a stop of the vehicle, transmitting vehicle stop information indicating the stop of the vehicle to the external device with the radio communication section;

when confirmation completion information generated in response to the vehicle stop information is transmitted from the external device to the radio communication section, receiving the confirmation completion information through the radio communication section; and

placing the on-board unit into a low power consumption state in response to receipt of the confirmation completion information by the radio communication section.

11. A vehicle management method to be implemented in a vehicle management system including an on-board unit mounted on a vehicle and a host computer, the method comprising:

by a processing unit included in the on-board unit, generating vehicle location information indicating a location of the on-board unit determined by a location determination section included in the on-board unit after the processing unit starts a normal operation to transmit the vehicle location information to the host computer;

storing in a database of the host computer the

location of the on-board unit described in the vehicle location information;

detecting a stop of the vehicle;

when detecting the stop of the vehicle, transmitting vehicle stop information indicating the stop of the vehicle to the host computer;

in the host computer, storing data indicating the stop of the vehicle in the database in response to the vehicle stop information;

transmitting confirmation completion information from the host computer to the on-board unit in response to receipt of the vehicle stop information by the host computer, and

placing the on-board unit into the low power consumption state in response to reception of the confirmation completion information by the on-board unit.