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Flick

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(54) **REMOTE CLIMATE CONTROL DEVICE INCLUDING ELECTRICAL HEATER FOR A HYBRID VEHICLE AND ASSOCIATED METHODS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1997 days.

This patent is subject to a terminal disclaimer.

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(51) **Int. Cl.**

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B60H 1/02	(2006.01)
B60K 6/20	(2007.10)
G05D 23/19	(2006.01)
B60H 1/00	(2006.01)
B60H 1/22	(2006.01)
B60W 10/06	(2006.01)
B60W 20/00	(2006.01)

(52) **U.S. Cl.**

CPC ***G05D 23/1905*** (2013.01); ***B60H 1/004*** (2013.01); ***B60H 1/00657*** (2013.01); ***B60H 1/2218*** (2013.01); ***B60W 10/06*** (2013.01); *B60W 20/00* (2013.01); *B60W 2510/244* (2013.01)

(58) **Field of Classification Search**

CPC B60R 25/00; B60R 11/02; B60R 25/10; G05D 23/1905; B60H 1/004; B60H 1/2218; B60W 10/06; B60W 20/00; B60W 2510/244

USPC 701/36

See application file for complete search history.

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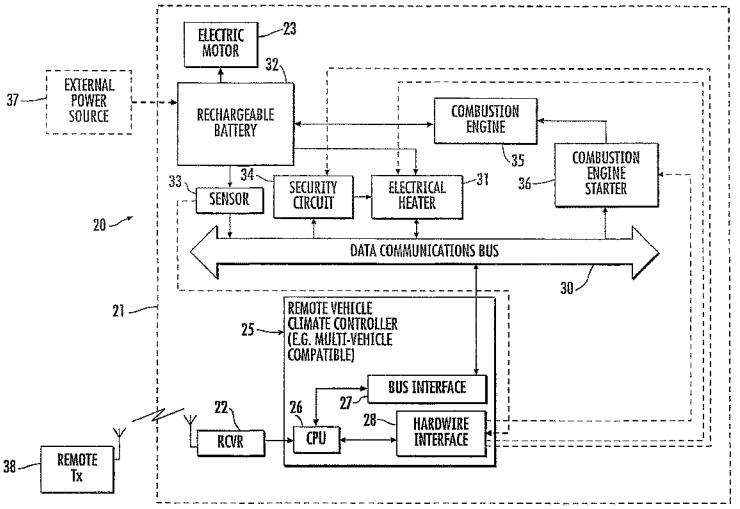
(57) **ABSTRACT**

A remote climate control system is for a hybrid vehicle having a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, and a data communications bus extending throughout the hybrid vehicle. At least one of the electrical heater and the sensor is coupled to the data communications bus. The remote climate control system includes a remote transmitter and a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter. A vehicle remote climate controller cooperates with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter.

32 Claims, 12 Drawing Sheets



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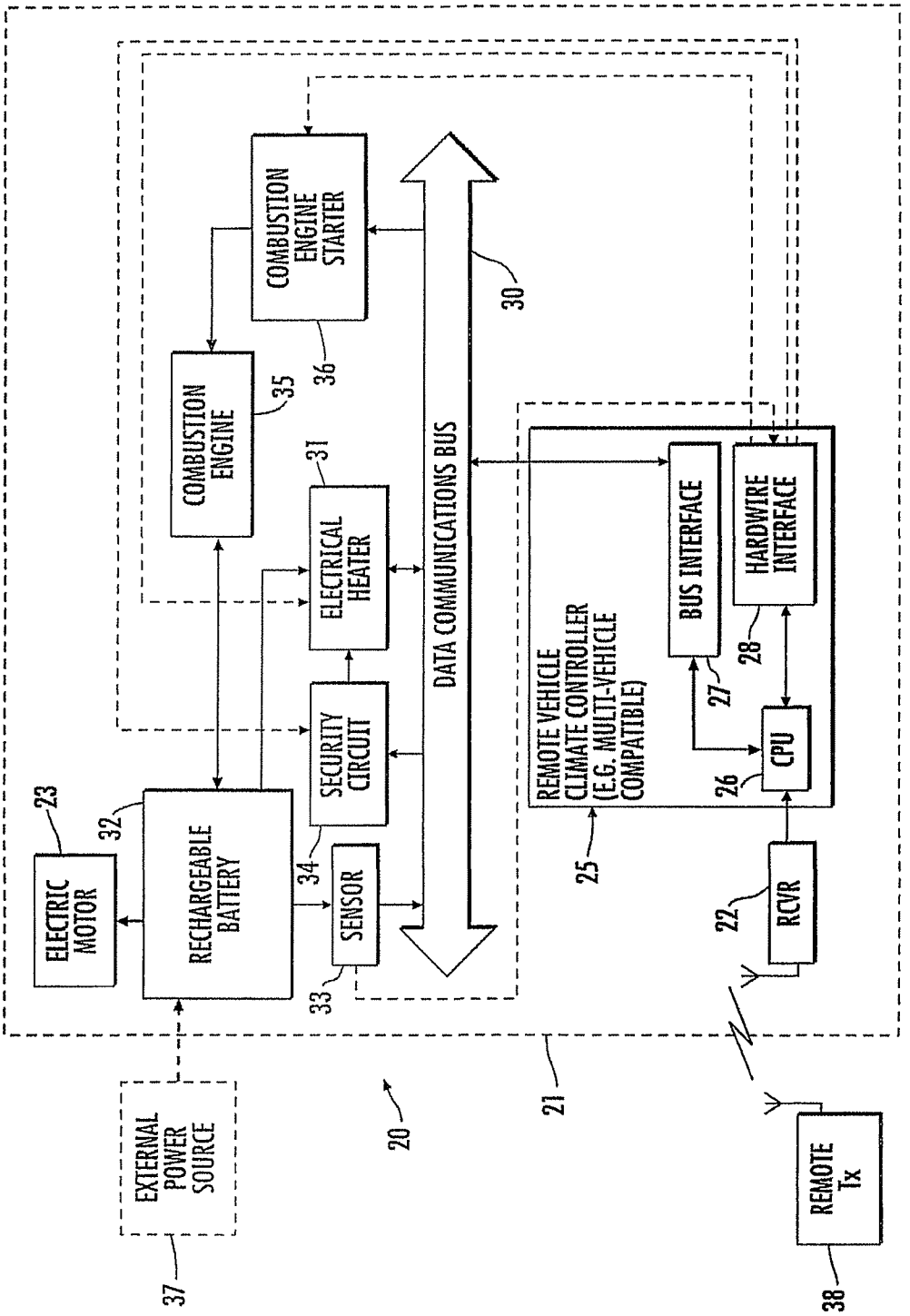
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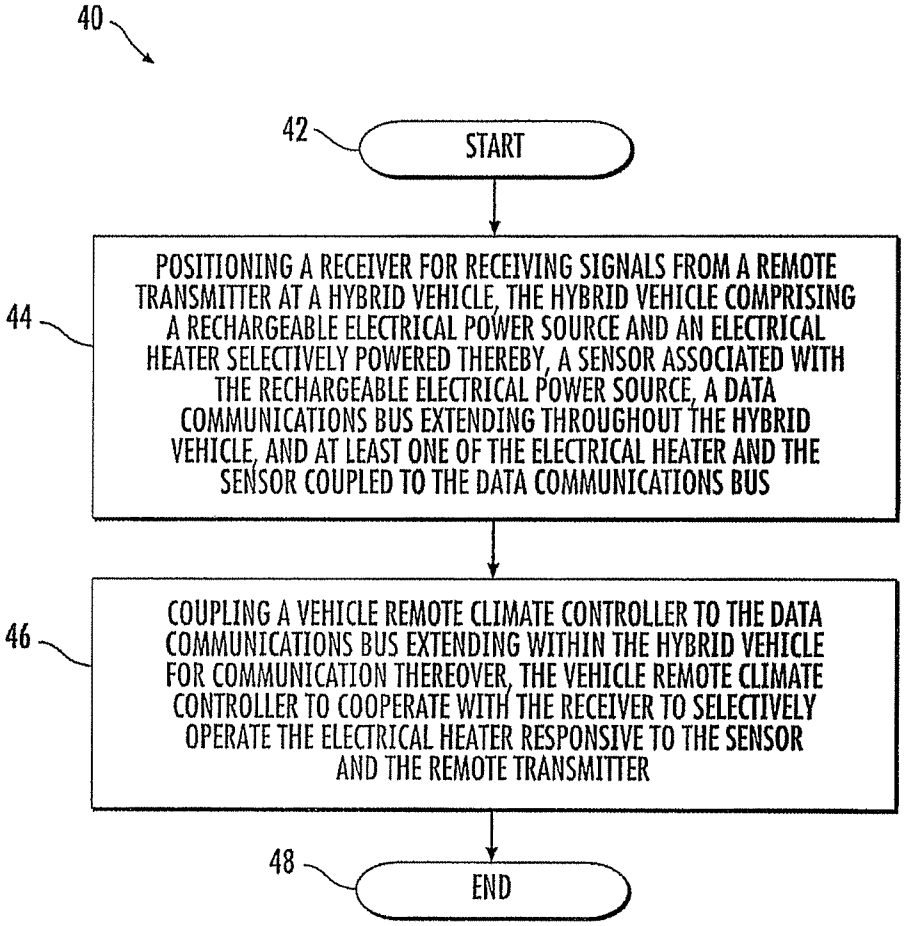
23
RECHARGEABLE BATTERY
32
EXTERNAL POWER SOURCE
37
COMBUSTION ENGINE
35
COMBUSTION ENGINE STARTER
36
ELECTRICAL HEATER
31
SECURITY CIRCUIT
34
SENSOR
33
DATA COMMUNICATIONS BUS
30
REMOTE VEHICLE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
25
BUS INTERFACE
27
HARDWIRE INTERFACE
28
CPU
26
RCVR
22
REMOTE Tx
38
20
21

FIG. 1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42
START
44
POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT A HYBRID VEHICLE, THE HYBRID VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRICAL HEATER SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE HYBRID VEHICLE, AND AT LEAST ONE OF THE ELECTRICAL HEATER AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
46
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE HYBRID VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRICAL HEATER RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
48
END

FIG. 2

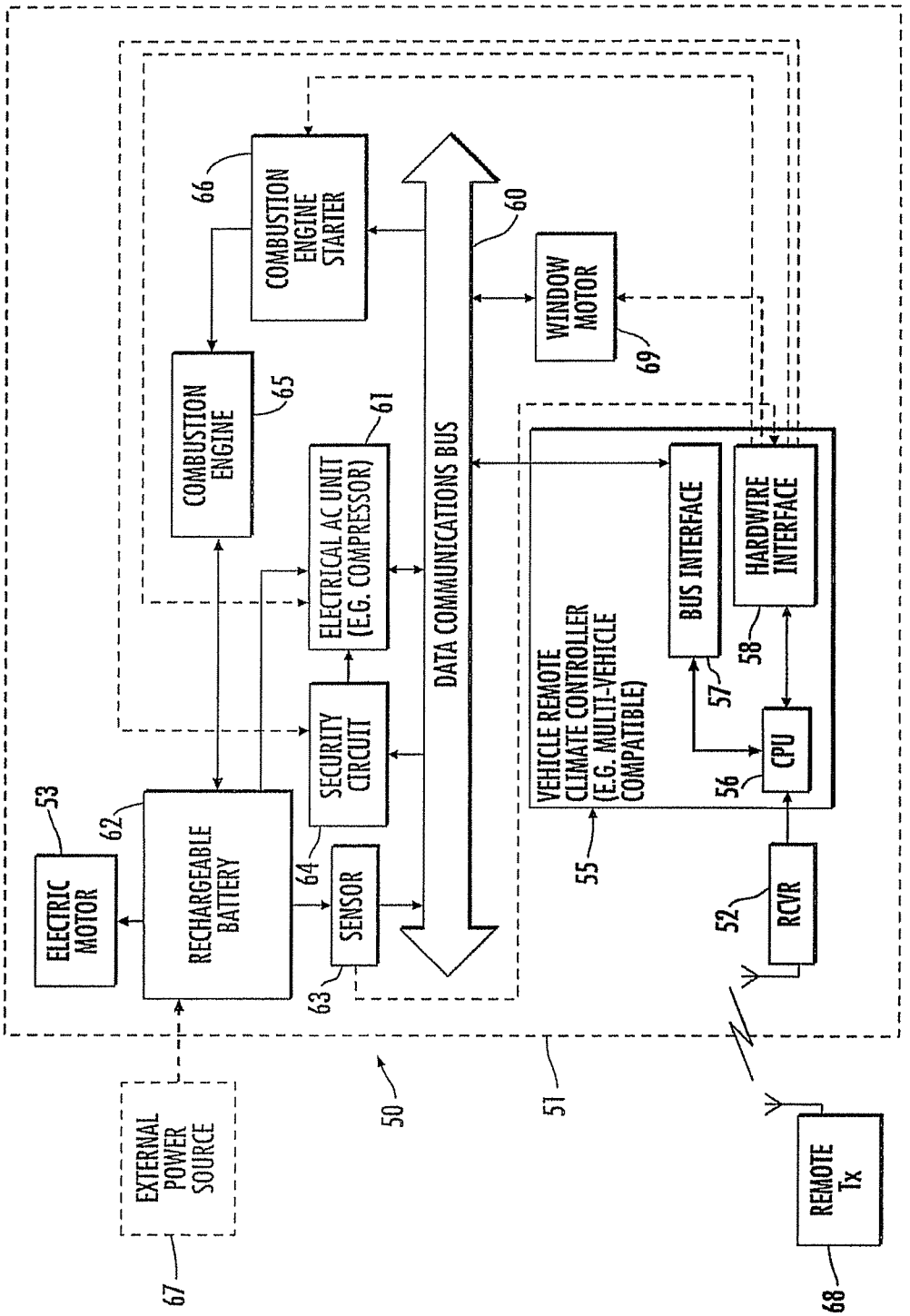
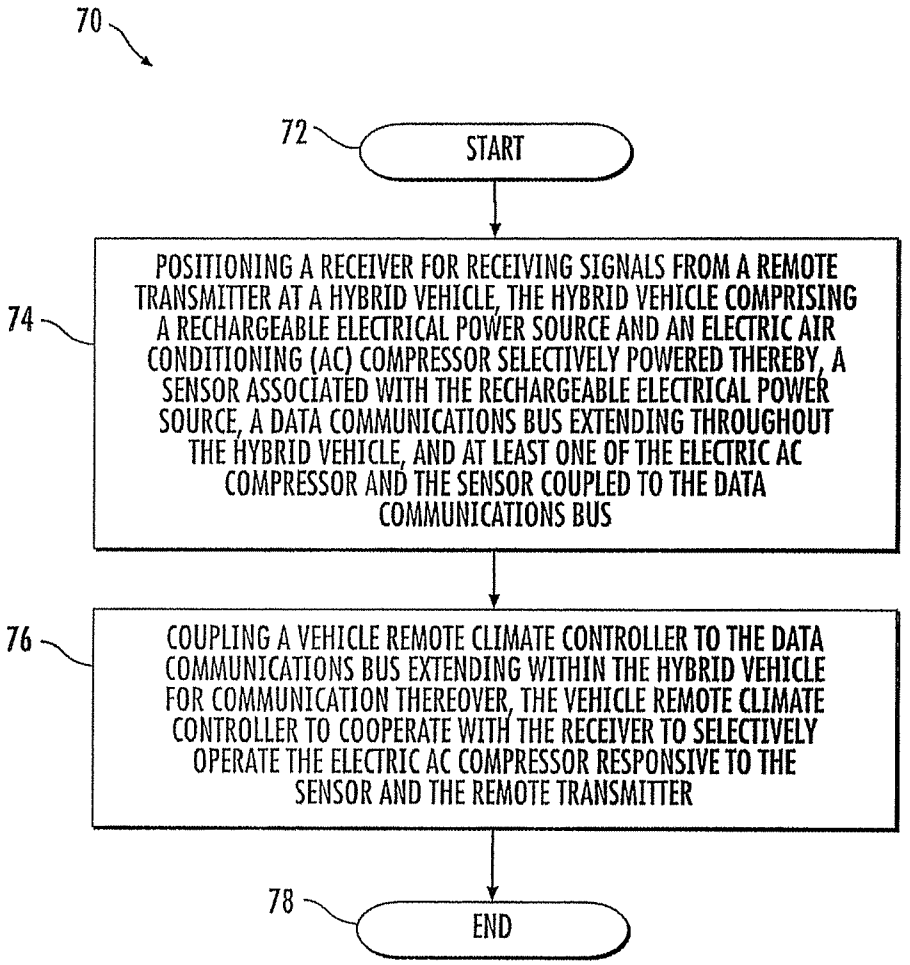

COMBUSTION ENGINE STARTER
66
COMBUSTION ENGINE
65
ELECTRICAL AC UNIT (E.G. COMPRESSOR)
61
SECURITY CIRCUIT
64
SENSOR
63
DATA COMMUNICATIONS BUS
60
WINDOW MOTOR
69
VEHICLE REMOTE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
55
BUS INTERFACE
57
HARDWIRE INTERFACE
58
CPU
56
RCVR
52
ELECTRIC MOTOR
53
RECHARGEABLE BATTERY
62
EXTERNAL POWER SOURCE
67
REMOTE Tx
68
50
51

FIG. 3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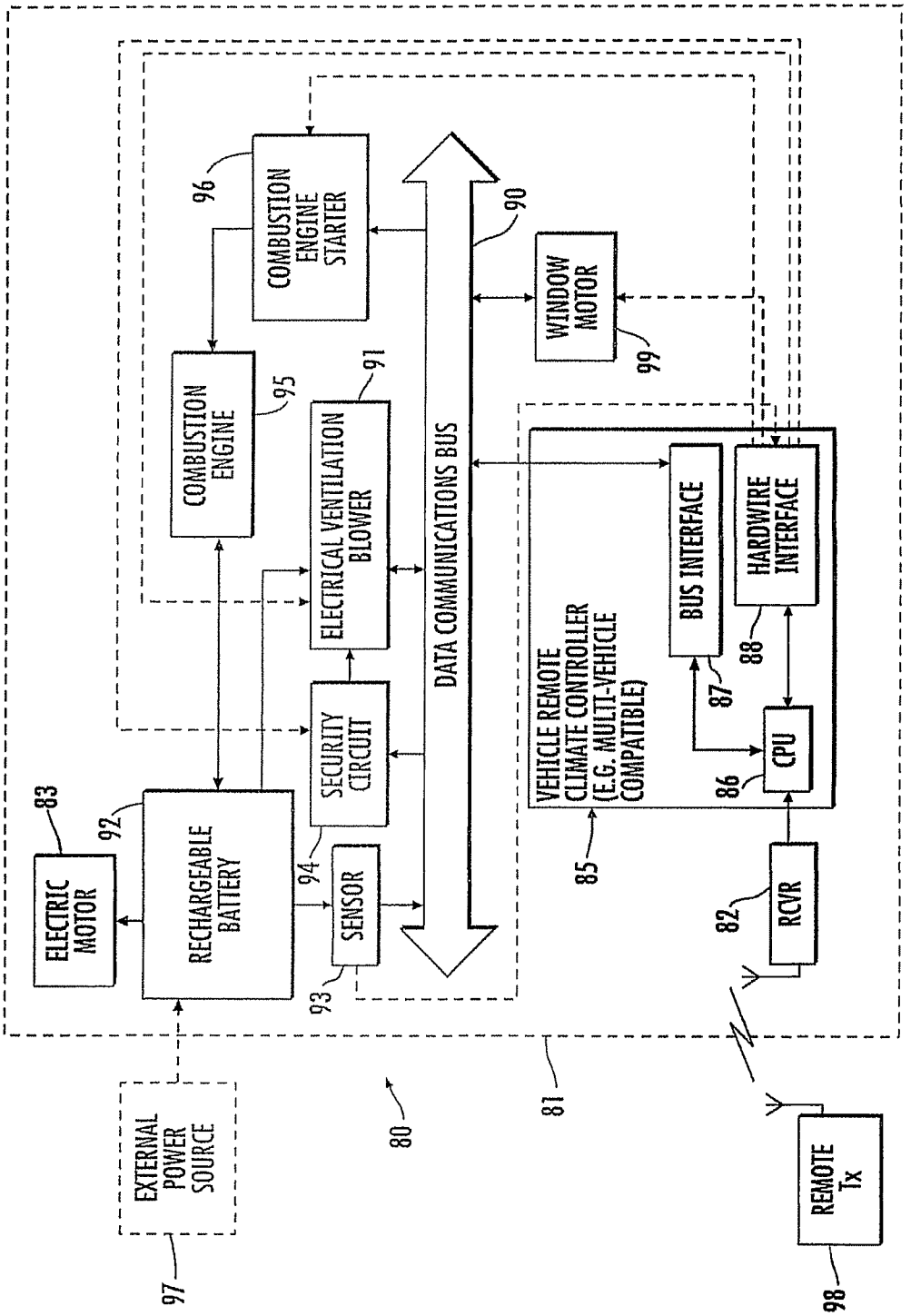
START
74
POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT A HYBRID VEHICLE, THE HYBRID VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRIC AIR CONDITIONING (AC) COMPRESSOR SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE HYBRID VEHICLE, AND AT LEAST ONE OF THE ELECTRIC AC COMPRESSOR AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
76
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE HYBRID VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRIC AC COMPRESSOR RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
78
END

FIG. 4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83
RECHARGEABLE BATTERY
92
EXTERNAL POWER SOURCE
97
COMBUSTION ENGINE
95
COMBUSTION ENGINE STARTER
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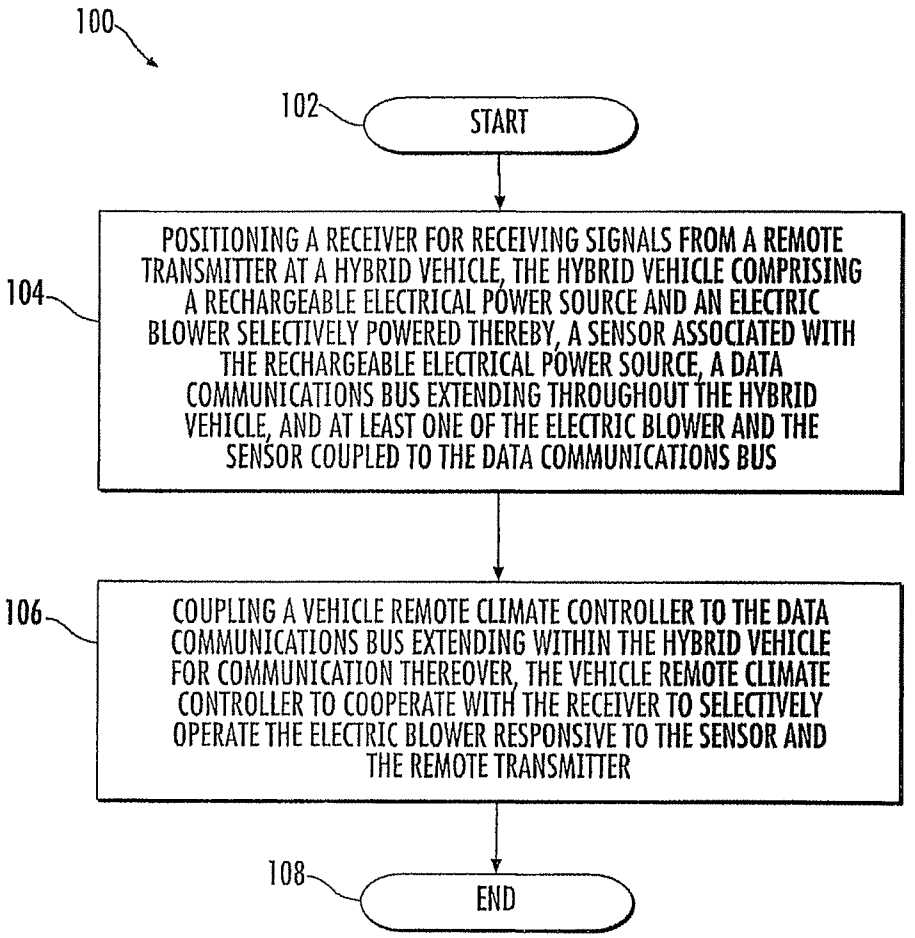
SECURITY CIRCUIT
94
SENSOR
93
ELECTRICAL VENTILATION BLOWER
91
DATA COMMUNICATIONS BUS
90
WINDOW MOTOR
99
VEHICLE REMOTE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
85
BUS INTERFACE
87
HARDWIRE INTERFACE
88
CPU
86
RCVR
82
REMOTE Tx
98
80
81

FIG. 5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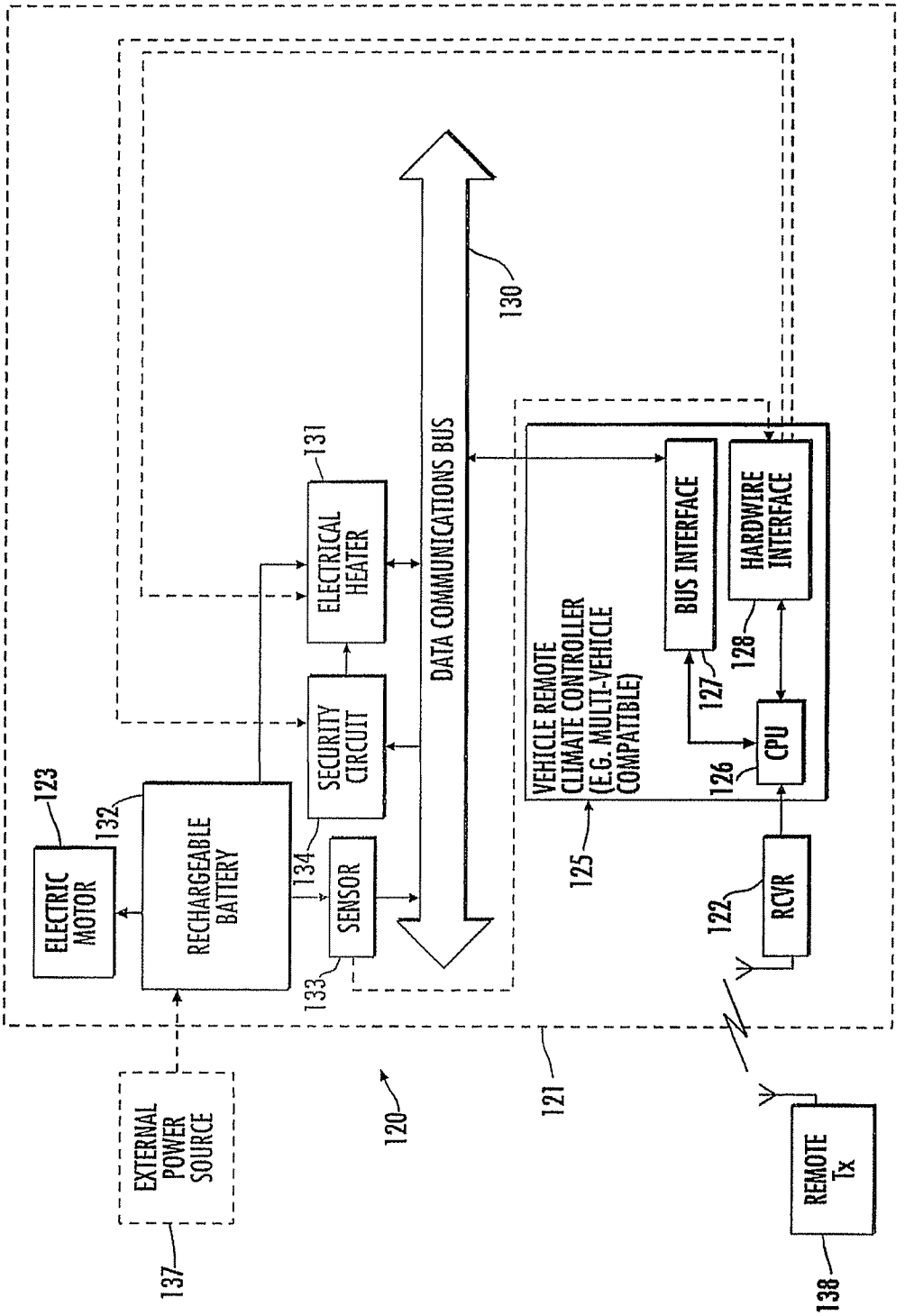
POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT A HYBRID VEHICLE, THE HYBRID VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRIC BLOWER SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE HYBRID VEHICLE, AND AT LEAST ONE OF THE ELECTRIC BLOWER AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
106
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE HYBRID VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRIC BLOWER RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
108
END

FIG. 6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RECHARGEABLE BATTERY
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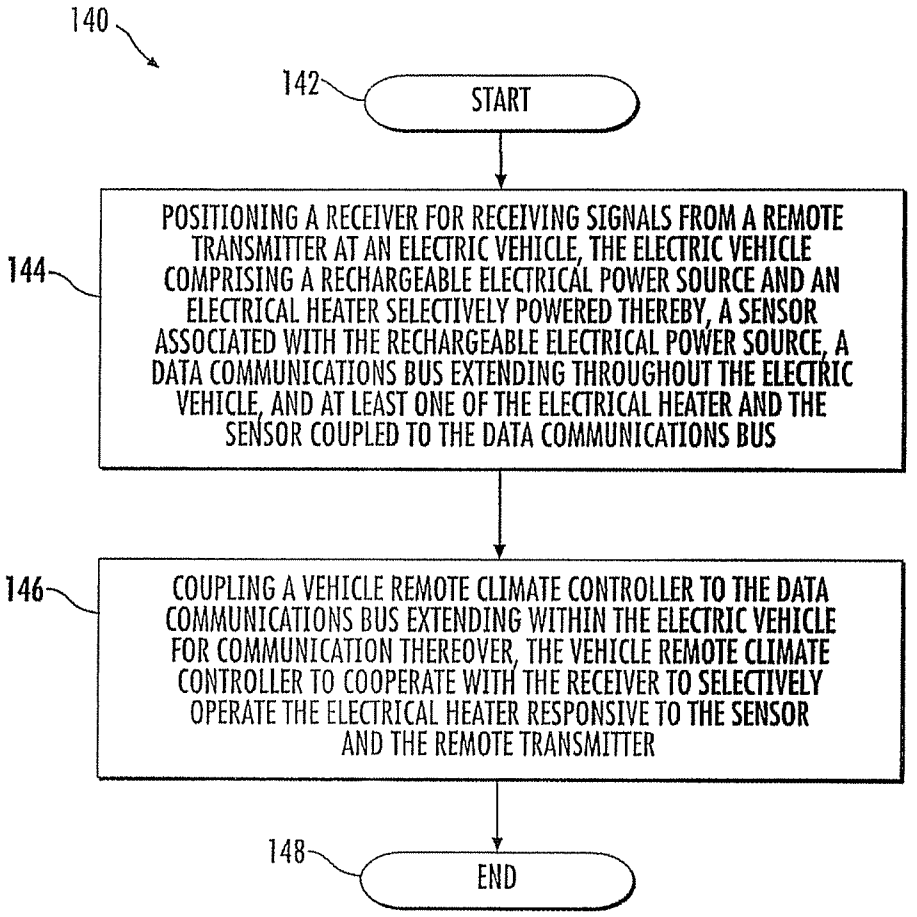
EXTERNAL POWER SOURCE
137
SECURITY CIRCUIT
134
SENSOR
133
ELECTRICAL HEATER
131
DATA COMMUNICATIONS BUS
130
120
121
VEHICLE REMOTE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
125
BUS INTERFACE
127
HARDWIRE INTERFACE
128
CPU
126
RCVR
122
REMOTE Tx
138

FIG. 7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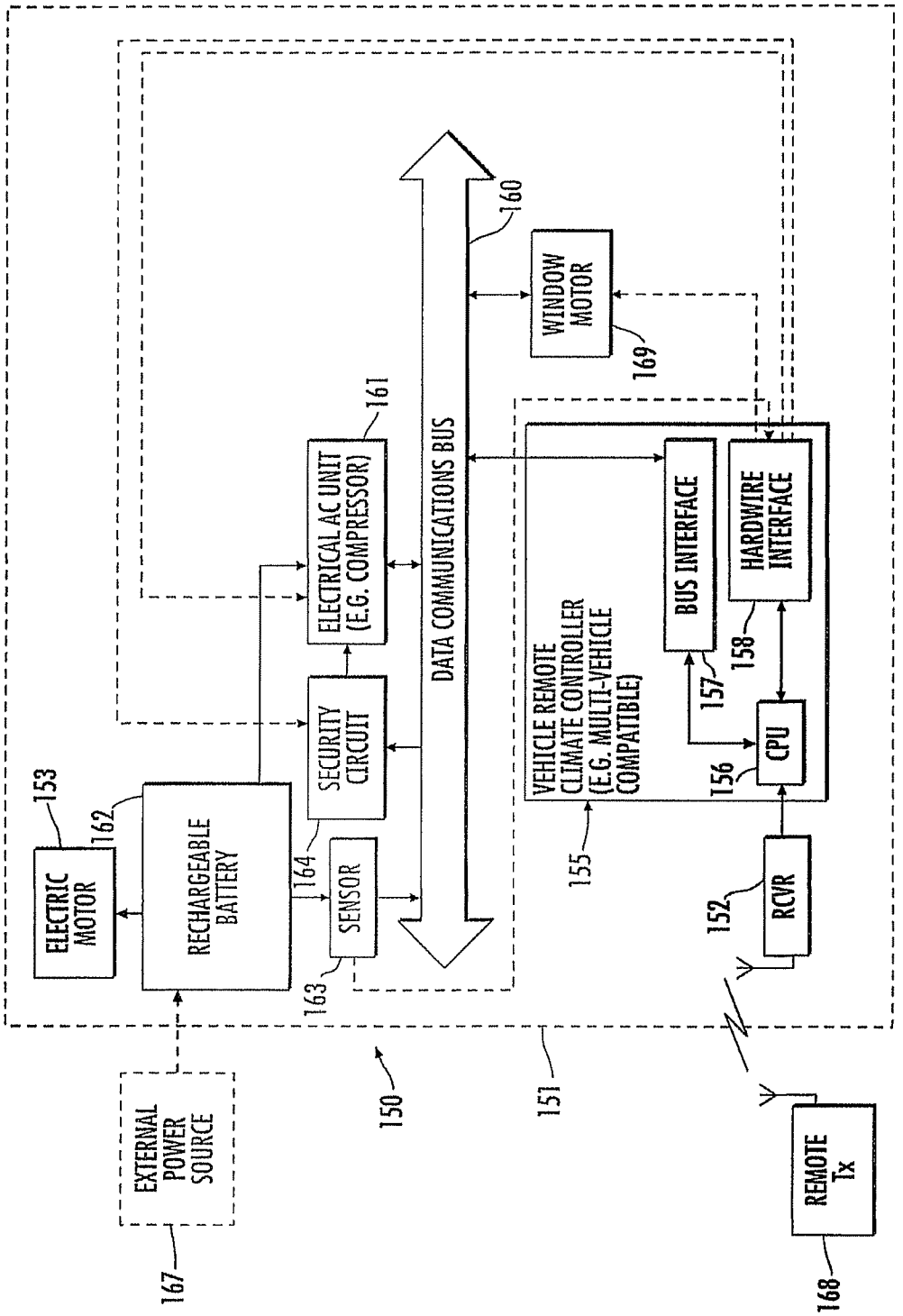
POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT AN ELECTRIC VEHICLE, THE ELECTRIC VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRICAL HEATER SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE ELECTRIC VEHICLE, AND AT LEAST ONE OF THE ELECTRICAL HEATER AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
146
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE ELECTRIC VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRICAL HEATER RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
148
END

FIG. 8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RECHARGEABLE BATTERY
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EXTERNAL POWER SOURCE
167
150
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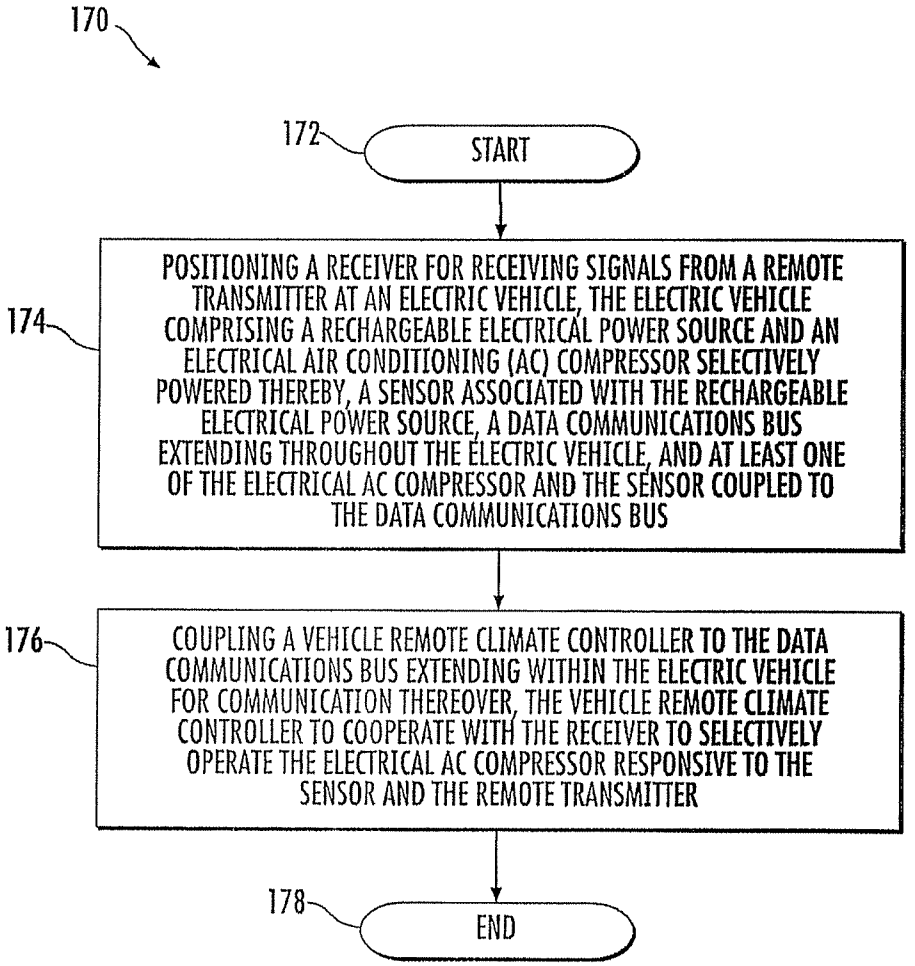
SENSOR
163
SECURITY CIRCUIT
164
ELECTRICAL AC UNIT (E.G. COMPRESSOR)
161
DATA COMMUNICATIONS BUS
160
WINDOW MOTOR
169
VEHICLE REMOTE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
155
BUS INTERFACE
157
HARDWIRE INTERFACE
158
CPU
156
RCVR
152
REMOTE Tx
168

FIG. 9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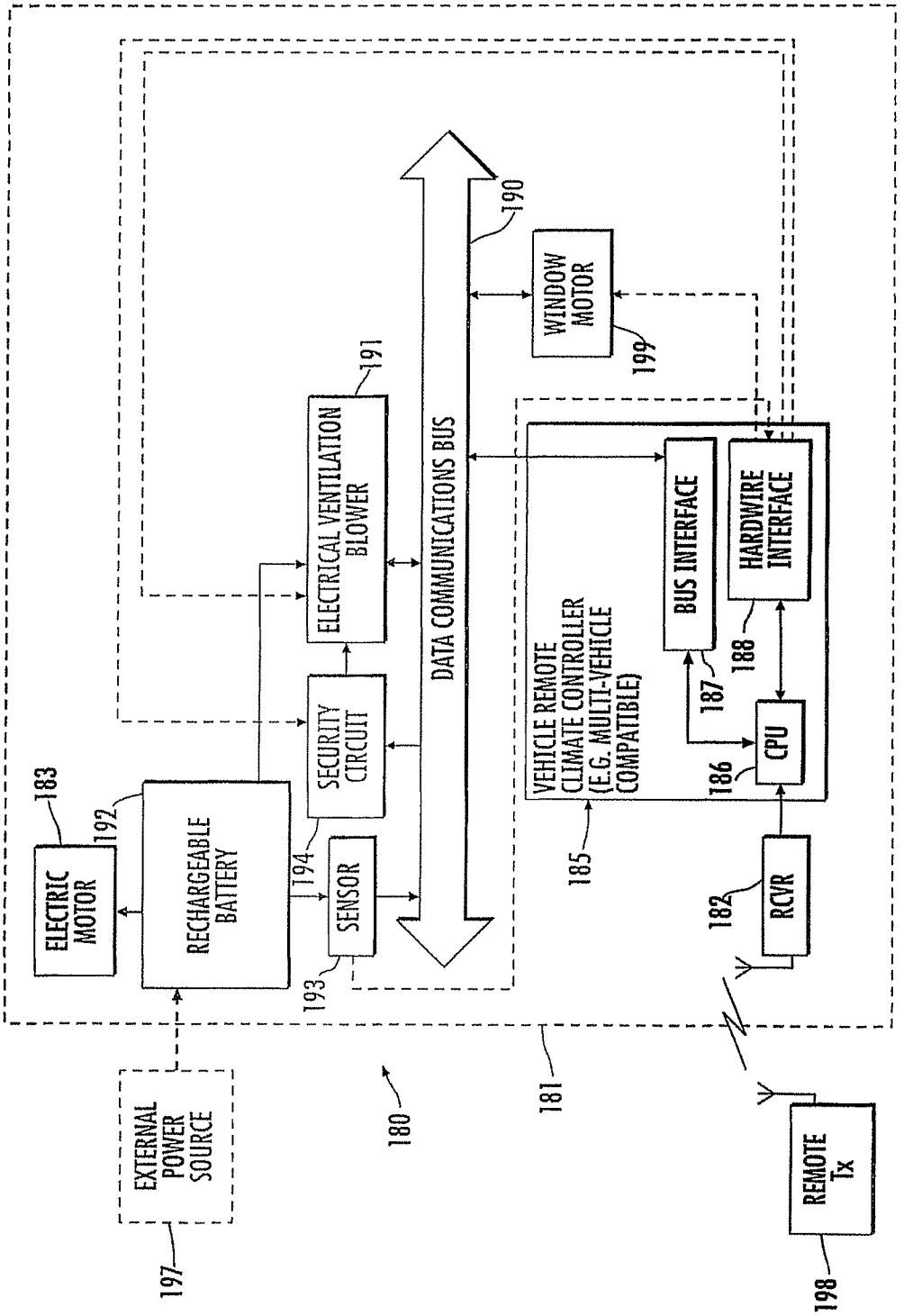
POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT AN ELECTRIC VEHICLE, THE ELECTRIC VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRICAL AIR CONDITIONING (AC) COMPRESSOR SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE ELECTRIC VEHICLE, AND AT LEAST ONE OF THE ELECTRICAL AC COMPRESSOR AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
176
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE ELECTRIC VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRICAL AC COMPRESSOR RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
178
END

FIG. 10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EXTERNAL POWER SOURCE
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SENSOR
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SECURITY CIRCUIT
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ELECTRICAL VENTILATION BLOWER
191
DATA COMMUNICATIONS BUS
190
WINDOW MOTOR
199
VEHICLE REMOTE CLIMATE CONTROLLER (E.G. MULTI-VEHICLE COMPATIBLE)
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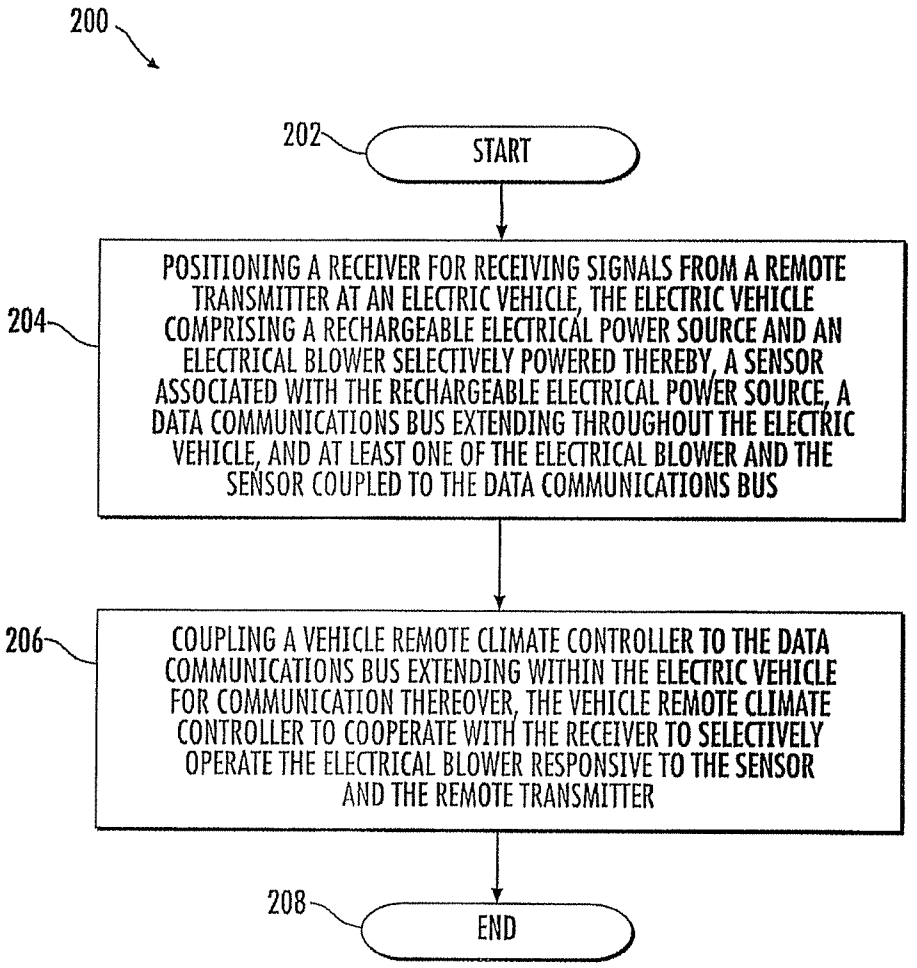
BUS INTERFACE
187
HARDWIRE INTERFACE
188
CPU
186
RCVR
182
REMOTE Tx
198
180
181

FIG. 11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POSITIONING A RECEIVER FOR RECEIVING SIGNALS FROM A REMOTE TRANSMITTER AT AN ELECTRIC VEHICLE, THE ELECTRIC VEHICLE COMPRISING A RECHARGEABLE ELECTRICAL POWER SOURCE AND AN ELECTRICAL BLOWER SELECTIVELY POWERED THEREBY, A SENSOR ASSOCIATED WITH THE RECHARGEABLE ELECTRICAL POWER SOURCE, A DATA COMMUNICATIONS BUS EXTENDING THROUGHOUT THE ELECTRIC VEHICLE, AND AT LEAST ONE OF THE ELECTRICAL BLOWER AND THE SENSOR COUPLED TO THE DATA COMMUNICATIONS BUS
206
COUPLING A VEHICLE REMOTE CLIMATE CONTROLLER TO THE DATA COMMUNICATIONS BUS EXTENDING WITHIN THE ELECTRIC VEHICLE FOR COMMUNICATION THEREOVER, THE VEHICLE REMOTE CLIMATE CONTROLLER TO COOPERATE WITH THE RECEIVER TO SELECTIVELY OPERATE THE ELECTRICAL BLOWER RESPONSIVE TO THE SENSOR AND THE REMOTE TRANSMITTER
208
END

FIG. 12

REMOTE CLIMATE CONTROL DEVICE INCLUDING ELECTRICAL HEATER FOR A HYBRID VEHICLE AND ASSOCIATED METHODS

FIELD OF THE INVENTION

The present invention relates to the field of vehicle climate control, and, more particularly, to remote vehicle climate control devices and related methods.

BACKGROUND OF THE INVENTION

The passenger compartment of a vehicle parked outside during a cold day may become very cold, with temperatures reaching that of the ambient air outside the vehicle. Likewise, the passenger compartment of a vehicle parked outside during a hot day may become very hot, very quickly, with temperatures that greatly exceed that of the ambient air outside the vehicle.

Some drivers start a vehicle, activate the vehicle's climate control system, then leave the vehicle until the climate control system begins to heat or cool the vehicle. However, this requires the driver to leave the comfort of the indoors, momentarily enter the vehicle, start the engine and operate the climate control system, and leave the vehicle unattended.

To avoid this, remote starting systems have been developed which allow a driver to start a vehicle without entering the vehicle. However, such systems may be incompatible with hybrid electric vehicles or electric vehicles. Similarly, such systems may lack desired features.

The air conditioning system of a standard vehicle having an internal combustion engine as its prime mover typically employs a compressor. On such a vehicle, this compressor is powered by the internal combustion engine via mechanical energy transferred from the crankshaft to the compressor through the use of a serpentine or v-shaped belt. The heating system of such a vehicle uses waste heat of the internal combustion engine to heat the passenger compartment.

Efforts have been made at remotely activating the climate control system of a hybrid or electric vehicle. U.S. Pub. No. 2006/0075766 to Ziehr et al., for example, discloses a remote climate control system for pre-cooling or pre-heating the passenger compartment of a hybrid vehicle that includes a combustion engine, an electrically activatable window, a heater, an electrically powered blower, and a passenger compartment temperature sensor. The remote climate control system is hard wired to a starter of the combustion engine, the electrically activatable window, the heater, the electrically powered blower, and the passenger compartment temperature sensor.

The remote climate control system includes a controller to read the passenger compartment temperature from the sensor. If the temperature is greater than a first predetermined value, the controller opens the activatable window and activates the electrically powered blower. If the temperature is less than a predetermined value, the controller starts the hybrid vehicle and activates the heater. The heater uses waste heat of the combustion engine to cool the passenger compartment. During cooling or heating, the controller monitors the temperature of the passenger compartment and deactivates the blower and the heater, respectively, when the temperature drops below, or rises above, a second predetermined value.

US Pub. No. 2008/0117079 to Hassan discloses a remote starting system for hybrid vehicles. The remote starting system includes a remote transmitter operable to communicate a start signal and a controller at the hybrid vehicle that receives the start signal. The controller can be coupled to a data communications bus of the hybrid vehicle and processes images captured by at least one imaging device to determine if the images are indicative of the hybrid vehicle being parked in an enclosed environment, such as a garage. The controller starts the combustion engine of the hybrid vehicle in response to the remote transmitter and the processed images. The controller can also control the climate control system of the hybrid vehicle after starting the combustion engine.

In particular, the controller can activate an air conditioning (AC) unit that is mechanically powered by the combustion engine, in order to cool the passenger compartment. The controller may also activate an auxiliary heater coil, or a heater that uses waste heat of the combustion engine, to heat the passenger compartment.

U.S. Pat. No. 6,357,244 to Mori discloses a plurality of remote climate control systems, each for an electric vehicle, and a common remote transmitter to activate the remote climate control system of each electric vehicle, respectively. Each electric vehicle has an AC unit, a battery, and a sensor to sense the voltage of the battery. The remote climate control system of each vehicle includes a controller that is hard wired to the AC unit and sensor. The controller reads the voltage of the battery using the sensor and selectively operates the AC unit based upon the voltage of the battery and signals received from the common remote transmitter. If the voltage of the battery falls below a predetermined value, the remote climate control system deactivates the AC unit.

In view of the foregoing limitations of the prior art, a remote climate control system having additional features and compatibility may be desirable.

SUMMARY OF THE INVENTION

In view of the foregoing background, it is therefore an object of the present invention to provide a remote climate control system for a hybrid vehicle.

This and other objects, features, and advantages in accordance with the present invention are provided by a remote climate control system for a hybrid vehicle that may comprise a rechargeable electrical power source, an electrical heater selectively powered by the rechargeable electrical power source, and a sensor associated with the rechargeable electrical power source. A data communications bus may extend throughout the hybrid vehicle, and at least one of the electrical heater and the sensor may be coupled to the data communications bus.

The remote climate control system may include a remote transmitter and a receiver to be positioned at the hybrid vehicle for receiving signals from the remote transmitter. The remote climate control system may also include a vehicle remote climate controller to cooperate with the receiver. The vehicle remote climate controller may be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and the remote transmitter.

The sensor may be coupled to the data communications bus and the vehicle remote climate controller may receive signals from the sensor via the data communications bus. The electrical heater may be coupled to the data communications bus and the vehicle remote climate controller may send signals to the electrical heater via the data communications bus.

The vehicle remote climate controller may disable the electrical heater based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold. This feature helps to prevent excessive discharging of the

rechargeable electrical power source, due to operation of the heater, that might leave a driver stranded and the hybrid vehicle inoperable.

The hybrid vehicle may have a combustion engine that provides mechanical energy to a generator or alternator that recharges the rechargeable electrical power source. The vehicle remote climate controller may start the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold. This may be done to charge the rechargeable electrical power source and to thus help prevent excessive discharging thereof.

The vehicle remote climate controller may enable the electrical heater based upon the sensor sensing the rechargeable electrical power source being coupled to an external power source. Also, the hybrid vehicle may have a security circuit coupled to the electrical heater for selectively enabling operation thereof. Furthermore, the vehicle remote climate controller may bypass the security circuit to enable remote operation of the electrical heater.

The remote transmitter may be a remote wireless handheld transmitter that is carried by a user when away from the vehicle. In addition, the vehicle remote climate controller may comprise a multi-vehicle compatible remote climate controller. This may reduce the need to produce a variety of different versions of the remote climate control system for different hybrid or electric vehicles.

A method aspect is directed to a method of installing a remote climate control system in a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, and a data communications bus extending throughout the hybrid vehicle. At least one of the electrical heater and the sensor may be coupled to the data communications bus. The method may comprise coupling a vehicle remote climate controller to the data communications bus extending within the hybrid vehicle for communication thereover. The vehicle remote climate controller may cooperate with a receiver to selectively operate the electrical heater responsive to the sensor and the remote transmitter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic block diagram of a remote climate control system for a hybrid vehicle in accordance with the present invention.

FIG. **2** is a flowchart of a method of installing the remote climate control system of FIG. **1** in a hybrid vehicle.

FIG. **3** is a schematic block diagram of an alternative embodiment of a remote climate control system for a hybrid vehicle in accordance with the present invention.

FIG. **4** is a flowchart of a method of installing the remote climate control system of FIG. **3** in a hybrid vehicle.

FIG. **5** is a schematic block diagram of a further embodiment of a remote climate control system for a hybrid vehicle in accordance with the present invention.

FIG. **6** is a flowchart of a method of installing the remote climate control system of FIG. **6** in a hybrid vehicle.

FIG. **7** is a schematic block diagram of a remote climate control system for an electric vehicle in accordance with the present invention.

FIG. **8** is a flowchart of a method of installing the remote climate control system of FIG. **7** in an electric vehicle.

FIG. **9** is a schematic block diagram of an alternative embodiment of a remote climate control system for an electric vehicle in accordance with the present invention.

FIG. **10** is a flowchart of a method of installing the remote climate control system of FIG. **9** in an electric vehicle.

FIG. **11** is a schematic block diagram of a further embodiment of a remote climate control system for an electric vehicle in accordance with the present invention.

FIG. **12** is a flowchart of a method of installing the remote climate control system of FIG. **11** in an electric vehicle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

Referring initially to FIG. **1**, a remote climate control system **20** for a hybrid vehicle **21** is now described. The hybrid vehicle **21** has a rechargeable battery **32**, although those of skill in the art will appreciate that the hybrid vehicle may have another rechargeable electrical power source, such as a capacitor or flywheel/generator, in addition to or instead of the rechargeable battery. The hybrid vehicle **21** has a combustion engine **35** that operates a generator or alternator (not shown) to recharge the rechargeable battery **32** and an electric motor **23**. Those skilled in the art will appreciate that the hybrid vehicle **21** may have more than one electric motor **23** and that the electric motor is coupled to the rechargeable battery **32**. An optional separate combustion engine starter **36** starts the combustion engine. Those of skill in the art will understand that the combustion engine **35** may instead be started by the electric motor **23**.

It should be understood that the combustion engine **35** may be an internal combustion engine that burns gasoline, diesel, ethanol, or other fuels. Rather than a combustion engine **35**, the hybrid vehicle **21** may instead have an external heat engine, such as a Stirling engine.

The hybrid vehicle **21** further comprises an electrical heater **31** selectively powered by the rechargeable battery **32** and a sensor **33** associated with the rechargeable battery. The electrical heater **31** may be a resistive heater or other suitable heater as known to those of skill in the art. The electrical heater **31** may be a combination heater, for example a heater core with electrical heater coils, that employs both resistive heating and the use of waste heat from the combustion engine **35** to heat the passenger compartment of the hybrid vehicle **21**.

The hybrid vehicle **21** may also include a security circuit **34** connected to the electrical heater **31**. The security circuit **34** selectively disables the electrical heater **31**. Those of skill in the art will appreciate that, in some applications, the security circuit **34** may also be connected to the combustion engine starter **36** to selectively disable the operation thereof and therefore the operation of the combustion engine. **35**. Indeed, in some applications, the security circuit **34** may selectively disable operation of a plurality of, or all of, the devices and functions of the hybrid vehicle **21**. The security circuit **34** may be considered as an ignition switch of a conventional internal combustion engine vehicle.

The hybrid vehicle **21** has a data communications bus **30** extending throughout. The data communications bus **30** may

extend through at least one of the engine compartment, the passenger compartment, and the trunk of the hybrid vehicle **21**.

The sensor **33** is coupled to the rechargeable battery **32** and reads the voltage thereof. The sensor **33** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **37**. The external power source **37** may be an electrical socket or recharging station, for example.

The electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36** are each coupled to the data communications bus **30** for communication thereover. Those of skill in the art will understand that each of the electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36** need not be on the data communications bus **30**. Indeed, one of, or a plurality of the electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36** may be on the data communications bus **30**. Furthermore, each of the electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36** may communicate unidirectionally via the data communications bus **30**, or may communicate bidirectionally via the data bus. Each of the electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36** need not communicate in the same manner via the data communications bus **30**. For example, the electrical heater **31** may communicate bidirectionally while the sensor **33** communicates unidirectionally.

It should be understood that there may be intervening circuitry between the data communications bus **30** and at least one of the electrical heater **31**, the sensor **33**, the security circuit **34**, and the combustion engine starter **36**.

The remote climate control system **20** includes a remote transmitter **38** and a receiver **22** positioned at the hybrid vehicle **21** for receiving signals from the remote transmitter. The remote climate controller **25** may be a multi-vehicle compatible remote climate controller to cooperate with the receiver **22**. Those of skill in the art will understand that the receiver **22** and the vehicle remote climate controller **25** may be associated together in a same housing. In fact the receiver **22** and the vehicle remote climate controller **25** may each be embodied on a same printed circuit board or even in a same integrated circuit. The vehicle remote climate controller **25** bypasses the security circuit **34** to enable operation of the electrical heater **31**.

More details of multi-vehicle compatible devices may be found in the following references, each of which is incorporated by reference herein in its entirety, and assigned to the assignee of the present invention. U.S. Pat. No. 7,378,945; U.S. Pat. No. 7,369,936; U.S. Pat. No. 7,224,083; U.S. Pat. No. 7,205,679; U.S. Pat. No. 7,091,822; U.S. Pat. No. 7,068,153; U.S. Pat. No. 7,046,126; U.S. Pat. No. 7,031,826; U.S. Pat. No. 7,010,402; U.S. Pat. No. 6,812,829; U.S. Pat. No. 6,756,886; U.S. Pat. No. 6,756,885; U.S. Pat. No. 6,529,124; and U.S. Pat. No. 6,346,876.

The vehicle remote climate controller **25** is coupled to the data communications bus **30** extending within the hybrid vehicle **21** for communication thereover to selectively operate the electrical heater **31** responsive to the sensor **33** and the remote transmitter **38**. The vehicle remote climate controller **25** selectively operates the electrical heater **31** responsive to the sensor **33** and the remote transmitter **38**.

The remote transmitter **38** may cause the vehicle remote climate controller **25** to heat the passenger compartment of the hybrid vehicle **21** to a pre-set temperature. Alternatively, the remote transmitter **38** may have buttons that enable a user to set the temperature to which the vehicle remote climate controller **25** is to heat the passenger compartment of the hybrid vehicle **21**. Additionally or alternatively, the remote transmitter **38** may have buttons that enable a user to select to which of a plurality of pre-set temperatures the vehicle remote climate controller **25** is to heat the passenger compartment of the hybrid vehicle **21**.

The remote transmitter **38** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **38** to the receiver **22** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **38** may indirectly communicate with the receiver **22** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **38** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **38** may optionally include a remote receiver cooperating with a transmitter (not shown) at the vehicle, such as to provide status information to the user relating to a condition of the hybrid vehicle **21**, for example the temperature of the passenger compartment.

The remote transmitter **38** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **38** may operate a plurality of hybrid vehicles **21**. Such a feature may be desirable to a driver who owns multiple hybrid vehicles **21** or to a rental car company, for example.

The vehicle remote climate controller **25** includes a central processing unit (CPU) **26** which performs the signal processing and logic functions to control operation of the electrical heater **31**. The vehicle remote climate controller **25** also includes a bus interface **27** and a hardwire interface **28**. The bus interface **27** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **30** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **28** is to directly interface with the sensor **33**, electrical heater **31**, security circuit **34**, and combustion engine starter **36**. It should be understood that in these applications, one of the sensor **33**, security circuit **34**, electrical heater **31**, and combustion engine starter **36** may each be directly connected to the hardwire interface **28**, or that a plurality of the sensor, security circuit, electrical heater, and combustion engine starter, and may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **25** selectively operates the electrical heater **31** responsive to the sensor **33** and the remote transmitter **38**. For example, the vehicle remote climate controller **25** may operate the electrical heater **31** if it receives, via the receiver **22**, a signal from the remote transmitter **38** instructing it to do so.

If, during operation of the electrical heater **31**, the sensor **33** senses that the voltage of the rechargeable battery **32** has fallen below a threshold voltage, the vehicle remote climate controller **25** may disable the electrical heater to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **25** receives an instruction to activate the electrical heater **31**, but the sensor **33** senses that the

voltage of the rechargeable battery **32** is below a threshold voltage, the multi-vehicle compatible remote climate controller **20** may not activate the electrical heater. This feature helps to prevent excessive discharging of the rechargeable battery **32**, due to operation of the heater **31**, that might leave a driver stranded and the hybrid vehicle **21** inoperable.

If, during operation of the electrical heater **31**, the sensor **33** senses that the voltage of the rechargeable battery **32** has fallen below a threshold voltage, the vehicle remote climate controller **25** may start the combustion engine **35**. This may be done to charge the rechargeable battery **32** and to help prevent excessive discharging thereof.

If the vehicle remote climate controller **25** receives an instruction to activate the electrical heater **31**, but the sensor **33** senses that the voltage of the rechargeable battery **32** is below a threshold voltage, the multi-vehicle compatible remote climate controller **20** may start the combustion engine **35** prior to operating the electrical heater **31**.

In some applications, the vehicle remote climate controller **25** may sense if the shift selector of the hybrid vehicle **21** is in a position other than park and, if so, the multi-vehicle compatible remote climate controller may not start the combustion engine **35**. Similarly, the vehicle remote climate controller **25** may sense whether the hood of the hybrid vehicle **21** is open and may not start the combustion engine **35** based thereupon. In addition, the vehicle remote climate controller **25** may shut down the combustion engine **25** if the engine RPM exceeds a predetermined value. Many other vehicle conditions, such as the fuel level of the hybrid vehicle **21**, may be taken into account by the vehicle remote climate controller **25** before or during operation of the combustion engine **25** as will be appreciated by those skilled in the art. If the vehicle remote climate controller **25** elects to not start, or elects to shut down, the combustion engine **35** due to such a vehicle condition, it may instead deactivate the electrical heater **31**.

The vehicle remote climate controller **25** may enable the electrical heater **31** based upon the sensor sensing the rechargeable battery **32** being coupled to an external power source **37**. The external power source **37** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the hybrid vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **32**. The vehicle remote climate controller **25** may enable the electrical heater **31** based upon the sensor sensing the rechargeable battery **32** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **33** may also measure the current flowing in of or out of the rechargeable battery **32** and that the vehicle remote climate controller **25** may operate the electrical heater **31** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **33** may measure the temperature of the rechargeable battery **32** and the vehicle remote climate controller **25** may operate the electrical heater **31** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **25** in a hybrid vehicle **21** is now described with reference to the flowchart **40** of FIG. **2**. After the start (Block **42**), at Block **44** a receiver **22** for receiving signals from a remote transmitter **38** is positioned at a hybrid vehicle **21**. The hybrid vehicle **21** comprises a rechargeable electrical power source **32** and an electrical heater **31** selectively powered thereby, a sensor **23** associated with the rechargeable electrical power source, and a data communications bus **30** extending throughout the hybrid vehicle. At least one of the electrical heater **31** and the sensor **33** is coupled to the data communications bus **30**.

At Block **46** a vehicle remote climate controller **25** is coupled to the data communications bus **30** extending within the hybrid vehicle **21** for communication thereover. The vehicle remote climate controller **25** is to cooperate with the receiver **22** to selectively operate the electrical heater **31** responsive to the sensor **33** and the remote transmitter **38**. Block **48** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **25** to the data communications bus **30** extending within the hybrid vehicle **21** for communication thereover and the vehicle remote climate controller **25** is to cooperate with a receiver **22** to selectively operate the electrical heater **31** responsive to the sensor **33** and the remote transmitter **38**.

The vehicle remote climate controller **25** may disable the electrical heater **31** based upon the sensor **33** sensing a voltage of the rechargeable electrical power source **32** being below a threshold. The hybrid vehicle **21** may have a combustion engine **35** and the vehicle remote climate controller **25** may start the combustion engine **35** based upon the sensor **33** sensing a voltage of the rechargeable electrical power source **32** being below a threshold.

The vehicle remote climate controller **35** may enable the electrical heater **31** based upon the sensor **33** sensing the rechargeable electrical power source **32** being coupled to an external power source **37**. The vehicle remote climate controller **25** may comprise a multi-vehicle compatible remote climate controller.

Referring now to FIG. **3**, another embodiment of a remote climate control system **50** for a hybrid vehicle **51** is now described. The hybrid vehicle **51** has a rechargeable battery **62**, although those of skill in the art will appreciate that the hybrid vehicle may have another rechargeable electrical power source, such as a capacitor or flywheel/generator, in addition to or instead of the rechargeable battery. The hybrid vehicle **51** has a combustion engine **65** that operates a generator or alternator (not shown) to recharge the rechargeable battery **62**. The hybrid vehicle **51** also has an electric motor **53** that is coupled to the rechargeable battery **62**. Those skilled in the art will appreciate that the hybrid vehicle **51** may have more than one electric motor **63**. An optional separate combustion engine starter **66** starts the combustion engine. Those of skill in the art will understand that the combustion engine **65** may instead be started by the electric motor **53**.

It should be understood that the combustion engine **65** may be an internal combustion engine that burns gasoline, diesel, ethanol, or other fuels. Rather than a combustion engine **65**, the hybrid vehicle **51** may instead have an external heat engine, such as a Stirling engine.

The hybrid vehicle **51** further comprises an electrical air conditioning (AC) unit **61**, for example an AC compressor, selectively powered by the rechargeable battery **62**, a sensor **63** associated with the rechargeable battery, and an electric window motor **69**. The electrical AC unit **61** may be a conventional AC compressor coupled to an electric motor via a belt or may be an AC compressor having an internal electric motor. In some embodiments, the electrical AC unit may be a thermoelectric cooler or other suitable electric AC unit as known to those of skill in the art.

The hybrid vehicle **51** may also include a security circuit **64** connected to the electrical AC unit **61**. The security **64** circuit selectively disables the electrical AC unit **61**. Those of skill in the art will appreciate that, in some applications, the security circuit **64** may also be connected to the combustion engine starter **66** to selectively disable the operation thereof and

therefore the operation of the combustion engine **65**. Indeed, in some applications, the security circuit **64** may selectively disable operation of a plurality of, or all of, the devices and functions of the hybrid vehicle **51**. The security circuit **64** may be considered as an ignition switch of a conventional internal combustion engine vehicle.

The hybrid vehicle **51** has a data communications bus **60** extending throughout. The data communications bus **60** may extend through at least one of the engine compartment, the passenger compartment, and the trunk of the hybrid vehicle **51**.

The sensor **63** is coupled to the rechargeable battery **62** and reads the voltage thereof. The sensor **63** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **67**. The external power source **67** may be an electrical socket or recharging station.

The electrical AC unit **61**, the sensor **63**, the security circuit **64**, the combustion engine starter **66**, and the window motor **69** are each coupled to the data communications bus **60** for communication thereover. Those of skill in the art will understand that each of the electrical AC unit **61**, the sensor **63**, the security circuit **64**, the combustion engine starter **66**, and the window motor **69** need not be on the data communications bus **60**. Indeed, one of, or a plurality of, the electrical AC unit **61**, the sensor **63**, the security circuit **64**, the combustion engine starter **66**, and the window motor **69** may be on the data communications bus **60**.

The remote climate control system **50** includes a remote transmitter **68** and a receiver **52** positioned at the hybrid vehicle **51** for receiving signals from the remote transmitter. The remote vehicle climate controller **55** may be a vehicle remote climate controller **55** to cooperate with the receiver **52**. Those of skill in the art will understand that the receiver **52** and the vehicle remote climate controller **55** may be associated together in a same housing. In fact the receiver **52** and the vehicle remote climate controller **55** may each be embodied on a same printed circuit board or even in a same integrated circuit. The vehicle remote climate controller **55** bypasses the security circuit **64** to enable operation of the electrical AC unit **61**. The security circuit **64** selectively disables the

The vehicle remote climate controller **55** is coupled to the data communications bus **60** extending within the hybrid vehicle **51** for communication thereover to selectively operate the electrical AC unit **61** responsive to the sensor **63** and the remote transmitter **68**. The vehicle remote climate controller 5S selectively operates the electrical AC unit **61** responsive to the sensor **63** and the remote transmitter **68**.

The vehicle remote climate controller **55** may selectively operate the window motor **69** to assist cooling the passenger compartment of the hybrid vehicle **51**. For example, the vehicle remote climate controller **55** may operate the window motor **69** to open the window during operation of the electrical AC unit **61**. The hybrid vehicle **51** may have a rain sensor to detect precipitation. The rain sensor may be on the data bus **60**. The vehicle remote climate controller **55** may communicate with the rain sensor through the data bus **60** or through the hardwire interface **58**. If precipitation is detected, the vehicle remote climate controller **55** will not operate the window motor **69** to open the window. Similarly, if precipitation is detected while the window is open, the vehicle remote climate controller **55** will operate the window motor **69** to close the window.

The remote transmitter **68** may instruct the vehicle remote climate controller **55** to cool the passenger compartment of the hybrid vehicle **51** to a pre-set temperature. Alternatively, the remote transmitter **68** may have buttons that enable a user to set the temperature which the vehicle remote climate controller **55** is to cool the passenger compartment of the hybrid vehicle **51** to. Additionally or alternatively, the remote transmitter **68** may have buttons that enable a user to select which of a plurality of pre-set temperatures the vehicle remote climate controller **55** is to cool the passenger compartment of the hybrid vehicle **51** to.

The remote transmitter **68** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **68** to the receiver **52** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **68** may indirectly communicate with the receiver **52** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **68** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **68** may optionally include a remote receiver (not shown), such as to provide status information to the user relating to the temperature of the passenger compartment of the hybrid vehicle **51**.

The remote transmitter **68** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **68** may operate a plurality of hybrid vehicles **51**. Such a feature may be desirable to a driver who owns multiple hybrid vehicles **51** or to a rental car company, for example.

The vehicle remote climate controller **55** includes a central processing unit (CPU) **56** which performs the signal processing and logic functions to control operation of the electrical AC unit **61**. The vehicle remote climate controller **55** also includes a bus interface **57** and a hardwire interface **58**. The bus interface **57** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **60** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **58** is to directly interface with the sensor **63**, electrical AC unit **61**, security circuit **64**, combustion engine starter **66**, and window motor **69**. It should be understood that in these applications, one of the sensor **63**, security circuit **64**, electrical AC unit **61**, combustion engine starter **66**, and window motor **69** may each be directly connected to the hardwire interface **58**, or that a plurality of the sensor, security circuit, electrical heater, combustion engine starter, and window motor may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **55** selectively operates the electrical AC unit **61** responsive to the sensor **63** and the remote transmitter **68**. For example, the vehicle remote climate controller **55** may operate the electrical AC unit **61** if it receives, via the receiver **52**, a signal from the remote transmitter **68** instructing it to do so.

If, during operation of the electrical AC unit **61**, the sensor **63** senses that the voltage of the rechargeable battery **62** has fallen below a threshold voltage, the vehicle remote climate controller **55** may disable the electrical AC unit to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **25** receives an instruction to activate the electrical AC unit **61**, but the sensor **63** senses that

the voltage of the rechargeable battery **62** is below a threshold voltage, the vehicle remote climate controller **55** may not activate the electrical AC unit. This feature helps to prevent excessive discharging of the rechargeable battery **62**, due to operation of the electrical AC unit **61**, that might leave a driver stranded and the hybrid vehicle **51** inoperable.

If, during operation of the electrical AC unit **61**, the sensor **63** senses that the voltage of the rechargeable battery **62** has fallen below a threshold voltage, the vehicle remote climate controller **55** may start the combustion engine **65**. This may be done to charge the rechargeable battery **62** and to help prevent excessive discharging thereof.

If the vehicle remote climate controller **55** receives an instruction to activate the electrical AC unit **61**, but the sensor **63** senses that the voltage of the rechargeable battery **62** is below a threshold voltage, the vehicle remote climate controller **55** may start the combustion engine **65** prior to operating the electrical AC unit **61**.

In some applications, the vehicle remote climate controller **55** may sense if the shift selector of the hybrid vehicle **51** is in a position other than park and, if so, the multi-vehicle compatible remote climate controller may not start the combustion engine **65**. Similarly, the vehicle remote climate controller **55** may sense whether the hood of the hybrid vehicle **51** is open and may not start the combustion engine **65** based thereupon. In addition, the vehicle remote climate controller **55** may shut down the combustion engine **65** if the engine RPM exceeds a predetermined value. Many other vehicle conditions, such as the fuel level of the hybrid vehicle **51**, may be taken into account by the vehicle remote climate controller **55** before or during operation of the combustion engine **65** as will be appreciated by those skilled in the art. If the vehicle remote climate controller **55** elects to not start, or elects to shut down, the combustion engine **65** due to such a vehicle condition, it may instead deactivate the electrical AC unit **61**.

The vehicle remote climate controller **55** may enable the electrical AC unit **61** based upon the sensor sensing the rechargeable battery **62** being coupled to an external power source **67**. The external power source **67** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the hybrid vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **62**. The vehicle remote climate controller **55** may enable the electrical AC unit **61** based upon the sensor sensing the rechargeable battery **62** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **63** may also measure the current flowing in of or out of the rechargeable battery **62** and that the vehicle remote climate controller **55** may operate the electrical AC unit **61** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **63** may measure the temperature of the rechargeable battery **62** and the vehicle remote climate controller **55** may operate the electrical AC unit **61** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **55** in a hybrid vehicle **51** is now described with reference to the flowchart **70** of FIG. **4**. After the start (Block **72**), at Block **74** a receiver **52** for receiving signals from a remote transmitter **68** is positioned at a hybrid vehicle **51**. The hybrid vehicle **51** comprises a rechargeable electrical power source **32** and an electrical AC unit **61** selectively powered thereby, a sensor **63** associated with the rechargeable electrical power source, and a data communications bus **60** extending throughout the hybrid vehicle. At least one of the electrical AC unit **61** and the sensor **63** is coupled to the data communications bus **60**.

At Block **76** a vehicle remote climate controller **55** is coupled to the data communications bus **60** extending within the hybrid vehicle **51** for communication thereover. The vehicle remote climate controller **55** is to cooperate with the receiver **52** to selectively operate the electrical AC unit **61** responsive to the sensor **63** and the remote transmitter **68**. Block **78** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **55** to the data communications bus **60** extending within the hybrid vehicle **51** for communication thereover, the vehicle remote climate controller **55** to cooperate with a receiver **52** to selectively operate the electrical AC unit **61** responsive to the sensor **63** and the remote transmitter **68**.

The vehicle remote climate controller **55** may disable the electrical AC unit **61** based upon the sensor **63** sensing a voltage of the rechargeable electrical power source **62** being below a threshold. The hybrid vehicle **51** may have a combustion engine **65** and the vehicle remote climate controller **55** may start the combustion engine **65** based upon the sensor **63** sensing a voltage of the rechargeable electrical power source **62** being below a threshold.

The vehicle remote climate controller **55** may enable the electrical AC unit **61** based upon the sensor **63** sensing the rechargeable electrical power source **62** being coupled to an external power source **67**. The vehicle remote climate controller **55** may comprise a multi-vehicle compatible remote climate controller.

Referring now to FIG. **5**, yet another embodiment of a remote climate control system **80** for a hybrid vehicle **81** is now described. The hybrid vehicle **81** has a rechargeable battery **92**, although those of skill in the art will appreciate that the hybrid vehicle may have another rechargeable electrical power source, such as a capacitor or flywheel/generator, in addition to or instead of the rechargeable battery. The hybrid vehicle **81** has a combustion engine **95** that operates a generator or alternator (not shown) to recharge the rechargeable battery **92**. The hybrid vehicle **81** also has an electric motor **83** coupled to the rechargeable battery **92**. An optional separate combustion engine starter **96** starts the combustion engine. Those of skill in the art will understand that the combustion engine **95** may instead be started by the electric motor **83**.

It should be understood that the combustion engine **95** may be an internal combustion engine that burns gasoline, diesel, ethanol, or other fuels. Rather than a combustion engine **95**, the hybrid vehicle **81** may instead have an external heat engine, such as a Stirling engine.

The hybrid vehicle **81** further comprises an electrical ventilation blower **91** selectively powered by the rechargeable battery **92**, a sensor **93** associated with the rechargeable battery, and an electric window motor **99**. The electrical ventilation blower **91** may be a conventional blower coupled to an electric motor via a belt or may be a blower having an internal electric motor. It should be understood that the electric blower **91** merely blows ambient outside air into the passenger compartment of the vehicle and does not actively cool the air, as would an electric AC unit. It may be advantageous to use the electrical ventilation blower **91** to cool the passenger compartment of the hybrid vehicle **81** as opposed to an electrical AC unit because the electrical ventilation blower may consume less electricity than an electrical AC unit.

The hybrid vehicle **81** may also include a security circuit **94** connected to the electrical ventilation blower **91**. The security circuit **94** selectively disables the electrical ventilation blower

91. Those of skill in the art will appreciate that, in some applications, the security circuit **94** may also be connected to the combustion engine starter **96** to selectively disable the operation thereof and therefore the operation of the combustion engine **95**. Indeed, in some applications, the security circuit **94** may selectively disable operation of a plurality of, or all of, the devices and functions of the hybrid vehicle **81**. The security circuit **94** may not be considered as an ignition switch of a conventional internal combustion engine vehicle.

The hybrid vehicle **81** has a data communications bus **90** extending throughout. The data communications bus **90** may extend through at least one of the engine compartment, the passenger compartment, and the trunk of the hybrid vehicle **81**.

The sensor **93** is coupled to the rechargeable battery **92** and reads the voltage thereof. The sensor **93** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **97**. The external power source **97** may be an electrical socket or recharging station.

The electrical ventilation blower **91**, the sensor **93**, the security circuit **94**, the combustion engine starter **96**, and the window motor **99** are each coupled to the data communications bus **90** for communication thereover. Those of skill in the art will understand that each of the electrical ventilation blower **91**, the sensor **93**, the security circuit **94**, the combustion engine starter **96**, and the window motor **99** need not be on the data communications bus **90**. Indeed, one of, or a plurality of, the electrical ventilation blower **91**, the sensor **93**, the security circuit **94**, the combustion engine starter **96**, and the window motor **99** may be on the data communications bus **90**.

The remote climate control system **80** includes a remote transmitter **98** and a receiver **82** positioned at the hybrid vehicle **81** for receiving signals from the remote transmitter. The remote vehicle climate controller **85** may be a vehicle remote climate controller **85** to cooperate with the receiver **82**. Those of skill in the art will understand that the receiver **82** and the vehicle remote climate controller **85** may be associated together in a same housing. In fact the receiver **82** and the vehicle remote climate controller **85** may each be embodied on a same printed circuit board or even in a same integrated circuit. The vehicle remote climate controller **85** bypasses the security circuit **94** to enable operation of the electrical ventilation blower **91**.

The vehicle remote climate controller **85** is coupled to the data communications bus **90** extending within the hybrid vehicle **81** for communication thereover to selectively operate the electrical ventilation blower **91** responsive to the sensor **93** and the remote transmitter **98**. The vehicle remote climate controller **85** selectively operates the electrical ventilation blower **91** responsive to the sensor **93** and the remote transmitter **98**.

The vehicle remote climate controller **85** may selectively operate the window motor **99** to assist cooling the passenger compartment of the hybrid vehicle **81**. For example, the vehicle remote climate controller **85** may operate the window motor **99** to open the window during operation of the electrical ventilation blower **91**. The hybrid vehicle **81** may have a rain sensor to detect precipitation. The rain sensor may be on the data bus **90**. The vehicle remote climate controller **85** may communicate with the rain sensor through the data bus **90** or through the hardwire interface **88**. If precipitation is detected, the vehicle remote climate controller **85** will not operate the window motor **99** to open the window. Similarly, if precipitation is detected while the window is open, the vehicle remote climate controller **85** will operate the window motor **99** to close the window.

The remote transmitter **98** may cause the vehicle remote climate controller **85** to cool the passenger compartment of the hybrid vehicle **81** to a pre-set temperature. Alternatively, the remote transmitter **98** may have buttons that enable a user to set the temperature which the vehicle remote climate controller **85** is to cool the passenger compartment of the hybrid vehicle **81** to. Additionally or alternatively, the remote transmitter **98** may have buttons that enable a user to select which of a plurality of pre-set temperatures the vehicle remote climate controller **85** is to cool the passenger compartment of the hybrid vehicle **81** to.

In some applications, the vehicle remote climate controller **25** may be programmable to cool the passenger compartment of the hybrid vehicle **81** to a pre-set temperature at pre-set times. For example, the vehicle remote climate controller **25** may be set to cool the passenger compartment to 70° C. at 5:00 PM on Monday through Friday.

The remote transmitter **98** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **98** to the receiver **82** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **98** may indirectly communicate with the receiver **82** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **98** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **98** may optionally include a remote receiver (not shown), such as to provide status information to the user relating to the temperature of the passenger compartment of the hybrid vehicle **81**.

The remote transmitter **98** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **98** may operate a plurality of hybrid vehicles **81**. Such a feature may be desirable to a driver who owns multiple hybrid vehicles **81** or to a rental car company, for example.

The remote vehicle climate controller **85** includes a central processing unit (CPU) **86** which performs the signal processing and logic functions to control operation of the electrical ventilation blower **91**. The vehicle remote climate controller **85** also includes a bus interface **87** and a hardwire interface **88**. The bus interface **87** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **90** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **88** is to directly interface with the sensor **93**, electrical ventilation blower **91**, security circuit **94**, combustion engine starter **96**, and window motor **99**. It should be understood that in these applications, one of the sensor **93**, security circuit **94**, electrical ventilation blower **91**, combustion engine starter **96**, and window motor **99** may each be directly connected to the hardwire interface **88**, or that a plurality of the sensor, security

circuit, electrical heater, combustion engine starter, and window motor may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **85** selectively operates the electrical ventilation blower **91** responsive to the sensor **93** and the remote transmitter **98**. For example, the vehicle remote climate controller **85** may operate the electrical ventilation blower **91** if it receives, via the receiver **82**, a signal from the remote transmitter **98** causing it to do so.

If, during operation of the electrical ventilation blower **91**, the sensor **93** senses that the voltage of the rechargeable battery **92** has fallen below a threshold voltage, the vehicle remote climate controller **85** may disable the electrical ventilation blower to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **25** receives an instruction to activate the electrical ventilation blower **91**, but the sensor **93** senses that the voltage of the rechargeable battery **92** is below a threshold voltage, the vehicle remote climate controller **85** may not activate the electrical ventilation blower. This feature helps to prevent excessive discharging of the rechargeable battery **92**, due to operation of the electrical ventilation blower **91**, that might leave a driver stranded and the hybrid vehicle **81** inoperable.

If, during operation of the electrical ventilation blower **91**, the sensor **93** senses that the voltage of the rechargeable battery **92** has fallen below a threshold voltage, the vehicle remote climate controller **85** may start the combustion engine **95**. This may be done to charge the rechargeable battery **92** and to help prevent excessive discharging thereof.

If the vehicle remote climate controller **85** receives an instruction to activate the electrical ventilation blower **91**, but the sensor **93** senses that the voltage of the rechargeable battery **92** is below a threshold voltage, the vehicle remote climate controller **85** may start the combustion engine **95** prior to operating the electrical ventilation blower **91**.

In some applications, the vehicle remote climate controller **25** may sense if the shift selector of the hybrid vehicle **81** is in a position other than park and, if so, the multi-vehicle compatible remote climate controller may not start the combustion engine **95**. Similarly, the vehicle remote climate controller **85** may sense whether the hood of the hybrid vehicle **81** is open and may not start the combustion engine **95** based thereupon. In addition, the vehicle remote climate controller **85** may shut down the combustion engine **95** if the engine RPM exceeds a predetermined value. Many other vehicle conditions, such as the fuel level of the hybrid vehicle **81**, may be taken into account by the vehicle remote climate controller **85** before or during operation of the combustion engine **95** as will be appreciated by those skilled in the art. If the vehicle remote climate controller **85** elects to not start, or elects to shut down, the combustion engine **95** due to such a vehicle condition, it may instead deactivate the electrical ventilation blower **91**.

The vehicle remote climate controller **85** may enable the electrical ventilation blower **91** based upon the sensor sensing the rechargeable battery **92** being coupled to an external power source **97**. The external power source **97** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the hybrid vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **92**. The vehicle remote climate controller **85** may enable the electrical ventilation blower **91** based upon the sensor sensing the rechargeable battery **92** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **93** may also measure the current flowing in of or out of the rechargeable battery **92** and that the vehicle remote climate controller **85** may operate the electrical ventilation blower **91** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **93** may measure the temperature of the rechargeable battery **92** and the vehicle remote climate controller **85** may operate the electrical ventilation blower **91** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **85** in a hybrid vehicle **81** is now described with reference to the flowchart **100** of FIG. **6**. After the start (Block **102**), at Block **104** a receiver **82** for receiving signals from a remote transmitter **98** is positioned at a hybrid vehicle **81**. The hybrid vehicle **81** comprises a rechargeable electrical power source **32** and an electrical ventilation blower **91** selectively powered thereby, a sensor **93** associated with the rechargeable electrical power source, and a data communications bus **90** extending throughout the hybrid vehicle. At least one of the electrical ventilation blower **91** and the sensor **93** is coupled to the data communications bus **90**.

At Block **106** a vehicle remote climate controller **85** is coupled to the data communications bus **90** extending within the hybrid vehicle **81** for communication thereover. The vehicle remote climate controller **85** is to cooperate with the receiver **82** to selectively operate the electrical ventilation blower **91** responsive to the sensor **93** and the remote transmitter **98**. Block **108** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **85** to the data communications bus **90** extending within the hybrid vehicle **81** for communication thereover, the vehicle remote climate controller **85** to cooperate with a receiver **82** to selectively operate the electrical ventilation blower **91** responsive to the sensor **93** and the remote transmitter **98**.

The vehicle remote climate controller **85** may disable the electrical ventilation blower **91** based upon the sensor **93** sensing a voltage of the rechargeable electrical power source **92** being below a threshold. The hybrid vehicle **81** may have a combustion engine **95** and the vehicle remote climate controller **85** may start the combustion engine **95** based upon the sensor **93** sensing a voltage of the rechargeable electrical power source **92** being below a threshold.

The vehicle remote climate controller **85** may enable the electrical ventilation blower **91** based upon the sensor **93** sensing the rechargeable electrical power source **92** being coupled to an external power source **97**. The vehicle remote climate controller **85** may comprise a multi-vehicle compatible remote climate controller.

Referring now to FIG. **7**, a remote climate control system **120** for an electric vehicle **121** is now described. The electric vehicle **121** has a rechargeable battery **132**, although those of skill in the art will appreciate that the electric vehicle may have another rechargeable electrical power source, such as a capacitor, fuel cell, or flywheel/generator, in addition to or instead of the rechargeable battery. The electric vehicle **121** also has an electric motor **123** coupled to the rechargeable battery **132**.

The electric vehicle **121** further comprises an electrical heater **131** selectively powered by the rechargeable battery **132** and a sensor **133** associated with the rechargeable battery. The electrical heater **131** may be a resistive heater or other suitable heater as known to those of skill in the art.

The electric vehicle **121** may also include a security circuit **134** connected to the electrical heater **131**. The security cir-

cuit **134** selectively disables the electrical heater **131**. Those of skill in the art will appreciate that, in some applications, the security circuit **134** may selectively disable operation of a plurality of, or all of, the devices and functions of the electric vehicle **121**. The security circuit **134** may be considered as an ignition switch of a conventional internal combustion engine vehicle.

The electric vehicle **121** has a data communications bus **130** extending throughout. The data communications bus **130** may extend through at least one of the engine compartment, the passenger compartment, and the trunk of the electric vehicle **121**.

The sensor **133** is coupled to the rechargeable battery **132** and reads the voltage thereof. The sensor **133** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **137**. The external power source **137** may be an electrical socket or recharging station.

The electrical heater **131**, the sensor **133**, the security circuit **134**, and the combustion engine starter **36** are each coupled to the data communications bus **130** for communication thereover. Those of skill in the art will understand that each of the electrical heater **131**, the sensor **133**, and the security circuit **134** need not be on the data communications bus **130**. Indeed, one of, or a plurality of the electrical heater **131**, the sensor **133**, and the security circuit **134** may be on the data communications bus **130**.

The remote climate control system **120** includes a remote transmitter **138** and a receiver **122** positioned at the electric vehicle **121** for receiving signals from the remote transmitter. The remote climate control system **120** also includes a vehicle remote climate controller **125** to cooperate with the receiver **122**. Those of skill in the art will understand that the receiver **122** and the vehicle remote climate controller **125** may be associated together in a same housing. In fact the receiver **122** and the vehicle remote climate controller **125** may each be embodied on a same printed circuit board or even in a same integrated circuit.

The vehicle remote climate controller **125** bypasses the security circuit **134** to enable operation of the electrical heater **131**. The security circuit **134** selectively disables the electrical heater **131**.

The vehicle remote climate controller **125** is coupled to the data communications bus **130** extending within the electric vehicle **121** for communication thereover to selectively operate the electrical heater **131** responsive to the sensor **133** and the remote transmitter **138**. The vehicle remote climate controller **125** selectively operates the electrical heater **131** responsive to the sensor **133** and the remote transmitter **138**.

The remote transmitter **138** may cause the vehicle remote climate controller **125** to heat the passenger compartment of the electric vehicle **121** to a pre-set temperature. Alternatively, the remote transmitter **138** may have buttons that enable a user to set the temperature which the vehicle remote climate controller **125** is to heat the passenger compartment of the electric vehicle **121** to. Additionally or alternatively, the remote transmitter **138** may have buttons that enable a user to select which of a plurality of pre-set temperatures the vehicle remote climate controller **125** is to heat the passenger compartment of the electric vehicle **121** to.

The remote transmitter **138** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **138** to the receiver **122** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **138** may indirectly communicate with the receiver **122** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **138** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **138** may optionally include a remote receiver (not shown), such as to provide status information to the user relating to the temperature of the passenger compartment of the electric vehicle **121**.

The remote transmitter **138** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **138** may operate a plurality of electric vehicles **121**. Such a feature may be desirable to a driver who owns multiple electric vehicles **121** or to a rental car company, for example.

The vehicle remote climate controller **125** includes a central processing unit (CPU) **126** which performs the signal processing and logic functions to control operation of the electrical heater **131**. The vehicle remote climate controller **125** also includes a bus interface **127** and a hardwire interface **128**. The bus interface **127** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **130** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **128** is to directly interface with the sensor **133**, electrical heater **131**, and security circuit **134**. It should be understood that in these applications, one of the sensor **133**, security circuit **134**, and electrical heater **131** may each be directly connected to the hardwire interface **128**, or that a plurality of the sensor, security circuit, and electrical heater may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **125** selectively operates the electrical heater **131** responsive to the sensor **133** and the remote transmitter **138**. For example, the vehicle remote climate controller **125** may operate the electrical heater **131** if it receives, via the receiver **122**, a signal from the remote transmitter **138** causing it to do so.

If, during operation of the electrical heater **131**, the sensor **133** senses that the voltage of the rechargeable battery **132** has fallen below a threshold voltage, the vehicle remote climate controller **125** may disable the electrical heater to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **125** receives an instruction to activate the electrical heater **131**, but the sensor **133** senses that the voltage of the rechargeable battery **132** is below a threshold voltage, the multi-vehicle compatible remote climate controller **120** may not activate the electrical heater. This feature helps to prevent excessive discharging of the rechargeable battery **132**, due to operation of the heater **131**, that might leave a driver stranded and the electric vehicle **121** inoperable.

The vehicle remote climate controller **125** may enable the electrical heater **131** based upon the sensor sensing the rechargeable battery **132** being coupled to an external power source **137**. The external power source **137** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the electric vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **132**. The vehicle remote climate controller **125** may

enable the electrical heater **131** based upon the sensor sensing the rechargeable battery **132** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **133** may also measure the current flowing in of or out of the rechargeable battery **132** and that the vehicle remote climate controller **125** may operate the electrical heater **131** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **133** may measure the temperature of the rechargeable battery **132** and the vehicle remote climate controller **125** may operate the electrical heater **131** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **125** in a electric vehicle **121** is now described with reference to the flowchart **140** of FIG. **2**. After the start (Block **142**), at Block **144** a receiver **122** for receiving signals from a remote transmitter **138** is positioned at an electric vehicle **121**. The electric vehicle **121** comprises a rechargeable electrical power source **132** and an electrical heater **131** selectively powered thereby, a sensor **123** associated with the rechargeable electrical power source, and a data communications bus **130** extending throughout the electric vehicle. At least one of the electrical heater **131** and the sensor **133** is coupled to the data communications bus **130**.

At Block **146** a vehicle remote climate controller **125** is coupled to the data communications bus **130** extending within the electric vehicle **121** for communication thereover. The vehicle remote climate controller **125** is to cooperate with the receiver **122** to selectively operate the electrical heater **131** responsive to the sensor **133** and the remote transmitter **138**. Block **148** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **125** to the data communications bus **130** extending within the electric vehicle **121** for communication thereover, the vehicle remote climate controller **125** to cooperate with a receiver **122** to selectively operate the electrical heater **131** responsive to the sensor **133** and the remote transmitter **138**.

The vehicle remote climate controller **125** may disable the electrical heater **131** based upon the sensor **133** sensing a voltage of the rechargeable electrical power source **132** being below a threshold.

The vehicle remote climate controller **135** may enable the electrical heater **131** based upon the sensor **133** sensing the rechargeable electrical power source **132** being coupled to an external power source **137**. The vehicle remote climate controller **125** may comprise a multi-vehicle compatible remote climate controller.

Referring now to FIG. **9**, a further embodiment of a remote climate control system **150** for an electric vehicle **151** is now described. The electric vehicle **151** has a rechargeable battery **162**, although those of skill in the art will appreciate that the electric vehicle may have another rechargeable electrical power source, such as a capacitor or flywheel/generator, in addition to or instead of the rechargeable battery. The electric vehicle **151** also has an electric motor **153** coupled to the rechargeable battery **162**.

The electric vehicle **151** further comprises an electrical air conditioning (AC) unit **161**, for example an AC compressor, selectively powered by the rechargeable battery **162**, a sensor **163** associated with the rechargeable battery, and an electric window motor **169**. It is to be understood that the sensor **163** is optional that, in some applications, it may not be present.

The electrical AC unit **161** may be a conventional AC compressor coupled to an electric motor via a belt or may be an AC compressor having an internal electric motor. In some embodiments, the electrical AC unit **161** may be a thermoelectric cooler or other suitable electric AC unit as known to those of skill in the art.

The electric vehicle **151** further comprises an electrical AC unit **161** selectively powered by the rechargeable battery **162**, a sensor **163** associated with the rechargeable battery, and an electric window motor **169**. The electrical AC unit **161** may be a conventional AC unit coupled to an electric motor via a belt or may be an AC unit having an internal electric motor. In some embodiments, there may be a thermoelectric cooler in addition to or instead of the electrical AC unit **161**.

The electric vehicle **151** may also include a security circuit **164** connected to the electrical AC unit **161**. The security circuit **164** selectively disables the electrical AC unit **161**. Those of skill in the art will appreciate that, in some applications, the security circuit **164** may selectively disable operation of a plurality of, or all of, the devices and functions of the electric vehicle **151**. The security circuit **164** may be considered as an ignition switch of a conventional internal combustion engine vehicle.

The electric vehicle **151** has a data communications bus **160** extending throughout. The data communications bus **160** may extend through at least one of the engine compartment, the passenger compartment, and the trunk of the electric vehicle **151**.

The sensor **163** is coupled to the rechargeable battery **162** and reads the voltage thereof. The sensor **163** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **167**. The external power source **167** may be an electrical socket or recharging station.

The electrical AC unit **161**, the sensor **163**, the security circuit **164**, and the window motor **169** are each coupled to the data communications bus **160** for communication thereover. Those of skill in the art will understand that each of the electrical AC unit **161**, the sensor **163**, the security circuit **164**, and the window motor **169** need not be on the data communications bus **160**. Indeed, one of, or a plurality of, the electrical AC unit **161**, the sensor **163**, the security circuit **164**, and the window motor **69** may be on the data communications bus **160**.

The remote climate control system **150** includes a remote transmitter **168** and a receiver **152** positioned at the electric vehicle **151** for receiving signals from the remote transmitter. The remote climate control system **150** also includes a vehicle remote climate controller **155** to cooperate with the receiver **152**. Those of skill in the art will understand that the receiver **152** and the vehicle remote climate controller **155** may be associated together in a same housing. In fact the receiver **152** and the vehicle remote climate controller **155** may each be embodied on a same printed circuit board or even in a same integrated circuit.

The vehicle remote climate controller **155** bypasses the security circuit **164** to enable operation of the electrical AC unit **161**. The security circuit **164** selectively disables the electrical AC unit **161**.

The vehicle remote climate controller **155** is coupled to the data communications bus **160** extending within the electric vehicle **151** for communication thereover to selectively operate the electrical AC unit **161** responsive to the sensor **163** and the remote transmitter **168**. The vehicle remote climate controller **155** selectively operates the electrical AC unit **161** responsive to the sensor **163** and the remote transmitter **168**.

The vehicle remote climate controller **155** may selectively operate the window motor **169** to assist cooling the passenger compartment of the electric vehicle **151**. For example, the

vehicle remote climate controller **155** may operate the window motor **169** to open the window during operation of the electrical AC unit **161**. The electric vehicle **151** may have a rain sensor to detect precipitation. The rain sensor may be on the data bus **160**. The vehicle remote climate controller **155** may communicate with the rain sensor through the data bus **160** or through the hardwire interface **158**. If precipitation is detected, the vehicle remote climate controller **155** will not operate the window motor **169** to open the window. Similarly, if precipitation is detected while the window is open, the vehicle remote climate controller **155** will operate the window motor **169** to close the window.

The remote transmitter **168** may cause the vehicle remote climate controller **155** to cool the passenger compartment of the electric vehicle **151** to a pre-set temperature. Alternatively, the remote transmitter **168** may have buttons that enable a user to set the temperature which the vehicle remote climate controller **155** is to cool the passenger compartment of the electric vehicle **151** to. Additionally or alternatively, the remote transmitter **168** may have buttons that enable a user to select which of a plurality of pre-set temperatures the vehicle remote climate controller **155** is to cool the passenger compartment of the electric vehicle **151** to.

The remote transmitter **168** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **168** to the receiver **152** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **168** may indirectly communicate with the receiver **152** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **168** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **168** may optionally include a remote receiver (not shown), such as to provide status information to the user relating to the temperature of the passenger compartment of the electric vehicle **151**.

The remote transmitter **168** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **168** may operate a plurality of electric vehicles **151**. Such a feature may be desirable to a driver who owns multiple electric vehicles **151** or to a rental car company, for example.

The vehicle remote climate controller **155** includes a central processing unit (CPU) **156** which performs the signal processing and logic functions to control operation of the electrical AC unit **161**. The vehicle remote climate controller **155** also includes a bus interface **157** and a hardwire interface **158**. The bus interface **157** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **160** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **158** is to directly interface with the sensor **163**, electrical AC unit **161**, security circuit **164**, and window motor **69**. It should be understood that in these applications, one of the sensor **163**, security circuit **164**, electrical AC unit **161**, and window motor **69** may each be directly connected to the hardwire interface **158**, or that a plurality of the sensor, security circuit, electrical heater, and window motor may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **125** selectively operates the electrical AC unit **161** responsive to the sensor **163** and the remote transmitter **168**. For example, the vehicle remote climate controller **155** may operate the electrical AC unit **161** if it receives, via the receiver **152**, a signal from the remote transmitter **168** causing it to do so.

If, during operation of the electrical AC unit **161**, the sensor **163** senses that the voltage of the rechargeable battery **162** has fallen below a threshold voltage, the vehicle remote climate controller **155** may disable the electrical AC unit to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **125** receives an instruction to activate the electrical AC unit **161**, but the sensor **163** senses that the voltage of the rechargeable battery **162** is below a threshold voltage, the vehicle remote climate controller **155** may not activate the electrical AC unit. This feature helps to prevent excessive discharging of the rechargeable battery **162**, due to operation of the electrical AC unit **161**, that might leave a driver stranded and the electric vehicle **151** inoperable.

The vehicle remote climate controller **155** may enable the electrical AC unit **161** based upon the sensor sensing the rechargeable battery **162** being coupled to an external power source **167**. The external power source **167** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the electric vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **162**. The vehicle remote climate controller **155** may enable the electrical AC unit **161** based upon the sensor sensing the rechargeable battery **162** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **163** may also measure the current flowing in of or out of the rechargeable battery **162** and that the vehicle remote climate controller **155** may operate the electrical AC unit **161** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **163** may measure the temperature of the rechargeable battery **162** and the vehicle remote climate controller **155** may operate the electrical AC unit **161** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **155** in an electric vehicle **151** is now described with reference to the flowchart **170** of FIG. **10**. After the start (Block **172**), at Block **74** a receiver **152** for receiving signals from a remote transmitter **168** is positioned at an electric vehicle **151**. The electric vehicle **151** comprises a rechargeable electrical power source **132** and an electrical AC unit **161** selectively powered thereby, a sensor **163** associated with the rechargeable electrical power source, and a data communications bus **160** extending throughout the electric vehicle. At least one of the electrical AC unit **161** and the sensor **163** is coupled to the data communications bus **160**.

At Block **176** a vehicle remote climate controller **155** is coupled to the data communications bus **160** extending within the electric vehicle **151** for communication thereover. The vehicle remote climate controller **155** is to cooperate with the receiver **152** to selectively operate the electrical AC unit **161** responsive to the sensor **163** and the remote transmitter **168**. Block **178** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **155** to the data communications bus **160** extending within the electric vehicle **151** for communi-

cation thereover, the vehicle remote climate controller **155** to cooperate with a receiver **152** to selectively operate the electrical AC unit **161** responsive to the sensor **163** and the remote transmitter **168**.

The vehicle remote climate controller **155** may disable the electrical AC unit **161** based upon the sensor **163** sensing a voltage of the rechargeable electrical power source **162** being below a threshold.

The vehicle remote climate controller **155** may enable the electrical AC unit **161** based upon the sensor **163** sensing the rechargeable electrical power source **162** being coupled to an external power source **167**. The vehicle remote climate controller **155** may comprise a multi-vehicle compatible remote climate controller.

Referring now to FIG. **11**, still another embodiment of a remote climate control system **180** for an electric vehicle **181** is now described. The electric vehicle **181** has a rechargeable battery **192**, although those of skill in the art will appreciate that the electric vehicle may have another rechargeable electrical power source, such as a capacitor, fuel cell, or flywheel/generator, in addition to or instead of the rechargeable battery. The electric vehicle **181** also includes an electric motor **183** coupled to the rechargeable battery **192**.

The electric vehicle **181** further comprises an electrical ventilation blower **191** selectively powered by the rechargeable battery **192**, a sensor **193** associated with the rechargeable battery, and an electric window motor **199**. It is to be understood that the sensor **193** is optional and that, in some applications, will not be present.

The electrical ventilation blower **191** may be a conventional blower coupled to an electric motor via a belt or may be an electrical ventilation blower having an internal electric motor. It should be understood that the electric ventilation blower **191** merely blows ambient outside air into the passenger compartment of the vehicle and does not actively cool the air, as would an electric AC unit. It may be advantageous to use the electrical ventilation blower **191** to cool the passenger compartment of the electric vehicle **181** as opposed to an electrical AC unit such as an electrical AC unit because the electrical ventilation blower may consume less electricity.

The electric vehicle **181** may also include a security circuit **194** connected to the electrical ventilation blower **191**. The security **194** circuit selectively disables the electrical ventilation blower **191**. Those of skill in the art will appreciate that, in some applications, the security circuit **194** may selectively disable operation of a plurality of, or all of, the devices and functions of the electric vehicle **181**. The security circuit **194** may be considered as an ignition switch of a conventional internal combustion engine vehicle.

The electric vehicle **181** has a data communications bus **190** extending throughout. The data communications bus **190** may extend through at least one of the engine compartment, the passenger compartment, and the trunk of the electric vehicle **181**.

The sensor **193** is coupled to the rechargeable battery **192** and reads the voltage thereof. The sensor **193** may, additionally or alternatively, be able to detect whether the rechargeable battery is connected to an external power source **197**. The external power source **197** may be an electrical socket or recharging station.

The electrical ventilation blower **191**, the sensor **193**, the security circuit **194**, and the window motor **199** are each coupled to the data communications bus **190** for communication thereover. Those of skill in the art will understand that each of the electrical ventilation blower **191**, the sensor **193**, the security circuit **194**, the combustion engine starter **96**, and the window motor **199** need not be on the data communications bus **190**. Indeed, one of, or a plurality of, the electrical ventilation blower **191**, the sensor **193**, the security circuit **194** and the window motor **199** may be on the data communications bus **190**.

The remote climate control system **180** includes a remote transmitter **198** and a receiver **182** positioned at the electric vehicle **181** for receiving signals from the remote transmitter. The remote climate control system **180** also includes a vehicle remote climate controller **185** to cooperate with the receiver **182**. Those of skill in the art will understand that the receiver **182** and the vehicle remote climate controller **185** may be associated together in a same housing. In fact the receiver **182** and the vehicle remote climate controller **185** may each be embodied on a same printed circuit board or even in a same integrated circuit.

The vehicle remote climate controller **185** bypasses the security circuit **194** to enable operation of the electrical ventilation blower **191**. The security circuit **194** selectively disables the electrical ventilation blower **191**.

The vehicle remote climate controller **185** is coupled to the data communications bus **190** extending within the electric vehicle **181** for communication thereover to selectively operate the electrical ventilation blower **191** responsive to the sensor **193** and the remote transmitter **198**. The vehicle remote climate controller **185** selectively operates the electrical ventilation blower **191** responsive to the sensor **193** and the remote transmitter **198**.

The vehicle remote climate controller **185** may selectively operate the window motor **199** to assist cooling the passenger compartment of the electric vehicle **181**. For example, the vehicle remote climate controller **185** may operate the window motor **199** to open the window during operation of the electrical ventilation blower **191**. The electric vehicle **181** may have a rain sensor to detect precipitation. The rain sensor may be on the data bus **190**. The vehicle remote climate controller **185** may communicate with the rain sensor through the data bus **190** or through the hardwire interface **188**. If precipitation is detected, the vehicle remote climate controller **185** will not operate the window motor **199** to open the window. Similarly, if precipitation is detected while the window is open, the vehicle remote climate controller **185** will operate the window motor **199** to close the window.

The remote transmitter **198** may cause the vehicle remote climate controller **185** to cool the passenger compartment of the electric vehicle **181** to a pre-set temperature. Alternatively, the remote transmitter **198** may have buttons that enable a user to set the temperature which the vehicle remote climate controller **185** is to cool the passenger compartment of the electric vehicle **181** to. Additionally or alternatively, the remote transmitter **198** may have buttons that enable a user to select which of a plurality of pre-set temperatures the vehicle remote climate controller **185** is to cool the passenger compartment of the electric vehicle **181** to.

The remote transmitter **198** may be a small portable unit including a housing, function control switches carried by the housing, a battery within the housing, and the associated wireless transmitter circuitry also within the housing. The communications from the remote transmitter **198** to the receiver **182** at the vehicle is typically a direct radio frequency link. In other words, there are no intervening communications links. However, in other embodiments, the remote transmitter **198** may indirectly communicate with the receiver **182** via other communications infrastructure, such as via satellite, or cellular communications, via the public switched telephone network (PSTN) and/or over the World Wide Web or Internet, as will be appreciated by those skilled in the art.

The remote transmitter **198** may also include one or more central station transmitters, such as may be provided by a satellite transmitter or cellular telephone transmitter, for example. Such a central station transmitter may also be connected to other communications infrastructures. In some embodiments, the remote transmitter **198** may optionally include a remote receiver (not shown), such as to provide status information to the user relating to the temperature of the passenger compartment of the electric vehicle **181**.

The remote transmitter **198** may be a common remote transmitter. By common remote transmitter, it is meant that the remote transmitter **198** may operate a plurality of electric vehicles **181**. Such a feature may be desirable to a driver who owns multiple electric vehicles **181** or to a rental car company, for example.

The vehicle remote climate controller **185** includes a central processing unit (CPU) **186** which performs the signal processing and logic functions to control operation of the electrical ventilation blower **191**. The vehicle remote climate controller **185** also includes a bus interface **187** and a hardwire interface **188**. The bus interface **187** includes circuitry for interfacing to the proper signal levels and formats on the data communications bus **190** as will be appreciated by those skilled in the art without further discussion herein.

In some applications, the hardwire interface **188** is to directly interface with the sensor **193**, electrical ventilation blower **191**, security circuit **194**, combustion engine starter **96**, and window motor **199**. It should be understood that in these applications, one of the sensor **193**, security circuit **194**, electrical ventilation blower **191**, and window motor **199** may each be directly connected to the hardwire interface **188**, or that a plurality of the sensor, security circuit, electrical heater, combustion engine starter, and window motor may be directly connected to the hardwire interface.

As stated above, the vehicle remote climate controller **125** selectively operates the electrical ventilation blower **191** responsive to the sensor **193** and the remote transmitter **198**. For example, the vehicle remote climate controller **185** may operate the electrical ventilation blower **191** if it receives, via the receiver **182**, a signal from the remote transmitter **198** instructing it to do so.

If, during operation of the electrical ventilation blower **191**, the sensor **193** senses that the voltage of the rechargeable battery **192** has fallen below a threshold voltage, the vehicle remote climate controller **185** may disable the electrical ventilation blower to conserve the voltage of the rechargeable battery. Similarly, if the vehicle remote climate controller **125** receives an instruction to activate the electrical ventilation blower **191**, but the sensor **193** senses that the voltage of the rechargeable battery **192** is below a threshold voltage, the vehicle remote climate controller **185** may not activate the electrical ventilation blower. This feature helps to prevent excessive discharging of the rechargeable battery **192**, due to operation of the electrical ventilation blower **191**, that might leave a driver stranded and the electric vehicle **181** inoperable.

The vehicle remote climate controller **185** may enable the electrical ventilation blower **191** based upon the sensor sensing the rechargeable battery **192** being coupled to an external power source **197**. The external power source **197** may be an electrical socket, a recharging station, or other external power source as known to those skilled in the art.

In some applications, the electric vehicle may have a solar panel, such as on the roof thereof, coupled to the rechargeable battery **192**. The vehicle remote climate controller **185** may enable the electrical ventilation blower **191** based upon the sensor sensing the rechargeable battery **192** being recharged by the solar panel.

Those of skill in the art will appreciate that the sensor **193** may also measure the current flowing in of or out of the rechargeable battery **192** and that the vehicle remote climate controller **185** may operate the electrical ventilation blower **191** based thereupon in the same manner as described above with reference to voltages of the rechargeable battery. Similarly, the sensor **193** may measure the temperature of the rechargeable battery **192** and the vehicle remote climate controller **185** may operate the electrical ventilation blower **191** based thereupon in the same manner as described above with reference to the voltage of the rechargeable battery.

A method of installing a remote climate controller **185** in an electric vehicle **181** is now described with reference to the flowchart **100** of FIG. **12**. After the start (Block **202**), at Block **204** a receiver **182** for receiving signals from a remote transmitter **198** is positioned at an electric vehicle **181**. The electric vehicle **181** comprises a rechargeable electrical power source **132** and an electrical ventilation blower **191** selectively powered thereby, a sensor **193** associated with the rechargeable electrical power source, and a data communications bus **190** extending throughout the electric vehicle. At least one of the electrical ventilation blower **191** and the sensor **193** is coupled to the data communications bus **190**.

At Block **206** a vehicle remote climate controller **185** is coupled to the data communications bus **190** extending within the electric vehicle **181** for communication thereover. The vehicle remote climate controller **185** is to cooperate with the receiver **182** to selectively operate the electrical ventilation blower **191** responsive to the sensor **193** and the remote transmitter **198**. Block **208** indicates the end of the method.

In other words, the method includes coupling a vehicle remote climate controller **185** to the data communications bus **190** extending within the electric vehicle **181** for communication thereover, the vehicle remote climate controller **185** to cooperate with a receiver **182** to selectively operate the electrical ventilation blower **191** responsive to the sensor **193** and the remote transmitter **198**.

The vehicle remote climate controller **185** may disable the electrical ventilation blower **191** based upon the sensor **193** sensing a voltage of the rechargeable electrical power source **192** being below a threshold.

The vehicle remote climate controller **185** may enable the electrical ventilation blower **191** based upon the sensor **193** sensing the rechargeable electrical power source **192** being coupled to an external power source **197**. The vehicle remote climate controller **185** may comprise a multi-vehicle compatible remote climate controller.

Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are intended to be included within the scope of the appended claims.

That which is claimed is:

1. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, and at least one of the electrical heater and the sensor coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller disabling the electrical heater based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

2. The remote climate control system of claim **1** wherein the sensor is coupled to the data communications bus; and wherein said vehicle remote climate controller receives signals from the sensor via the data communications bus.

3. The remote climate control system of claim **1** wherein the electrical heater is coupled to the data communications bus; and wherein said vehicle remote climate controller sends signals to the electrical heater via the data communications bus.

4. The remote climate control system of claim **1** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

5. The remote climate control system of claim **1** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

6. The remote climate control system of claim **1** wherein said remote transmitter comprises a remote wireless handheld transmitter to be carried by a user when away from the vehicle.

7. The remote temperature climate system according to claim **1** wherein said vehicle remote climate controller comprises a multi-vehicle compatible remote climate controller.

8. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, the electrical heater coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter comprising a remote wireless handheld transmitter to be carried by a user when away from the vehicle;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller disabling the electrical heater based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

9. The remote climate control system of claim **8** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

10. The remote climate control system of claim **8** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

11. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, the sensor coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter comprising a remote wireless handheld transmitter to be carried by a user when away from the vehicle;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller disabling the electrical heater based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

12. The remote climate control system of claim **11** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

13. The remote climate control system of claim **11** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

14. A method of installing a remote climate control system in a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, and at least one of the electrical heater and the sensor coupled to the data communications bus, the method comprising:

coupling a vehicle remote climate controller to the data communications bus extending within the hybrid vehicle for communication thereover, the vehicle remote climate controller to cooperate with a receiver to selectively operate the electrical heater responsive to the sensor and the remote transmitter, the vehicle remote climate controller disabling the electrical heater based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

15. The method of claim **14** wherein the hybrid vehicle further comprises a combustion engine; and wherein the vehicle remote climate controller is to start the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

16. The method of claim **14** wherein the vehicle remote climate controller comprises a multi-vehicle compatible remote climate controller.

17. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor asso-

ciated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, and at least one of the electrical heater and the sensor coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller enabling the electrical heater based upon the sensor sensing the rechargeable electrical power source being coupled to an external power source.

18. The remote climate control system of claim **17** wherein the sensor is coupled to the data communications bus; and wherein said vehicle remote climate controller receives signals from the sensor via the data communications bus.

19. The remote climate control system of claim **17** wherein the electrical heater is coupled to the data communications bus; and wherein said vehicle remote climate controller sends signals to the electrical heater via the data communications bus.

20. The remote climate control system of claim **17** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

21. The remote climate control system of claim **17** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

22. The remote climate control system of claim **17** wherein said remote transmitter comprises a remote wireless handheld transmitter to be carried by a user when away from the vehicle.

23. The remote temperature climate system according to claim **17** wherein said vehicle remote climate controller comprises a multi-vehicle compatible remote climate controller.

24. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, the electrical heater coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter comprising a remote wireless handheld transmitter to be carried by a user when away from the vehicle;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller enabling the electrical heater based upon the sensor sensing the rechargeable electrical power source being coupled to an external power source.

25. The remote climate control system of claim **24** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

26. The remote climate control system of claim **24** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

27. A remote climate control system for a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, the sensor coupled to the data communications bus, the remote climate control system comprising:

a remote transmitter comprising a remote wireless handheld transmitter to be carried by a user when away from the vehicle;

a receiver to be positioned at the hybrid vehicle for receiving signals from said remote transmitter; and

a vehicle remote climate controller cooperating with said receiver and to be coupled to the data communications bus extending within the hybrid vehicle for communication thereover to selectively operate the electrical heater responsive to the sensor and said remote transmitter, said vehicle remote climate controller enabling the electrical heater based upon the sensor sensing the rechargeable electrical power source being coupled to an external power source.

28. The remote climate control system of claim **27** wherein the hybrid vehicle further comprises a combustion engine; and wherein said vehicle remote climate controller starts the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

29. The remote climate control system of claim **27** wherein the hybrid vehicle further comprises a security circuit coupled to the electrical heater for selectively enabling operation thereof; and wherein said vehicle remote climate controller bypasses the security circuit to enable remote operation of the electrical heater.

30. A method of installing a remote climate control system in a hybrid vehicle comprising a rechargeable electrical power source and an electrical heater selectively powered thereby, a sensor associated with the rechargeable electrical power source, a data communications bus extending throughout the hybrid vehicle, and at least one of the electrical heater and the sensor coupled to the data communications bus, the method comprising:

coupling a vehicle remote climate controller to the data communications bus extending within the hybrid vehicle for communication thereover, the vehicle remote climate controller to cooperate with a receiver to selectively operate the electrical heater responsive to the sensor and the remote transmitter, the vehicle remote climate controller enabling the electrical heater based upon the sensor sensing the rechargeable electrical power source being coupled to an external power source.

31. The method of claim **30** wherein the hybrid vehicle further comprises a combustion engine; and wherein the vehicle remote climate controller is to start the combustion engine based upon the sensor sensing a voltage of the rechargeable electrical power source being below a threshold.

32. The method of claim **30** wherein the vehicle remote climate controller comprises a multi-vehicle compatible remote climate controller.

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