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## (54) HVAC SYSTEM WITH SMS CAPABILITY

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## ABSTRACT

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(60) Provisional application No. 62/034,491, filed on Aug. 7, 2014.

## Publication Classification

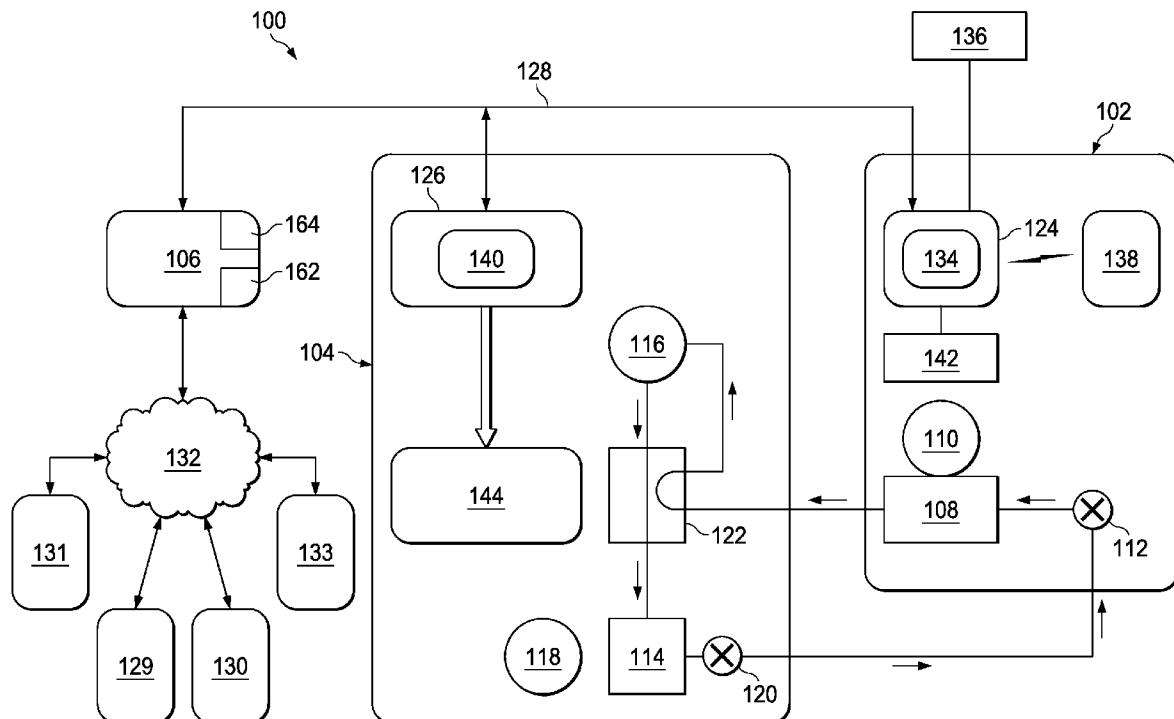
(51) Int. Cl.

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(2006.01)

Systems and methods are disclosed that include providing a system controller in a heating, ventilation, and/or air conditioning (HVAC) system with an SMS module. Initialization and/or actuation of an SMS initiator input may cause the SMS module to generate, transmit, and/or to allow a request for generation and/or transmittal of a predetermined SMS message to alter a setting and/or an operation of a smartphone that allows the smartphone to produce an audible alert, even when the smartphone is configured in a so-called silent mode.



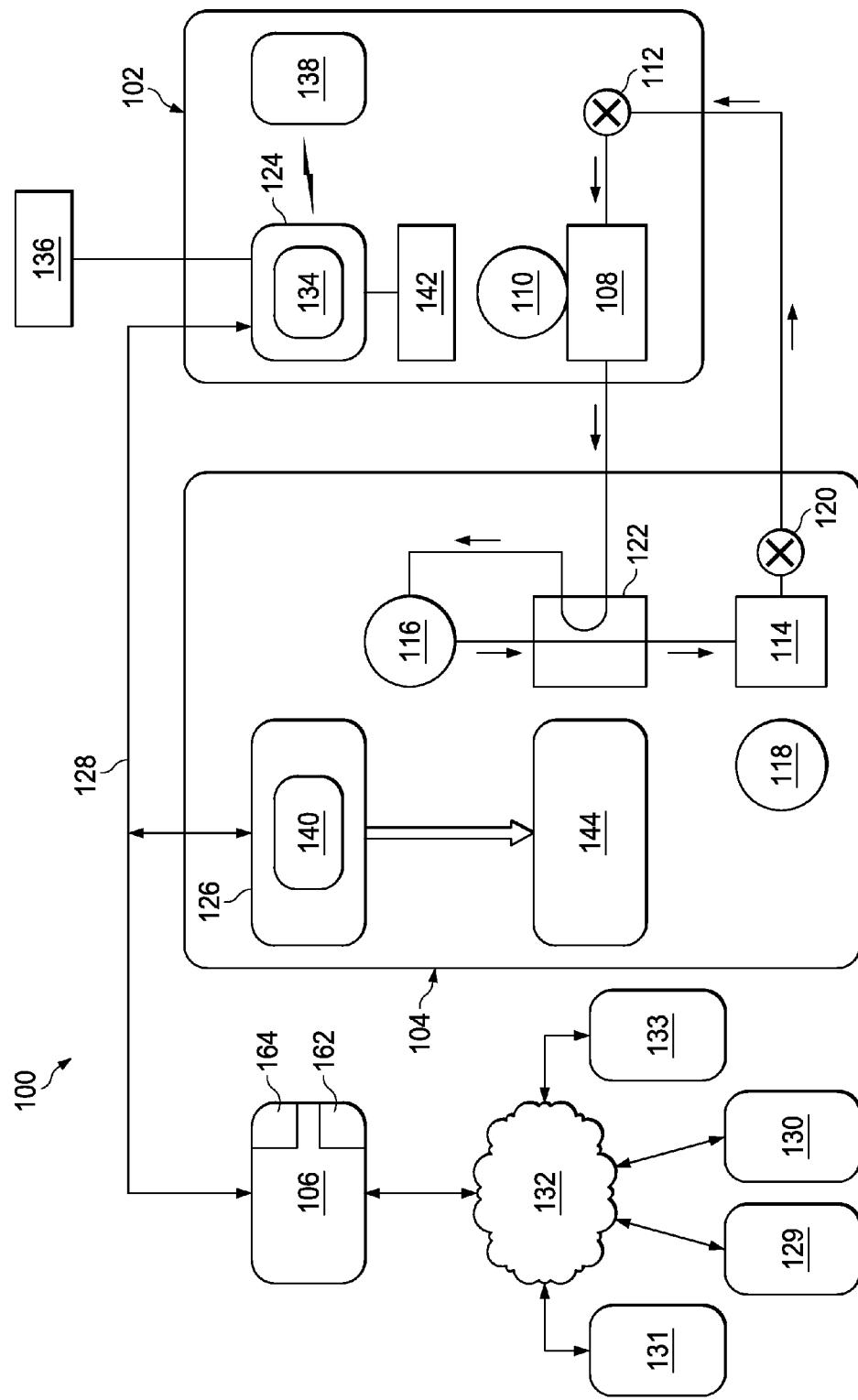


FIG. 1

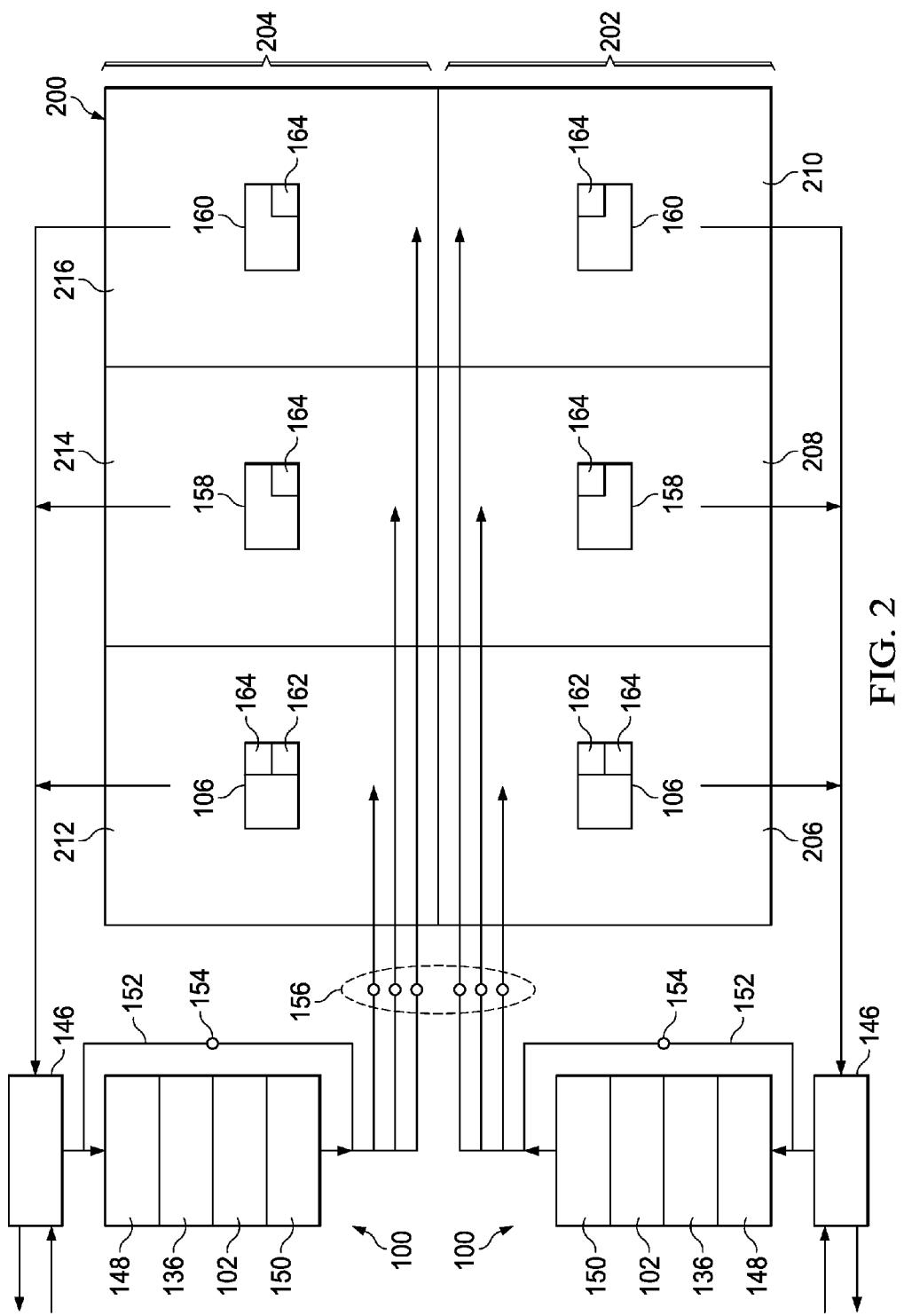


FIG. 2

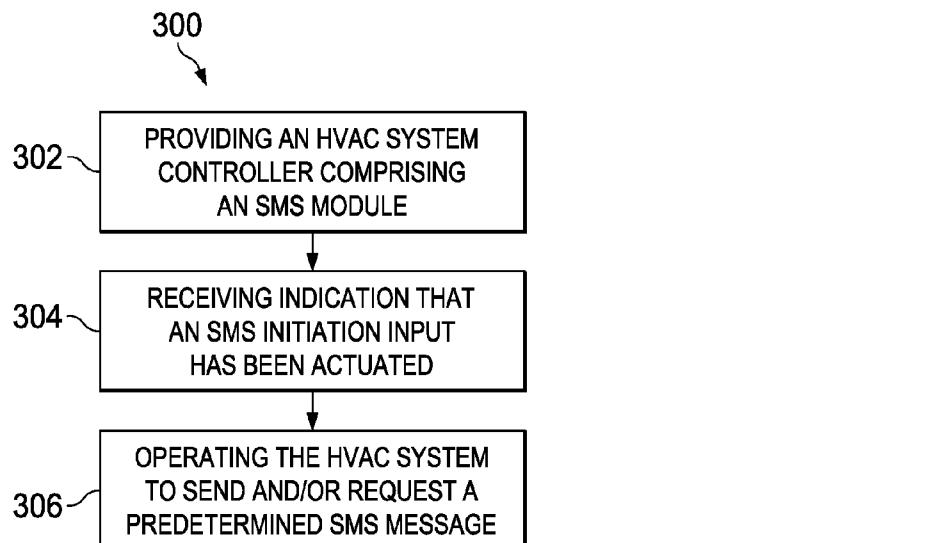


FIG. 3

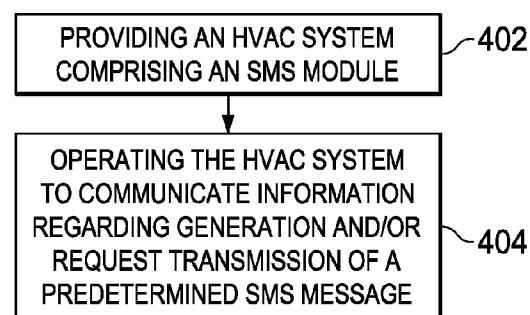


FIG. 4

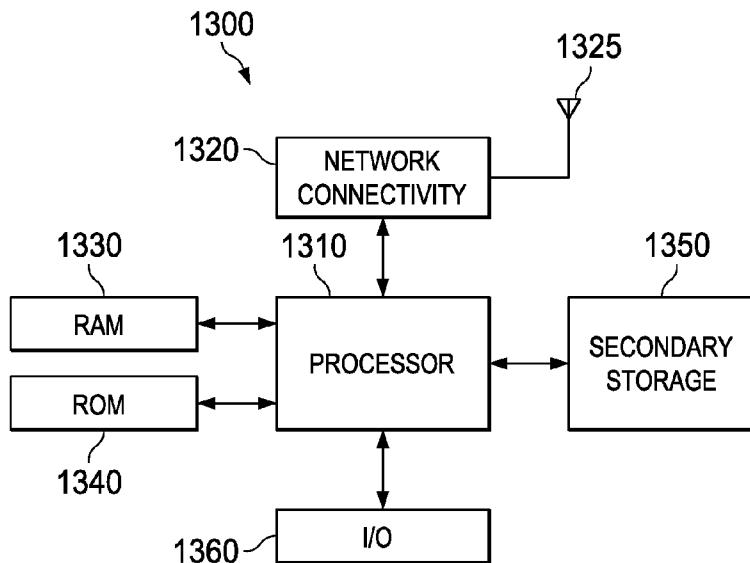


FIG. 5

**HVAC SYSTEM WITH SMS CAPABILITY****CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] The present application claims priority under 35 U.S.C. 119(e) to U.S. Provisional Patent Application No. 62/034,491 filed on Aug. 7, 2014 by Pradeep Chandramohan and entitled "HVAC System with SMS Capability," the disclosure of which is hereby incorporated by reference in its entirety.

**STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

[0002] Not applicable.

**REFERENCE TO A MICROFICHE APPENDIX**

[0003] Not applicable.

**BACKGROUND**

[0004] In some cases, heating, ventilation, and/or air conditioning (HVAC) systems comprise wall mounted system controllers. While the wall mounted system controllers often have user interfaces that allow a user to selectively adjust, control, and/or monitor operating parameters of an HVAC system, the wall mounted system controller may often be configured to communicate with other remotely located devices.

**SUMMARY**

[0005] In some embodiments of the disclosure, a heating, ventilation, and/or air conditioning (HVAC) system is disclosed as comprising: an SMS module.

[0006] In other embodiments of the disclosure, a method of operating a heating, ventilation, and/or air conditioning (HVAC) system is disclosed as comprising: providing an HVAC system comprising an SMS module; and communicating information regarding an SMS message to a remote system.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0007] For a more complete understanding of the present disclosure and the advantages thereof, reference is now made to the following brief description, taken in connection with the accompanying drawings and detailed description:

[0008] FIG. 1 is a schematic diagram of an HVAC system according to an embodiment of the disclosure;

[0009] FIG. 2 is a schematic diagram of the air circulation paths of the HVAC system of FIG. 1 according to an embodiment of the disclosure;

[0010] FIG. 3 is a flowchart of a method of operating an HVAC system according to an embodiment of the disclosure;

[0011] FIG. 4 is a flowchart of another method of operating an HVAC system according to an embodiment of the disclosure; and

[0012] FIG. 5 is a simplified representation of a general purpose processor (e.g. electronic controller or computer) system suitable for implementing the embodiments of the disclosure.

**DETAILED DESCRIPTION**

[0013] In some cases, it may be desirable to provide a system controller in a heating, ventilation, and/or air conditioning (HVAC) system with a Short Message Service (SMS) module. For example, where a lost smartphone may be located in a residence, initialization and/or actuation of an SMS initiator input may cause the SMS module to generate, transmit, and/or to allow a request for generation and/or transmittal of a predetermined SMS message to alter a setting and/or an operation of a smartphone (i.e. ringer volume) that allows the smartphone to produce an audible alert, even when the smartphone is configured in a so-called silent mode. Accordingly, a lost and/or misplaced smartphone in a residence may be located through the HVAC system controller and/or thermostat.

[0014] Referring now to FIG. 1, a schematic diagram of an HVAC system 100 according to an embodiment of this disclosure is shown. HVAC system 100 comprises an indoor unit 102, an outdoor unit 104, and a system controller 106. In some embodiments, the system controller 106 may operate to control operation of the indoor unit 102 and/or the outdoor unit 104. As shown, the HVAC system 100 is a so-called heat pump system that may be selectively operated to implement one or more substantially closed thermodynamic refrigeration cycles to provide a cooling functionality and/or a heating functionality.

[0015] Indoor unit 102 comprises an indoor heat exchanger 108, an indoor fan 110, and an indoor metering device 112. Indoor heat exchanger 108 is a plate fin heat exchanger configured to allow heat exchange between refrigerant carried within internal tubing of the indoor heat exchanger 108 and fluids that contact the indoor heat exchanger 108 but that are kept segregated from the refrigerant. In other embodiments, indoor heat exchanger 108 may comprise a spine fin heat exchanger, a microchannel heat exchanger, or any other suitable type of heat exchanger.

[0016] The indoor fan 110 is a centrifugal blower comprising a blower housing, a blower impeller at least partially disposed within the blower housing, and a blower motor configured to selectively rotate the blower impeller. In other embodiments, the indoor fan 110 may comprise a mixed-flow fan and/or any other suitable type of fan. The indoor fan 110 is configured as a modulating and/or variable speed fan capable of being operated at many speeds over one or more ranges of speeds. In other embodiments, the indoor fan 110 may be configured as a multiple speed fan capable of being operated at a plurality of operating speeds by selectively electrically powering different ones of multiple electromagnetic windings of a motor of the indoor fan 110. In yet other embodiments, the indoor fan 110 may be a single speed fan.

[0017] The indoor metering device 112 is an electronically controlled motor driven electronic expansion valve (EEV). In alternative embodiments, the indoor metering device 112 may comprise a thermostatic expansion valve, a capillary tube assembly, and/or any other suitable metering device. The indoor metering device 112 may comprise and/or be associated with a refrigerant check valve and/or refrigerant bypass for use when a direction of refrigerant flow through the indoor metering device 112 is such that the indoor metering device 112 is not intended to meter or otherwise substantially restrict flow of the refrigerant through the indoor metering device 112.

[0018] Outdoor unit 104 comprises an outdoor heat exchanger 114, a compressor 116, an outdoor fan 118, an

outdoor metering device 120, and a reversing valve 122. Outdoor heat exchanger 114 is a spine fin heat exchanger configured to allow heat exchange between refrigerant carried within internal passages of the outdoor heat exchanger 114 and fluids that contact the outdoor heat exchanger 114 but that are kept segregated from the refrigerant. In other embodiments, outdoor heat exchanger 114 may comprise a plate fin heat exchanger, a microchannel heat exchanger, or any other suitable type of heat exchanger.

[0019] The compressor 116 is a multiple speed scroll type compressor configured to selectively pump refrigerant at a plurality of mass flow rates. In alternative embodiments, the compressor 116 may comprise a modulating compressor capable of operation over one or more speed ranges, the compressor 116 may comprise a reciprocating type compressor, the compressor 116 may be a single speed compressor, and/or the compressor 116 may comprise any other suitable refrigerant compressor and/or refrigerant pump.

[0020] The outdoor fan 118 is an axial fan comprising a fan blade assembly and fan motor configured to selectively rotate the fan blade assembly. In other embodiments, the outdoor fan 118 may comprise a mixed-flow fan, a centrifugal blower, and/or any other suitable type of fan and/or blower. The outdoor fan 118 is configured as a modulating and/or variable speed fan capable of being operated at many speeds over one or more ranges of speeds. In other embodiments, the outdoor fan 118 may be configured as a multiple speed fan capable of being operated at a plurality of operating speeds by selectively electrically powering different ones of multiple electromagnetic windings of a motor of the outdoor fan 118. In yet other embodiments, the outdoor fan 118 may be a single speed fan.

[0021] The outdoor metering device 120 is a thermostatic expansion valve. In alternative embodiments, the outdoor metering device 120 may comprise an electronically controlled motor driven EEV, a capillary tube assembly, and/or any other suitable metering device. The outdoor metering device 120 may comprise and/or be associated with a refrigerant check valve and/or refrigerant bypass for use when a direction of refrigerant flow through the outdoor metering device 120 is such that the outdoor metering device 120 is not intended to meter or otherwise substantially restrict flow of the refrigerant through the outdoor metering device 120.

[0022] The reversing valve 122 is a so-called four-way reversing valve. The reversing valve 122 may be selectively controlled to alter a flow path of refrigerant in the HVAC system 100 as described in greater detail below. The reversing valve 122 may comprise an electrical solenoid or other device configured to selectively move a component of the reversing valve 122 between operational positions.

[0023] The system controller 106 may comprise a touch-screen interface for displaying information and for receiving user inputs. The system controller 106 may display information related to the operation of the HVAC system 100 and may receive user inputs related to operation of the HVAC system 100. However, the system controller 106 may further be operable to display information and receive user inputs tangentially and/or unrelated to operation of the HVAC system 100. In some embodiments, the system controller 106 may comprise a temperature sensor and may further be configured to control heating and/or cooling of zones associated with the HVAC system 100. In some embodiments, the system controller 106

may be configured as a thermostat for controlling supply of conditioned air to zones associated with the HVAC system 100.

[0024] In some embodiments, the system controller 106 may selectively communicate with an indoor controller 124 of the indoor unit 102, with an outdoor controller 126 of the outdoor unit 104, and/or with other components of the HVAC system 100. In some embodiments, the system controller 106 may be configured for selective bidirectional communication over a communication bus 128. In some embodiments, portions of the communication bus 128 may comprise a three-wire connection suitable for communicating messages between the system controller 106 and one or more of the HVAC system 100 components configured for interfacing with the communication bus 128. Still further, the system controller 106 may be configured to selectively communicate with HVAC system 100 components and/or other device 130 via a communication network 132. In some embodiments, the communication network 132 may comprise a telephone network and the other device 130 may comprise a telephone. In some embodiments, the communication network 132 may comprise the Internet and the other device 130 may comprise a so-called smartphone and/or other Internet enabled mobile telecommunication device.

[0025] The indoor controller 124 may be configured to receive information inputs, transmit information outputs, and otherwise communicate with the system controller 106, the outdoor controller 126, and/or any other device via the communication bus 128 and/or any other suitable medium of communication. In some embodiments, the indoor controller 124 may be configured to communicate with an indoor personality module 134, receive information related to a speed of the indoor fan 110, transmit a control output to an electric heat relay, transmit information regarding an indoor fan 110 volumetric flow-rate, communicate with and/or otherwise affect control over an air cleaner 136, and communicate with an indoor EEV controller 138. In some embodiments, the indoor controller 124 may be configured to communicate with an indoor fan controller 142 and/or otherwise affect control over operation of the indoor fan 110. In some embodiments, the indoor personality module 134 may comprise information related to the identification and/or operation of the indoor unit 102 and/or a position of the outdoor metering device 120.

[0026] In some embodiments, the indoor EEV controller 138 may be configured to receive information regarding temperatures and pressures of the refrigerant in the indoor unit 102. More specifically, the indoor EEV controller 138 may be configured to receive information regarding temperatures and pressures of refrigerant entering, exiting, and/or within the indoor heat exchanger 108. Further, the indoor EEV controller 138 may be configured to communicate with the indoor metering device 112 and/or otherwise affect control over the indoor metering device 112.

[0027] The outdoor controller 126 may be configured to receive information inputs, transmit information outputs, and otherwise communicate with the system controller 106, the indoor controller 124, and/or any other device via the communication bus 128 and/or any other suitable medium of communication. In some embodiments, the outdoor controller 126 may be configured to communicate with an outdoor personality module 140 that may comprise information related to the identification and/or operation of the outdoor unit 104. In some embodiments, the outdoor controller 126 may be configured to receive information related to an ambient

ent temperature associated with the outdoor unit **104**, information related to a temperature of the outdoor heat exchanger **114**, and/or information related to refrigerant temperatures and/or pressures of refrigerant entering, exiting, and/or within the outdoor heat exchanger **114** and/or the compressor **116**. In some embodiments, the outdoor controller **126** may be configured to transmit information related to monitoring, communicating with, and/or otherwise affecting control over the outdoor fan **118**, a compressor sump heater, a solenoid of the reversing valve **122**, a relay associated with adjusting and/or monitoring a refrigerant charge of the HVAC system **100**, a position of the indoor metering device **112**, and/or a position of the outdoor metering device **120**. The outdoor controller **126** may further be configured to communicate with a compressor drive controller **144** that is configured to electrically power and/or control the compressor **116**.

[0028] The HVAC system **100** is shown configured for operating in a so-called cooling mode in which heat is absorbed by refrigerant at the indoor heat exchanger **108** and heat is rejected from the refrigerant at the outdoor heat exchanger **114**. In some embodiments, the compressor **116** may be operated to compress refrigerant and pump the relatively high temperature and high pressure compressed refrigerant from the compressor **116** to the outdoor heat exchanger **114** through the reversing valve **122** and to the outdoor heat exchanger **114**. As the refrigerant is passed through the outdoor heat exchanger **114**, the outdoor fan **118** may be operated to move air into contact with the outdoor heat exchanger **114**, thereby transferring heat from the refrigerant to the air surrounding the outdoor heat exchanger **114**. The refrigerant may primarily comprise liquid phase refrigerant and the refrigerant may be pumped from the outdoor heat exchanger **114** to the indoor metering device **112** through and/or around the outdoor metering device **120** which does not substantially impede flow of the refrigerant in the cooling mode. The indoor metering device **112** may meter passage of the refrigerant through the indoor metering device **112** so that the refrigerant downstream of the indoor metering device **112** is at a lower pressure than the refrigerant upstream of the indoor metering device **112**. The pressure differential across the indoor metering device **112** allows the refrigerant downstream of the indoor metering device **112** to expand and/or at least partially convert to gaseous phase. The gaseous phase refrigerant may enter the indoor heat exchanger **108**. As the refrigerant is passed through the indoor heat exchanger **108**, the indoor fan **110** may be operated to move air into contact with the indoor heat exchanger **108**, thereby transferring heat to the refrigerant from the air surrounding the indoor heat exchanger **108**. The refrigerant may thereafter reenter the compressor **116** after passing through the reversing valve **122**.

[0029] To operate the HVAC system **100** in the so-called heating mode, the reversing valve **122** may be controlled to alter the flow path of the refrigerant, the indoor metering device **112** may be disabled and/or bypassed, and the outdoor metering device **120** may be enabled. In the heating mode, refrigerant may flow from the compressor **116** to the indoor heat exchanger **108** through the reversing valve **122**, the refrigerant may be substantially unaffected by the indoor metering device **112**, the refrigerant may experience a pressure differential across the outdoor metering device **120**, the refrigerant may pass through the outdoor heat exchanger **114**, and the refrigerant may reenter the compressor **116** after passing through the reversing valve **122**. Most generally,

operation of the HVAC system **100** in the heating mode reverses the roles of the indoor heat exchanger **108** and the outdoor heat exchanger **114** as compared to their operation in the cooling mode.

[0030] Referring now to FIG. 2, a simplified schematic diagram of the air circulation paths for a structure **200** conditioned by two HVAC systems **100** is shown. In this embodiment, the structure **200** is conceptualized as comprising a lower floor **202** and an upper floor **204**. The lower floor **202** comprises zones **206**, **208**, and **210** while the upper floor **204** comprises zones **212**, **214**, and **216**. The HVAC system **100** associated with the lower floor **202** is configured to circulate and/or condition air of lower zones **206**, **208**, and **210** while the HVAC system **100** associated with the upper floor **204** is configured to circulate and/or condition air of upper zones **212**, **214**, and **216**.

[0031] In addition to the components of HVAC system **100** described above, in this embodiment, each HVAC system **100** further comprises a ventilator **146**, a prefilter **148**, a humidifier **150**, and a bypass duct **152**. The ventilator **146** may be operated to selectively exhaust circulating air to the environment and/or introduce environmental air into the circulating air. The prefilter **148** may generally comprise a filter media selected to catch and/or retain relatively large particulate matter prior to air exiting the prefilter **148** and entering the air cleaner **136**. The humidifier **150** may be operated to adjust a humidity of the circulating air. The bypass duct **152** may be utilized to regulate air pressures within the ducts that form the circulating air flow paths. In some embodiments, air flow through the bypass duct **152** may be regulated by a bypass damper **154** while air flow delivered to the zones **206**, **208**, **210**, **212**, **214**, and **216** may be regulated by zone dampers **156**.

[0032] Still further, each HVAC system **100** may further comprise a zone thermostat **158** and a zone sensor **160**. In some embodiments, a zone thermostat **158** may communicate with the system controller **106** and may allow a user to control a temperature, humidity, and/or other environmental setting for the zone in which the zone thermostat **158** is located. Further, the zone thermostat **158** may communicate with the system controller **106** to provide temperature, humidity, and/or other environmental feedback regarding the zone in which the zone thermostat **158** is located. In some embodiments, a zone sensor **160** may communicate with the system controller **106** to provide temperature, humidity, and/or other environmental feedback regarding the zone in which the zone sensor **160** is located.

[0033] While HVAC systems **100** are shown as a so-called split system comprising an indoor unit **102** located separately from the outdoor unit **104**, alternative embodiments of an HVAC system **100** may comprise a so-called package system in which one or more of the components of the indoor unit **102** and one or more of the components of the outdoor unit **104** are carried together in a common housing or package. The HVAC system **100** is shown as a so-called ducted system where the indoor unit **102** is located remote from the conditioned zones, thereby requiring air ducts to route the circulating air. However, in alternative embodiments, an HVAC system **100** may be configured as a non-ducted system in which the indoor unit **102** and/or multiple indoor units **102** associated with an outdoor unit **104** is located substantially in the space and/or zone to be conditioned by the respective indoor units **102**, thereby not requiring air ducts to route the air conditioned by the indoor units **102**.

[0034] Still referring to FIG. 2, the system controllers 106 may be configured for bidirectional communication with each other and may further be configured so that a user may, using any of the system controllers 106, monitor and/or control any of the HVAC system 100 components regardless of which zones the components may be associated. Further, each system controller 106, each zone thermostat 158, and each zone sensor 160 may comprise a humidity sensor. As such, it will be appreciated that structure 200 is equipped with a plurality of humidity sensors in a plurality of different locations. In some embodiments, a user may effectively select which of the plurality of humidity sensors is used to control operation of one or more of the HVAC systems 100.

[0035] In this embodiment, at least one of the HVAC systems 100 comprises a Short Message Service (SMS) module 162 and each of the system controllers 106, zone thermostats 158, and zone sensors 160 comprise an SMS initiator input 164. In this embodiment, the SMS module 162 may comprise a computer, software, and/or hardware configured to allow generation, transmittal, and/or to allow a request for generation and/or transmittal of an SMS message. In this embodiment, the SMS module 162 is configured to generate, transmit, and/or allow a request for generation and/or transmittal of an SMS message in response to initialization and/or actuation of the SMS initiator input 164. One or more SMS initiator inputs 164 may be carried by at least one of the system controllers 106, zone thermostats 158, and zone sensors 160. In some cases, initialization and/or actuation of the SMS initiator input 164 may cause the SMS module to generate, transmit, and/or to allow a request for generation and/or transmittal of a predetermined SMS message. In some embodiments, the HVAC systems 100 may communicate the predetermined SMS message and/or the request for the predetermined SMS message to other systems via the communication network 132. In this embodiment, the SMS module 162 may be configured to generate, transmit, and/or allow a request for generation and/or transmittal of a predetermined SMS message selected to alter a setting and/or an operation of another device 130, such as, but not limited to, a smartphone. In some embodiments, the HVAC system 100 may communicate with a security provider (SP) 133 which may take predetermined actions in response to receiving the predetermined SMS message and/or the request for the predetermined SMS message. In some embodiments, the HVAC system 100 may communicate with a customized data provider (CDP) 131, such as home automation service provider authorized by the manufacturer of system controller 106, which may similarly take predetermined actions in response to receiving the predetermined SMS message and/or the request for the predetermined SMS message.

[0036] The CDP 131, the SP 133, and/or the HVAC system 100 may also be configured to communicate with each other and/or other devices 130, such as, telephones, smart phones, and/or personal computers. In some cases, the CDP 131 may be controlled and operated by any entity authorized to communicate with system controller 106. Authorization for access to system controller 106 may take the form of a password, encryption, and/or any other suitable authentication method. Optionally, authorization may be disabled using system controller 106. CDP 131 may be configured to allow for the setup of account login information to remotely configure system controller 106. For example, the CDP 131 may provide the user an opportunity to configure system controller 106 with a large general purpose computer screen and greater

number of interface features than may be available on a user interface of system controller 106, in some cases, allowing the interface of system controller 106 to be smaller and/or eliminated entirely.

[0037] System controller 106 may also be configured to communicate with other Internet sites 129. Such other Internet sites 129 may receive and/or distribute data regarding the information and/or signals regarding a received predetermined SMS message and/or request for the predetermined SMS message. In some cases, other Internet sites 129 may provide a private and/or secured portal to information gathered as a function of and/or related to the SMS message and/or the request for the SMS message generated and/or transmitted by the HVAC system 100. In some cases, any of the HVAC systems 100, CDP 131, SP 133, other Internet sites 129, and/or other devices 130 may generate, transfer, receive, and/or present information and/or signals ultimately related to a predetermined SMS message and/or a request for a predetermined SMS message. As an example, the SMS initiator input 164 may comprise a push button that when pressed indicates to a system controller 106 that a predetermined SMS message is desired to be generated and/or transmitted. In some cases, the system controller 106 may request that the CDP 131, the SP 133, and/or the other Internet site 129 generate and transmit the predetermined SMS message to a predetermined SMS recipient device, such as, but not limited to, another device 130, such as, but not limited to, a smartphone. In some cases, the CDP 131 and/or the SP 133 may take predetermined actions in response to receiving the request from the system controller 106. For example, the CDP 131 may remotely initiate a change in ringer volume setting, tactile vibration settings, and/or visual display setting of a smartphone so that no matter what the smartphone settings were before the smartphone receives the predetermined SMS message, the smartphone reacts to receipt of the predetermined SMS message in a predetermined manner. In some embodiments, the smartphone reacts to receipt of the predetermined SMS message by initiating an audible, visible, and/or tactile response that is selected to assist in locating the smartphone when the smartphone has been misplaced. In alternative embodiment, the HVAC system 100 may, with or without prompting by SMS initiator input 164, generate, transmit, request generation, and/or request transmission of an SMS message. In some cases, the SMS message may comprise HVAC system 100 operation information such as, but not limited to, a filter status of the HVAC system 100, alarms and/or warning messages, power efficiency reports, overall efficiency reports of the HVAC system 100, and/or any other information and/or report comprising information available to the controller 106 and which is suitable for transmission via SMS message.

[0038] Referring now to FIG. 3, a flowchart of a method 300 of operating an HVAC system, such as HVAC system 100, is shown. The method 300 may begin at block 302 by providing an HVAC system controller such as system controller 106. In some embodiments, the system controller provided may comprise a wall mountable thermostat comprising an SMS module, such as SMS module 162. The HVAC system may further comprise an SMS initiation input 164 configured to selectively trigger generation and/or transmission of a predetermined SMS message. The method 300 may continue at block 304 by operating the HVAC system controller to receive information and/or a signal indicating that the SMS initiation input 164 has been actuated. In some cases,

a smartphone may be in a mode in which audible, visual, and/or tactile indicators are not set at maximum levels and so that locating the smartphone is relatively more difficult than if the smartphone were in a louder, more visible, and/or more tactile mode. In some embodiments, multiple HVAC systems **100** may be configured to communicate requests for sending SMS messages, in some embodiments as generated by actuating SMS initiation inputs **164**, between each other so actuating an SMS initiation input of a first HVAC system may result in an SMS module **162** of a second HVAC system generating, transmitting, requesting generation of, and/or requesting transmission of a predetermined SMS message. Method **300** may continue at block **306** by sending and/or requesting that a predetermined SMS message be transmitted.

[0039] Referring now to FIG. 4, a flowchart of a method **400** of operating an HVAC system such as HVAC system **100** is shown. The method **400** may begin at block **402** by providing an HVAC system comprising an SMS module such as, but not limited to, SMS module **162**. The method **400** may continue at block **404** by operating the HVAC system to communicate information regarding generation and/or transmission of an SMS message to a remote system, such as, but not limited to, another HVAC system, CDP **131**, SP **133**, other Internet site **129**, and/or other devices **130**.

[0040] FIG. 5 illustrates a typical, general-purpose processor (e.g., electronic controller or computer) system **1300** that includes a processing component **1310** suitable for implementing one or more embodiments disclosed herein. In addition to the processor **1310** (which may be referred to as a central processor unit or CPU), the system **1300** might include network connectivity devices **1320**, random access memory (RAM) **1330**, read only memory (ROM) **1340**, secondary storage **1350**, and input/output (I/O) devices **1360**. In some cases, some of these components may not be present or may be combined in various combinations with one another or with other components not shown. These components might be located in a single physical entity or in more than one physical entity. Any actions described herein as being taken by the processor **1310** might be taken by the processor **1310** alone or by the processor **1310** in conjunction with one or more components shown or not shown in the drawing.

[0041] The processor **1310** executes instructions, codes, computer programs, or scripts that it might access from the network connectivity devices **1320**, RAM **1330**, ROM **1340**, or secondary storage **1350** (which might include various disk-based systems such as hard disk, floppy disk, optical disk, and/or solid state systems such as, but not limited to, SD cards, USB flash drives, and/or the like). While only one processor **1310** is shown, multiple processors may be present. Thus, while instructions may be discussed as being executed by a processor, the instructions may be executed simultaneously, serially, or otherwise by one or multiple processors. The processor **1310** may be implemented as one or more CPU chips.

[0042] The network connectivity devices **1320** may take the form of modems, modem banks, Ethernet devices, universal serial bus (USB) interface devices, serial interfaces, token ring devices, fiber distributed data interface (FDDI) devices, wireless local area network (WLAN) devices, radio transceiver devices such as code division multiple access (CDMA) devices, global system for mobile communications (GSM) radio transceiver devices, worldwide interoperability for microwave access (WiMAX) devices, Wi-Fi, Z-Wave,

Zigbee, Bluetooth, and/or other well-known devices for connecting to networks. These network connectivity devices **1320** may enable the processor **1310** to communicate with the Internet or one or more telecommunications networks or other networks from which the processor **1310** might receive information or to which the processor **1310** might output information.

[0043] The network connectivity devices **1320** might also include one or more transceiver components **1325** capable of transmitting and/or receiving data wirelessly in the form of electromagnetic waves, such as radio frequency signals or microwave frequency signals. Alternatively, the data may propagate in or on the surface of electrical conductors, in coaxial cables, in waveguides, in optical media such as optical fiber, or in other media. The transceiver component **1325** might include separate receiving and transmitting units or a single transceiver. Information transmitted or received by the transceiver **1325** may include data that has been processed by the processor **1310** or instructions that are to be executed by processor **1310**. Such information may be received from and outputted to a network in the form, for example, of a computer data baseband signal or signal embodied in a carrier wave. The data may be ordered according to different sequences as may be desirable for either processing or generating the data or transmitting or receiving the data. The baseband signal, the signal embedded in the carrier wave, or other types of signals currently used or hereafter developed may be referred to as the transmission medium and may be generated according to several methods well known to one skilled in the art.

[0044] The RAM **1330** might be used to store volatile data and perhaps to store instructions that are executed by the processor **1310**. The ROM **1340** is a non-volatile memory device that typically has a smaller memory capacity than the memory capacity of the secondary storage **1350**. ROM **1340** might be used to store instructions and perhaps data that are read during execution of the instructions. Access to both RAM **1330** and ROM **1340** is typically faster than to secondary storage **1350**. The secondary storage **1350** is typically comprised of one or more disk drives or tape drives and/or solid state systems such as, but not limited to, SD cards, USB flash drives, and/or the like and might be used for non-volatile storage of data or as an over-flow data storage device if RAM **1330** is not large enough to hold all working data. Secondary storage **1350** may be used to store programs or instructions that are loaded into RAM **1330** when such programs are selected for execution or information is needed.

[0045] The I/O devices **1360** may include liquid crystal displays (LCDs), touch screen displays, keyboards, keypads, switches, dials, mice, track balls, voice recognizers, card readers, paper tape readers, printers, video monitors, transducers, sensors, or other well-known input or output devices. Also, the transceiver **1325** might be considered to be a component of the I/O devices **1360** instead of or in addition to being a component of the network connectivity devices **1320**. Some or all of the I/O devices **1360** may be substantially similar to various components disclosed herein.

[0046] At least one embodiment is disclosed and variations, combinations, and/or modifications of the embodiment(s) and/or features of the embodiment(s) made by a person having ordinary skill in the art are within the scope of the disclosure. Alternative embodiments that result from combining, integrating, and/or omitting features of the embodiment(s) are also within the scope of the disclosure. Where numerical ranges or limitations are expressly stated, such express ranges

or limitations should be understood to include iterative ranges or limitations of like magnitude falling within the expressly stated ranges or limitations (e.g., from about 1 to about 10 includes, 2, 3, 4, etc.; greater than 0.10 includes 0.11, 0.12, 0.13, etc.). For example, whenever a numerical range with a lower limit,  $R_1$ , and an upper limit,  $R_u$ , is disclosed, any number falling within the range is specifically disclosed. In particular, the following numbers within the range are specifically disclosed:  $R=R_1+k*(R_u-R_1)$ , wherein  $k$  is a variable ranging from 1 percent to 100 percent with a 1 percent increment, i.e.,  $k$  is 1 percent, 2 percent, 3 percent, 4 percent, 5 percent, . . . 50 percent, 51 percent, 52 percent, . . . , 95 percent, 96 percent, 97 percent, 98 percent, 99 percent, or 100 percent. Moreover, any numerical range defined by two  $R$  numbers as defined in the above is also specifically disclosed. Use of the term “optionally” with respect to any element of a claim means that the element is required, or alternatively, the element is not required, both alternatives being within the scope of the claim. Use of broader terms such as comprises, includes, and having should be understood to provide support for narrower terms such as consisting of, consisting essentially of, and comprised substantially of. Accordingly, the scope of protection is not limited by the description set out above but is defined by the claims that follow, that scope including all equivalents of the subject matter of the claims. Each and every claim is incorporated as further disclosure into the specification and the claims are embodiment(s) of the present invention.

What is claimed is:

1. A heating, ventilation, and/or air conditioning (HVAC) system, comprising:
  - an SMS module.
  2. The HVAC system of claim 1, wherein the SMS module is carried by a system controller of the HVAC system.
  3. The HVAC system of claim 1, wherein the SMS module is configured to generate an SMS message.
  4. The HVAC system of claim 1, wherein the SMS module is configured to request generation of an SMS message.

5. The HVAC system of claim 1, wherein the SMS module is configured to transmit an SMS message.

6. The HVAC system of claim 1, wherein a system controller of the HVAC system is configured to selectively communicate information regarding an SMS message to a home automation provider.

7. The HVAC system of claim 1, wherein a system controller of the HVAC system is configured to selectively communicate information regarding an SMS message to an SMS gateway.

8. The HVAC system of claim 1, wherein a system controller of the HVAC system is configured to selectively communicate information regarding an SMS message to a second HVAC system.

9. The HVAC system of claim 1, further comprising:  
an SMS initiator input.

10. The HVAC system of claim 9, wherein the SMS initiator input comprises a push button.

11. A method of operating a heating, ventilation, and/or air conditioning (HVAC) system, comprising:

providing an HVAC system comprising an SMS module;  
and  
communicating information regarding an SMS message to  
a remote system.

12. The method of claim 11, wherein the remote system comprises a smartphone.

13. The method of claim 11, wherein the remote system comprises a home automation provider.

14. The method of claim 11, wherein the remote system is a security provider.

15. The method of claim 11, wherein the remote system is a second HVAC system.

16. The method of claim 11, wherein when the remote system receives the information regarding the SMS message the remote system changes at least one of a visual, audible, and tactile operation mode.

17. The method of claim 16, further comprising:  
causing the remote system to produce an audible alert.

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