

MOUNTABLE TOUCH THERMOSTAT USING TRANSPARENT SCREEN TECHNOLOGY

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This application claims the benefit of U.S. Application No. 62/156,868, filed May 4, 2015, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] The present disclosure relates generally to thermostat controls. With many buildings having access to HVAC (heating, ventilation, air conditioning) technology, there is the use of programmable thermostats to allow for comfortable temperatures, operating efficiency, and energy efficiency.

SUMMARY

[0002A] The present invention provides a user control device comprising: a transparent display, wherein the matter behind the transparent display is visible in non-active display portions to allow a user to view a wall the user control device is mounted on through the transparent display; a housing connected on one side of the housing to one side of the transparent display, wherein the transparent touch screen display is spaced apart from the wall by the housing; and processing circuitry operably connected to the transparent display and configured to monitor and control building equipment.

[0002B] In one embodiment, the user control device comprises a thermostat; wherein the transparent display comprises: a transparent touch screen display, wherein the matter behind the transparent touch screen display is visible in the non-active display portions to allow the user to view the wall the thermostat is mounted on through the transparent touch screen display; and a control bar connected to one side of the transparent touch screen display, wherein the control bar comprises: the housing; the processing circuitry, which is operably connected to the transparent touch screen display; and a temperature sensor operably connected to the processing circuitry.

[0003] There is a need for thermostat and other building controls with increased integrated functionality that allows for more capabilities and better aesthetics. There is a need for thermostats that offer NFC capability, transparent displays, Fire/Security /Emergency messaging, general messaging, custom messaging, and location based security tied to HVAC.

[0004] One implementation of the present disclosure is an HVAC control system which may include a processor with memory, a network connection, a transparent display screen, a touch screen operably connected to the processor. The display may have a control bar mechanically and electronically connected to at least one side. Various sensors may be incorporated into the control bar including a temperature sensor. Electronics and circuitry may be contained in a housing that is attached to a bracket that is perpendicular to the display allowing the wall where the control system is mounted to insulate the temperature sensor from some of the heat of some of the electronics and circuitry. The control system

purpose or special purpose computer or other machine with a processor. When information is transferred or provided over a network or another communications connection (either hardwired, wireless, or a combination of hardwired or wireless) to a machine, the machine properly views the connection as a machine-readable medium. Thus, any such connection is properly termed a machine-readable medium. Combinations of the above are also included within the scope of machine-readable media. Machine-executable instructions include, for example, instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing machines to perform a certain function or group of functions.

[0091] Although the figures show a specific order of method steps, the order of the steps may differ from what is depicted. Also two or more steps may be performed concurrently or with partial concurrence. Such variation will depend on the software and hardware systems chosen and on designer choice. All such variations are within the scope of the disclosure. Likewise, software implementations could be accomplished with standard programming techniques with rule based logic and other logic to accomplish the various connection steps, processing steps, comparison steps and decision steps.

[0092] Many modifications will be apparent to those skilled in the art without departing from the scope of the present invention.

[0093] Throughout this specification, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0094] References in this specification to any prior publication, information derived from any said prior publication, or any known matter are not and should not be taken as an acknowledgement, admission or suggestion that said prior publication, or any information derived from this prior publication or known matter forms part of the common general knowledge in the field of endeavour to which the specification relates.

WHAT IS CLAIMED IS:

1. A user control device comprising:
 - a transparent display, wherein the matter behind the transparent display is visible in non-active display portions to allow a user to view a wall the user control device is mounted on through the transparent display;
 - a housing connected on one side of the housing to one side of the transparent display, wherein the transparent touch screen display is spaced apart from the wall by the housing; and
 - processing circuitry operably connected to the transparent display and configured to monitor and control building equipment.
2. The user control device of claim 1, wherein the user control device comprises a thermostat;
 - wherein the transparent display comprises:
 - a transparent touch screen display, wherein the matter behind the transparent touch screen display is visible in the non-active display portions to allow the user to view the wall the thermostat is mounted on through the transparent touch screen display; and
 - a control bar connected to one side of the transparent touch screen display, wherein the control bar comprises:
 - the housing;
 - the processing circuitry, which is operably connected to the transparent touch screen display; and
 - a temperature sensor operably connected to the processing circuitry.
3. The user control device of claim 2, wherein the housing of the control bar is perpendicular to the transparent touch screen display.
4. The user control device of claim 2 or claim 3, wherein the transparent touch screen display is oriented vertically in a portrait orientation.
5. The user control device of claim 4, wherein the transparent touch screen display extends vertically from the control bar.

6. The user control device of claim 2 or claim 3, wherein the transparent touch screen display is oriented horizontally in a landscape orientation.
7. The user control device of claim 6, wherein the transparent touch screen display extends horizontally from the control bar.
8. The user control device of any one of claims 2 to 7, further comprising a second control bar connected to another side of the transparent touch screen display.
9. The user control device of claim 8, wherein the second control bar is opposite the control bar.
10. The user control device of any one of claims 2 to 9, further comprising at least one sensor operably connected to the processing circuitry, the at least one sensor from the group consisting of a humidity sensor, a carbon dioxide sensor, a carbon monoxide sensor, a smoke sensor, a proximity sensor, an ambient light sensor, and a biometric sensor.
11. The user control device of any one of claims 2 to 10, wherein the processing circuitry comprises a processor and a memory, wherein the processor is configured to cause the transparent touch screen display to present a user interface for monitoring and controlling building equipment.
12. The user control device of claim 11, wherein the building equipment comprises at least one system from the group consisting of an HVAC system, a lighting system, a blinds system, a projector system, and a lock system.
13. The user control device of claim 11 or claim 12, wherein the processor is configured to cause the transparent touch screen display to present a user interface providing an alarm message.
14. The user control device of claim 13, wherein the alarm message is from the group consisting of a fire alarm, a tornado alarm, and a suspect alarm.

15. The user control device of any one of claims 11 to 14, wherein the processor is configured to cause the transparent touch screen display to present a user interface providing an exit sign.
16. The user control device of any one of claims 11 to 15, wherein the processor is configured to provide customized controls based on an identity of a user.
17. The user control device of any one of claims 2 to 16, wherein the processing circuitry comprises a circuit board that is perpendicular to the transparent touch screen display.
18. The user control device of claim 17, wherein the circuit board is configured to be located inside of a wall that the thermostat is mounted on.
19. The user control device of claim 1, further comprising at least one sensor from the group consisting of a temperature sensor, a humidity sensor, a carbon dioxide sensor, a carbon monoxide sensor, a smoke sensor, an ambient light sensor, a proximity sensor, and a biometric sensor.
20. The user control device of claim 1 or claim 19, wherein the housing is perpendicular to the transparent display.
21. The user control device of claim any one of claims 1, 19 and 20, wherein the transparent display is oriented vertically in a portrait orientation.
22. The user control device of claim 21, wherein the transparent display extends vertically from the housing.
23. The user control device of any one of claims 1, 19 and 20, wherein the transparent display is oriented horizontally in a landscape orientation.
24. The user control device of claim 23, wherein the transparent display extends horizontally from the housing.

25. The user control device of any one of claims 1 and 19 to 24, further comprising a second housing connected to another side of the transparent display.

26. The user control device of any one of claims 1 and 19 to 25, wherein the processing circuitry comprises a circuit board that is perpendicular to the transparent display.