

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LENNOX INDUSTRIES INC.,
Petitioner,

v.

ROSEN TECHNOLOGIES LLC,
Patent Owner.

IPR2023-00719
Patent 7,232,075 B1

Before MEREDITH C. PETRAVICK, JAMES P. CALVE, and
JASON W. MELVIN, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. BACKGROUND

Lennox Industries Inc. (“Petitioner”) filed a petition seeking an *inter partes* review of claims 1–4 and 11–15 (the “challenged claims”) of U.S. Patent No. 7,232,075 (“the ’075 patent”) (Ex. 1001). Paper 2 (“Pet.”), 1, 7. Rosen Technologies LLC (“Patent Owner”) timely filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Petitioner filed an authorized Reply. Paper 7 (“Reply”); Ex. 1037 (authorizing Petitioner to file a Reply). Patent Owner was authorized to file Sur-Reply (Ex. 1037) but did not do so.

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2022) (“The Board institutes the trial on behalf of the Director.”). An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon consideration of the evidence and arguments in the record, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. We therefore grant institution of an *inter partes* review.

A. *Related Proceedings*

The parties identify the following proceedings involving the ’075 patent: *Rosen Techs. LLC v. Lennox Indus. Inc.*, No. 3:22-cv-00732 (N.D. Tex.) (“the Texas proceeding”); *Rosen Techs. LLC v. Resideo Techs., Inc.*, No. 6:22-cv-00131 (W.D. Tex.) (dismissed); and *Verdant Env'tl. Techs. v. Ecobee Inc.*, No. 1:10-cv-02771 (N.D. Ill.) (voluntary dismissal). Pet. 1–2; Paper 3, 1.

B. Real Parties in Interest

Petitioner identifies Lennox Industries Inc., Lennox International Inc., Heatcraft Inc., Heatcraft Technologies Inc., and Lennox Procurement Company Inc. as the real parties in interest. Pet. 1. Patent Owner identifies Rosen Technologies LLC as the real party in interest. Paper 3, 1.

C. The '075 Patent (Ex. 1001)

The '075 patent describes a thermostat system that receives functional programming from remote correspondent (RC) 15 to change its operation as shown in Figure 2, which is reproduced below. Ex. 1001, 1:15–19, 3:15–25.

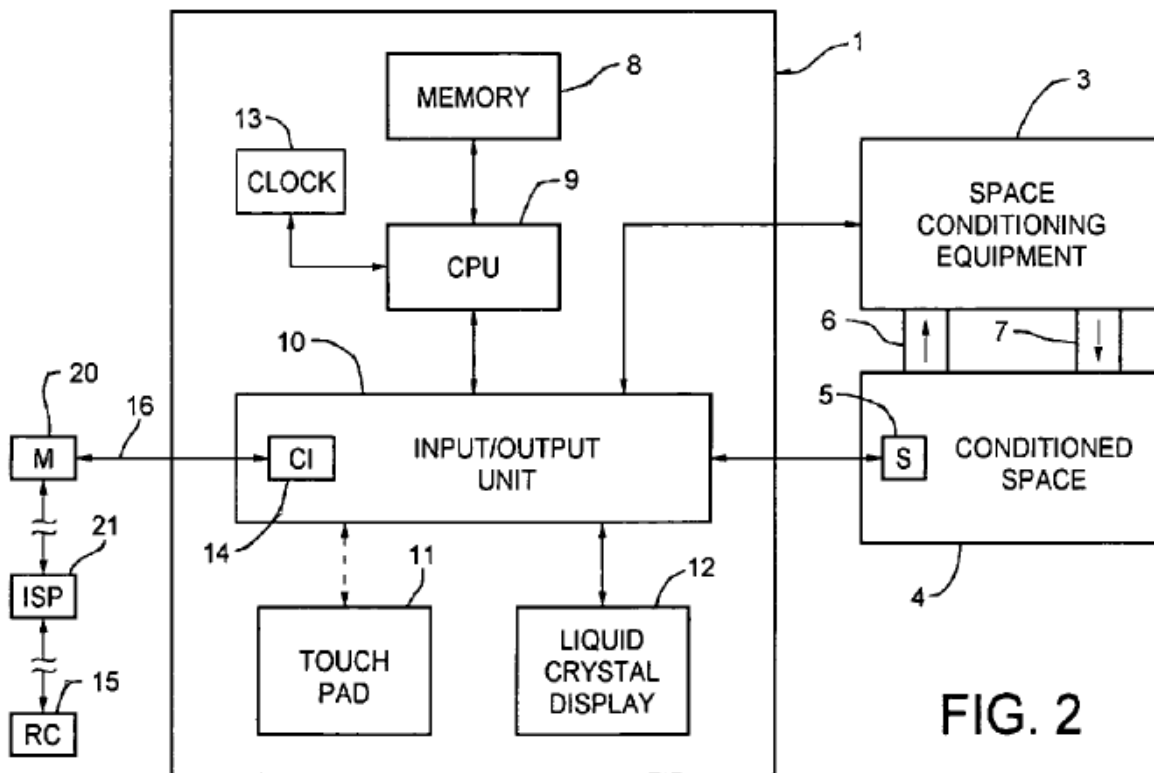


Figure 2 depicts a thermostat including temperature sensor 5 located in conditioned space 4, processor 1, and central processing unit 9 that control space conditioning equipment 3 based on signals sent by sensor 5. Processor 1 communicates with RC 15 via communication interface 14, link 16, modem 20, and Internet Service Provider (ISP) 21. Ex. 1001, 6:1–41, 8:53–65.

Control programs in memory 8 provide functions of the thermostat via touch pad 11 and liquid crystal display (LCD) 12. Ex. 1001, 9:32–47. Users can communicate with RC 15 via input/output (I/O) unit 10, communications interface 14, and link 16 to obtain other functional programming to change a control program and features of touch pad 11 and LCD 12. *Id.* at 9:49–10:2.

The functional programming that is transferred to thermostat memory 8 can be graphical user interfaces (GUI) on a touchscreen, portions of a GUI, representations of virtual buttons on the touchscreen, operational algorithms for the control program and for controlling space conditioning equipment, operational algorithms to communicate with environmental sensors, means for changing functions of a virtual button, and means for establishing or controlling communications with RC 15. Ex. 1001, 10:35–11:3. Figure 10 is reproduced below to illustrate several functional programming modules.

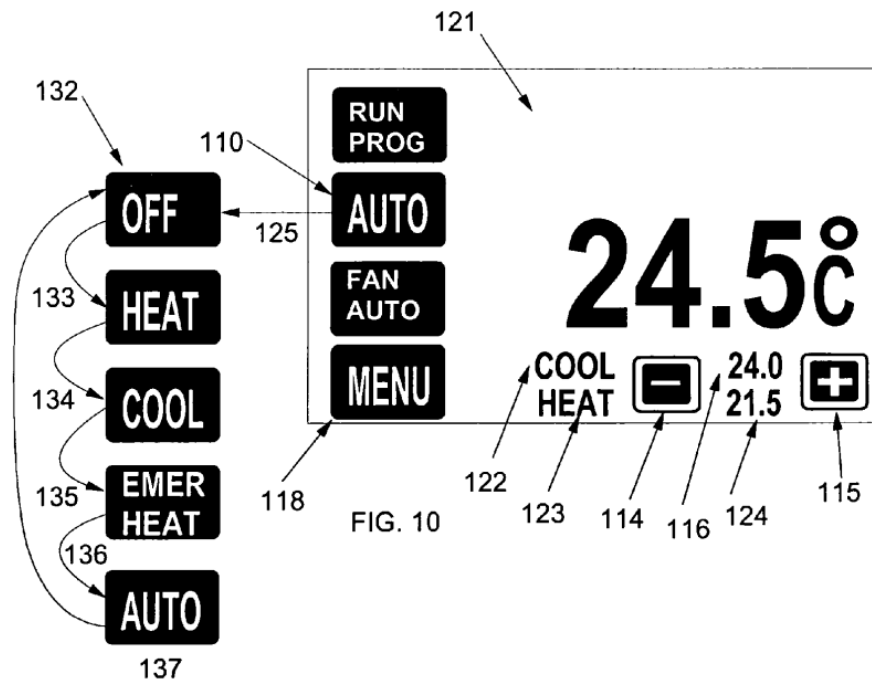


Figure 10 includes colling and heating mode indicators 122, 123 with associated setpoints 116, 124. Ex. 1001, 11:7–13.

Selection of virtual button 110 by a user touch changes the operating state of the thermostat and legends to one of the virtual buttons in column 132 from automatic mode 137 to “off” mode to “heat” mode at step 133 to “cool” mode at step 134 to “emergency heat” mode at step 1235 and back to “automatic mode at step 136. Ex. 1001, 11:7–45. A user can add or delete to the virtual buttons shown in column 132 and their associated functions. *Id.* at 12:12–15. The transferrable functional programming from a RC 15 may create virtual buttons numbering from one to many within viewable LCD 12 with different sizes, shapes, legends, icons, or even animations depending on a particular desired user interface to accommodate functions of the user interface. *Id.* at 13:48–59. Different menus can place the virtual buttons and associated messages in various positions on touch screen 11 to facilitate intuitive programming. *Id.* at 4:1–3.

As a result of this arrangement, a user may add or change functions of the programmable thermostat as desired. If desired functions are not part of the control program provided at original installation of the thermostat, the user may initiate bi-directional communication with a remote correspondent and download functional programming to implement the new functions. Ex. 1001, 4:27–35. Communications may be established with removable media and infrared link as well to transfer functional programming. *Id.* at 4:35–36, 3:14–19, 9:49–56, 10:59–11:3.

D. Challenged Claims

Claim 1 is independent with claims 2–4 and 11–15 depending from claim 1, which we reproduce below reformatted with Petitioner’s annotations in italics to identify each limitation.

1[pre] A thermostat system for controlling space conditioning equipment comprising:

1[a] A) a temperature sensor for providing an electrical signal indicative of the temperature of a conditioned space in which the temperature sensor is situated;

1[b] B) a transparent touch pad juxtaposed over a liquid crystal display to constitute a touch screen for interactive interface with a user and for selectively displaying alphanumeric and graphic devices;

1[c] C) a processor, said processor including:

1) a central processing unit;

1[d] 2) a real time clock;

1[e] 3) a memory coupled to said central processing unit for storing program and data information; and

1[f] 4) an input/output unit including:

1[g] a) a sensor input coupled to said temperature sensor for receiving said electrical signal therefrom;

1[h] b) a control output coupled to the space conditioning equipment for issuing control signals thereto; and

1[i] c) a communications interface adapted to establish communications between said processor and a first remote correspondent which is a source of functional programming; and

1[j] D) a control program stored in said memory for causing said central processing unit to selectively:

1) establish on said liquid crystal display one or more representations of buttons at a separated and predetermined positions;

- 1[k]* 2) read the position on the touch pad juxtaposed with said predetermined position to determine if said representation of a button has been touched; and
- 1[l]* 3) if said a representation of a button has been touched, processing this information to establish a condition incorporated into the operation of said thermostat system;
- 1[m]* 4) establish communications between said processor and a first remote correspondent from which is transferred to said memory one or more modules of functional programming; and
- 1[n]* 5) operate said transferred functional programming to change or add to representations on the touch screen, where said changes or additions of representation on the touch screen were not available to the control program before their transfer to the memory;
- 1/o* E) means coupling said communications interface and said first remote correspondent.

Ex. 1001, 14:1–48.

E. Asserted Ground of Unpatentability

Ground	Challenged Claims	35 U.S.C. §	References
1	1–4, 11–15	103(a) ¹	Rosen, ² Rosen-II, ³ Smith ⁴

Pet. 7. Petitioner also relies on the Declaration of Dr. R. Jacob Baker.

Ex. 1002.

¹ The Leahy-Smith America Invents Act (“AIA”) revised 35 U.S.C. § 103 effective on March 16, 2013. Because the ’075 patent has an effective filing date before March 16, 2013, we use the pre-AIA version of 35 U.S.C. § 103.

² US 2003/0150926 A1, published Aug. 14, 2003 (Ex. 1005, “Rosen”).

³ US 2003/0142121 A1, published July 31, 2003 (Ex. 1006, “Rosen-II”).

⁴ WO 02/48851 A2, published June 20, 2002 (Ex. 1007, “Smith”).

II. DISCUSSION

A. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art would have had a Bachelor of Science degree in Electrical Engineering or a year or two of experience working with or designing processor-based systems with network connectivity, and more experience would compensate for less formal education and vice versa. Pet. 6–7 (citing Ex. 1002 ¶¶ 63–66). Patent Owner asserts that a person of ordinary skill in the art would have a bachelor’s degree in engineering, computer science, or a comparable field with at least 2 years’ experience in temperature controls, embedded control systems, electronic thermostats, or HVAC controls, or similarly relevant industry experience, with relevant experience substituting for education and vice versa. Prelim. Resp. 7. We perceive no significance to how any difference between the two definitions might affect our analysis. To the extent either party believes its proposed level of skill affects part of the unpatentability analysis, it should explain how during the instituted trial.

B. Claim Interpretation

We interpret the claims “using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under this standard, we construe claims “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* We only need to construe the claims to the extent necessary to resolve the parties’ disputes. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

1. *“means coupling said communications interface and said first remote correspondent”*

The parties interpret this limitation under 35 U.S.C. § 112, ¶ 6 to perform a function of “coupling the communications interface and the remote correspondent” using “a serial link and/or data link and any equivalents.” Pet. 16–17; Prelim. Resp. 7; Ex. 1026, 76–80 (Joint Claim Construction and Prehearing Statement). The Court in the Texas proceeding has interpreted this term under Section 112, ¶ 6. *See* IPR2023-00715, Ex. 1056, 79–83, 113.

The '075 patent describes several different structures that couple the communications interface 14 with RC 15. Communications interface 14 can couple and communicate with RC 15 via link 16. Ex. 1001, 6:59–7:3, Fig. 1. Communications interface 14 couples to RC 15 via serial link 16, external modem 20, and Internet Service Provider (ISP) 21. *Id.* at 8:53–65, Fig. 2. Communications interface 14 also couples to RC 15 via integrated modem 24, data link 26, and ISP 21. *Id.* at 8:66–9:5, Fig. 3. Thus, the structures that perform this function include (1) a serial link, a modem external to the thermostat system, and a communications link provided by an ISP or (2) an integrated modem within the communications interface, a data link, and communications link provided by an ISP and equivalents. IPR2023-00715, Ex. 1056 (Claim Construction Order), 113.

2. *“means for controlling space conditioning equipment”*

The parties agree that the function of controlling space conditioning equipment in claim 4 is performed by virtual buttons operating with control programs as described in Ex. 1001, 11:7–13:62 and equivalents. Pet. 17–18; Prelim. Resp. 7; Ex. 1026, 80–83. For purposes of this Decision, we adopt the parties' claim construction of this limitation and that of the Court in the Texas proceeding. *See* IPR2023-00715, Ex. 1056, 84–88, 113.

3. *Other terms*

Based on the current record, we determine that it is not necessary to construe any other terms to reach our decision. To the extent either party believes a particular claim term's scope affects our unpatentability determination, during the trial, it should explain the correct construction and how that construction affects the analysis.

C. *Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103 if differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. Similarly, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *Id.* at 417.

The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Ground 1: Alleged Obviousness Over Rosen, Rosen-II, and Smith

Petitioner asserts that claims 1–4 and 11–15 are unpatentable under 35 U.S.C. § 103(a) over Rosen, Rosen-II, and Smith. Pet. 7, 26–85.

1. Rosen (Ex. 1005)

Rosen connects a thermostat system to a remote correspondent (RC) 15 as shown in Figure 1, which is reproduced below. Ex. 1005 ¶ 17.

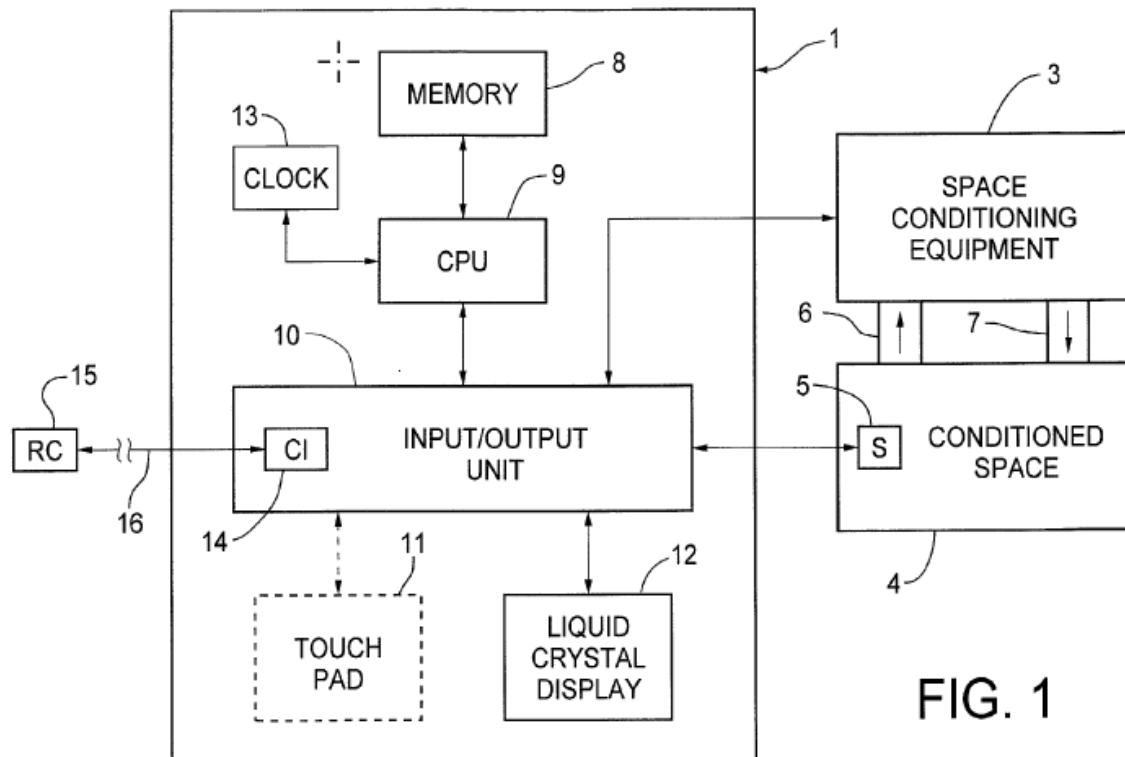


Figure 1 depicts thermostat system with processor 1 and temperature sensor 5 that is disposed in conditioned space 4. Ex. 1005 ¶ 17. Processor 1 includes a central processing unit (CPU) 9 that communicates with memory 8 where data and programs are stored and with touch pad 11 and liquid crystal display (LCD) 12 via input/output (I/O) unit 10. *Id.* ¶ 18. Sensor 5 sends electrical signals representing the temperature in space 4 to processor, which signals space conditioning equipment 3 to heat or cool the space to maintain temperature set points. *Id.* ¶ 19.

At predetermined times of day stored in memory 8 and set by real time clock 13, CPU 9 signals to I/O unit 10 to cause communications interface 14 to communications with RC 15 via link 16. Ex. 1005, 6:59–65, Fig. 1. RC 15 may provide a source of current information such as local weather that is available using the Internet. *Id.* ¶ 22.

Alternatively, communications interface 14 can send and receive serial data to or from external modem 20 via serial link 16. Ex. 1001 ¶ 32. Modem 20 interfaces conventionally with Internet Service Provider (ISP) 21 shown in Figure 2, which is reproduced below.

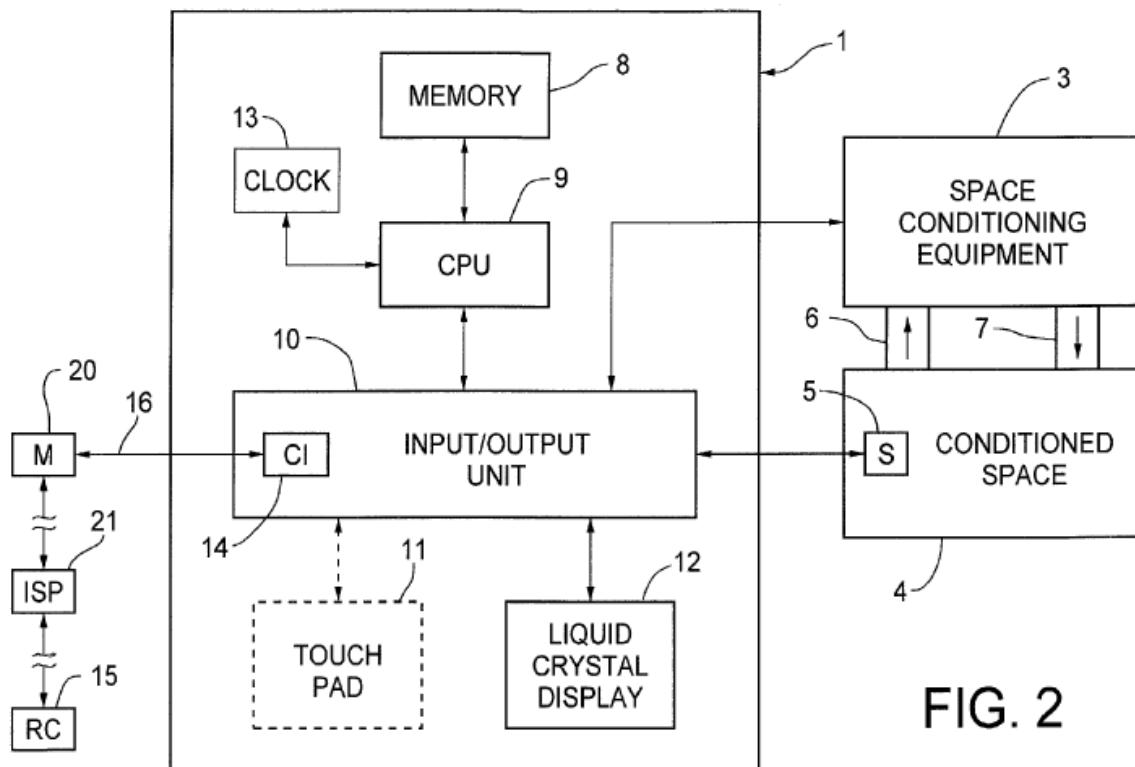


Figure 2 shows communications interface 14 connected to RC 15 via serial link 16, external modem 20, and ISP 21. Ex. 1001 ¶ 32. Modem 20 may be a dial-up, cable, digital subscriber line (DSL) or other suitable type. *Id.* Modem 24 also may be integrated into communications interface 14 to communicate with IPS 21 via data link 21. *Id.* ¶ 33, Fig. 3.

2. *Rosen-II (Ex. 1006)*

Rosen-II describes a programmable thermostat system for controlling space conditioning equipment. Ex. 1006 ¶ 7. The system integrates LCD 12 and touch pad 11 into touch screen 2 as an interactive intuitive interface to facilitate programming as shown in Figure 1, reproduced below. *Id.* ¶¶ 1, 20.

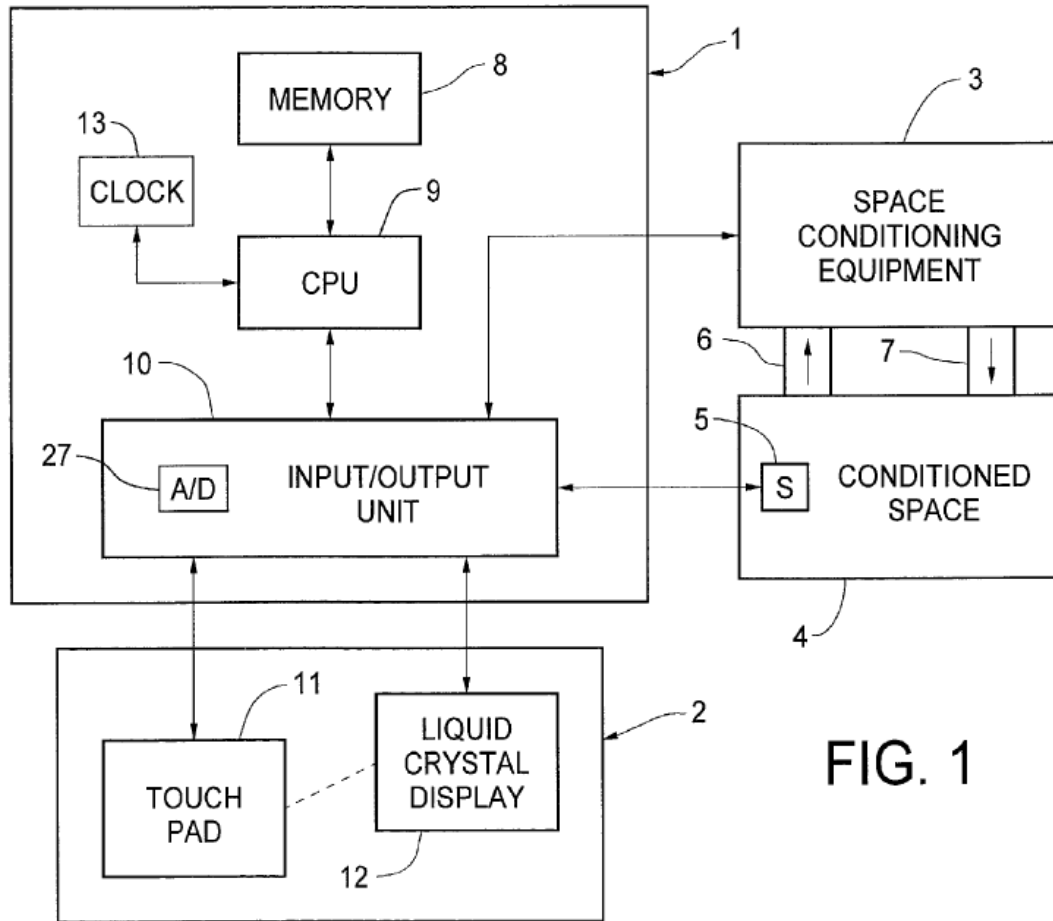


FIG. 1

Rosen-II's thermostat system includes processor 1, touch screen 2 and temperature sensor 5 located in conditioned space 4 to send signals indicative of temperature in space 4. Ex. 1001 ¶¶ 19, 22. CPU 9 communicates with memory 8 that stores data and programs. *Id.* ¶ 20. Touch screen 2 allows processor 1 to generate buttons at predetermined, convenient, and intuitive positions shown in Figures 3 and 4, which are reproduced below. *Id.* ¶ 28.

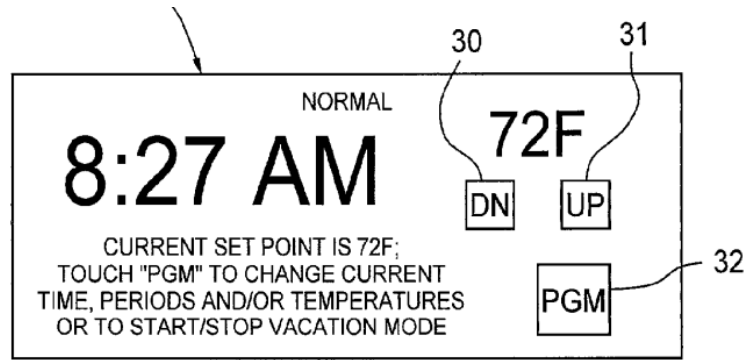


FIG. 3

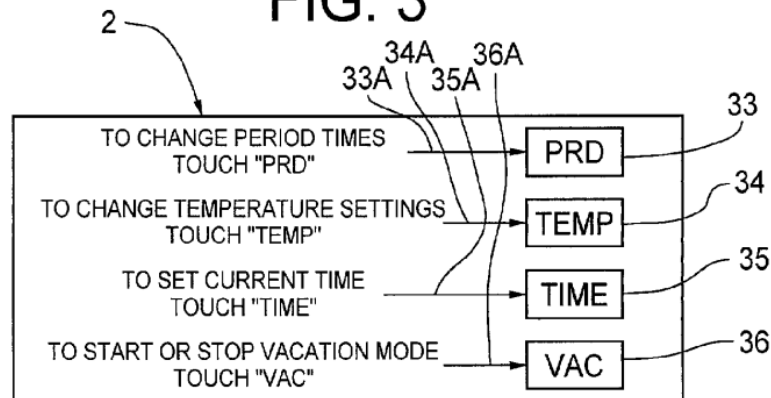


FIG. 4

Figures 3 and 4 depict touch screen 2 with alphanumeric messages and buttons. In Figure 3, button 32 is labeled “PGM” and used to change current time, time periods, temperatures, and/or vacation modes. Ex. 1006 ¶ 29. If button 32 is touched, the menu shown in Figure 4 replaces the display shown in Figure 3 with display information prestored in memory 8. *Id.* Figure 4 is an intermediate level display that presents four actions for a user to select by selecting one of buttons 33–36 based on its corresponding alphanumeric message. *Id.* ¶ 30. The positions of buttons 33–36 can be placed wherever it is most intuitive and convenient for the present selection of operations rather than being limited to locations of buttons 30–32 in Figure 3 as would be the case if conventional tactile buttons were used. *Id.*

3. *Smith (Ex. 1007)*

Smith provides a multiple language user interface system for thermal comfort controllers that stores control algorithms and user interface objects in memory and can load additional control algorithms and user interface objects from the Internet after installation. Ex. 1007, 1:29–2:19, 3:8–17. A control algorithm may be programmed or selected by a user to provide a set-point schedule with a list of times and associated temperatures shown in Figure 2, which is reproduced below.

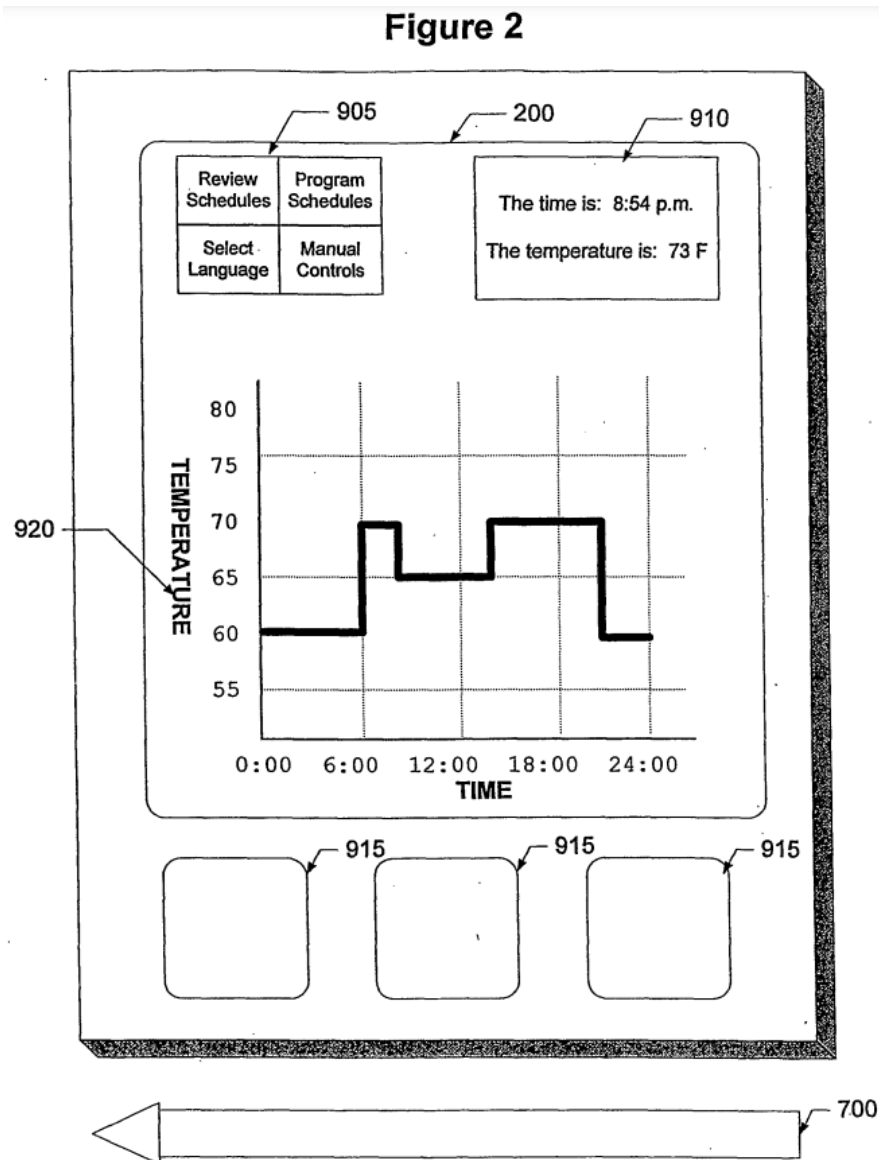


Figure 2 depicts a graphical representation of a set-point temperature schedule shown on a display 200 of the user interface system with stylus 700. Ex. 1007, 4:13–16. The display can be configured with additional controls 905 to review schedules, program new schedules, manually control heating or cooling of a house, and select a language. *Id.* at 4:21–5:7.

If thermal comfort controller is installed without user interface objects, initial interface objects, or control algorithms in memory, it can load initial interface objects 600 via network interface 950 from Internet web pages when first powered-up after installation. Ex. 1007, 5:8–12. Initial interface objects 600 ask the user to choose a preferred language, whereupon proper user interface objects 400 are downloaded for the display once the preferred language is chosen. *Id.* at 5:14–17. The initial interface objects and user interface objects also can be downloaded from a laptop computer or device carried by a comfort controller installer via cable, infrared port, or other communication method. *Id.* at 5:17–22. When a system is shipped with control algorithms 500 already stored in memory, a user can choose these algorithms or download updated or additional control algorithms via network interface 950. *Id.* at 5:29–31.

4. *Motivation to combine*

Petitioner asserts that a skilled artisan would combine Rosen-II's touch screen with Rosen's thermostat system to improve the interface and make it easier to program with buttons placed in intuitive, convenient, and ergonomic places and to eliminate the need for fixed buttons that take up significant space. Pet. 36–40 (citing Ex. 1002 ¶¶ 134–144). Petitioner also asserts that a skilled artisan would combine Smith with Rosen and Rosen-II to provide a flexible, customized user interface. *Id.* 70–72 (citing Ex. 1002 ¶¶ 179–183).

5. *Independent Claim 1*

- a. *1[pre]: “A thermostat system for controlling space conditioning equipment comprising:”*

Petitioner asserts that Rosen discloses and claims a thermostat system for controlling space conditioning equipment. Pet. 27–28 (citing Ex. 1005, ¶¶ 2, 10, 17, Title, Abstract, claim 1, Figs. 1–4; Ex. 1002 ¶ 121). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- b. *1[a]: “a temperature sensor for providing an electrical signal indicative of the temperature of a conditioned space in which the temperature sensor is situated;”*

Petitioner asserts that Rosen discloses a thermostat system including a temperature sensor 5 that provides an electrical signal indicative of the temperature of a conditioned space 4 in which the sensor is situated. Pet. 28–29 (citing Ex. 1005 ¶¶ 2, 3, 19; Ex. 1006 ¶ 22; Ex. 1012, 264:2–5; Ex. 1014, 3:47–62; Ex. 1015, 2:50–53, Abstract; Ex. 1002 ¶¶ 77–82, 122, 123). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- c. *1[b]: “a transparent touch pad juxtaposed over a liquid crystal display to constitute a touch screen for interactive interface with a user and for selectively displaying alphanumeric and graphic devices;”*

Petitioner asserts that Rosen’s thermostat has touch pad 11 and LCD 12, and Rosen-II’s programmable thermostat system has a transparent touch pad 11 juxtaposed over LCD 12 to provide touch screen 2 for an interactive interface with a user. Pet. 30–32 (citing Ex. 1005 ¶¶ 4, 18, 21, 29, Fig. 1; Ex. 1006 ¶¶ 1, 20, 25, 26, Abstract, Figs. 1, 2; Ex. 1002 ¶¶ 124–133).

Petitioner contends that such touch screens were known in the art and used in thermostat systems before the priority data as admitted by the '075 patent. Pet. 31 (citing Ex. 1001, 2:50–53; Ex. 1007, 3:18–4:5; Ex. 1018, 19:6–15; Ex. 1019, 1, 7; Ex. 1012, 263:24–264:1).

Petitioner asserts that Rosen-II's touch screen 2 selectively displays alphanumeric and graphic devices so programming is greatly simplified by providing menus with ergonomically placed buttons along with messages to provide a high level interactive interface displayed on the touch screen with graphic device buttons and alphanumeric device messages that are associated with each button. Petitioner contends that buttons with text are alphanumeric devices. Petitioner asserts that Rosen-II displays intermediate and low level interactive interfaces during normal operations as shown in Figures 4 and 5, and users can access different menus by pressing buttons on the touch screen. Pet. 33–36 (citing Ex. 1006 ¶¶ 11–13, 28–31, 37, Figs. 3–5; Ex. 1002 ¶¶ 129–133; Ex. 1001, 4:12–16, 9:40–43).

(1) Motivation to combine

Petitioner contends that a skilled artisan would have been motivated to combine Rosen-II's touch screen with Rosen's thermostat system as a simple substitution of one known element (Rosen's touch pad and LCD) for another (Rosen-II's touch screen) for predictable results of a thermostat system with a touch screen and interactive user interface to selectively display graphic and alphanumeric devices. Petitioner asserts that both references provide touch pads with buttons for programming, but Rosen-II makes it easier for a user to program by placing buttons where it is most intuitive and convenient to select operations with various messages. Pet. 36–40 (citing Ex. 1005 ¶¶ 1, 4, 18, Figs. 1–4; Ex. 1006 ¶¶ 1, 4, 5, 24, 28, 30, 31, 37; Ex. 1002 ¶¶ 134–139).

Petitioner asserts that a skilled artisan would have modified Rosen to incorporate the touch screen of Rosen-II to enable the size of the display to be increased by replacing fixed buttons that take up significant space with the touch screen of Rosen-II, and this use of Rosen-II's touch screen would be an obvious design choice. Pet. 40 (citing Ex. 1002 ¶¶ 140–141). Petitioner also asserts that a skilled artisan would have been motivated to modify Rosen's control program to include the functionality of Rosen-II to operate the touch screen and selectively establish a menu and buttons and determine if the button has been touched and change to a different menu. *Id.* at 40–41 (citing Ex. 1006 ¶¶ 7, 26, 28, Ab., claims 1, 3, 17; Ex. 1002 ¶ 141).

(2) *Reasonable expectation of success*

Petitioner contends that a skilled artisan would have had a reasonable expectation of success in combining Rosen and Rosen-II due to their similar touch pad and LCD and the use of off-the-shelf equipment and commercially available transparent touch screens to implement their inventions. Pet. 41–42 (citing Ex. 1005 ¶ 20, Fig. 1; Ex. 1006 ¶¶ 23, 27, Fig. 1; Ex. 1002 ¶¶ 143–144; Ex. 1012, 264:6–265:4).

These contentions for element 1[b], which are not contested by Patent Owner at this stage, are supported by record evidence.

d. *1[c]–1[f]: “a processor, central processing unit, real time clock, memory, and input/output unit”*

Petitioner contends that Rosen discloses processor 1 with CPU 9, real time clock 13, memory 8, and input/output (I/O) unit 10. Pet. 43–44 (citing Ex. 1005 ¶¶ 7, 17, 18, claims 1, 11, Figs. 1–4; Ex. 1001, 1:39–46; Ex. 1002 ¶¶ 83–86, 145–146; Ex. 1012, 273:18–274:11). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- e. *1[g]–1[h]: “a sensor input coupled to said temperature sensor . . .; a control output coupled to the space conditioning equipment . . .; and”*

Petitioner contends that Rosen discloses I/O unit 10 including a sensor output coupled to temperature sensor 5 for receiving an electrical signal and a control output coupled to space conditioning equipment 3 for issuing control signals as shown in Figure 1. Petitioner asserts that processor 1 receives an electrical signal from temperature sensor 5 representative of the temperature in the conditioned space 4 and uses that information to determine if control signals need to be sent to space conditioning equipment 3. Pet. 44–45 (citing Ex. 1005 ¶¶ 18, 19, claims 1, 11; Fig. 1; Ex. 1002 ¶¶ 145–148; Ex. 1012, 274:12–23). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- f. *1[i]: “a communications interface adapted to establish communications between said processor and a first remote correspondent which is a source of functional programming”*

Petitioner contends that Rosen’s I/O unit 10 includes communications interface 14 that may be a conventional serial port to establish bidirectional communication via serial link 16, modem 20, and ISP 21, between processor 1 and RC 15. Petitioner contends that RC 15 has a known communication address such as an Internet address and is a source of current information such as local weather or current stock quotes. Petitioner asserts that Rosen sends signals to I/O unit 10 to cause communications interface 14 to establish communications via link 16 with RC 15. Pet. 46–49 (citing Ex. 1005 ¶¶ 7, 8, 18, 22, 25, 27–29, 32, claims 1, 11, Figs. 1–4; Ex. 1002 ¶¶ 94–102, 146, 149–152; Ex. 1012, 268:1–3). Petitioner asserts that Rosen does not disclose RC 15 as a source of functional programming. *Id.* at 48.

Petitioner contends that “[i]t was well known that appliances such as thermostat systems can be connected to the Internet to obtain software to expand, update, or change functionality,” and Smith discloses this aspect of element 1[i]. Pet. 48–49 (citing Ex. 1002 ¶¶ 94–102, 152; Ex. 1018, 9:22–24; Ex. 1021, 4:46–52, 6:26–36; Ex. 1022, 9 n.10; Ex. 1023 ¶¶ 2, 46; Ex. 1024, 1:6–10; Ex. 1025, Abstract; Ex. 1027 ¶ 7, Abstract). Petitioner asserts that Smith’s thermostats provide multiple language interfaces and include memory 300 that stores user interface object(s) 400 and control algorithm(s) 500. Smith couples a CPU to a network interface to connect the thermostat to a network such as the Internet to load user interface objects and control algorithms so users can choose ones suited to their climate and personal preferences. Pet. 49–50 (citing Ex. 1007, 1:6–7, 2:8–11, 2:17–19, 2:21–22, 3:8–17, 7:12–20 (claims 2 and 4), Fig. 1; Ex. 1002 ¶¶ 152–157).

Petitioner contends that Smith downloads user interface objects and control algorithms from an Internet web page and loads these items into the system when a comfort controller first powers up by loading initial interface objects 600 via network interface 950 from a web page on the Internet so a user can choose a language. Petitioner also asserts that a user can download control algorithms via network interface 950, and the interface objects and control algorithms disclose or render obvious the “functional programming” and the web page on the Internet is a remote correspondent that is a source of functional programming. Pet. 50–53 (citing Ex. 1007, 1:12–23, 2:3–5, 2:17–19, 5:8–12, 5:14–17, 5:30–31, Abstract; Ex. 1001, 10:34–47; Ex. 1002 ¶¶ 153–157).

These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- g. *1[j]: “a control program stored in said memory for causing said central processing unit to selectively: 1) establish on said liquid crystal display one or more representations of buttons at a separated and predetermined positions; ”*

Petitioner asserts that Rosen’s thermostat stores a program such as a control program in memory to cause the CPU to selectively perform certain operations such as establishing communications with a remote correspondent and Rosen-II stores a program in memory to direct the CPU to communicate through the I/O unit to establish a representation of at least one button on the LCD at a predetermined XY position. Petitioner asserts that Rosen-II teaches that different menus can place buttons and messages in various positions on a touch screen to facilitate intuitive programming, and Figures 3–5 of Rosen-II depict representations of buttons at predetermined, separated positions. Pet. 53–56 (citing Ex. 1005 ¶ 7; Ex. 1006 ¶¶ 7, 28, 30, 32 claim 1, Figs. 3–5, 14; Ex. 1002 ¶¶ 83–86, 145–146, 158–160; Ex. 1012, 274:24–275:7). Petitioner contends that the rationale and motivation to combine Rosen and Rosen-II is the same as for element 1[b]. *Id.* at 56. These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- h. *1[k]: “read the position on the touch pad juxtaposed with said predetermined position to determine if said representation of a button has been touched; and*

Petitioner asserts that Rosen-II stores a program in memory to direct a CPU to communicate through the I/O unit to selectively read the XY position on the touch pad to determine if the button was touched and would combine with Rosen for the same reasons as element 1[b]. Pet. 57–58 (citing Ex. 1006 ¶¶ 7, 28, Abstract, Fig. 14; Ex. 1002 ¶¶ 161–162). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- i. *1[l]: “if said a representation of a button has been touched, processing this information to establish a condition incorporated into the operation of said thermostat system;”*

Petitioner asserts that Rosen-II discloses a program stored in memory to direct the CPU to determine selectively if a particular button was touched and to perform a predetermined action such as moving to a different menu or changing operating criteria to establish a condition incorporated into the thermostat system operation such as dropping the temperature set point when a “DN” button 30 is touched, raising the set point when an “UP” button 31 is touched, or returning to normal operation if a “RUN” button 42 is touched. Pet. 59–61 (citing Ex. 1006 ¶¶ 7, 28, 32, 33, Fig. 14, claims 1, 3, 17, 18, Abstract; Ex. 1002 ¶¶ 163–165). Petitioner contends that the rationale and motivation to combine Rosen and Rosen-II is the same as for element 1[b]. *Id.* at 61. These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- j. *1[m]: “establish communications between said processor and a first remote correspondent from which is transferred to said memory one or more modules of functional programming; and”*

Petitioner asserts that Rosen’s communication interface establishes bi-directional communications with a remote correspondent to obtain current information, and Smith’s comfort controller establishes communications via network interface 950 to retrieve initial interface objects 600, user interface objects 400, and control algorithms 500 from a remote correspondent web page on the Internet and store them in memory as functional programming modules. Pet. 61–64 (citing Ex. 1005 ¶¶ 7, 22, claims 1, 11; Ex. 1007, 2:3–5, 2:8–11, 3:8–17, 5:8–17, 5:30–31, Abstract, Fig. 1; Ex. 1002 ¶¶ 166–172).

k. Are functional programming modules transferred from a remote correspondent to memory

Patent Owner argues that the combination of Rosen and Rosen-II do not disclose functional programming modules transferred from a remote correspondent to the memory. Prelim. Resp. 16–17. We disagree.

Smith's thermostats download control algorithms and user interface objects from remote correspondents on the Internet and elsewhere to store in system memory to provide controls programs and interface objects that match a user's preferred language and suit their climate and personal preferences. Ex. 1007, 2:7–19, 3:8–15, 5:8–31, Fig. 1 (memory 300 stores user interface objects 400, control algorithms 500, and initial interface objects 600).

Control algorithms 500 can provide a set-point schedule that adjusts temperatures at different times in the day. Ex. 1007, 4:7–12. Thus, control algorithms 500 are used in control programs that control space conditioning equipment like those described in the '075 patent. *Id.*; Ex. 1001, 10:48–51.

Smith depicts a set-point schedule in display unit 200 as a graph 920 with one axis denoting time and another denoting temperature. Ex. 1007, 4:13–18. Graph 920 is a portions of a graphical user interface with items of different size, shape, color, legend, location as text and graphic items like the modules described in the '075 patent. *Id.*; Ex. 1001, 10:41, 10:45–47.

Display unit 200 also includes controls 905 to switch the temperature display between Fahrenheit and Celsius, the time display between standard and military, and to show a single day's schedule versus a week's schedule. Ex. 1007, 4:21–24, Fig. 2. These user interfaces provide portions of a GUI, virtual buttons, and other viewable text or graphic devices on a touch screen like the modules described in the '075 patent. *Id.*; Ex. 1001, 10:41–47.

Other control algorithms allow users to review schedules, program new schedules, and manually control heating and cooling. Ex. 1007, 4:24–26, Fig. 2. These algorithms control programs and space conditioning equipment like the modules described in the '075 patent. *Id.*; Ex. 1001, 10:48–51.

Smith allows users to add or change user interfaces objects and control algorithms. User interface objects and control algorithms are loaded from the Internet so users can choose preferred ones. Ex. 1007, 2:17–19. If a user's selection of a preferred language does not include user interface objects 400 already stored in memory 300, the user may *add* such user interface objects to change existing objects via network interface 950. Ex. 1007, 5:23–28. A user can choose control algorithms 500 stored in memory or can download updated or additional control algorithms 500 via network interface 950. *Id.* at 5:29–31. Thus, control algorithms may be loaded over the Internet or other network *after installation*. *Id.* at 2:3–5; *see* Pet. 49–52, 61–64.

Once a user selects a language, “the proper user interface objects 400 are then downloaded.” Ex. 1007, 5:15–17. To add user interface objects 400 or change initial interface objects 600, thermostats can connect via network interface 950 and cable, infrared port, or radio-frequency port to media such as personal digital assistants or laptop computers to obtain user interface and initial interface objects. *Id.* at 5:17–22. The '075 patent describes remote correspondents as including removable media that establish bi-directional communication to download functional programming by infrared links. Ex. 1001, 4:29–36, 9:49–56, 10:59–64. Indeed, claim 10 recites that “said first remote correspondent is removable media.” *Id.* at 15:7–8.

On this record, Petitioner has made a sufficient showing that functional programming is transferred from a remote correspondent as claimed.

- l. *l[n]: “operate said transferred functional programming to change or add to representations on the touch screen, where said changes or additions of representation on the touch screen were not available to the control program before their transfer to the memory;”*

Petitioner asserts that Smith operates transferred functional program to change initial interface objects, user interface objects, and control algorithms. Petitioner contends that Smith’s comfort controller is programmed to load initial interface objects 600 via network interface 950 when first powered-up so a user can choose a preferred language and the initial interface objects 600 change or add to representations on the touch screen by adding options that were not available to the control program because the comfort controller was installed without any initial interface objects. Pet. 65–66 (citing Ex. 1007, 5:8–12, 5:14–16; Ex. 1002 ¶¶ 173–178). Petitioner also asserts that Smith’s downloading of user interface objects 400 into memory after the preferred language is chosen to display all of the textual information in the preferred language, changes or adds to the original representation on the touch screen including the initial interface objects 600 because the comfort controller was installed without any user interface objects. *Id.* at 66 (citing Ex. 1007, 5:2–6, 5:16–17; Ex. 1002 ¶ 174). Petitioner also contends that Smith loads control algorithms from the Internet so that a user can choose one suited to the user’s climate and personal preferences. Petitioner asserts that these algorithms add or change representations on the touch screen such as a set-point schedule, and users “can choose to download updated or additional control algorithms 500 via the network interface 950.” *Id.* at 66–67 (citing Ex. 1007, 2:17–19, 4:7–20, 5:8–9, 5:30–31, Abstract, Fig. 2; Ex. 1002 ¶¶ 175–176).

m. Does Smith change or add to representations on the touch screen?

Patent Owner argues that “the proposed combination does not show or render obvious changes or additions in representations that were not . . . available to the control program before their transfer to the memory as claimed in Elements M and N.” Prelim. Resp. 17. Patent Owner argues that the ’075 patent discloses transferred or downloaded functional programming changes or adds to representations on the touch screen that already must exist and were not available to the control program before their transfer to the memory. *Id.* at 17–18. Patent Owner asserts, “*Smith’s* ‘initial user interface objects and interface objects’ during the first power-up cannot be considered as one or more modules of functional programming which changes or adds representation to already existing/pre-installed representations of the LCD or touchscreen.” *Id.* at 19.

The plain meaning of element 1[n] is that a control program stored in memory causes the CPU to operate transferred functional programming to change or add to representations on the touch screen that were not available to the control program before their transfer to memory. Ex. 1001, 14:25–45.

Smith discloses a comfort controller that downloads initial interface objects 600 via network interface 950 from a web page on the Internet and then operates this “transferred functional programming” to change or add to representations on the touch screen that were not available previously by allowing “the user to choose a preferred language” whereupon “the proper user interface objects 400 are then downloaded.” Ex. 1007, 5:10–17. The downloaded user interface objects 400 add to or change the initial interface objects 600 that were installed initially and were not available previously.

The '075 patent describes this element as allowing a user interface to be changed after installation to accommodate equipment or control options not anticipated at installation or to change the user interface to a form not possible with a control program originally installed. Ex. 1001, 3:5–10.

Smith discloses a control program that allows users to change a user interface to a form not possible with a control program originally installed due to unanticipated user language preferences or climates. Ex. 1007, 1:20–2:5, 5:8–28. Smith presents initial interface objects 600 that allow a user to choose a preferred language. These initial interface objects 600 add to any representations that were present on the touch screen.

When a user selects a preferred language in response to initial interface objects 600, user interface objects 400 are downloaded and added to display unit 200 to change the representations provided by the initial interface objects 600. Ex. 1007, 5:8–22. Once a preferred language is chosen, additional controls 905, display information 910, and labels 920 are redisplayed in the chosen language and may be downloaded via network interface 950 if the preferred language does not have user interface objects 400 already stored in memory. *Id.* at 5:1–7, 5:23–28.

Users can load control algorithms 500 stored in memory at installation, *or* users “can choose to download updated or additional control algorithms 500 via the network interface 950” to add to or change representations on the touch screen. Ex. 1007, 5:29–31. Thus, the user interface of Figure 2 of Smith can be changed to add controls 905, different information and labels 910, and new program schedules 920. *Id.* at 4:13–29; *see* Pet. 65–69.

On this record, Petitioner has shown that the transferred functional programming changes or adds to representations on the touch screen.

n. Motivation to combine

Petitioner contends that a skilled artisan would have modified Rosen's thermostat system (as modified by Rosen-II) to include Smith's functionality for transferring functional programming such as initial interface objects, user interface objects, and control algorithms from a remote correspondent that is a source of such functional programming (e.g., a website on the Internet) to a thermostat system to change or add to the representations on the touch screen and/or to control the space conditioning equipment. Petitioner asserts that the modification applies a known technique of Smith's approach to the known thermostat system of Rosen that is ready for such improvement to yield predictable results. Pet. 69–70 (citing Ex. 1005 ¶ 1; Ex. 1006 ¶ 1; Ex. 1007, 1:6–7; Ex. 1002 ¶¶ 179–183; Ex. 1001, 1:12–13).

Petitioner contends that a skilled artisan would have been motivated to combine Smith's teachings with those of Rosen and Rosen-II to provide flexibility and accommodate user preferences and facilitate customized user interfaces of the programmable thermostat system of Rosen to make it easier to program and more effective at controlling space conditioning equipment. Pet. 70–72 (citing Ex. 1007, 1:20–2:5, 2:12–19, 5:6–7; Ex. 1002 ¶¶ 181–183).

Petitioner contends that a skilled artisan would have had a reasonable expectation of success in combining these teachings due to Smith's teachings being applicable to systems such as Rosen's that have hardware and software needed to implement Smith's teachings. Pet. 72–73 (citing Ex. 1007, 2:7–11, 5:8–17; Ex. 1002 ¶ 185; contentions for elements 1[b], 1[c], 1[e], and 1[i]).

These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- o. 1[o]: “means coupling said communications interface and said first remote correspondent.”*

Petitioner contends that Rosen couples communications interface 14 to a first remote correspondent by CPU issuing signals to I/O unit 10 to cause communications interface 14 to establish communications between CPU 9 and RC 15 via serial link 16 and modem 20 that interfaces with ISP 21 or by integrated modem 24, data link 26, and ISP 21. Pet. 73–76 (citing Ex. 1005 ¶¶ 18, 22, 32, 33, claim 1, Figs. 2, 3; Ex. 1009, 5; Ex. 1026, 76–77; Ex. 1002 ¶¶ 187–190). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

On this record, we find that Petitioner has established a reasonable likelihood that claim 1 is unpatentable over Rosen, Rosen-II, and Smith.

6. Claims 2–4

Petitioner contends that Rosen discloses a communication interface 14 with modem 24 integrated therein to communicate with ISP 21 to eliminate the need for an external modem (Figure 3) as in claim 2 and with an external modem 20 (Figure 2) as in claim 3. Pet. 76–78 (citing Ex. 1005 ¶¶ 32, 33, Figs. 2, 3; Ex. 1012, 267:19–25; Ex. 1002 ¶¶ 191–192). Petitioner asserts that combination renders claim 4 obvious using virtual buttons operating with control programs to control space conditioning equipment as part of Smith’s functional programming. Pet. 78– (citing Ex. 1006 ¶¶ 28, 29, Fig. 3; Ex. 1007, 1:30–2:2, 5:2–6, 5:14–16, 5:30–31, Fig. 2; Ex. 1009, 5–6; Ex. 1026, 80; Ex. 1002 ¶¶ 179–186, 193–197; contentions for elements 1[i], 1[m], 1[n]). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. *See* Prelim. Resp. 19.

On this record, we find that Petitioner has established a reasonable likelihood that claims 2–4 are unpatentable over Rosen, Rosen-II, and Smith.

7. *Claims 11–15*

Petitioner asserts that Smith’s functional programming determines a user interface as in claim 11 as different languages with different graphical representations of a set-point temperature schedule, different text for buttons and legends or other viewable aspects of buttons on display as in claim 12, different viewable aspects of text or graphic devices on display in claim 13 as a set-point temperature schedule, operational algorithms for set-back and set-up temperatures as in claim 14, and operational algorithms that control space conditioning equipment by set-up and set-back temperatures set in a set-point schedule as in claim 15. Pet. 83–85 (citing Ex. 1007, 1:12–18, 1:20–21, 4:7–12, 4:16–18, 5:4–6; 5:15–16; Ex. 1002 ¶¶ 198–204; contentions for elements 1[i], 1[m], 1[n]). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence. *See* Prelim. Resp. 19. On this record, we find that Petitioner has established a reasonable likelihood that claims 11–15 are unpatentable over Rosen, Rosen-II, and Smith.

E. Exercise of Discretion under 35 U.S.C. § 314(a)

In its Preliminary Response, Patent Owner argues that the *Fintiv* factors support the exercise of our discretion under 35 U.S.C. § 314(a) to deny institution based on the Texas proceeding. Prelim. Resp. 7–13.

Because Patent Owner has withdrawn its arguments concerning discretionary denial under 35 U.S.C. § 314(a) (*see* Ex. 3001), the issue is moot and we need not address it.

III. CONCLUSION

For the reasons discussed above, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in establishing that at least one of claims 1–4 and 11–15 of the ’075 patent is unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review of the '075 patent is hereby instituted as to claims 1–4 and 11–15 on all grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial on the grounds of unpatentability authorized above; the trial commences on the entry date of this decision.

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