

Display and operating apparatus for home automation
systems

Description

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The invention relates to a display and operating apparatus for home automation systems, which is connected to actuators via a processing unit and a bus system, each actuator being assigned a specific address within the bus system, and at least one electrical device being connected to each actuator, and which comprises a touch-screen element for controlling the electrical devices. The invention can be used, for example, for input devices in the field of installation systems of home automation systems.

Input devices are known in the field of home automation systems that allow electrical devices (loads) connected to a bus system via actuators to be operated via a touch-screen interface. The common form of representation in this case is a menu structure or symbols, which are touched to change the output state. Symbolic slide controls are commonly used to implement dimming functions. Commissioning, i.e. assignment of actuators to the electrical devices, is performed by means of separate commissioning software, which is used to assign the menu options or the symbols to the relevant addresses of the actuators.

The commissioning software is linked to symbols or menu texts, which means that selecting the required electrical devices must be implemented by reading and identifying terms or symbols. For example, on the "living room" page, there are terms such as "wall luminaire", "ceiling luminaire", "left-hand window blinds", "right-hand window blinds", "French window blinds". An operating prompt such as "ON", "OFF", "OPEN" or "CLOSE" is displayed by clicking-on/touching

one of these terms.

DE 10 2004 016 604 A1 discloses a home automation system input/output device having a freely programmable signalling and control panel, which comprises a front panel containing a built-in touch-screen element. The touch-screen element comprises graphical buttons for programming/operation, which can have a relatively fine-structured design because a control pen can be used for operation. Alternatively, operation can also be by finger-touch. One example of programming is setting different daily time switches and/or weekly time switches for various devices such as lights, roller shutters, blinds, heating that are controlled via an installation bus. The front panel has a slot for insertion of a memory card into a memory-card reader arranged inside the housing for reading/writing to a standard memory card (data and/or programs). In addition, the housing comprises a range of slots for accommodating modules (Ethernet, video, radio).

The object of the invention is to design an extremely easy-to-operate commissioning, display and operating apparatus for home automation systems.

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This object is achieved according to the invention in conjunction with the features of the preamble in that

- at least one room of a house or one sub-area of a room is represented on the touch-screen element in the form of a photo, on which the electrical devices to be controlled in this room can be seen,
- the representational photo area of a specific electrical device is allocated via the processing unit to an address assigned to the actuator of this electrical device,
- a required actuator function is implemented via the processing unit on touching the representational photo area.

It is particularly advantageous that by means of the invention there is no need to read menu texts and terms, or to identify and comprehend symbols, before it
5 is possible to control a specific electrical device in a required manner and using the display and operating apparatus. The device to be controlled is instead identified directly on the photo and controlled directly by touching the representational photo area of
10 this device.

Further advantages are apparent from the following description.

15 Advantageous embodiments of the invention are characterized in the subclaims.

The invention is explained below with reference to the exemplary embodiments shown in the drawing, in which
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Fig. 1 shows a schematic diagram of a display and operating apparatus for home automation systems having a plurality of electrical devices connected to a bus system,

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Fig. 2 shows a display and operating apparatus showing the floor plan of a house.

Fig. 1 shows a schematic diagram of a display and operating apparatus for home automation systems having
30 a plurality of electrical devices connected to a bus system. It shows a display and operating apparatus 1, which comprises:

- a touch-screen element 2,
- 35 • a built-in camera (optional) 3,
- a storage element 4 for storing image data from the camera 3,

- a card reader 5 for the input of image data by means of a card, for example an SD card
- a storage element 6 for storing image data input via the card reader 5,
- 5 • a processing unit 7, which is connected to the touch-screen element 2, the storage element 4, the storage element 6 and the bus system.

The processing unit 7 is connected via the bus system
10 8 to a plurality of actuators 9, 10, 11 and 12, to each of which is connected an electrical device 13, 14, 15 and 16 respectively.

For commissioning the display and operating apparatus
15 1, image data is input in a first step to the storage element 6, said image data comprising both the floor plan of the house, where a suitable card and the card reader 5 are practical means of data input, and photos relating to the individual rooms of the house. The
20 latter can be done

- by taking a photo internally by means of the camera 3, and storing in the storage element 4,
- by taking a photo externally by means of a separate camera, the external photo being stored
25 on a storage medium, and by reading into the storage element 6 by means of a suitable card and the card reader 5.

In a second step, the assignment between a
30 representational photo area of a specific electrical device in the touch-screen element and the electrical device itself is made separately for each room of the house and for every electrical device. To do this, the photo of the selected room is displayed on the touch-
35 screen element 2. The electrical device identifiable on the photo, for example a ceiling luminaire driven via an actuator or a standard lamp, is encircled by a small box using a pen, and assigned to the relevant actuator

of the device by means of its system-individual address. At the respective actuator itself, this must be done by pressing the programming button in a known manner. In this context, a window having a set of
5 blinds to be opened/closed by means of a blinds drive is also referred to as an "electrical device". In this way, the address of a specific actuator is successively assigned by means of the processing unit 7 to the representational photo area of a specific electrical
10 device shown in a photo in the touch-screen element 2.

To control an electrical device during subsequent operation, it is then sufficient to click on the device to be controlled on the touch-screen element 2, or to
15 use a pen to touch the representational photo area of the device to be controlled, in order to initiate a required actuator function. The following actuator functions can be implemented (not an exclusive list):

- To switch a light on/off - see ceiling luminaire
20 19 in Fig. 1 - it suffices to touch the representational photo area of the device to be controlled using the pen or finger, whereupon a switched-off device is switched on, and a switched-on device is switched off.
- To adjust the dimming level of a light upwards ("brighter" direction) - see standard lamp 20 in
25 Fig. 1 - an upward stroke of the pen or finger is made across the representational photo area of the device to be controlled until the required brightness is obtained, or a brief touch is made on the representational photo area of the light.
- To adjust the dimming level of a light downwards ("darker" direction), a downward stroke of the
30 pen or finger is made across the representational photo area of the device to be controlled until the required brightness is
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obtained, or a brief touch is made on the representational photo area of the light.

- 5 • To open a set of blinds - see blinds 17, 18 in Fig. 1 - an upward stroke of the pen or finger is made across the representational photo area of the blinds to be controlled as far as the required position. The blinds can be stopped at the instantaneous position by briefly touching the representational photo area of the blinds.
- 10 • To close a set of blinds, a downward stroke of the pen or finger is made across the representational photo area of the blinds to be controlled as far as the required position. The blinds can be stopped at the instantaneous position by briefly touching the
- 15 representational photo area of the blinds.

In a modified embodiment, when a luminaire having a dimming actuator, or a set of blinds, is touched/clicked on, a symbolic slide control is displayed for the period of operation beside the device touched/clicked on, which can then be used to input the required brightness or blinds position directly.

25 All the functions cited above involve the use of the processing unit 7, the bus system 8 and the addressed actuators.

30 If all the electrical devices of a room that can be controlled via the bus system 8 cannot be displayed in a single photo, it is useful to show two or more photos of this room side by side on the touch-screen element 2, for example each photo showing one wall of the room.

35 In order to select a specific room, the floor plan of the house is shown on the touch-screen element 2 in a top-level page - see Fig. 2. The pen or finger is used to touch the representational photo area of this room

in the floor plan 21 in order to select the required room - see the various rooms 22 of the floor plan. The photo of this specific room is thereupon shown on the touch-screen element 2, and electrical devices are
5 operated as explained above.

Alternatively, the individual rooms of the house are shown in small photos side by side on the touch-screen element 2, thereby simplifying selection of the
10 required room. Touching the photo of the required room displays the photo of this room in an enlarged manner. In this form of representation, however, a touch-screen element having a relatively large surface area is advantageous in order to be able to show all the rooms
15 in sufficient size and clarity despite the reduced-size representation.

When the representation of a room in the form of a photo is mentioned above, this also includes
20 abstracting graphics, but not the representation of devices by symbols.

List of references:

- 1 display and operating apparatus
- 2 touch-screen element
- 3 camera
- 4 storage element
- 5 card reader
- 6 storage element
- 7 processing unit
- 8 bus system
- 9 actuator
- 10 actuator
- 11 actuator
- 12 actuator
- 13 electrical device
- 14 electrical device
- 15 electrical device
- 16 electrical device
- 17 blinds
- 18 blinds
- 19 ceiling luminaire
- 20 standard lamp
- 21 floor plan of a house
- 22 rooms of the house

Claims

1. Display and operating apparatus (1) for home automation systems, which is connected to actuators (9, 5 10, 11, 12) via a processing unit (7) and a bus system (8), each actuator being assigned a specific address within the bus system, and at least one electrical device (13, 14, 15, 16, 17, 18, 19, 20) being connected to each actuator, and which comprises a touch-screen 10 element (2) for controlling the electrical devices, characterized in that
 - at least one room (22) of a house or one sub-area of a room is represented on the touch-screen element (2) in the form of a photo, on which the electrical 15 devices (13, 14, 15, 16, 17, 18, 19, 20) to be controlled in this room can be seen,
 - the representational photo area of a specific electrical device (13, 14, 15, 16, 17, 18, 19, 20) is allocated via the processing unit (7) to an address 20 assigned to the actuator of this electrical device,
 - a required actuator function is implemented via the processing unit (7) on touching the representational photo area.
2. Display and operating apparatus according to Claim 1, characterized in that there is a built-in card reader (5), by means of which at least one photo taken externally of a room can be read in and can be stored 35 in a storage element (6).
3. Display and operating apparatus according to any of the preceding claims, characterized in that two or

more photos of a room are shown side by side on the touch-screen element (2).

4. Display and operating apparatus according to any
5 of the preceding claims, characterized in that to adjust the dimming level of a light upwards or downwards respectively, an upward or downward stroke respectively is made across the representational photo area of the device to be controlled.

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5. Display and operating apparatus according to any
of the preceding claims, characterized in that to open or close respectively a set of blinds, an upward or downward stroke respectively is made across the
15 representational photo area of the blinds to be controlled.

6. Display and operating apparatus according to Claim
4 or 5, characterized in that when a light or a set of
20 blinds is touched/clicked on, a symbolic slide control is displayed beside the device touched/clicked on, which can be used to input the required brightness or position.

7. Display and operating apparatus according to any
25 of the preceding claims, characterized in that in order to select a specific room (22) of a house, the floor plan (21) of the house is shown on the touch-screen element (2).

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8. Display and operating apparatus according to any
of the preceding claims, characterized in that in order to select a specific room (22) of a house, the individual rooms of the house are shown in photos side
35 by side on the touch-screen element (2).