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Introduction

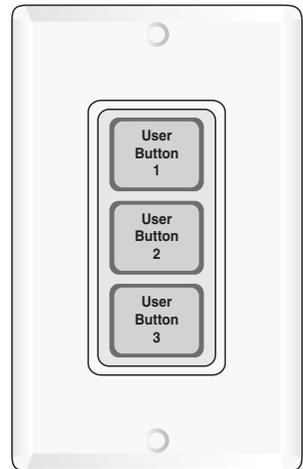
The User Switch 481 has 3 programmable buttons that allow users to easily change the operating scene or allow users to enable / disable tN4 setpoint controls on a tN4 system.

Multiple User Switches are required if more than 3 scenes or setpoint enable / disables are desired.

The 481 has 3 output relay contacts that allow for connection to alarm systems or paging systems to alert service personnel. The output relay contacts can also be used to indicate the scene of the tN4 system to an automation system.

Features

- tN4 Compatible
- 3 User buttons
- 3 Programmable Output Relay Contacts
 - Output for Critical Alert
 - Output for Non Critical Alert
 - Output for Scenes
 - Output for Enable / Disable Signal



Decora cover plate not included

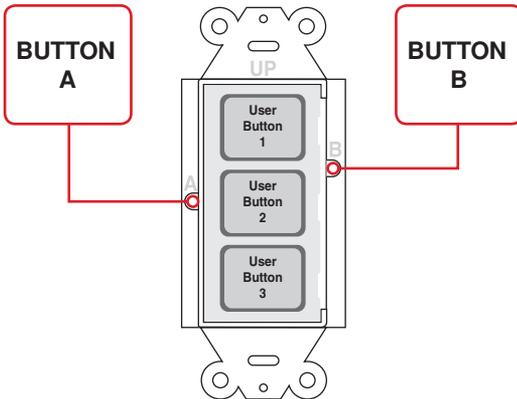
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User Interface

The User Switch has a total of 5 buttons.

User Buttons 1, 2, and 3 allow for users to select the operation of the tN4 system. Buttons A and B allow the installer to program the operation of User Buttons 1, 2, and 3.



Factory Defaults:

User Button 1

Scene = 1

Label = Normal

User Button 2

Scene = 3

Label = Unoccupied

User Button 3

Scene = 2

Label = Away

Sequence of Operation

Three User Buttons

The User Switch provides users with a simple interface to change the operating scene of the tN4 system or provide an enable / disable to tN4 setpoint controls. The 481 has 3 User Buttons and 3 output relay contacts.

The 3 User Buttons provide the ability to:

1) Select a scene for the tN4 system

The User Buttons allow users to select the scene of the tN4 system. Each of the 3 User Buttons is programmed by the installer to select a particular scene on the tN4 system. The temperature of each tN4 thermostat in the system is pre-programmed by the installer for each of the scenes. This allows users to change the temperature of all the thermostats using a single button.

tN4 thermostats and tN4 setpoint controls must have Scenes turned to “On” in order to respond to scene changes on the User Switch.

When a User Button is pressed, the green LED under that button turns on and remains on until a new scene is selected, or the time for the selected temporary scene expires.

When the current selected scene on the tN4 network is the same as the scene that the User Button is programmed for, the button turns green.

When a selected scene is “On” and that User button is pressed again, the scene is changed based on the following table:

| Current Scene | Press the Same Button | New Scene |
|---------------------------|-----------------------|-----------------------------|
| Perm Scene 1 | → | No Change |
| Perm Scene 2 - Away | → | Selects Scene 1 |
| Perm Scene 3 - Unoccupied | → | Selects Scene 1 |
| Perm Scene 4 | → | Selects Scene 1 |
| Perm Scene 5 | → | Selects Scene 1 |
| Tmpy Scene 6 - Occupied | → | Selects previous perm scene |
| Tmpy Scene 7 | → | Selects previous perm scene |
| Tmpy Scene 8 | → | Selects previous perm scene |

Application Examples:

Allows residential users to change the scene to 2 (Away) while going on vacation, or select an occupied scene while entertaining guests.

Allows commercial users a simple way to allow staff to override the night setback / setup schedule on the tN4 system.

2) Provide a setpoint device enable

Each of the 3 User Buttons can be programmed to enable or disable one or more tN4 setpoint controls on the tN4 bus. The installer programs a setpoint device enable number for one of the User Buttons. In turn, the installer programs a tN4 setpoint control with the same setpoint device enable number. This allows users to enable or disable a tN4 setpoint control by pressing a single button. Multiple tN4 setpoint controls can be enabled or disabled from the same User Switch button.

The tN4 setpoint control operates for the “Occupied Time” or until the User Button is pressed once again to cancel the operation. The User Button is green when the tN4 setpoint device is in operation. Should the tN4 setpoint control be unable to operate, the button turns red for 5 seconds and then the button light is turned off.

See the tN4 Setpoint Control Data Brochure for more information on the setpoint control operation.

Application Examples:

A user can remotely enable a tN4 setpoint control to heat a hot tub or sauna.

A user can remotely enable a tN4 setpoint control to heat a garage or workshop.

3) Disabled Button

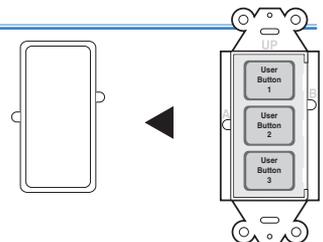
The User Button can be disabled so that it does not function when pressed.

In certain cases, the disabled button can be used to close the corresponding relay contact. See the “Button Operation” section for more information.

Programming the User Buttons

STEP 1

Remove the plastic trim bezel.

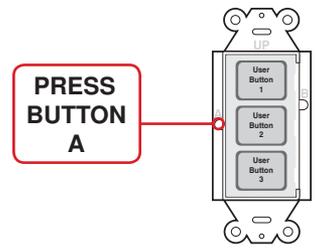


STEP 2

Press button “A” once using a blunt object to begin programming mode.

Each of the 3 User Buttons will begin to flash to indicate the current program setting:

- Red flashes indicate the User Button is programmed to select a scene. The number of flashes in a row indicate the scene number.
- Green flashes indicate the User Button is programmed to enable or disable a tN4 setpoint control. The number of flashes in a row indicate the setpoint device enable number.
- Orange indicates the User Button has been disabled.



STEP 3

Press and hold down the User Button until the button changes to the color of operation that is desired and then release the button.

Red = Scene

Green = tN4 Setpoint Control Enable / Disable

Orange = Disabled Button

STEP 4

(Scene Operation, Red Flashes)

Press the User Button the number of times equal to the desired scene.

| Press “User” Button | Scene | Red Light Flash Sequence |
|---------------------|------------------------------|--------------------------|
| 1 Time | 1 | 1 Red, Off, Repeat |
| 2 Times | 2 (Away) | 2 Red, Off, Repeat |
| 3 Times | 3 (Unoccupied) | 3 Red, Off, Repeat |
| 4 Times | 4 | 4 Red, Off, Repeat |
| 5 Times | 5 | 5 Red, Off, Repeat |
| 6 Times | 6 (3 hr. Temporary Occupied) | 6 Red, Off, Repeat |
| 7 Times | 7 (4 hr. Temporary) | 7 Red, Off, Repeat |
| 8 Times | 8 (8 hr. Temporary) | 8 Red, Off, Repeat |

STEP 4 (Continued)

(Setpoint Device Enable, Green Flashes)

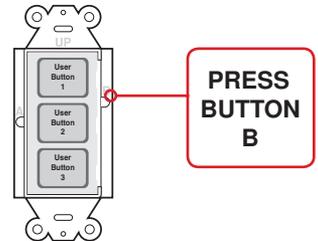
Press the User Button the number of times equal to the desired setpoint device enable number.

| Press "User" Button | Setpoint Enable | Green Light Flash Sequence |
|---------------------|-----------------|----------------------------|
| 1 Time | 1 | 1 Green, Off, Repeat |
| 2 Times | 2 | 2 Green, Off, Repeat |
| 3 Times | 3 | 3 Green, Off, Repeat |
| 4 Times | 4 | 4 Green, Off, Repeat |
| 5 Times | 5 | 5 Green, Off, Repeat |
| 6 Times | 6 | 6 Green, Off, Repeat |
| 7 Times | 7 | 7 Green, Off, Repeat |
| 8 Times | 8 | 8 Green, Off, Repeat |
| 9 Times | 9 | 9 Green, Off, Repeat |
| 10 Times | 10 | 10 Green, Off, Repeat |
| 11 Times | 11 | 11 Green, Off, Repeat |
| 12 Times | 12 | 12 Green, Off, Repeat |

STEP 5

Press button "B" to finalize the User Button setting and exit the programming mode.

Note: To return to Step 2 without saving the setting, press button "A".



STEP 6

Repeat steps 2 through 5 to program each User Button.

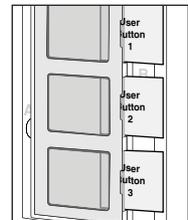
STEP 7

Included with the User Switch are labels to identify the operation of each User Button. Each label has a description on it. Choose the label with the appropriate description for each button.

A template has been included on Page 10 to create your own labels.

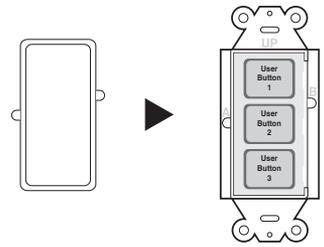
Insert the label into the slot located under the right hand side of each User Button.

Repeat for each User Button.



STEP 8

Replace the trim bezel.

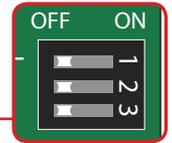


Output Relay Contacts and DIP Switches

The functionality of the 3 dry relay contacts on the User Switch 481 are determined by the settings of DIP switches 1, 2 and 3. Dip switches 1 and 2 select the mode of operation for relay outputs.



DIP Switches



Permanent or Momentary Contact Closure

DIP switch 3 = OFF (Permanent)

DIP switch 3 = ON (Momentary)

The output relay contacts can close momentarily for 5 seconds and then re-open or the relay contacts can close permanently. Use DIP switch 3 to select either Momentary or Permanent. Momentary closure is often used in alarm systems. Permanent is the factory default setting.



Alert and Scene Status

DIP switch 1 = OFF

DIP switch 2 = OFF

DIP switch 3 = Permanent or Momentary

Relay contact 1 closes to provide an alert when there is an error message present on the tN4 system.

Relay contact 2 closes while the scene is set to Away (Scene 2).

Relay contact 3 closes while the scene is set to Scene 3.



Application Examples:

The relay contacts can connect to a third party alarm system or automation system to provide the status of the tN4 system.

Relay contact 2 can connect to a non-tN4 snow melt control (664, 665, 667) to provide an Idle Demand. The snow melt control Idle temperature is set to OFF. While the tN4 system is in Away (scene 2), the snow melt control is prevented from entering the melting operation.

Critical and Non-Critical Alert Levels



DIP switch 1 = ON

DIP switch 2 = OFF

DIP switch 3 = Permanent or Momentary

Relay contact 1 closes while a non-critical error message is present on the tN4 system. A non-critical error allows the heating system to continue to operate.

Relay contact 2 closes while a critical error message is present on the tN4 system. The critical errors are:

- 1) Adjust EEPROM error on any device.
- 2) Boiler supply sensor open or short circuit.
- 3) Mix supply sensor open or short circuit.
- 4) A thermostat has no air or floor temperature sensor reading.

Relay contact 3 is not used.

Application Example:

The relay contacts can connect to a third party paging device that, when activated, pages a service technician when a critical error message is present.

Button Operation

DIP switch 1 = OFF

DIP switch 2 = ON

DIP switch 3 = Permanent or Momentary



Each relay contact is synchronized with the corresponding User Button. When a button is pressed or the scene is changed to the User Button's programmed scene, the relay contact closes.

Application Examples:

The relay contacts can connect to a third party automation system to indicate that one of the User Buttons has been activated.

The User Button can be programmed to the "disabled" button operation. When the User Button is pressed, the light turns green and the corresponding output relay contact can activate lighting, security cameras, alarms or power a melt demand on a non-tN4 snow melt control (664, 665, 667) to manually start snow melting.

Scene Signal

DIP switch 1 = ON

DIP switch 2 = ON

DIP switch 3 = Permanent or Momentary



The relay contacts operate in combinations in order to communicate the current tN4 scene to third party devices. The contacts operate according to the following table:

| Scene | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------|-----|-----|-----|-----|-----|-----|-----|----|
| Contact 1 | Off | On | Off | On | Off | On | Off | On |
| Contact 2 | Off | Off | On | On | Off | Off | On | On |
| Contact 3 | Off | Off | Off | Off | On | On | On | On |

Scene Signals

Application Example:

The relay contact can connect to a third party automation system to indicate the current tN4 scene.

Applications Using Multiple 480 and 481 Together

Multiple User Switches 480 and 481 can be used together when:

- 1) Applications require more than 3 User Buttons.
- 2) Applications require both input demands and output relay contacts.
- 3) User Switches with the same functionality are required at different locations.

Each tN4 bus cannot exceed 24 devices. Devices include Thermostats, Setpoint Controls, Mixing Expansion Modules, and User Switches.

When using multiple User Switches at the same location, they can be installed adjacent to each other in the same switch box.

Applications requiring more than 3 User Buttons

When more than 3 User Buttons are required, two or more User Switches can be located next to each other in a double switch box. Each button can be programmed to either select a scene or provide a setpoint enable.

Application Example:

Applications that select more than three scenes or setpoint device enables will require two or more User Switches.

Applications with both input demands and output relay contacts

Applications that require input demands and output relay contacts require a 480 and a 481. The 480 provides the input demands and the 481 provides the output contacts.

Application Example:

A third party telephone switch device allows a user to change the scene from 1 to 2 (Away) through the demand input on the 480. Should a critical or non-critical error occur on the tN4 system, a 481 can close an alert contact to allow a third party telephone switch to page a service technician.

User Switches with the same functionality at different locations

There may be applications where there are two or more User Switches installed in a building. Each of the User Switch User Buttons can be programmed with the same functionality. When an User Button is pressed, User Buttons with the same functionality will all light green at the same time.

Application Example:

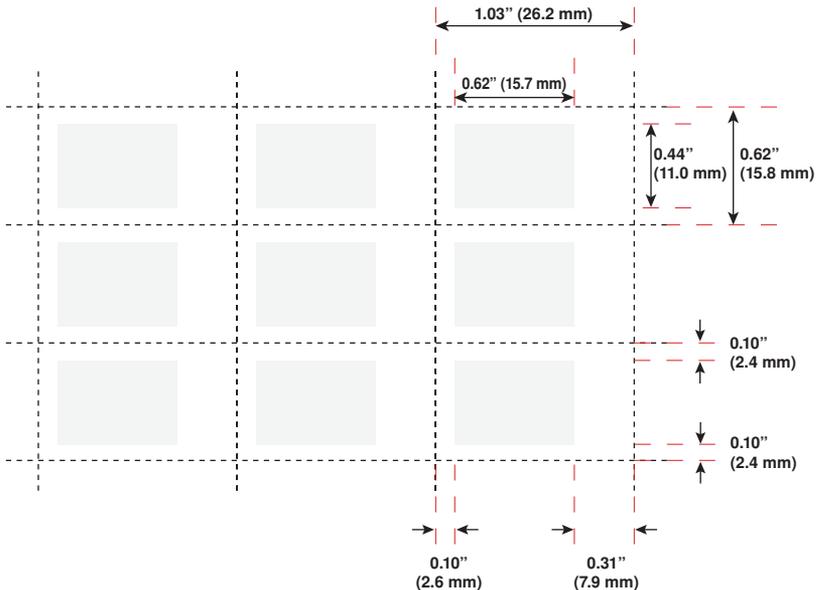
A User Switch is installed in the garage and another User Switch is installed in the master bedroom.

Cleaning the User Switch

The User Switch's exterior can be cleaned using a damp cloth. Moisten the cloth with water and wring out prior to wiping the device. Do not use solvents or cleaning solutions.

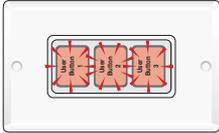
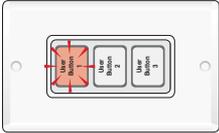
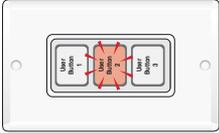
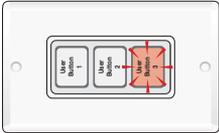
User Button Label Template

- 1) Download the User Switch Data Brochure PDF file D481.pdf from the Downloadable Literature Section on our tekmar website:
<http://www.tekmarcontrols.com> to your computer.
- 2) Click on the grey area (text field) and type the label description.
- 3) Print this page onto transparency film. Ensure the correct transparency film type is used for either laser printers or bubble-jet printers.



Error Messages

Error Messages

| Symptom | Cause | Corrective Action |
|--|---|---|
| <p>3 Buttons Flashing Red</p>  | <p>User Switch disconnected from tN4 bus.</p> | <ul style="list-style-type: none"> • Check tN4 and common wires for loose wire connections. • Ensure the tN4 controls have power. • Check R and C wires for correct polarity. |
| <p>1 Button Flashing Red</p>  <p>or</p>  <p>or</p>  | <p>The User Button is configured for setpoint device enable operation and there is no response from the tN4 setpoint control.</p> | <ul style="list-style-type: none"> • Ensure the setpoint device has power and is connected to the tN4 bus. • Ensure the setpoint device enable number of the User Button and of the tN4 setpoint control match. |

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