

Pow-R-Command Digital Switch— system overview



General overview

The Pow-R-Command™ (PRC) Digital Switch is a state-of-the-art microprocessor-based low voltage switch. Each switch has the ability to communicate directly to a Pow-R-Command 1000 line of the controllers over a dedicated switch network. This gives distributed control throughout the entire facility at a much lower cost of installation. In addition to advanced network features, each PRC Digital Switch is completely customizable and can be programmed to precisely meet customers' requirements for lighting control. All the programming features are stored directly in each switch's integrated memory, which adds to the robustness of the digital switch network. In addition, each switch is equipped with onboard inputs and outputs, which expands the switch's capability by allowing the connection of photo sensors, occupancy sensors, and/or dimmable ballasts directly to the switch.

Product layout and onboard I/O

The PRC Digital Switch is offered in multiple pushbutton configurations with color options of white, black, or almond. Depending on the pushbutton configuration, each switch has a number of inputs and outputs available.

Analog input: 0 to 10 Vdc. Typically used to monitor a photo sensor or occupancy sensor.

Analog output: 0 to 10 Vdc. Used primarily for dimmable ballast control. Each analog output can have up to 30 dimmable ballasts connected to it.

Digital input: Typically used for dry contact input from an occupancy sensor.

DC output: The 12 V/10 mA Vdc output is primarily used to power auxiliary devices such as the occupancy sensor and photo sensor.

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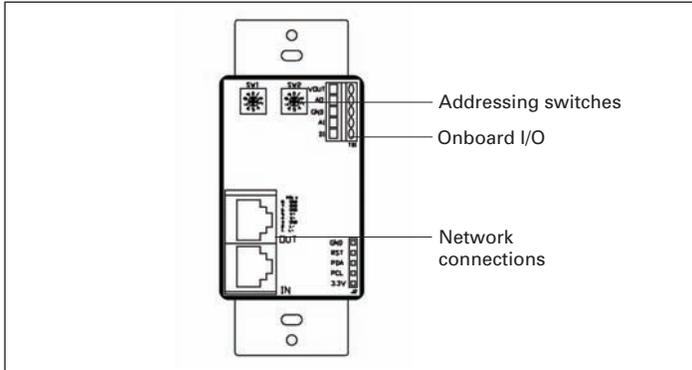


Figure 1. Digital switch

Table 1.

Button Configuration	Analog Input	Analog Output	Digital Input	12 Vdc Output
2-button	✓	✓	✓	✓
4-button	✓	✓	✓	✓
6-button	✓	✓	X	✓

Onboard memory

The PRC Digital Switch comes standard with onboard memory to store all programming and configuration. This allows for the switch network to have distributed intelligence. Rather than having all programming information for each switch stored at one centralized location, each switch stores its own configuration on its onboard memory. This keeps the switch network from having a centralized break point. If one switch were to fail, the integrity of the network would not be compromised, and the remaining switches would still function properly.

Easy installation

The PRC Digital Switch was designed to mount into a standard switch box. Switches on the basic network are powered by the Pow-R-Command controller; no additional power supply is required. The network uses standard 23-gauge CAT6 cable, and connections to each switch are made using standard RJ-45 connectors. Each switch can be easily addressed through the onboard rotary switches. For more information on installation, please reference the *PRC Digital Switch Installation Guide—IL01412025E*.

Programmable

With its ability to be custom programmed, each PRC Digital Switch offers complete flexibility to the end user. The PRC Digital Switch comes in two-pushbutton, four-pushbutton, and six-pushbutton configurations. Each pushbutton can be separately programmed to meet the customer requirements. The actions of the pushbutton can be programmed to: Momentary Toggle, Momentary ON, or Momentary OFF operation. The action executed when the pushbutton is pressed can be programmed to command any breaker or number of breakers in the facility. In addition to breaker and zone control, each pushbutton can be set to control multiple dimmable ballasts.

Pow-R-Command software: The Pow-R-Command Lighting Optimization Software will be used to configure and program each digital switch. Each configuration parameter is easily set through this user-friendly “point and click” interface. From the software, the user will have the ability to change a number of switch parameters.

Switch pushbutton type: Each pushbutton on the switch can be adjusted to be a Momentary Toggle, Momentary ON, or Momentary OFF button type.

Switch pushbutton action: Each switch pushbutton on the device can be set up to execute a different action or command. Once the pushbutton is pressed, the switch will send a network command to execute the desired action. This action can be set to turn on any number of breakers throughout the facility, dim multiple ballasts, activate a digital output, and so on.

Analog input: The analog input is typically used to monitor a photo sensor or occupancy sensor. The action, like the switch pushbutton action, can be completely customized and typically is set to dim multiple ballasts throughout the facility by setting the analog output.

Digital input: The digital input is typically used to monitor an occupancy sensor. The action, like the switch pushbutton and analog input actions, can be completely customized and typically is set to control the Smart Breaker(s) associated with that room or space.

The screenshot in **Figure 3** shows a typical dimming program for a six-button switch with an occupancy sensor. This programming has set up five incremental dimming levels and an OFF function button on the switch. The value entry is the percentage setting of the analog output to the dimmable ballasts. This gives the ability to set the maximum light output level at the switch. Also, the occupancy sensor input is programmed to activate and deactivate the lights automatically.

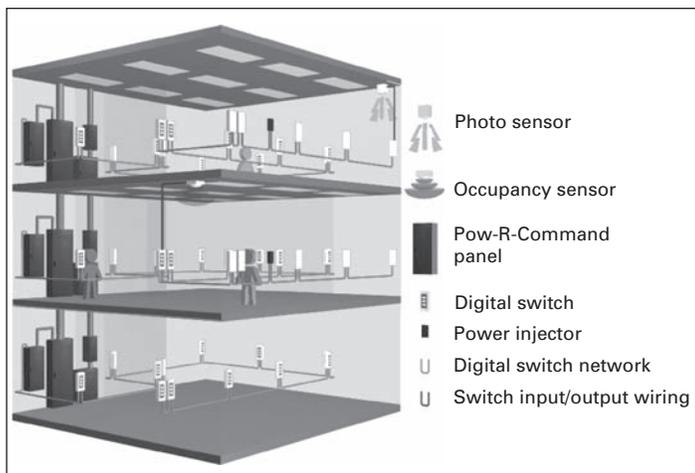


Figure 2. Lighting control in a commercial building

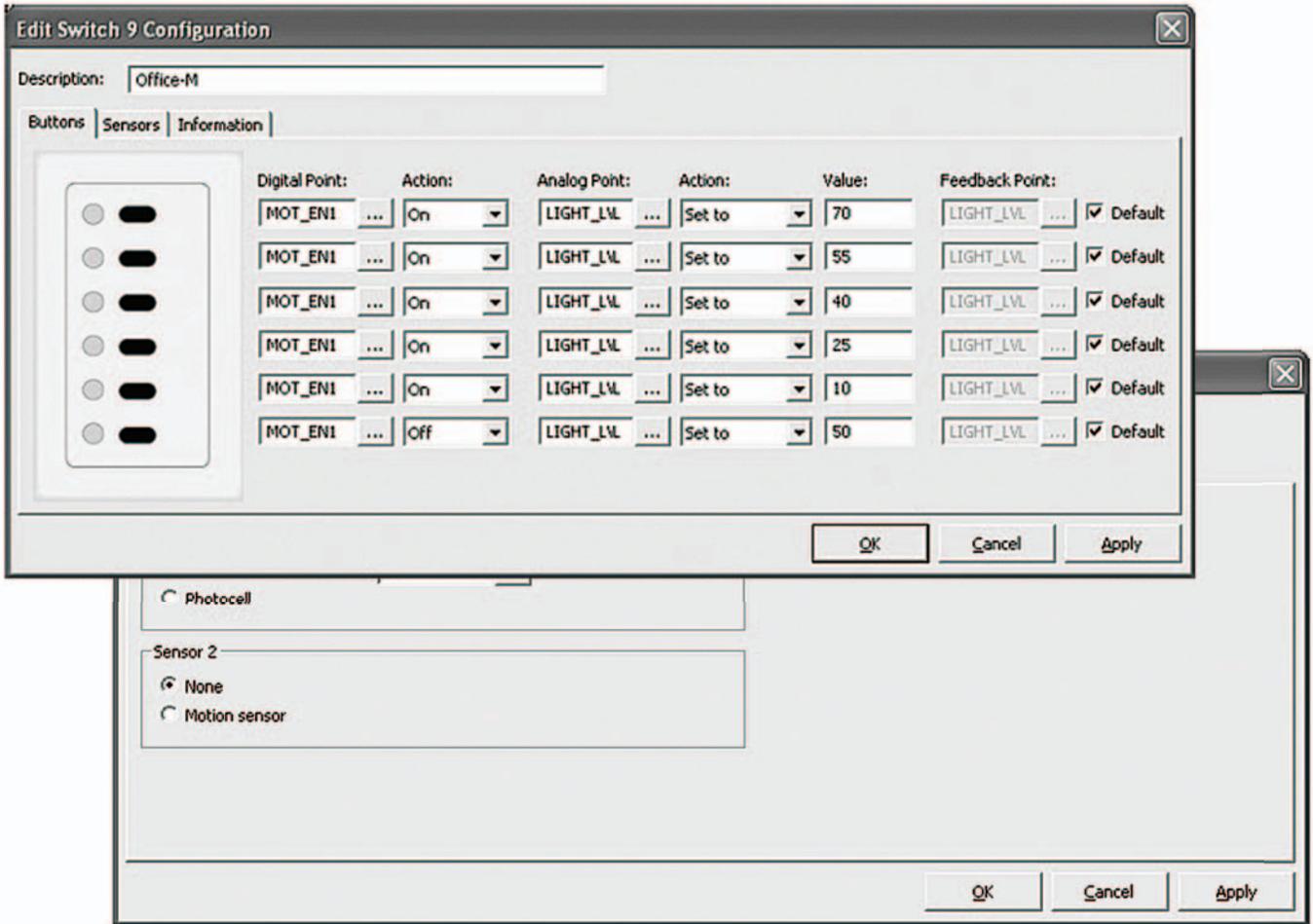


Figure 3. Digital Switch programming screen

Network philosophy

Each PRC Digital Switch communicates over a daisy-chained RS-485 peer-to-peer network. The beginning of the network will be a Pow-R-Command 1000 or 2000 Lighting Control panelboard. Each Pow-R-Command controller in the facility can have up to 99 digital switches on its switch network and each facility can have up to 120 Pow-R-Command panelboards on its lighting network. That's the ability to have up to 11,880 digital switches on the facility's lighting network.

Each digital switch on a basic network is powered by the Pow-R-Command controller; no additional power supply is required. Due to the power being supplied to the switches on the same CAT6 cable as the communication network, there are a few requirements that need to be followed when laying out the switch network:

- 23-gauge CAT6 wiring should be used
- Standard RJ-45 connectors should be used to make connections to each switch
- Due to the current (50 mA) requirements of each switch to operate correctly, a power injector should be installed on the communication network cable before every 16th switch or before the total length of the network reaches 500 ft (whichever comes first)

As shown in **Figure 4**, the PRC Digital Switch Network is seamlessly integrated into the facility's Pow-R-Command Lighting Control Network. Each switch has the ability to send commands to the host Pow-R-Command controller and/or any other Pow-R-Command panelboard on the network, giving it the ability to extend the control to any Smart Breaker in the facility.

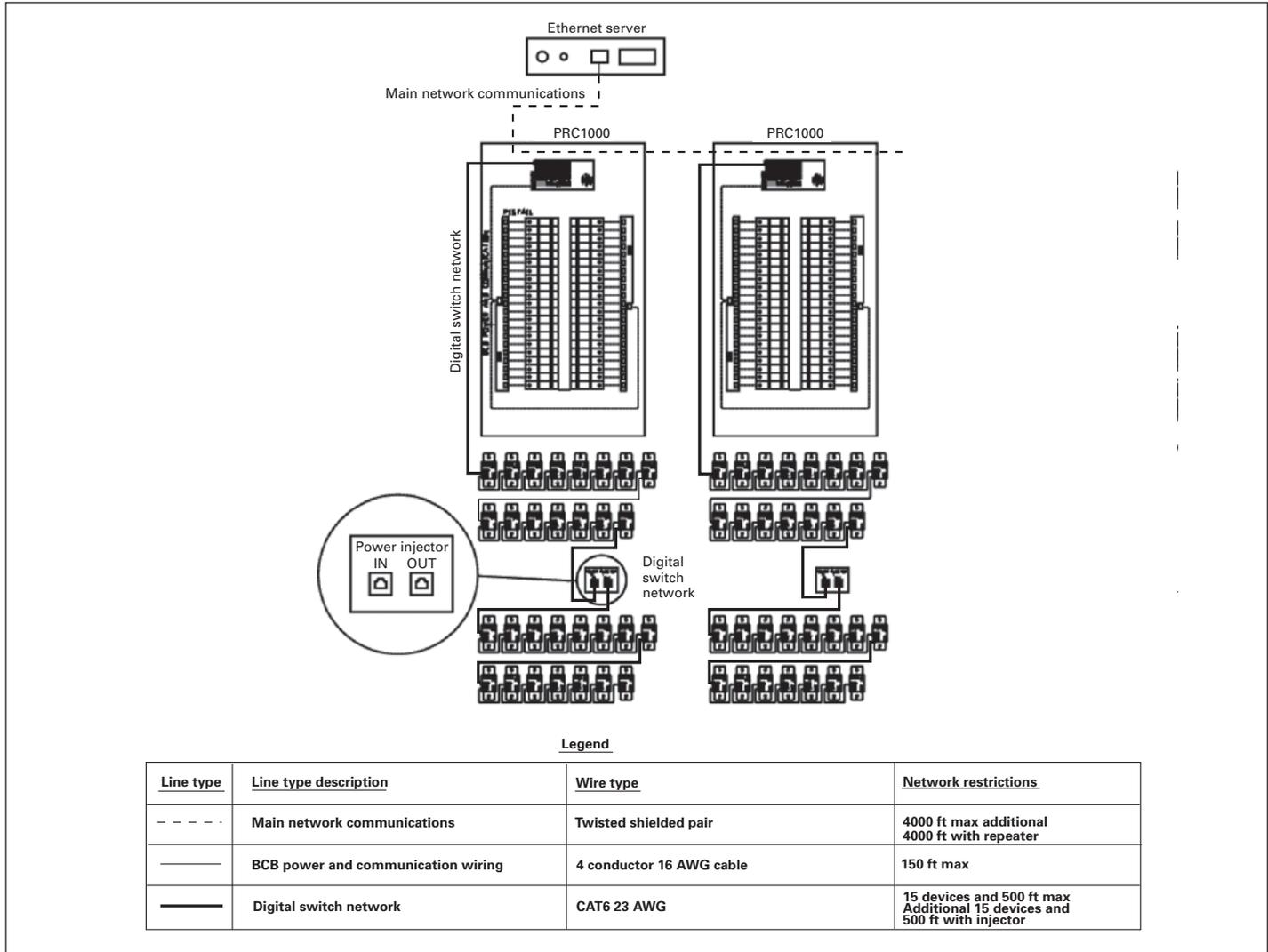


Figure 4. Digital Switch Network

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