

Fader switch uses inexpensive controller

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 Customizing a model or a simulator with a bit of illumination is a nice touch. Rather than a simple on or off, you can add a touch of both refinement and control to your display with fading light. Employing a Microchip (www.microchip.com) 10F20x

microcontroller, the circuit in **Figure 1** provides dual-rate fader control for a push-on/push-off switch, a momentary pushbutton switch, or a simple on/off SPST (single-pole/single-throw) switch. The circuit monitors and debounces the switch and generates a

multiple-cycle, 470-Hz, PWM (pulse-width-modulated) output to drive LEDs or incandescent lamps. The circuit includes a MAX16823 (www.maxim-ic.com) IC that drives multiple LEDs.

The microcontroller produces 64 linear steps of a PWM signal between 0 and 100% duty cycle. The controller maintains each pulse width for a variable number of cycles employing a table in the assembly code (**Listing 1**,

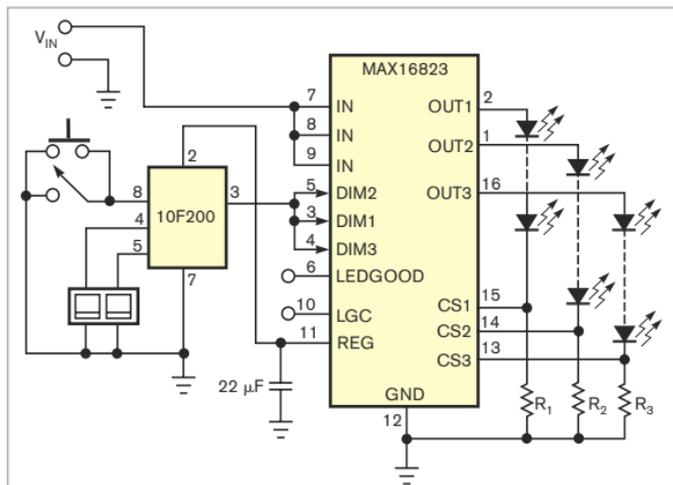


Figure 1 A microcontroller provides pulses with adjustable widths to create fading in LEDs.

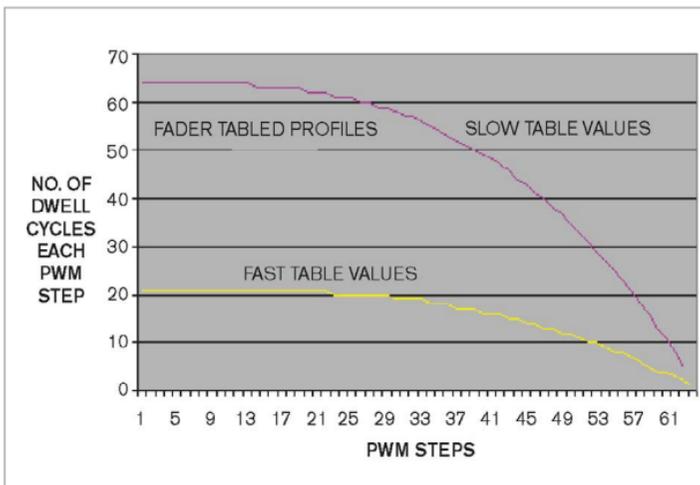


Figure 2 A table in the microcontroller code lets you run fast- or slow-fading profiles.

which you can download at the online version of this Design Idea at www.edn.com/091112dia). You can modify the code to build profiles of LEDs or incandescent lamps by applying a settable dwell time to each PWM step. The code contains two tables to set fast- and slow-fade characteristics. The fade values provide a cubed index that produces a 3-to-1 fade ratio (**Figure 2**). Using the final state of the

output at Pin 3 of the 10F200, you access the tabled number of dwell cycles from the first table entry to the last entry to the first to arrive at the final low state.

Fade-transition timing is user-selectable for either a 3- or a 9-second period. The circuit periodically samples both the fade rate and button or switch mode, allowing you to multi-

plex the design or use it in multiple configurations. The mode control is on Pin 5 of the controller, and the rate control is on Pin 4. The application exploits the controller's internal 4-MHz clock and the configurable pullup resistors on the monitored inputs. A prototype of the circuit uses a 10F20x in an eight-pin DIP, but the controller is also available in a smaller SOT-23 package. **EDN**