Add a manual reset to a standard three-pin-reset supervisor

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Adding a manual reset to a design usually involves designing in a new part with a manual-reset input. But, by adding a couple of low-value resistors, a standard three-pin-reset supervisor can work in most applications. The circuit in **Figure 1** ensures a clean $\overline{\text{RESET}}$ signal during and after you have pressed the manual-reset button. When you activate the manual-reset button, the supply voltage drops below the reset supervisor's minimum reset threshold because of the R_1/R_2 voltage divider formed when S_1 is active. This action causes the reset supervisor to activate its $\overline{\text{RESET}}$ output. When you realease S_1, the supply voltage returns to above the reset-supervisor maximum-reset threshold, and $\overline{\text{RESET}}$ remains active for the time-out period of the reset supervisor.

When you do not press S_1, R_2 has a voltage drop arising from the reset supervisor's supply current and $\overline{\text{RESET}}$ output loading. For most reset supervisors, the maximum supply current is 50 μA. For most designs, the $\overline{\text{RESET}}$ output goes to one or more CMOS inputs that require about 10 μA each. With two CMOS devices connected to $\overline{\text{RESET}}$, the total current through R_2 would be $(2\times10\ \mu\text{A})+50\ \mu\text{A}=70\ \mu\text{A}$. The voltage drop across R_2 due to the current flow effectively adds $70\ \mu\text{A}\times100\Omega=7$ mV to the reset supervisor's reset-threshold voltage.

You should consider several tradeoffs for the selection of values for R_1, R_2, and C_1. The value of the local bypass capacitor, C_1, for the reset supervisor should be low enough to allow the reset supervisor to detect transient supply-voltage drops. The time constant of R_2 and C_1 determines this factor; in this example, the time constant is $100\Omega \times 0.01\ \mu F = 1\ \mu sec$. This figure is typically much higher than the decay rate of a regulated power supply that has lost power.

When you activate S_1, current flows through R_1 and R_2. In the circuit in **Figure 1**, the current flow when you activate S_1 is $3.3V/(100\Omega + 100\Omega) = 16.5$ mA. This amount of current would be OK for a line-powered system but may not be OK for a battery-powered system. You can reduce the current by increasing the value of R_1 and ensuring that the reset supervisor's supply voltage drops below the minimum reset threshold. You can also increase the value of R_2, along with that of R_1, but doing so will cause increased voltage drop and slower response to transients. Note that the increased current of the manual reset occurs only while the manual reset is active, and typical system current drops while $\overline{RESET}$ is active. EDN

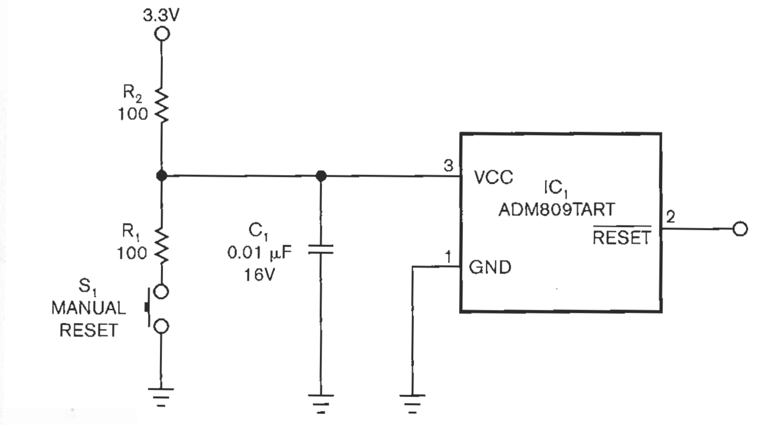

Figure 1 A pair of low-value resistors, a capacitor, and a pushbutton add a manual-reset function to a standard three-pin-reset supervisor.