Autostart circuit helps ATX motherboards resume operation after power interruptions

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Unlike legacy PC motherboards, an ATX-style motherboard controls its power supply's on/off state. If ac power fails, many ATX motherboards do not automatically restart when power returns, and that behavior is unacceptable for a server system that must provide near-continuous service. Although some PCs provide BIOS configuration selections for "wake-on-LAN" or "wake-on-modem" operation, these options depend on another computer to provide the wake-up call. A few ATX motherboard chip sets offer an "always-on" BIOS option, but chances are, the motherboard that's available for your server system isn't one of these.

The circuit design in Figure 1 offers a reliable method of recovery from a power interruption. Upon restoration of ac power, an ATX power supply delivers a standby voltage of 5V dc at a maximum of 10 mA via Pin 9 of its power connector (Figure 2). With standby power available, low-power CMOS timer TLC555 CP IC\textsuperscript{1} functions as an astable oscillator and delivers pulses at approximately 4-sec intervals to MOSFET-output optoisolator IC\textsuperscript{2}. The output of IC\textsuperscript{2} connects in parallel with the PC's front-panel power-on switch and in effect "pushes the power switch" every 4 sec.

In most astable-oscillator designs based on the generic 555 timer, timing capacitor C\textsubscript{3} connects from pins 2 and 6 to ground. Upon initial application of power, IC\textsuperscript{1}'s output goes low, activating IC\textsuperscript{2} and generating an immediate power-on signal. Depending on the motherboard's design, an immediate start-up signal may cause the motherboard to lock up. Connecting C\textsubscript{3} as shown eliminates the initial start-up pulse.

When the power supply switches on, primary 5V power becomes available at pins 4, 6, 19, and 20, driving diode D\textsubscript{1} into conduction and biasing Pin 7 of IC\textsuperscript{1} to a level that stops oscillation. Although IC\textsuperscript{1}'s output (Pin 3) can directly drive a motherboard's power-on input, MOSFET-output optoisolator IC\textsuperscript{2} removes the need to trace the polarity of the power-on switch's connections. In addition, IC\textsuperscript{2} eliminates any possibility of incompatible logic levels that some 3.3V motherboards impose.

You can assemble the start-up circuit on a small section of prototyping board and splice its connections into the power supply's wiring harness and power-on pushbutton wiring. Variants of ATX connectors exist, so verify wiring before connecting the start-up circuit.

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