

Power-failure detector is good for short lapses

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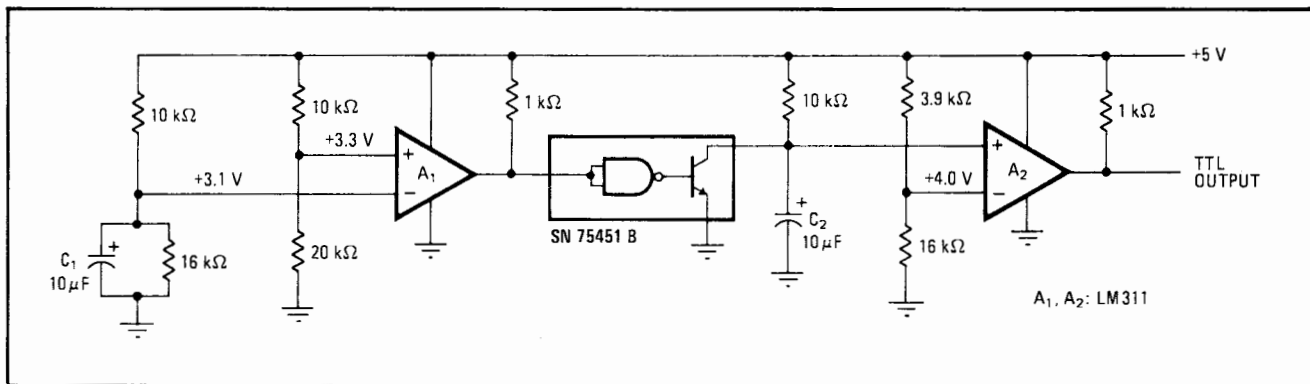
A power-failure-detection circuit for a digital system should be reliable for any interruption, whether it lasts for milliseconds or hours. It should also produce reset and restart timing pulses. The conventional power-clear circuit, which consists of a gate with an RC delaying network at its input, works well for power failures of long duration, but not after a momentary failure. Nevertheless, the system must still be reset and checked before it is restarted.

Two voltage comparators and an open-collector gate

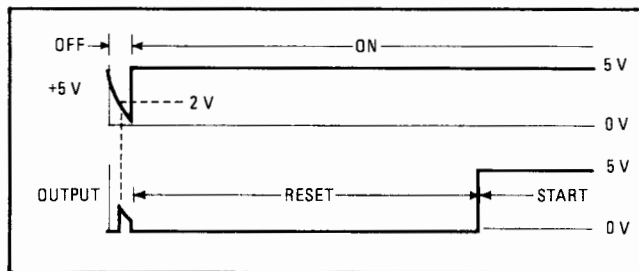
can be the basis of such a circuit as shown in Fig. 1. The diagram shows the LM 311, which can be operated with only a +5-volt power supply, and the peripheral driver SN 75451 B, useful because of its small physical size. But any comparator or open-collector gate with the proper specifications can be used.

When power is present, the (+) input of comparator A_1 stays higher than the (-) side, and the output is high. The NAND gate inverts the level, cutting off the transistor. As soon as power starts to go down, the (+) input, nominally at 3.3 v, quickly drops below the 3.1-v level on the (-) input, which is maintained briefly by capacitor C_1 . This reversal of the input levels causes the output of A_1 to become low; capacitor C_2 , which is normally fully charged, discharges through the transistor, which turns on when the output of A_1 drops.

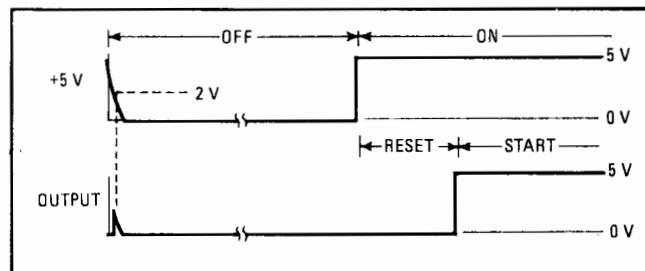
While the power-supply voltage is less than about 2 v, the output of both amplifiers simply follows whatever may be available on the supply line. But when full



1. Reset and restart. Two voltage comparators and a gate can reset a digital system and restart it after any power interruption, be it a glitch or a complete blackout. Wide variety of ICs can be used. Key components are the RC network at the input of A_2 .



2. Short failure. Even a momentary failure that falls below 2 volts can cause problems. Reset begins the moment power is restored; start pulse is generated after restored power recharges capacitor.



3. Long failure. In the event of a total power failure, the output stays down after power is restored, again until capacitor has been recharged. Duration of reset depends on RC time constant.