

Summary

All XC5200, XC4000, XC3000, and newer 0.8 μ XC2000 devices have internal voltage monitoring. A simple circuit provides the equivalent feature for older XC2000 devices.

Xilinx Family

XC2000

Demonstrates

Voltage monitoring

Introduction

All Xilinx FPGA devices—including XC2000 devices built using 0.8 μ technology—have an internal voltage monitoring circuit. This circuit assures proper start-up after V_{CC} has returned from a voltage drop below 3 V, **even if V_{CC} did not drop all the way to ground.**

Newer XC2000 Devices Include Monitor

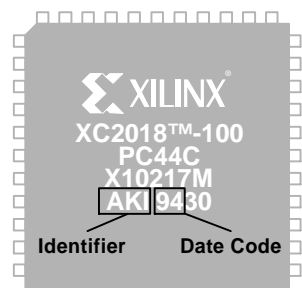


Figure 1. Top marking.

A voltage monitor is included in all XC2000 devices top-marked with a lot code identifier starting with 'AKI,' 'CKI,' or a date code of '95 or later—see Figure 1. The voltage monitoring circuit was added as part of the re-design for the 0.8 μ process.

Voltage Monitor for Older XC2000 Devices

For applications using non-0.8 μ XC2000 product and requiring voltage monitoring, a small amount of additional logic will detect low V_{CC} and will apply the appropriate start-up conditions. The condition required during start-up or reprogram are detailed on pages 2-198 and 2-208 in **The Programmable Logic Data Book, 1994.**

The complete monitoring circuit is shown in Figure 2. It is not sufficient to keep RESET Low while V_{CC} is detected as being Low. A High-to-Low transition on RESET, while DONE is Low, is required.

The DONE/PROG pin is permanently grounded. This makes the RESET pin a RECONFIGURE input. Consequently, the RESET pin can no longer be used as a global reset for user logic. However, automatic reset occurs during any start-up or reconfiguration.

Whenever V_{CC} drops below ~ 4.5 V, the V_{CC} monitoring circuit generates a Low signal. This signal activates an oscillator circuit built from an 74HC00. The oscillator applies alternating High and Low levels of 20 μ s duration to the RESET input.

Once V_{CC} exceeds ~ 4 V, then the monitor output goes High. If the FPGA's RESET input is also High, then the leftmost NAND goes Low, which immediately stops the oscillator. This assures that the XC2000 starts its configuration process properly when V_{CC} returns to an acceptable value as detected by the voltage monitor.

Table 1. Parts List for Voltage Monitor.

Part Number	Quantity
Three-terminal reset monitor. Maxim MAX809CPA-M (8-pin DIP) or Dallas DS1233-15 (TO-92).	1
74HC00 quad-NAND	1
10 K Ω resistor	2
1,000 pF capacitor	1

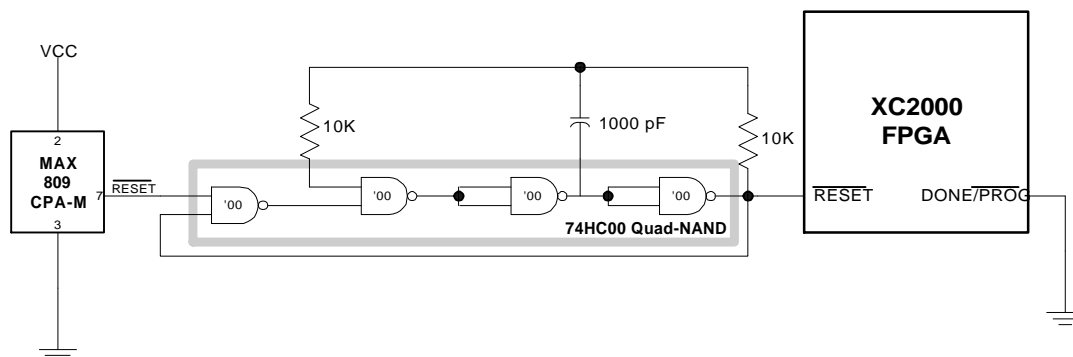


Figure 2. Simple circuit to add voltage monitoring for older XC2000 devices (pre-0.8 μ technology).

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