Customer Idea For Booting Code Before BIOS

Overview

Occasionally we get interesting ideas and comments from designers using our ZFx86 chip. We thought the following trick was particularly creative and asked its author Daniel Goertzen for permission to share it.

Objective:

Execute your own firmware before BIOS starts up.

Implementation:

Daniel used a 512k flash (Atmel AT29LV040) with 19 address lines (A18-A0). Lines A17-A0 were hooked directly to the ZFx86 ISA bus, but A18 passed through logic that allowed them to insert an inverter where and when they wanted. Daniel s 256K BIOS image began at the START of flash rather than at the end as you might expect, and his own firmware was placed in the last 256K.

When the ZFx86 powers up, Daniel s code is executed first. Afterward, it turns on an A18 inversion (effectively swapping the location of the two 256K halves) and then jumps to f000:fff0. The 16 byte pipeline of the ZFx86 CPU allows this method to work.

Daniel s *pre-BIOS* firmware performs the following tasks:

1. Programs the FPGA through the ISA bus.
2. Sends a system is booting" message to the LCD panel. (It s not acceptable to wait 10-20 seconds before displaying some sign of life.)

Note From Daniel:

You may pass this trick on, but I don’t know how useful it is considering that it is partly in hardware. It wasn’t a big deal for us because we already had an FPGA fully connected to the ISA bus that could do the A18 inversion for us.

Thank you for your contributed ideas Daniel!

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