Subject: Sergey's micro 8088 - more speed?
Posted by Jonas on Thu, 30 Jan 2020 20:48:04 GMT
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Hi

I have experimented with Sergey's micro 8088 for a few days (well, few...)now. The board is stable, reliable and elegant. I am aware of the limitations of a PC XT, but I had hoped for (just a little) more speed :)

My setup: Main board with a NEC V20 at 9,55 MHz and an i8087 plus Sergey's Adlib, XT-CF Lite, ISA Floppy&Serial and Trident VGA boards. No troubles at all!

The available UMBs are provided and used with: USE!UMBS.SYS (an upgraded version)and DOSMAX v2.1, together with DOS6.22. Memory usage: 10 kB below 640kB and the rest (DOS kernel, environment, devices et cetera) in UMB (ca 78kB).

I read about the FE2010A in Sergey's excellent documentation here:
https://   github.com/skiselev/micro_8088/blob/master/Documentation/Far
aday-XT_Controller-FE2010A.md

The information about the Configuration Register and Sergey's BIOS source code (very well documented indeed) triggered a few experiments. Given the information in bios.asm and cpu.inc, I changed one line (132) of code i bios.asm:

from:
fe_clk_9_55mhz equ 80h ;FE2010A 9.55 MHz CPU clock frequency

to:
fe_clk_9_55mhz equ 10100000b ; FE2010A 9.55 MHz CPU clock frequency

In theory, setting bit 5 means Fast Mode (0 RAM wait states).

More speed? Well, it was not a total failure.

Benchmarking with Sergey's BIOS v0.9.7
Mem timing with Quarterdeck manifest:
0 - 640kB, 1434kB/s, 4 clock cycles and two wait states per byte?
above 640KB, 887kB/s (i.e VGA, BIOS and UMBs, 4 clock cycles and six wait states per byte?

Checkit 3.0, Config v8.02 and Snooper:
Disk transfer speed: ca 270 kB/s

Config v8.02:
VRAM throughput, text, 581 kB/s
VRAM throughput, graph, 581 kB/s
Mem timing, 0-640kB factor 1.0, above 640KB factor 1.5 (i.e slower)

Benchmarking with a modified BIOS
Mem timing with Quarterdeck manifest:
0 - 640kB, 1434kB/s, 4 clock cycles and two wait states per byte?
A0000-B7FFF, 1434kB/s
B8000-BFFFF, 1200kB/s, ???
C0000-FFFFF, 1434kB/s

Checkit 3.0, Config v8.02 and Snooper:
Disk transfer speed: ca 340 kB/s

Config v8.02:
VRAM throughput, text, 902 kB/s
VRAM throughput, graph, 862 kB/s
Mem timing, 0-1024kB, factor 1.0 (same speed)

Modifying one line of code alters the speed of memory above 640kB, but not below. The impact on disk transfer speed and VRAM throughput is significant, though.

Jonas