

## Re: 66MIPS 8bit microcontroller

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*Source:* <http://coding.derkeiler.com/Archive/General/comp.arch.embedded/2007-07/msg00883.html>

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- *From:* [mojaveg@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:mojaveg@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx) (Everett M. Greene)
  - *Date:* Fri, 27 Jul 2007 08:47:02 PST
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"Wilco Dijkstra" <[Wilco\\_dot\\_Dijkstra@xxxxxxxxxxxxx](mailto:Wilco_dot_Dijkstra@xxxxxxxxxxxxx)> writes:

"Steve at fivetrees" <[steve@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:steve@xxxxxxxxxxxxxxxxxxxxxxxx)> wrote

"Anton Erasmus" <[nobody@xxxxxxxxxxxxxxxxxxxx](mailto:nobody@xxxxxxxxxxxxxxxxxxxx)> wrote

[http://www.tezaron.com/OtherICs/Super\\_8051.htm](http://www.tezaron.com/OtherICs/Super_8051.htm)

I see that they say that their 200MHz almost 1 cycle per instruction with hardware IEEE floating point support runs almost 3x faster than a standard 8051 computing a mandelbrot pattern. Am I missing something, or is this just slightly short of pathetic ? Just based on the clock frequency and less clock cycles per machine cycle, their 8051 should be close to 150x faster.

Given that they also say "up to 100 MFlops", I suspect they're comparing with/without the hardware IEEE on the same "standard" 8051 at the same clock speed. Although even then, I think I'd expect slightly better...

A quick look at the datasheet shows that a floating point operation takes 8 moves to set up the input operands, 1 to set the operation and 4 to store the result (which is valid after 4 cycles). So that's  $8 * 4 + 3 + 4 * 4 + 4 = 55$  cycles for one floating point operation. This gives 3.6MFlops at 200MHz, a little lower than the claimed 100MFlops. Similarly the 200MIPS maximum speed is more like 75MIPS on actual code as few instructions execute in 1 cycle.

A software floating point implementation on this 8-bit core might take around 200 cycles on average for addition/multiply, so getting a factor 3 speedup

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from the floating point hardware sounds feasible. Not very impressive indeed.

I think you'll find that float operations on an 8-bit micro are going to require much more than 200 cycles. Addition will be of the order of 1000 cycles and multiply/divide/sqrt nearer 3000.

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