

# Stack architecture

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I have been interested in computers with stack architectures for a long time. I wrote a bit about one of the latest versions at ECN a while back: [Testing The GA144 Eval Board](#) [1]. For those of you not familiar with the subject I thought it might be a good idea to present some resource material.

The place to start for an overview is Phil Koopman's book [Stack Computers](#) [2] which is available as a free e-book. You can read it online or download an html version for local reading. You can also buy the book or download a free pdf version from Lulu. Links at the above link.

Harris at one time made chips in the RTX series called the [RTX2000](#) [3]. I still have the RTX bags from a trade show. Plastic bags. Which just goes to show you how dedicated I am. Intersil took over making a rad hard version for space - the [RTX2010RH](#) [4]. You can still get the [data sheets](#) [5] but they are no longer selling the chip.

Phil Koopman also wrote up a computer science type paper comparing [RISC, CISC, and STACK architectures](#) [6]. He says stack architectures have advantages. I agree with him.

[Jeff Fox](#) [7] who was a good friend of mine but is sadly no longer with us has a good page on Stack Machine Architectures. I believe the boys at [Green Arrays](#) [8] are maintaining his site.

As you can see from this scan of [Patent #4,980,821](#) [9], the patent on machines of RTX version of the architecture have run out. I wonder if any chip maker who wants to differentiate themselves in the market will pick up on the idea and run with it. A machine with a lot of RAM, FLASH and a number of different types of I/O might go over big. Especially when you consider that using FORTH cuts development time in half compared to C. And then there are PLCs which run a version of FORTH called [Structured Text](#) [10]. The PLC market uses a lot of chips. When you make your hardware conform to your high level language there are speed gains to be made. Or price reductions from using less silicon.

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M. Simon's e-mail can be found on the sidebar at [Space-Time Productions](#) [11].

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### Links:

- [1] <http://www.ecnmag.com/blogs/2011/11/testing-ga144-eval-board>
- [2] [http://www.ece.cmu.edu/~koopman/stack\\_computers/index.html](http://www.ece.cmu.edu/~koopman/stack_computers/index.html)
- [3] <http://en.wikipedia.org/wiki/RTX2010>
- [4] <http://www.intersil.com/content/intersil/en/products/space-and-harsh-environment/rad-hard-digital/rh-microprocessors-and-peripherals/HS-RTX2010RH.html>
- [5] <http://www.intersil.com/content/dam/Intersil/documents/fn39/fn3961.pdf>
- [6] [http://www.ece.cmu.edu/~koopman/forth/sigarch\\_92.pdf](http://www.ece.cmu.edu/~koopman/forth/sigarch_92.pdf)
- [7] <http://www.ultratechnology.com/chips.htm>
- [8] <http://www.greenarraychips.com/index.html>
- [9] <http://www.ece.cmu.edu/~koopman/patents/us004980821.pdf>
- [10] [http://en.wikipedia.org/wiki/Structured\\_text](http://en.wikipedia.org/wiki/Structured_text)
- [11] <http://spacetimepro.blogspot.com/>