

FEATURE ARTICLE

George Martin

Behind the Scenes

A Comprehensive Look at ColdFire

George puts on a stage show of sorts with this installment, as he explores the PC/Internet combination and, in particular, Motorola's ColdFire processor. Taking its place as a standard CPU model, the ColdFire design is outlined on Motorola's web site, where all manner of datasheet and manual information is made available. If you're still not convinced that the needed support is there, the addition of an extensive discussion group should seal the sale for you.



With the introduction of the personal computer and its overwhelming success (after IBM placed its stamp of approval in the form of the IBM PC), engineers, including myself, who design embedded systems have enjoyed a tremendous boost in job productivity. We've moved away from the development systems built by manufacturers (Intel's Blue Box and Motorola's Exoramax), where we lived in the wake of whatever the PC system designers had in mind. From the early '80s up to the current multimedia additions, our jobs were made easier by all the PC had to offer. You might even include multimedia on the job-enhancing side of the ledger, but I see that as the end to a free ride.

Next, came the Internet. Remember all those component catalogues? They disappeared almost overnight. And, you no longer need to deal with a salesperson to get technical information (apologies to all my friends in sales). But, the PC and Internet combination is changing our jobs once again. There

is a new model on product sales, service, and support. That model will become the standard. One form of that model is what I'd like to talk about.

THE OPENING ACT

Motorola recently announced that its ColdFire processor includes a floating-point unit and achieves 350 Dhrystone MIPS in a 0.18-micron process. This version will ship in the first half of 2001 and runs at 225 MHz. In the latter part of 2001, a 333-MHz version will be available, delivering 500 MIPS.

And while I'm on the subject, the ColdFire design can be synthesized, meaning that, as FPGAs get larger, you'll be able to put the ColdFire core into one. Motorola's press release claimed that this new ColdFire design was built with 160,000 gates. [1]

For all the nerds out there (myself included), this press release could easily generate an article all by itself. But instead of a technical article on the ColdFire CPU family, I would like to share with you an overall picture of what Motorola, its vendors, and users have done.

Motorola has a new working model for a level of product sales, support, and service that you can't ignore. If you're only interested in learning about the new CPU, read on, I'll include all the links. However, I urge you to compare the information discussed here with what other vendors offer.

THE SECOND ACT

I wasn't sharp enough to see the ColdFire when it was originally introduced. I must confess that one of my customers first introduced me to this CPU family. He said this was the CPU I must use—no questions asked. I've been working with it for about a year now and have a good opinion of it. The ColdFire family is the 68000 core, updated, repackaged, and embedded.

It's the same basic register set and memory model contained in a surface-mount package. But also, the classic peripheral devices such as serial ports, DMA, and DRAM controllers are built into the chip. There are several flavors of the product line, each suited for different applications.

Here's where the story gets interesting. Motorola has, of course, a home page for the ColdFire family where you can get everything including an overview of detailed technical specifications on all the devices.

Motorola also has evaluation boards that showcase a baseline design. For about \$100, you can have a working unit and see how the design is put together. Also, when you purchase that evaluation board, the package includes information, CD-ROMs, and devices that third-party vendors (who are eager to answer all of your questions) are supplying in support of the CPU family. I purchased an evaluation board and got compilers and BDM (background debug module) units. As you'd expect, all the free stuff has limitations such as 30-day time limits or limited capabilities, but at least I got my hands on the actual pieces.

What this all means is that you have full datasheets and manuals available instantly. You can order a hard copy if you prefer, but you'll have to wait. Also, you have a reference design and a list of vendors ready to answer your questions and provide the tools you need to complete your project. Those tools range in price, and some are even free.

Another interesting page on Motorola's site is the links page. [2] This includes links to an odd collection of companies and individuals. As of September 26th, the source code for C compiler, assembler, linker, BDM interfaces, emulators, math routines, MBUS (the I²C bus), and a MicroC/OS-11 port could be found through these links.

This is an incredible resource when you're beginning to design with a new CPU family. And, even if you've got some experience, you can always learn something new. Follow some of these links and take a look at the information available.

THE FINAL ACT

Last, but not least, is a discussion group for ColdFire. [3] This is an amazing group. It's moderated, so off-topic messages are squashed early on and no spam comes through. Beginners can ask basic questions and, instead of getting trashed, get reasonable, helpful replies. And, on the flip side, experts can ask complicated questions and usually get several appropriate replies.

If you are planing to use DMA, you can follow all of the DMA discussions and threads. Motorola also monitors this group, so you get official input. Additionally, the group is exposed to input from Motorola about the general direction the product line is taking. Look through some of the archives; I think you'll be impressed.

CURTAIN CALL

In my opinion, Motorola has done a fine job of providing plenty of ColdFire support, before and after the sale. Are other companies doing as well? Is your company doing as well? Is your competition?

Motorola has been a perfect example to illustrate the correct way to support, at least for a technical product line. If your company does not offer such support, you could be losing out in the marketplace. What do you think? ☒

George Martin began his career in the aerospace industry in 1969. After five years at a real job, he set out on his own and cofounded a design and manufacturing firm. Typical systems that George designs include servo-motion control, graphical input and output, data acquisition, and remote control. George is a charter member of the Ciarcia Design Works Team and most recently, he's been working on the people-tracking system for Bill Gates' new house. You can reach him at george.martin@worldnet.att.net.

SOURCE

ColdFire
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REFERENCES

- [1] Motorola, "Motorola's Latest ColdFire Processor Core for a variety of Complex Applications," www.mot-sps.com/news_center/press_releases/PR001011C.html, October 2000.
 - [2] Motorola, links page, www.motorola.com/SPS/HPESD/prod/coldfire/cf_cool.html.
 - [3] Motorola, ColdFire discussion group, www.WildRice.com/ColdFire/.
- [1] L. Arendt, "Algorithm Tests for Point Location," *EDN Magazine*, Winnipeg, Canada, August 2000, www.ednmag.com.

RESOURCE

EE Times, www.eetimes.com.
T. Cantrell, "News Flash! Motorola Reorganizes!", *Circuit Cellar Online*, www.chipcenter.com/circuitcellar/june00/c0600sul.htm, June, 2000.

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