

SILICON UPDATE

Tom Cantrell

News Flash! Motorola Reorganizes!

We all know that old news is really no news at all, and when it comes to a company reorganizing, well... In this article, Tom takes a look at Motorola and shows us why it's so important to do away with the old and bring in the new.



here's an old saying in journalism, "If it isn't a surprise, it isn't news." This is a simple way of saying it's more important to learn something unlikely than something we expect. That makes the exclamation point in the headline a bit suspect.

Those of you who've followed the corporate machinations of Motorola over the years know the batwingers never met a reorganization they didn't like. Instead of an exclamation of surprise, consider the exclamation point in its mathematical context, where it means factorial, as in reorganization number $(n) \times (n-1) \times (n-2)$ and so on.

Whatever n is (I'd say it's about 99), it's now one more than it was last month. Trash those old organization charts because, once again, it's musical chairs at Motorola.

ENTREPRENEURIAL ENTROPY

This is not to say that Motorola is unique in shuffling

things around. It's simply a case of there being more ways to slice a bigger pie. When you're a small startup in a niche market, things are simple. When you're a huge enterprise (\$32 billion, with about a quarter of that in semiconductors) with a dizzying catalog of consumer and industrial electronic gadgets, it's a different story.

Big companies like Motorola rightfully live in mortal fear of succumbing to the bloat and sloth of conglomeritis. For instance, if the outfit is organized along product lines, it's time to switch to a market sector alignment. But then, maybe it's better to cozy up to major customers with a focus account strategy.

If the reorganizations are fast and frequent, it's easy for customers (not to mention journalists) to lose track of who's doing what. Do you have a question about the MC68xyz? Who are you going to call? The only thing you can count on for sure is that whoever you called yesterday won't be the one who's in charge tomorrow.

The most recent shuffle involves layering a channel focus, namely distribution, over the current market-based organization in the form of a Standard Embedded Solutions Group, or SESG (see Figure 1).

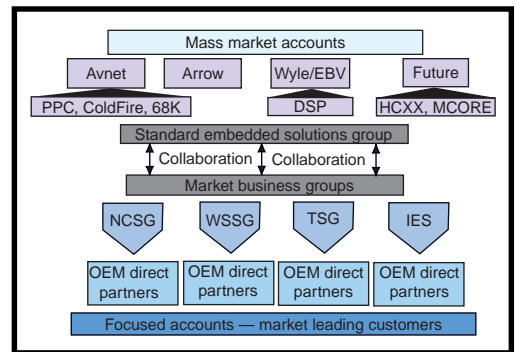


Figure 1—The new Standard Embedded Solutions Group (SESG) at Motorola fronts the traditional market-based organization (networking and computing, wireless subscriber, transportation, and imaging and entertainment) with one that is distribution channel-oriented.

IF THE CHIP FITS

No doubt, the crowded lineup of Motorola microcontrollers has been endless fodder for internal staff meetings and strategy sessions. Needless to say, juggling everything from mighty processors to minimalist MCUs represents a product positioning challenge worthy of Proctor & Gamble.

The depth of Motorola's product offering is truly staggering. The challenge is to make sure it isn't also truly confusing.

Starting at the top, there's the PowerPC (PPC), best known as the brains behind the second-place-but-we-try-harder Apple Macintosh. Apple provides a face-saving and fiscally-sound way to fund continued development of the PPC in the desktop space, but the architecture is also well-suited for other performance-at-any-price apps including servers, high-end board-level products, and big-iron communication infrastructure.

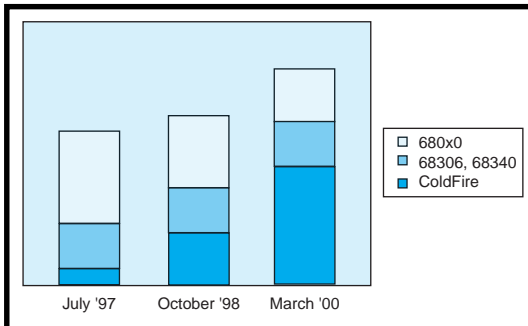


Figure 3—Design-ins of 68K and ColdFire continue apace, proving there's still a market for embedded 16- and 32-bit microprocessors.

Then comes the good old 68K and its successor, ColdFire (see Figure 2). Although no longer a contender in the general-purpose computing arena, the 68K/ColdFire parts continue serving the 16- and 32-bit embedded processor market that isn't going away.

The SOC hype would have you thinking everything is getting sucked into one piece of silicon, but there is, and apparently will always be, a market for CPU chips that have an external bus (see Figure 3).

Thanks to the explosion of bitmaps, MP3s, MPEGs, and so on, many devices (notably printers) will continue to rely on external memory, usually either DRAM or flash memory. As confirmed by Palm's

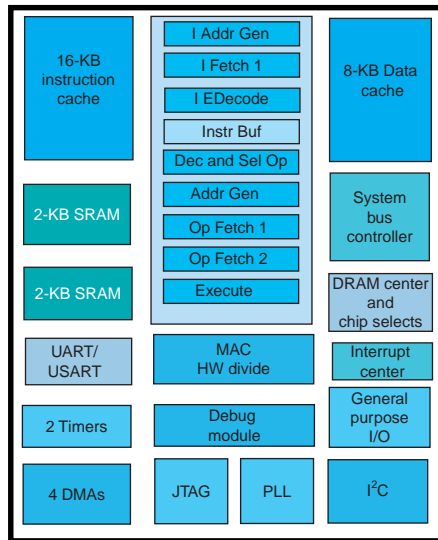


Figure 2—The latest 5407 version of ColdFire, incorporating the new five-stage pipelined 162-MHz V4 core, carries on the legacy of the 68K.

success, a 68K/ColdFire-class microprocessor makes for a good PDA, too.

Then there's M-Core, which seemed immaculately conceived as technology, rather than a product. For awhile, it looked as though PPC, 68K/ColdFire, and M-Core might end up stepping on each others' 32-bit toes. However, looking under the hood reveals that, with features like 16-bit opcodes and no-nonsense interrupt response, M-Core makes more sense as a high-end controller, rather than a low-end

processor. Labeled as a core, Motorola needs to come up with some lean-and-mean standard chips that can compete with the other volume 32-bit controllers, including entry-level parts in the ARM, MIPS, and Hitachi SH camps.

Finally, we come to the venerable '68xx MCUs, chips that trace their roots all the way back to the dawn of micros. Not that being long in the tooth is a problem, considering that the billions-of-units 8-bit market is still dominated by old timers, including other twenty-somethings like PICs, Z8s, and 8051s. Al-

though still arguably the champ in the embedded market, Motorola almost stumbled by failing to notice the widespread move to flash memory-based MCUs by competitors. However, thanks to a fire drill flash memory process deal with AMD, Motorola should be able to catch up to the pack.

Let's not forget DSPs! Not surprisingly, Motorola is juggling two major architectures, including the historic 56K (see Figure 4) and now, by teaming up with Lucent Technologies, StarCore. Fortunately, the positioning of the architectures at the middle range and high end of the market, respectively, is clear, although, there will be some areas of overlap that will require a bit of marketing finesse.

MOTOROLA

No sooner than the ink is dry on the new organization charts, folks start thinking about other arrangements. A particular organization can solve one set of problems but, like squeezing a balloon, will tend to create others.

For instance, a channel organization opens the door to possible prod-

Key Features

- DSP56300 derivative with a 150 MHz core
- 150 MHz Enhanced Filter Coprocessor (EFCOP) for filtering & echo cancellation
 - provides enhanced voice quality
- 270 effective MIPS - 150 Core MIPS + 120 EFCOP MIPS (80% utilization)
- 128K words (24-bit) on-chip SRAM
- Object code compatible with DSP56300 and DSP56000 families of devices
- Hardware and software migration path for 56303, 56309 & 56307 users
- 1.8V core & 3.3V I/O
- 0.7mA/MIPS based on GSM HR vocoder
- Small 196-pin PBGA (15x15 mm, 1mm ball pitch)
- 2Q 2000 production volumes

Figure 4—Although StarCore is positioned as the long-term solution for highest performance apps, the '311 represents a new high-water mark for the 56K family.

uct conflicts, which makes a company effectively compete with itself. In a worst case scenario, different product groups end up battling each other over the same design-in.

Consider the market for motion control (i.e., motors). This is a huge business, close to 7 billion units a year [1], comprising everything from simple brushless DC to extremely sophisticated AC induction units, from the tiniest watch motor to the high-horsepower engines in an electric car or train. Needless to say, the spectrum of appropriate control ICs is wide, all the way from the lowliest MCU to the fanciest DSP (see Figure 5).

The best choice of IC (i.e., MCU versus DSP) isn't strictly defined. Meanwhile, Motorola has so many chips, each of which is arguably a contender for a particular motor app. That's a classic recipe for duplication, overlap, and contention on the supply side and confusion on the customer's part.

To counter this, in the case of motion control, Motorola is overlaying a virtual market-centric push over the channel-centric SESG. This accomplishes a number of goals versus an every-chip-for-itself approach.

First, it allows Motorola to rationalize the partitioning of the market between a catalog of motor-featured 8-bit MCUs (e.g., deadtime correction PWMs, quadrature decoders, etc.) and 16-bit DSPs (versions of the 'HC08 and '568xx, respectively) in at least a semi-elegant way (see Figure 6). Whether MCU or DSP, the parts use on-chip flash memory technology and feature an extended -40°C to 105°C temperature range. In any case, customers need not fear the spectacle of Motorola MCU and DSP marketers and salespeople bashing each other over a single socket.

Besides maintaining an efficient and orderly interface with custom-

ers, the market focus enables specialized, yet streamlined, tool and application support. In Motorola's case, this starts with high-end CodeWarrior tools (Motorola recently acquired the respected IDE and compiler supplier, Metrowerks) and the motor-specific PCMaster eMotion program supplemented with dozens of specific canned drivers, everything from a simple PWM to the latest sensorless rocket science techniques.

The lineup of chips is backed with more than a dozen development and evaluation boards covering all popular motor types. A backplane approach allows mixing and matching of various EV boards, power stages, and motors.

Reflecting the designer-friendly philosophy of SESG, Motorola eliminates the hassle of rounding up the needed extras by packaging power stages and motors with the EV boards and software.

ONE DESIGNER, ONE VOTE

I think the new SESG organization is a good idea. It's enticing to go with

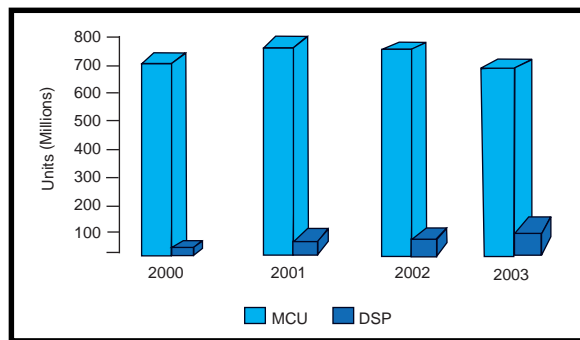


Figure 5—As motors get smarter, you can expect to see increasing migration from simple MCUs to sophisticated DSP controls.

a focus account strategy and avoid the travails of the rough-and-tumble mass market. You certainly don't have to fuss with as many phone calls and e-mails.

But, relying on a few main customers is ultimately a cheap high with a quick comedown. Sooner or later, your big-hitter customers will move on, and it will hurt.

Long term, there's an even more insidious threat, especially in the case of knowledge-intensive products that demand significant personnel and tool investment from customers—MCUs, MPUs, and DSPs being a classic example.

In this arena, suppliers must remember that each designer, no matter how small their application is in volume, gets a vote. The result is a band-

wagon effect fueled by everything from third-parties pursuing the most seats, to what chips get used in college labs, to idle chat around the engineering department water cooler.

MCU, MPU, or DSP chips that serve only a few customers, no matter how many chips they buy, will never have the staying power of chips that serve thousands of applications and are popular with thousands of designers. It may seem like a motley collection of startups, garage shops, consultants, and anonymous industrial parkers, but collectively they decide whose chips win.

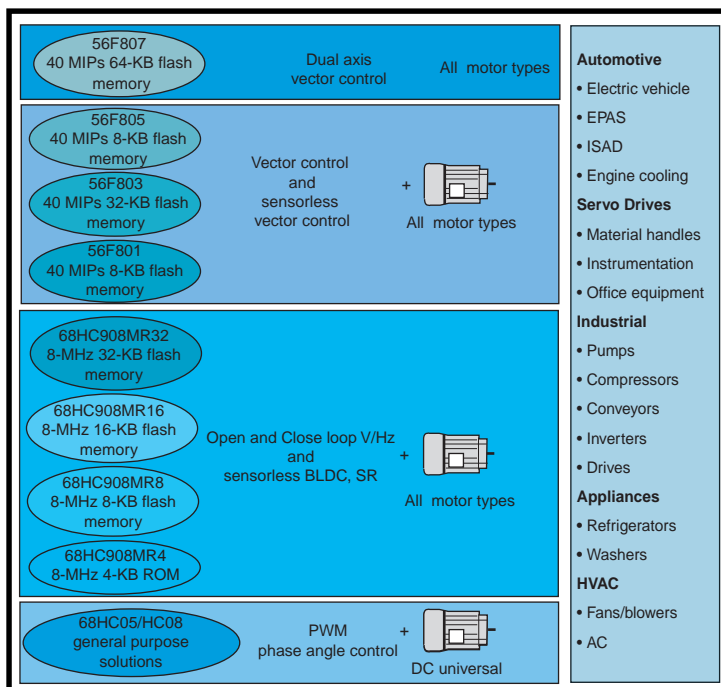


Figure 6—A motor-centric perspective allows Motorola to ensure that no application falls in a crack between MCUs and DSPs.

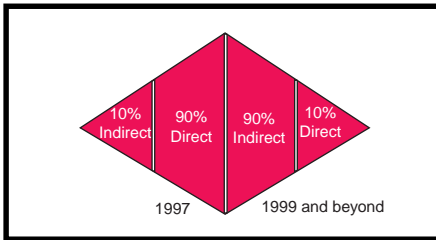


Figure 7—The numbers are extreme, but they make a point that Motorola plans to emphasize the distribution market and not just fixate on a few big focus accounts.

Indeed, Motorola's leading position in the embedded market over the years was arguably built on such a broad foundation, something it shouldn't, and witnessing the latest moves, doesn't seem inclined to forget (see Figure 7).

Is the "new" Motorola the right Motorola? The answer is yes. The fact is, there isn't any single best way. If there was, companies wouldn't spend so much time rearranging furniture and printing new business cards.

The right way is always a new way, and there's no need to apologize for shaking things up. Companies that blindly stick to the old way will indeed grow old and then die. The only thing for sure is that, in the age-old mating dance between suppliers and customers, the steps are always changing. 📍

Tom Cantrell has been working on chip, board, and system design and marketing in Silicon Valley for more than ten years. You may reach him by e-mail at tom.cantrell@circuitcellar.com, by telephone at (510) 657-0264, or by fax at (510) 657-5441.

REFERENCE

[1] Motion Tech Trends, February 1999.

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Motorola
 (602) 952-4103
 Fax: (602) 952-4067
www.motorola.com/sps

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