

# SELECTING AN EMBEDDED RTOS



## FEATURED INTERVIEW:

EXCERPTED FROM [WWW.EG3.COM](http://WWW.EG3.COM)

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## MICRO DIGITAL - RTOS PRODUCTS &amp; SERVICES, 2009

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**Q. First of all, tell us a little bit about yourself and your responsibilities at Micro Digital.**

A. I have over 30 years experience in the embedded systems industry starting as a logic designer, then a programmer/consultant, ending as founder and President of Micro Digital. I architected the SMX® RTOS kernel and wrote some of the code for it in 1989. Since then, I have progressively done more sales, marketing, and business management and less development work.

**Q. If you would, please give us a very brief, bulleted outline of your products. What sorts of real-time operating systems (RTOSes), tools, and/or services does your company offer?**

- SMX is a modular hard real-time RTOS with small code and RAM footprints and high performance.
- smx is the hard real-time multitasking kernel used by SMX. It rich function kernel as opposed to generic kernels flooding the market now. It offers features such as Link Service Routines, stack sharing, protected messages, etc.
- smxBSP is the BSP code that supports SMX products. We have versions available for nearly all ColdFire and ARM processors, x86, and many PowerPC processors. smxBSP allow us to offer out-of-the-box solutions that run immediately on processor evaluation boards.
- smxAware works with popular debuggers. It provides not only kernel awareness, but also file, network, and USB awareness. The graphical analysis tools (e.g. timelines) are particularly helpful during debugging.
- smxFS is a general-purpose FAT file system with support for ATA, CF, DiskOnChip, NAND, NOR, SD/MMC, USB, and RAM disks. smxFFS is a simple flash file system for NAND flash. smxFLog is a very simple flash logger.
- smxUSB provides host, device, and OTG stacks. An extensive assortment of class (for host) and function drivers (for device) is available and most common USB controllers are supported.
- smxNS is our TCP/IP stack. Available with it are all popular protocols: DHCP, FTP, HTTP, NAT, email, PPP, SNMP, SSH, SSL, and web server. Most on-chip and external Ethernet controllers are supported.
- GoFast provides significantly fast floating point for processor without FPUs.
- PEG GUI products from Swell Software are fully integrated and supported.

- Q. What is Micro Digital's "unique value proposition" for the embedded systems engineer or programmer who is considering an embedded RTOS? What do you and your products do to help him get his product to market faster, cheaper, better?**
- A. We are able to offer true out-of-the-box solutions for nearly all ARM and ColdFire processors, x86 processors, and many PowerPCs. The software we deliver is fully integrated with itself and popular development tools, has necessary BSP code and controller drivers, and will come up running on the evaluation board for the target processor in a matter of minutes. We offer extensive evaluation kits at <http://www.smxrtos.com/eval> and demos at <http://www.smxrtos.com/demo> that prove this. Our products are backed up by up-to-date, accurate manuals, and extremely good support. These give developers a head start on their projects vs. the norm.
- Q. How are you different as a company from competitors? What sets your products apart from those of other RTOS companies?**
- A. Offering out-of-the-box solutions, is the most important difference. In addition, we offer full-featured, compliant products, as compared to some of the low-end implementations available for low or no cost. We believe that what is not in the commercial software ends up in the application software as "green" code – i.e. full of bugs. Compared to our larger competitors, we offer lower cost and more liberal licensing. Some competitors require new licenses for different model numbers, different physical packaging, different numbers of inputs and outputs, etc. With us, one license covers all such minor differences. We are concerned with the processor being used and whether the application code is the same from model to model. As compared to the monster OSs (i.e. Linux and Windows), SMX offers simplicity, small size, high performance, hard real-time, and good support.
- Q. What embedded architectures do you support - e.g., Intel architecture, MIPS, ARM, PowerPC, etc.?**
- A. For smx, we support ARM, ColdFire, x86, and some PowerPCs. We are working on Cortex-M3. Our other products can run standalone and can be ported to most other processors.
- Q. What additional software do you offer such as networking, file systems, TCP/IP, security, IDE, GUIs etc.? What about development tools? Are there particular partnerships with other software companies that are especially helpful?**
- A. We consider these to be part of the SMX modular RTOS and they have been described above. We partner with IAR for EWARM, Freescale for CodeWarrior, Paradigm for x86 tools, Swell for PEG and numerous processor vendors. In each of these cases, we have invested major effort in tight integration and good working relationship so that our customers do not get caught in the middle. We are authorized reseller of our software partners' products so we can offer our customers one-stop shopping. We also provide first level support, project files, detailed BSP notes, etc.
- Q. How are your products sold? What is a typical fee arrangement? Is it royalty free? Per unit royalty?**

- A. We sell direct from our offices in California and through foreign distributors. Standard licensing is royalty-free, per product with a 50,000-production cap. We also offer higher caps, product line, product family, and site development licenses for higher prices. Our licenses include full source code, no per-seat charges, except for development tools, and 3 months of support.
- Q. Finally, what sort of “try before buy” experiences does your company offer? Are there free demo downloads, webinars, seminars? What web URL’s can you point us to for more information?**
- A. We believe strongly in try before you buy. See <http://www.smxrtos.com/eval> for our extensive lineup of free evaluation kits. These are provided in library form and users can actually write and debug code and do testing with them. We strongly encourage this. It is a good way to learn the processor and tools, as well as our products. This gives a developer a chance to be sure he is comfortable with the environment we provide. He also can measure performance and might decide to choose a different processor. For our USB and file system products, we offer free demos at <http://www.smxrtos.com/demo>. These show that particular processors are supported by these products. In addition, we sell on 30-day free trial to allow our customers to make absolutely sure they will be happy. Currently, we do no seminars or webinars, but our manuals are freely available to those who register and we provide many helpful white papers at <http://www.smxrtos.com/articles>.
- Q. Thank you for this product interview.**