The Embedded Muse 106

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Editor's Notes

When? December 10th. Where? Las Vegas. That's where I'll hold the next Better Firmware Faster seminar. This is the only non-vendor class that shows practical, hard-hitting ways to get your products out much faster with fewer bugs. 80% of systems get delivered late, often hopelessly bug-ridden. It *is* possible to do better – much better. See http://www.ganssle.com/classes.htm for more details including cheap fly-in options, and information about free hotel rooms.

I often do this seminar on-site, for companies with a dozen or more embedded folks who'd like to learn more efficient ways to build firmware. See http://www.ganssle.com/onsite.htm.

Electronica/ESC and the Deutsches Museum

I attended the Munich Electronica/Embedded Systems Conference last week in Munich. It's quite the experience; Electronica is probably the world's biggest electronics show. How big? Well, it fills 15 buildings! One of those was mostly dedicated to exhibits from embedded systems vendors. Another had nothing other than connector and cabling systems. Passives, semiconductors, PCB vendors – you name it, if it has anything to do with electronics, this show has the exhibits.

It's simply impossible to see the entire show in any reasonable amount of time. I surfed through several buildings till overwhelmed by the glitzy displays and the crowds.

Some wags tell me that trade shows are dinosaurs, going extinct due to the relentless force of the Internet. That's pretty hard to swallow given the scope and attendance at Electronica. The buildings were packed with attendees.

I gave a talk there about embedded disasters. Boarding the U-Bahn (Munich's subway) on the way to the talk I passed an ATM which obviously ran Windows, and which had a German error message displayed. Translated, it read "This application closed due to an illegal procedure. Contact the manufacturer if the problem persists further." I whipped out the digital camera, got some pics, and edited those into the talk! (See http://www.ganssle.com/misc/atm.htm for pictures).

Later we visited the amazing Deutsches Museum located on an island on the river Isar in Munich. This is a must-see for anyone with any interest in technology. Our 8 hours there were enough to gain only a sense of the displays; someday I'd like to spend a week.

Boats, planes, spacecraft, engines (including the first-ever diesel engine), musical instruments, printing technology, and much, much more fills this huge building. Time kept us from some of the exhibits I really wanted to see, such as one on amateur radio and another about time-keeping. But the computer display is simply mouth-watering. Dozens and dozens of exquisitely engineered mechanical calculators and totalizers give a marvelous view of the abilities of machinists. Zuse's first relay computer, which predated the ENIAC, is there, as is one of his later fully electronic versions. A 1957 UNIVAC 1 enticed with a (locked, drat it!) door leading to the interior of the machine, rather like the HAL-9000 in 2001 A Space Odyssey. A Cray-1 stands proudly in the middle of the exhibit.

In the microelectronics hall a 5 gallon jar held 150,000 transistors, shown next to an IC containing the same number. Consider this: it would take 10,000 such jars to contain the transistors on a 1 cm square 1 Gbit DRAM!

A few pictures are at http://www.ganssle.com/misc/dm.htm .

More on Free x86 Compilers and Core Memory

Simon Large contributed this about free x86 compilers:
Microsoft are providing their current 32 bit C/C++ compiler for free.
http://msdn.microsoft.com/visualc/vctoolkit2003/

I don't know how good it is for embedded work, or whether it will even produce code that works outside of Windows. I used the MS 16 bit compiler for years to generate code for the NEC V series microcontrollers, and it worked very well.

Everett Greene wrote about core memory:
I was working for Univac in those days and the bead stringing was done by a machine (at least the X-Y axes). I found it fascinating to watch the machine work. There were very few Asian women in Minnesota in those days, so it was more likely some women of north European heritage doing the sense wire stringing (if it was done by hand). By the time, I happened on the scene, the memories were only three-wire.

What I find more different (how's that for a phrase?) is the change in the state-of-the-art for NDRO memory. The earliest computers with which I worked had 32 words (30 bits each) of NDRO memory mounted in a chassis of about six square feet. The users of these machines didn't have to punch in the boot- strap loader by hand!

One of the more clever uses made of the non-volatility of core memory was a case where one of Univac's field engineers stationed in Newport was called to help troubleshoot a new computer being installed on a submarine in New London. The computer on the submarine didn't have much if anything in the way of peripherals so the field engineer loaded some diagnostic and test programs into memory in an identical computer in Newport, pulled the memory chassis, and took it with him to New London so that he could run the programs on the computer with the problem.

Rodney Dangerfield

"But, Gandalf" I squeaked, "I just can't go on any longer. The Precious is just too much for me. Can't one of the Great, maybe one of the Wizards, bear this terrible burden?"

I looked down at my furry toes, feeling the shoulder pain from that night on Weathertop when the Black Riders stabbed me with the cursed magic knife. Only a long, cold march by Strider and my friends had saved me then. Elrond himself tended the wound, yet it still throbbed painfully.

"You've been called to this mission," Gandalf intoned solemnly. "But now let me see the Precious!"

I pulled it out of my tunic, handing it to him reluctantly. He grabbed it with a bound and tossed it into the fire!

Red, serpentine writing appeared on the Precious. Gandalf, master of many ancient languages, read the script. "Copyright, 2004, Freescale Semiconductor," he intoned. "It is as I thought. It is indeed one of the great machine thinkers of the 21th century. If Sauron gains control of this, if he then builds a gigantic computer from this component, then all of Middle Earth will fall, doomed by the Precious's ability to compute catapult trajectories in real time!"

As so often happened, much of what Gandalf said meant little to me. The Great are like that, thinking thoughts mere Hobbits cannot understand.

"But wait! What's this? What means this '68HC05'? Is this bauble actually an entire embedded system?" Gandalf looked aged, thin and almost transparent, nothing more than an old man leaning on a gnarled cane.

"Then we have already lost. Frodo, take this to Lady Galadrial. See if she can make use of it. I'm weary, and need to rest."

I don't know what this 'embedded system' phrase means, but I read the fear in Gandalf's eyes, and so mine reflected the same.
 --
Are embedded systems doomed to this level of obscurity? How many of your friends and family equate computers with PCs? Over 9 billion CPUs are sold each year, a mere 100-150 million of those winding up in PCs. The rest are embedded systems, yet the embedded world is all but invisible to most people. When I go to a party and tell people I'm in the computer business they immediately bombard me with questions about Excel macros and Windows setup. Embedded? To most people that's a word that just does not compute.

The recently departed Rodney Dangerfield (http://en.wikipedia.org/wiki/Rodney_Dangerfield) summed it up best: we can't get no respect!

Jobs!

Let me know if you're hiring firmware or embedded designers. I'll continue to run notices for embedded developers as long as the job situation stays in the dumper. No recruiters please.

Plextek (http://www.plextek.com/) is one of the largest independent electronics design consultancies in Europe, based near Cambridge, UK. We currently have opportunities for embedded software engineers:

We have an immediate requirement for a software engineer with proven real-time embedded software development capabilities and one or more of the following skills: VxWorks; Network Protocols; Wireless Protocols; Windows CE; Windows Device Drivers. You will be self-motivated and keen to work in a dynamic environment where flexibility is paramount. The reward is an exciting, engineering environment offering a wide variety of challenges.

We also have a requirement for a Software Engineer. The position will involve working as part of a team developing a novel portable radar system. The successful candidate will be degree qualified and have a minimum of 3 years experience in software development, have relevant experience in real time C embedded software development and some background in signal processing. The candidate must also have experience in at least 2 of the following (in order of importance): Altivec/PowerPC, Radar, MathCAD, Fast Fourier Transforms, Vxworks and UI design. A background in telecoms or RF Comms is essential together with good people skills. The successful candidate must be comfortable operating within a team environment.

See the website for more information.

Joke for the Week

Engineers' Terminologies:

1. A number of different approaches are being tried
   - I dunno – you got any ideas?
2. Extensive report is being prepared on a fresh approach to the problem
   - we just hired three kids fresh out of college.
3. Close project coordination
   - we know who to blame.
4. Major technological breakthrough
   - it works ok, but looks very hi-tech.
5. Customer satisfaction is delivered assured
   - we are so far behind schedule the customer is happy to get it delivered.
6. Preliminary operational tests were inconclusive
   - the darn thing blew up when we threw the switch.
7. Test results were extremely gratifying
   - we are so surprised that the stupid thing works.
8. The entire concept will have to be abandoned
   - the only person who understood the thing quit.
9. It is in the process
   - it is so wrapped up in red tape that the situation is about hopeless.
10. We will look into it

- forget it! We have enough problems for now.
11. Please note and initial
   - let's spread the responsibility for the screw up.
12. Give us the benefit of your thinking
   - we'll listen to what you have to say as long as it doesn't interfere with what we've already done.
13. Give us your interpretation
   - I can't wait to hear this nonsense!
14. See me or let's discuss
   - come into my office, I'm lonely.
15. All new
   - parts not interchangeable with the previous design.
16. Rugged
   - too damn heavy to lift!
17. Lightweight
   - lighter than rugged.
18. Years of development
   - one finally worked.
19. Energy saving
   - achieved when the power switch is off.
20. Low maintenance
   - impossible to fix if broken.

About The Embedded Muse

The Embedded Muse is an occasional newsletter sent via email by Jack Ganssle. Send complaints, comments, and contributions to him at jack@ganssle.com.

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