

# The Embedded Muse 117

Editor: Jack Ganssle ([jack@ganssle.com](mailto:jack@ganssle.com))

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EDITOR: Jack Ganssle, [jack@ganssle.com](mailto:jack@ganssle.com)

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## Editor's Notes

Did you know it IS possible to estimate software schedules accurately? Do you want to increase your team's productivity? Reduce bugs? Meet deadlines? Take my one day Better Firmware Faster seminar. You'll learn how to estimate a schedule accurately, thwart schedule-killing bugs, manage reuse, build predictable real-time code, better ways to deal with uniquely embedded problems like reentrancy, heaps, stacks, and much, much more.

I'm presenting this on two dates:

- Chicago, IL on December 5
- Irvine, CA on December 7

Want to be your company's embedded guru? Join us! There's more info at <http://www.ganssle.com/classes.htm>, including cheap flights to these cities from around the USA.

If your outfit has a dozen or more engineers who can benefit from this training I can present the seminar on-site. See <http://www.ganssle.com/classes.htm>.

## Engineering Washouts

Richard Andrews passed along Douglas Kern's epistle about being a washout from engineering college (<http://www.techcentralstation.com/092105B.html>). It's well-written

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and brutally honest. Mr. Kern was apparently a very smart student who failed miserably at his semester and a half attempt to become an engineer. He fears the US's competitiveness will be destroyed by an inadequate number of engineers, and worries that the fault lies with teachers who can't teach and professors who use absurd boot-camp courses to weed out anyone with an IQ under 150.

The article makes for uncomfortable reading. When I went to school decades ago those same sorts of instructors obfuscated more than enlightened. Language barriers compounded by clueless teachers kept the college crowd in a continual level of bafflement. I never really understood the math till the next semester, yet mandated physics and engineering classes used the math we were supposed to learn tomorrow today.

In the transistor theory class the teacher – a tenured full professor - wrote the transfer function of an amplifier on the blackboard. The decaying exponential puzzled me so I asked, "Does that mean the output of my stereo will fall to zero over time?" He studied the formula for a minute, replied "I guess it does," and blissfully carried on.

I remain mixed on the math. In a 30 year career it's rare that I've needed even the most elementary calculus, and have never solved a differential equation since my university days. Yet those classes did give insight to certain engineering and physics problems. But today my 18 year old knows more calculus than I remember, despite my accumulating almost enough credits for a math degree.

Engineering education certainly shouldn't be dumbed-down. But the current practice of hiring and promoting teachers based on their research and PhD credentials is fatally flawed. Teaching comes first, but teaching is a difficult and critical skill seldom taught to engineering professors.

I see a strong parallel between academia and industry. Very bright technical experts become instructors with no formal teaching education, just as engineers get promoted into management without any management schooling. Yet all of these skills – teaching, engineering, and management - are careers unto themselves. Few of us learn anything about management or teaching except for what we manage to garner in on-the-job training. Yet we'd never hire an MBA or fry cook and park him down in front of a computer, departing with the words "OK, now write the signal processing code."

What do you think?

## **Variable & Function Naming**

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The Boston Embedded Systems Conference in September was, as usual, an interesting and fun experience. I try to sit in on a class or three at each of these events, and managed to attend Jean LaBrosse's seminar about firmware standards.

Now there's a guy who can teach!

Though standards are an important part of making fabulous firmware the subject is rather dry. But not in Jean's class. The packed room was raptly attentive, with the exception of one moron chatting loudly on a cell phone.

Though I've promoted standards for a long time I picked up a couple of good ideas about naming functions and variables, and will shamelessly share them here.

First, names should start with the big and work to the small. An example is: Universe\_Galaxy\_SolarSystem\_Planet. For example:

```
Timer_0_Initialize
```

is better than:

```
Initialize_Timer_0
```

If you were looking through a dictionary or link map that lists variable names, you're more likely to focus on functions related to the timer, rather than to initializing things. So for a timer we might find:

```
Timer_0_Initialize  
Timer_0_Read  
Timer_0_Set
```

Obviously, this is, well, obvious. What's important is that the rule is codified in the standard so everyone on the team uses the same, highly readable, convention.

Secondly, never use acronyms and abbreviations as part of a variable or function name, unless such acronym/abbreviation is defined in the code in a special abbreviations table, or if it's an accepted industry convention like LED, LCD, and CRT.

Clarity is our goal! Where "Disp" might mean display (as a verb) to you, to someone else it might imply a chunk of hardware. "Enc" could be encode or encoder.

An example Abbreviation Table is:

```
/* Abbreviation Table  
* Dsply == Display (the verb)  
* Disp == Display (our LCD display)
```

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\* Tot == Total  
\* Calc == Calculation  
\* Val == Value  
\* Pos == Position  
\*/

I've amended my firmware standard (at <http://www.ganssle.com/fsm.htm>) to reflect these ideas.

If you care about writing beautiful code, do take Jean's class.

## 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.

MITEQ Incorporated in Hauppauge, NY, a leader in the satellite communication industry, has a unique opportunity available for an experienced Embedded Systems Engineer. To contribute to our dynamic, professional environment, you will need a BSEE, with 5+ years experience in Firmware and Digital Hardware design. Only candidates with experience in developing firmware using C and C++ with RTOS experience will qualify for the position. Experience developing TCP/IP interfaces is required. In addition, those candidates capable of programming in VHDL will be given special consideration.

We offer a competitive compensation and benefits package. MITEQ Inc. does NOT offer relocation compensation to perspective employees. To explore this opportunity, please email your resume to: [amarinozzi@miteq.com](mailto:amarinozzi@miteq.com) or fax to (631) 439-9216.

Seagate is the worldwide leader in the design, manufacturing and marketing of hard disc drives, providing products for a wide-range of Enterprise, Desktop, Mobile Computing, and Consumer Electronics applications. Seagate jobs can be found at <http://www.seagate.com>.

Servo Engineering Opportunities at Seagate:

Skills required include:

- 1) Servo Controls Engineering
- 2) C, Matlab and assembly language programming.
- 3) Failure analysis and debug
- 4) Digital and analog electronics background

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**Experience Required:**

5+ years servo experience with embedded firmware and ASICs. Experience in controller design and algorithm development also preferred. Assembly and C development background.

**Education:**

Minimum BS Electrical Engineering, MS Electrical Engineering preferred. Electrical and Mechanical degrees acceptable.

Athena Technologies is hiring embedded software engineers! If you are ready for a new challenge, please visit us at [www.athenati.com](http://www.athenati.com) to learn more! We are seeking degreed engineers with embedded development experience to join our growing team. Please send your resume to [jobs@athenati.com](mailto:jobs@athenati.com).

Athena Technologies is the premier developer and producer of dynamics and control systems, specializing in navigation and flight control systems. At Athena you will work with enthusiastic and innovative business and technical professionals in a fast paced and positive environment. You will contribute directly to exciting projects on the cutting edge of controls technology. We are located in a beautiful uncongested area of Northern Virginia just 35 miles west of Washington, DC. Whether you prefer the city or the country, you will find easy access from our convenient location to all the region has to offer.

bSQUARE is the leading system integrator in the Windows Embedded Market focused on helping tier1 thru tier3 device makers bring their products to life! bSQUARE works with Windows Mobile, Windows CE, and Windows XPE. The smart device market is growing rapidly and bSQUARE is growing strong in this increase demand for embedded systems service and solutions.

We are looking for Platform Engineers who will be responsible for the design and development of drivers and system-level OS components for adaptations of Windows Embedded (CE, XP) to various platforms. We are also on the lookout for good Applications Engineers that will design Architecture and develop Win32-based apps for WinCE based platforms. Email your resume for immediate consideration to [kimberlyh@bsquare.com](mailto:kimberlyh@bsquare.com)

PCTEL, RF Solutions Group located in Germantown, Maryland has recently opened positions for a Senior Embedded Engineer and a Senior Hardware Engineer. Our main office in Chicago has a Software Engineer opening as well.

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Additional information can be found at: <http://www.pctel.com/aboutCareers.php>

Leica Geosystems is looking for a Senior Firmware Engineer. See [http://www.leica-geosystems.com/corporate/en/careers/lgs\\_jobs.htm?id=565](http://www.leica-geosystems.com/corporate/en/careers/lgs_jobs.htm?id=565)

## Joke for the Week

Short of an apt phrase for the annual appraisal of your staff? Try some of these for size (reputedly from Royal Navy Officer Fitness Reports):

1. His men would follow him anywhere, but only out of curiosity.
2. I would not breed from this Officer.
3. This Officer is really not so much of a has-been, but more of a definitely won't-be.
4. When she opens her mouth, it seems that this is only to change whichever foot was previously in there.
5. He has carried out each and every one of his duties to his entire satisfaction.
6. He would be out of his depth in a car park puddle.
7. Technically sound, but socially impossible.
8. This Officer reminds me very much of a gyroscope - always spinning around at a frantic pace, but not really going anywhere.
9. This young lady has delusions of adequacy.
10. When he joined my ship, this Officer was something of a granny; since then he has aged considerably.
11. This Medical Officer has used my ship to carry his genitals from port to port, and my officers to carry him from bar to bar.
12. Since my last report he has reached rock bottom, and has started to dig.
13. She sets low personal standards and then consistently fails to achieve them.
14. He has the wisdom of youth, and the energy of old age.
15. This Officer should go far - and the sooner he starts, the better.

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16. In my opinion this pilot should not be authorised to fly below 250 feet.
17. The only ship I would recommend this man for is citizenship.
18. Works well when under constant supervision and cornered like a rat in a trap
19. This man is depriving a village somewhere of an idiot.
20. Only occasionally wets himself under pressure.

## **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](mailto:jack@ganssle.com).

To subscribe, send a message to [majordomo@ganssle.com](mailto:majordomo@ganssle.com), with the words “subscribe embedded *your-email-address*” in the body. To unsubscribe, change the message to “unsubscribe embedded *your-email-address*”.

The Embedded Muse is supported by The Ganssle Group, whose mission is to help embedded folks get better products to market faster. We offer seminars at your site offering hard-hitting ideas - and action - you can take now to ***improve firmware quality and decrease development time***. Contact us at [info@ganssle.com](mailto:info@ganssle.com) for more information.

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