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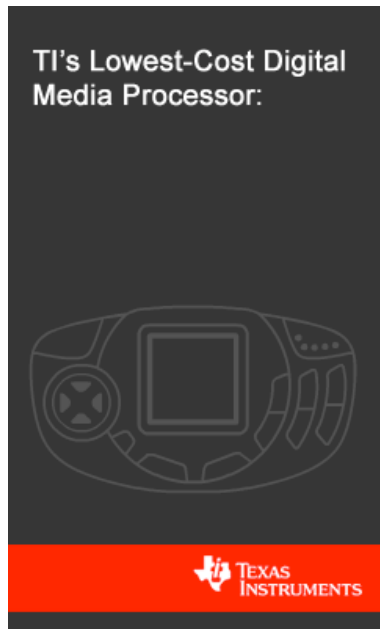
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Shortage of analogue engineers worsens

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A worsening shortage of analogue engineers has Freescale Semiconductor Inc. redoubling efforts to recruit and groom practitioners skilled in the alchemy of mixed-signal processing.

"Analogue IC design remains something of an art," said Gary Grandbois, principal analyst for iSuppli Corp.'s "Analogue ICs and Semiconductor Forecast." He added, "Today, analogue designers have to be comfortable in both analogue and digital designs—a demanding task that makes them rare, highly regarded and well paid."

Where the money is

"Mixed-signal expertise is what we look for when investing in semiconductor makers," said Alex Woodward, sector portfolio manager for technology at Mazama Capital Management. "Analogue circuitry on a digital chip is the secret sauce that can make a proprietary semiconductor uniquely qualified for high-volume applications. That's where the money is."

Patel: There are a lot of EEs graduating, but fewer and fewer are specialising in analogue.

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But analogue engineers are increasingly hard to find. The United States still leads the world in producing electrical engineering graduates. However, digital engineering has become very popular that many graduates specialising in analogue electronics are outnumbered by at least 10 to one, according to Freescale. The company has worked to build up its analogue capabilities after separating from parent Motorola in 2006.

Fewer analogue specialists

"In the United States, we are producing around 1,000 analogue engineers annually from our top universities, but 10 or 20 times that many digital engineers are graduating," said Jignasha Patel, director of global talent sourcing at Freescale. "There are a lot of EEs graduating, but fewer and fewer are specialising in analogue."

When Freescale was spun off two years ago, most of its analogue engineers remained at Motorola. The company started an aggressive program to recruit analogue engineers to design mixed-signal chips.

Workforce ratio

"With 23,000 employees in 30 countries, we tried to make up our shortfall in the U.S. by recruiting from other countries, so we opened development centres in many areas across the world in order to tap into the analogue talent wherever it might be," said Patel.

"We found that Eastern Europe and Asia both had growing markets with analogue engineering talent. Unfortunately, we also found that many were without the depth of expertise you need to participate in the global economy. We can find really great digital talent everywhere in the world, but we are still having a hard time finding experienced analogue talent anywhere in the world," she added.

Homegrown effort

As a result, Freescale concluded it had to start a homegrown effort to recruit experienced analogue engineers. Managers realised that they had to foster an internal culture that provided new engineering graduates with the experience needed to deepen their analogue expertise.

The company's first step was to hire a corporate analogue engineering manager with a proven track record: Arman Naghavi, a 19-year veteran of Analog Devices Inc. who had more recently overseen design, product and test and applications development at Intersil Corp.

"Our heritage was to use Motorola as our analogue supplier, but as an independent company, we had to start our own programs to attract analogue engineers and we have been very fortunate," said Naghavi, VP and general manager of the analogue, mixed-signal and power division at Freescale. "We have many talented recruits, but we still need more and will hire as many as we can get," he added.

Since Naghavi's arrival, Freescale has added several analogue "gurus" to its ranks and instituted a mentoring culture. "We complement one of our senior managers with several less-experienced engineers so that he can mentor them," said Naghavi.

"This allows the manager to work on more than one design at a time by delegating the tasks that are time-consuming, but require less experience," he added.

Naghavi noted that mentoring is a lengthy, but necessary process. "A digital engineer can often start making significant contributions to a company just six months after graduating," he said. "But analogue technology requires five to seven years of on-the-job experience before engineers can begin making significant contributions."

Common perception
Compounding the problem is the perception of digital engineering as cutting-edge and its analogue counterpart is old school. "Digital has become so popular that people often assume analogue is the old technology," said Naghavi. "I say the best thing that ever occurred to analogue was the digital revolution. The digital gadgets have to interface with the real world, which is analogue. To create those interfaces, you need analogue engineers."

Freescale is not only fostering its internal mentoring program, but is also courting universities to develop analogue programs. "Fewer students are specialising in analogue, and many of the professors who are analogue experts have taken higher-paying jobs at companies, so there are fewer professors to teach analogue too," Naghavi said. "What's worse, analogue is a whole lot more difficult to learn. You have to deal with all of the harsh environment problems in the real world: transients, temperature changes and all that digital designers can often ignore."

- **R. Colin Johnson**
EE Times

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