The semiconductor content in electronic systems has steadily risen to over 15% of the total system cost. PCs and peripherals in the late 1980s and networking chips in the late 1990s have caused major increases in IC usage, each providing about a 5% bump to the dollar value of IC content. Today, the semiconductor industry is at the threshold of another major expansion of IC slots driven by wireless and consumer devices. Of the semiconductor industry’s expected $214 billion in revenue for 2004, mobile phones will account for $31 billion and consumer electronics will account for almost twice as much.

Multimedia is driving the growth in both of these industry segments. The digital home has become the hub of what Dave Orton, CEO of ATI Technologies, calls “the first generation of the visual age.” The digital TV tuner, which the FCC mandated to reach 100% of all TV devices by 2007, is a small fraction of the high-definition TV cost—but it opens the door for many more silicon slots for video processing and storage. Supported on most air interfaces, multimedia has already gone wireless. Handheld wireless access is an important part of this growing segment. By 2003, cell phones became the single largest market for processor silicon, with 450 million units. This silicon goes beyond DSP baseband to real processor cores that handle not only networking and user interface tasks, but also JPEG, MPEG codecs for images and video, and MP3 for audio. The processor speed in handsets is on the same curve as those for the PCs of a decade earlier, albeit with enormous focus on energy efficiency. Embedded processing is now an important part of what Sanjay Jha of Qualcomm calls the wireless virtuous cycle: Increased data and media functions drive improvements in display and processor speeds that, in turn, enable new services and content, which then drive the need for even higher processor speeds. Indeed, services are moving from ring tones and photo messaging to video telephony, broadcast media, location-based services, and network-based gaming.

The processing of media data in these systems presents many challenges. These functions must be timely—even real-time—but must also be energy and bandwidth efficient. Design decisions at all levels must consider the impact on the end user’s experience. Guest editors Radu Marculescu and Petru Eles have done an excellent job in organizing a special issue on this subject; they selected a total of nine articles from 25 submissions after an extensive review process. This issue contains the first six of the selected articles: They address the energy-efficient scheduling of multimedia streams and backlight adaptation and compression issues for multimedia applications. In a later issue, D&T will feature articles on distributed speech recognition and multimedia SoCs.

In addition to these theme articles, Maria Varsamou, Nikolaos Papandreou, and Theodore Antonakopoulos present a testing methodology for the signaling protocols used by point-to-point communication links. In an article on the evaluation of DRAM tests, Ad J. van de Goor examines well-known memory tests and shows the importance of selecting the right stress combinations for good fault coverage.

With this issue, D&T also launches its Book Reviews department—edited by Scott Davidson, Sachin Sapatnekar, and Grant Martin—to bring forward a critical evaluation of the books that would interest D&T readers. Finally, Ken Wagner, D&T’s interviews editor, presents an interview with A. Richard Newton, Dean of the College of Engineering at the University of California, Berkeley, and his perspective on the increasing role of engineering in societal issues. I hope you enjoy this issue!

Rajesh Gupta
Editor in Chief
IEEE Design & Test of Computers