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B2C Technology Story

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Reading Time:
6 minutes

Reader Benefit:
♦PDAs exploit the latest innovations in embedded chip technologies;
♦Gain insights on the microprocessor chips embedded in PDAs;
♦The various types of chips that make the PDA heartbeat a possibility.

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Web Summary:

The Chip Within the PDA
by Leon A. Enriquez

When you think of the microprocessor, what comes to mind is almost always the PC chip or CPU. Yet, you'll be surprised to know that more than 98 percent of all microprocessors are used in "embedded" products, and not PCs!

Examples of embedded products include the appliances and devices that you see around your daily environment – your cellular phone, handheld PDA (personal digital assistant), video games, microwave oven, washing machine, refrigerator, thermostats, TV, digital audio systems, and other gadgets.

In fact, the embedded processors are actually leading the way in terms of transformational technological breakthroughs. Not surprisingly, new PDAs, mobile telephones, communicators, wireless Web browsers, and other gizmos-and-gadgets are being enabled by these new generation, microprocessor chips.

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In terms of performance and capability, today's embedded microprocessor chip rivals that of the PC chip produced just a few years ago. The latest embedded chips offer better performance than ever before, with clock frequencies of 200, 300, and even 400 MHz.

Critical to the success of such microprocessors is power management of the limited battery life. With improved design and enhanced manufacturing techniques, embedded processors are designed to be capable of very frugal electrical consumption.

With higher and more optimal performance levels, plus low power requirements, such microprocessors enable vendors of PDAs to create a new generation of low-priced, portable handheld devices. And such product offerings come with increasingly sophisticated features and innovative functionalities.

There is the practical need to optimise microprocessor speed with low power consumption, and at an affordable price that will lower the entry barrier for mass consumer or business acceptance. Obviously, the idea of balancing the three selling points – of performance, power consumption and price – is not an easy task.

Notice that super-charging a microprocessor with high-end features is not enough. You need to resolve the practical problem of extending battery life, reducing weight, and lowering the overall cost. At the same time, you also need to reduce the time-to-market of new product offerings.

Chips Galore

The latest generation of high-end 32-bit embedded microprocessors exhibit most of the features of performance-oriented machines. Combined with other innovative technologies that help to reduce power consumption, increase on-chip integration, and preserve software compatibility – the overall feature benefits gets better. And most of all, at a lower price-performance ratio.

Intel Microprocessors:

Intel XScale is a core-based microprocessor with a 32-bit RISC microarchitecture based on architecture by Advanced RISC Machines (ARM). Because both ARM-based and Intel XScale technologies are binary compatible, this means that software and software-developed tools designed for the older ARM processors will also work on newer Intel XScale core-based processors.

♦ *Intel XScale family:* Both chips are based on a core from chip design house ARM – the most popular 32-bit embedded CPU family in the world. The XScale chips are built using the 0.18-micron manufacturing process, which means they can be built in any of Intel's plants that make processors of the same size, including some of Intel Pentium III and Pentium 4 families.
  1. Intel PXA250 is aimed at high-end PDAs and comes in clock-speeds of 400MHz, 300MHz and 200MHz.
  2. Intel PXA210 is aimed at entry-level PDAs and mobile phones, and is available in 200MHz and 133MHz clock-speeds.

♦ *Intel StrongARM family:* StrongARM chips are larger 0.35-micron chips, and production is limited to plants that use that technology. None of Intel's PC processors use that technology.

In addition to having higher clock-speeds than StrongARM, the XScale family also consumes much less power. For example, the 300MHz PXA250 consumes roughly half the power of the 206MHz StrongARM SA-1110, which is used in PDAs such as Compaq's iPaq and Hewlett-Packard's Jornada. In short, the XScale microprocessor family will be the successor to StrongARM.

The new chips bring advantages like faster processors and more memory to a host of PDAs, and at the same time further reduce the prices of such handheld devices.

Motorola Microprocessors:
The Motorola DragonBall VZ microprocessor is the third generation of the DragonBall family – designed to save time, power, and cost in the design and operation of new handheld devices.

For example, DragonBall VZ requires less board space and allows for reduced pin count and fewer programming steps in designing the handheld product. The major differences between previous versions of DragonBall processors and the new VZ product are system speed improvement and SDRAM support.

All these features combine to make DragonBall VZ the microprocessor of choice among many system designers – with functionality and logic optimally connected, and timed with the same clock. The primary package is designed to occupy the smallest possible board footprint.

DragonBall VZ is the integrated processor for some of the most popular PDA designs, and is used in a wide variety of applications including exercise monitors, navigation systems, and smart phones.

Box Story 1:
PDA Brands and Processor Chips

PDA Brand	Model	Processor Chip Used	Chip Manufacturer
Palm	Palm Tungsten T	Texas Instruments OMAP1510	Texas Instruments
Palm	Palm M515	Motorola DragonBall VZ	Motorola
Handspring	Handspring Treo 90	Motorola DragonBall VZ	Motorola
Sony	Sony CLIE PEG-NX70V/G	Intel PXA250	Intel
Sony	Sony CLIE PEG-T615C/G	Motorola DragonBall	Motorola
Casio	Casio E-200	Intel StrongARM, 206MHz	Intel
Casio	Casio BE-300	NEC VR4131, 166MHz, 280MIPS, 64-bit CPU	NEC
NEC	NEC MobilePro P300	Intel StrongARM	Intel
Hewlett-Packard/ Compaq	Hewlett-Packard iPaq H3970	Intel XScale PXA250	Intel
Hewlett-Packard/ Compaq	Compaq iPaq H3870 (with Bluetooth)	Intel StrongARM SA-1110	Intel
Hewlett-Packard/ Compaq	Hewlett-Packard Jornada	Intel StrongARM SA-1110	Intel
Toshiba	Toshiba PocketPC e740	Intel XScale PXA250	Intel
Toshiba	Toshiba PocketPC e310	Intel StrongARM	Intel
Acer	Acer n20	Intel XScale PXA250	Intel
Dell	Dell Axim X5 (400 MHz)	Intel XScale PXA250	Intel
Fujitsu	Fujitsu Pocket L00X	Intel XScale PXA250	Intel
O2	O2 xda	Intel StrongARM SA-1110	Intel
Psion	Psion 5MX	ARM710T RISC CPU	ARM

About the Author
Leon A. Enriquez is managing editor and business manager of Editorial Thoughtscapes – a professional writing firm. Leon can be reached at leonenriquez@et-writer.com.

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