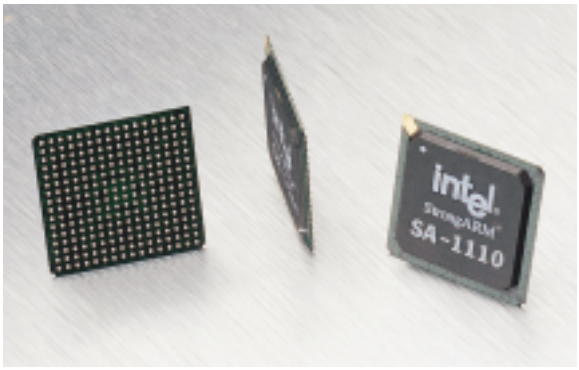
Advance Copy

Intel® StrongARM® SA-1110 High-Performance, Low-Power Processor For Portable Applied Computing Devices

PRODUCT HIGHLIGHTS

- **Innovative Application Specific Standard Product (ASSP) delivers leadership performance, integration and low power for palm-size devices, PC companions, smart phones and other emerging portable applied computing devices**
- **High-speed 100 MHz memory bus and a flexible memory controller that adds support for SDRAM, SMROM, and variable-latency I/O devices — provides design flexibility, scalability and high memory bandwidth**
- **Rich development environment enables leading edge products while reducing time-to-market**



As businesses and individuals rely increasingly on portable applied computing devices to simplify their lives and boost their productivity, these devices have to perform more complex functions quickly and efficiently. To satisfy ever-increasing customer demands to communicate and access information 'anytime, anywhere', manufacturers need technologies that deliver high-performance, robust functionality and versatility while meeting the small-size and low-power restrictions of portable, battery-operated products. Intel designed the SA-1110 processor with all of these requirements in mind.

The Intel® SA-1110 is a highly integrated 32-bit StrongARM® processor that incorporates Intel design and process technology along with the power efficiency of the ARM* architecture. The SA-1110 is software compatible with the ARM V4 architecture while utilizing a high-performance micro-architecture that is optimized to take advantage of Intel process technology.

The Intel SA-1110 provides the performance, low power, integration and cost benefits of the Intel SA-1100 processor plus a high speed memory bus, flexible memory controller and the ability to handle variable-latency I/O devices. Manufacturers who utilize the cost-effective SA-1110 ASSP benefit from this high-value feature set, which is complemented by a robust development environment that speeds time-to-market.

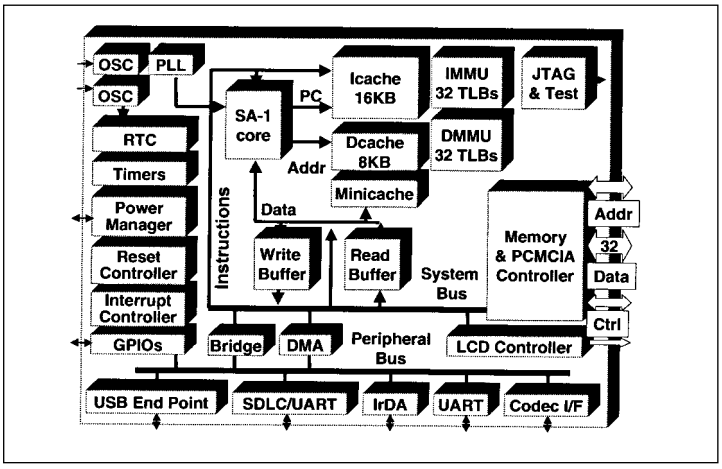
'SYSTEM ON A CHIP' INTEGRATION DELIVERS COST-EFFECTIVE SOLUTIONS

The Intel SA-1110 processor consists of:

- **Processing Core** - the processor is the Intel SA-1 core with a 16-Kbyte instruction and 8-Kbyte data cache, memory-management units, read and write buffers and a 512-byte mini-data cache that can be utilized to enhance caching performance when dealing with frequently used data structures
- **Memory and PCMCIA Control Module** - flexible memory controller supporting SDRAM, Synchronous Mask ROM, ROM, Flash, DRAM, SRAM, SRAM-like variable-latency I/O and PCMCIA control signals

- **System Control Module** - 28 general-purpose interruptible I/O ports, real-time clock, watchdog, interval timers, power management controller, interrupt controller, reset controller, and two on-chip oscillators
- **Peripheral Control Module** - six channel DMA controller, LCD controller, SDLC controller, 16550 compatible UART, IrDA serial port, synchronous serial port, USB end point interface, and codec interface

The Intel SA-1110 is offered in a small footprint 256-pin mBGA package.



SA-1110 Block Diagram

LEADERSHIP PERFORMANCE AND LOW POWER

Today's system designers are faced with the challenge of providing greater product performance and functionality while maintaining power requirements. The Intel SA-1110 has the unique ability to provide both leadership performance and low power. The SA-1110 processor achieves its leadership MIPS/mW by taking advantage of a high-performance micro-architecture, advanced CMOS process technology, and large on-chip memory caches. Power utilization is optimized through a low-voltage process technology that enables the SA-1110 integrated power management unit to conserve battery usage whenever tasks are not activating the system.

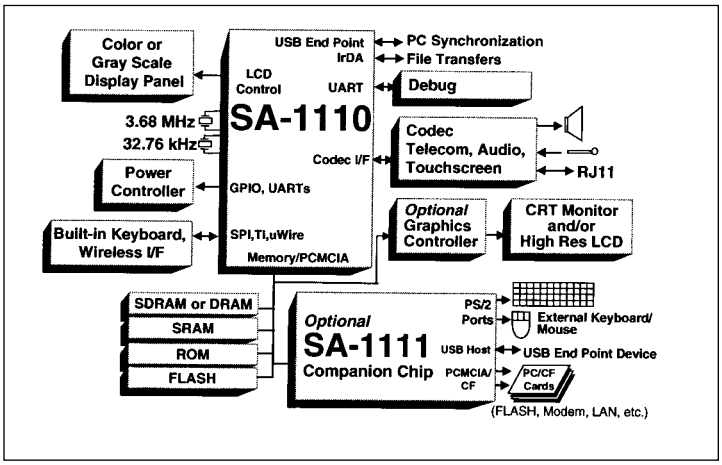
The high bandwidth of the Intel SA-1110 allows portable devices to provide faster response by utilizing operating systems and performance intensive applications like speech and handwriting recognition, soft modem, and Java interpretation more effectively. This ability enables portable devices based upon the SA-1110 to provide greater functionality and to deliver a richer internet experience.

ADVANCED CONTROLLER INCREASES MEMORY SPEED, FLEXIBILITY AND I/O VERSATILITY

The Intel SA-1110 advanced memory controller operates up to 100 MHz and supports four banks of either synchronous, fast-page-mode, or extended-data-out DRAM, providing manufacturers with more memory design alternatives to meet target cost and performance requirements. Additionally, the SA-1110 memory controller supports three banks of static memory–ROM, Flash, SRAM, and/or synchronous mask ROM (SMROM). The memory controller can access all supported memory types and I/O devices on either a 16- or 32-bit bus (with the exception of SMROM which is 32-bit only). This flexibility enables cost-effective, low component count designs.

The Intel SA-1110's support for variable-latency I/O devices makes it well-suited for designs that require a range of complementary devices like the SA-1111 companion chip and/or external graphics controllers. This versatility enables system performance to scale across the full range of portable applied computing–from palm-size devices that demand a highly integrated solution to high-end PC companions that require additional I/O and greater graphics performance.

RICH DEVELOPMENT ENVIRONMENT SPEEDS



SA-1110/SA-1111 System Example

TIME-TO-MARKET

Complementing the Intel SA-1110 high performance/low power attributes is a robust software and hardware development environment. Developers have access to a large library of ARM-compatible applications and tools plus an abundant set of operating systems and tool chains, including real-time and interactive development systems. Developers can use these resources to build libraries of new feature-rich, industry leading applications for StrongARM-based products and reduce overall time-to-market.

Samples of the Intel SA-1110 processor are planned to be available in June, while samples of the SA-1111 companion chip are planned to be available in July. Production of both is scheduled for the end of the third quarter of 1999. In addition, Intel will offer the SA-1110 hardware developer's kit and evaluation platform for developing and testing software.

Information in this document is provided in connection with Intel products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty, relating to sale and/or use of Intel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Intel products are not intended for use in medical, life saving, or life sustaining applications. Intel may make changes to specifications and product descriptions at any time, without notice.

For more information, visit Intel's World Wide Web Site at http://developer.intel.com/design/strong/index.htm

*Third-party marks and names are the property of their respective owners. ARM, ARM Powered and StrongARM are registered trademarks of ARM Limited.
©Intel Corporation 1999

Printed on Recycled Paper
Order Number 279009-001
Printed in U.S.A./0399/10K/IL0468A JD