

Transmeta™ Efficeon™ TM8800 Processor

Revision 2.0.1

Transmeta Efficeon TM8800 processor delivers high-performance for low power mobile, blade server and embedded designs. Built upon Fujitsu's next-generation 90nm silicon technology, it features transistors with an industry-leading length of 40nm, yielding even higher megahertz speeds and performance with lower power requirements for cooler, fanless operation.

To maximize performance and responsiveness, the Efficeon TM8800 processor features a 256-bit wide VLIW engine that can issue up to 8 instructions per clock cycle, a large 1 MB L2 cache, and support for MMX, SSE, and instructions for a powerful multimedia experience. The Efficeon processor combines the processor and Northbridge functionality into a single integrated circuit, creating a single package that reduces board space by eliminating the need for a dedicated Northbridge chip. Integrated functionality includes a high-performance DDR memory interface, a 1.6 GB/s HyperTransport™ I/O interconnect, and an AGP 4X graphics interface.



Transmeta EfficeonTM8800 Processor

Specifications	
Processor Speed	Up to 1.6 GHz
On-die L1 Instruction Cache	128 KB
On-die L1 Data Cache	64 KB
On-die L2 Write-Back Cache	1 MB
HyperTransport System Bus Speed	400MHz
Aggregate HyperTransport Link Bandwidth	1.6 GB/s
MMX, SSE and SSE2 Instruction Support	Yes
Fully Integrated Northbridge Functionality	Yes
Support for DDR-266, 333 memory	Yes
Support for ECC memory	Yes
Integrated AGP 4X graphics interface	Yes
Integrated Low Pin Count Bus (LPC)	Yes
Full x86 Software and OS Compatibility	Yes
Enhanced LongRun Thermal Management	Yes
Enhanced LongRun Power Management	Yes
AntiVirusNX Technology	Yes
Process Geometry	Fujitsu 90nm
Package Size	29mm x 29mm
Junction Temperature (Tj)	Up to 100° C
Package Type	783-pin OBGA with 1mm ball pitch

AntiVirusNX Technology

In response to the escalating threat of computer virus attacks, Transmeta has introduced a new feature in Efficeon processors - called AntiVirusNX - that can detect common viruses and render them harmless for Transmeta Efficeon processor-based computers.



Some of the most devastating attacks, including numerous worms, as well as many other malicious programs, attack computers by attempting to insert and execute code from data regions of system memory. The Data Execution Protection (DEP) feature in Windows XP Service Pack 2 leverages the Efficeon processor's AntiVirusNX technology to stop this malicious code immediately if it attempts to execute and thereby infect the computer. This combination offers significant improvements against software worms and viruses, providing enhanced security and safer computing. AntiVirusNX represents a significant deterrent to the ever increasing threat of computer viruses including the Sasser, Blaster, Bugbear, Code Red, Klez and Welchia worms.

HIGH PERFORMANCE

8 Instruction Issue, 256-Bit VLIW Engine

- Fully Pentium 4-ISA compatible
- Up to eight instructions issued per clock cycle
- Up to 50% improvement in integer applications
- SSE and SSE2 multimedia extensions enables multimedia applications to run up to 80% faster per clock cycle than previous generation processors from Transmeta
- Large 1 MB L2 cache improves processor performance

Advanced Code Morphing Software

- Improves performance and responsiveness over 1st generation Transmeta Crusoe technology
- Unique software based architecture is key to reducing power consumption and enabling future scalability and flexibility
- New generation Code Morphing Software technology leverages 256-bit VLIW hardware advances
- Enables quick, low cost improvements to performance and power consumption with updates of Code Morphing Software

HIGHLY INTEGRATED ARCHITECTURE

Fully Integrated Northbridge Core Logic

- On-chip DDR-266/333 memory interface
- Integrated AGP 2.0 compliant graphics interface for industry standard, high performance graphics solutions at 1X, 2X & 4X data rates
- On-chip 400 MHz HyperTransport interface, 8-bits wide in each direction, provides 12x the I/O throughput (1.6 GB/sec aggregate bandwidth) compared to 32-bit, 33 MHz PCI
- Full support for ECC in L2 cache and northbridge memory controller enables expansion into the server market

Enables Small Form Factor Designs

- Northbridge integration reduces system chip count, power consumption and PCB size

ENERGY EFFICIENT DESIGN

Enhanced LongRun Dynamic Power Management

- Enables longer battery life by dynamically adjusting operating frequency and voltage to match the performance requirements of application workloads
- Provides higher performance within smaller, thermally constrained environments

Enhanced LongRun Thermal Management

- Maximizes performance within a thermal envelope
- Low thermal characteristics enable fanless designs for quieter and more reliable systems

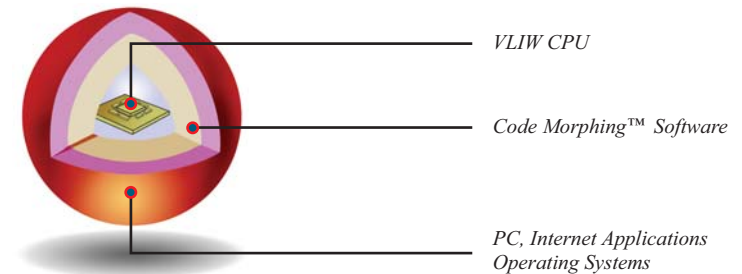
Transmeta Efficeon Processor Core

To maximize performance and responsiveness, the Efficeon processor features a state-of-the-art 256-bit-wide VLIW (Very Long Instruction Word) engine that can issue up to 8 instructions per clock cycle. A large 1 MB L2 cache and support for SSE & SSE2 instructions help make for a compelling multimedia experience.

Transmeta Code Morphing™ Software

Transmeta's proprietary Code Morphing Software (CMS) runs at the heart of the Efficeon processor, dynamically optimizing and translating x86 instructions into VLIW native code. This unique combination of hardware and software allows the processor to be more efficient, adding intelligence to the Efficeon processor to manage power consumption and heat dissipation not found in other x86 microprocessors.

With the new Code Morphing Software for the Efficeon processor, Transmeta extends its leadership in power management, offering a solution that provides high performance while consuming less power for the same work.



Transmeta Enhanced LongRun™ Power Management

LongRun power management technology provides Code Morphing software with the ability to adjust the Efficeon processor core operating voltage and clock frequency dynamically, depending on the demands placed on the processor by software. Because power varies linearly with clock speed and by the square of voltage, adjusting both processor voltage and clock frequency can produce cubic reductions in power consumption. Conventional processors can adjust power linearly, by adjusting the effective operating frequency.

LongRun power management policies are implemented within Code Morphing software, and can detect different workload scenarios based on runtime performance information, and then exploit these by adapting processor power usage accordingly. This ensures the processor delivers high performance when necessary and conserves power when demand on the processor is low.

Transmeta
CORPORATION

For more information, visit www.transmeta.com

efficeon
PROCESSOR

UNITED STATES & EUROPE

Transmeta Corporation
World Headquarters
3990 Freedom Circle
Santa Clara, CA 95054 USA
Tel: (408) 919-3000
For US Sales Inquiry: sales@transmeta.com
For Europe Sales Inquiry: sales-eur@transmeta.com
www.transmeta.com

JAPAN

Transmeta Japan
KDDI Bldg Annex 3F
2-3-3 Nishi-Shinjuku
Shinjuku-ku Tokyo 160-0023
Japan
Tel: +81-3-5325-9580
sales-jp@transmeta.com
www.crusoe.jp

TAIWAN

Transmeta Taiwan
7F-1, No.167,
Fu-Hsing North Road
Taipei, Taiwan
R.O.C. 105
Tel: +886-2-2718-0999
sales-tw@transmeta.com
www.transmeta.com.tw

CHINA

Transmeta Shanghai
Room 1202,
Lansheng Building,
No.8, Huai Hai Zhong Road
Shanghai, P.R.C.
Tel: +86-21-63191576
sales-sh@transmeta.com
www.transmeta.com.cn

KOREA

Transmeta Korea
602-603 Imae-Dong,
BunDang-Gu,
SeungNam City, Kyunggi-Do,
463-905 Korea
Tel: +82-19-321-1042
sales-kr@transmeta.com

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
ISO 9001:2000

©2004 Transmeta Corporation. All rights reserved. Transmeta, Efficeon, LongRun, Code Morphing and Crusoe are trademarks of Transmeta Corporation. All other product or service names mentioned herein are the trademarks of their respective owners. Information in this document is provided in connection with Transmeta Products. No license, express or implied, or otherwise to any intellectual property rights are granted by this document. Except as provided in Transmeta's Terms and Conditions of Sale for such products, Transmeta assumes no liability whatsoever including liability, warranties, infringement of any patent, copyright or other intellectual property right. Transmeta Corporation is an ISO 9001:2000 certified corporation based in Santa Clara California. Transmeta Efficeon TM8600 Processor Rev2004.08