

Product Brief

**Intel® Pentium® 4 Processors
with Hyper-Threading Technology**

Embedded Computing



Intel® Pentium® 4 Processors with Hyper-Threading Technology for Embedded Computing

Product Overview

Intel® Pentium® 4 processors with Hyper-Threading Technology¹ (HT Technology) provide increased system responsiveness in multi-tasking environments and are ideal for next-generation multi-threaded applications. Platforms based on Intel Pentium 4 processors with HT Technology can help reduce the total cost of ownership for a new generation of advanced, highly differentiated embedded products by providing performance headroom, robust I/O, scalability, and quality.

Manufactured on 65-nanometer (nm) process technology with a reduced thermal design power (TDP) of 65W, the 3.4 GHz Intel Pentium 4 processor 651^A with HT Technology offers 2 MB of L2 cache. In addition, based on 90-nm process technology, the Intel Pentium 4 processors 551^A and 531^A with HT Technology simplify the transition to 64-bit computing for embedded customers developing with Intel® 64 architecture¹ (Intel® 64).

With an 800 MHz front-side bus and a choice of 1 MB and 2 MB of Level 2 Advanced Transfer Cache, Intel Pentium 4 processors with HT Technology enable highly differentiated and scalable embedded solutions within the growing communications, interactive client, and industrial automation market segments.

Intel Pentium 4 processors 651, 551 and 531, available in LGA-775 package with integrated heat spreader, are all validated with the Intel® 915GV and Intel® 945G Express chipsets. In addition, processor 651 extends the selection of Intel Pentium 4 processor-based platforms to include the Intel® Q965 Express chipset, while processors 551 and 531 provide support for the Intel® 865G chipset.

The 3.0 GHz Intel Pentium 4 processor with HT Technology, available in µPGA-478 package, is validated with Intel 865G and Intel® 875P chipsets.



Rapid platform development is supported by the latest operating systems and Intel® architecture development tools. In addition, Intel offers validated design schematics, based on the Intel Pentium 4 processor with HT Technology, to rapidly meet unique product application requirements. Board solutions are also available from third-party providers.

Product Highlights

- 800 MHz front-side bus delivering 6.4 GB of data per second
- HT Technology provides increased system responsiveness in multi-tasking environments and supports next-generation multi-threaded applications
- Enhancements to the Intel NetBurst® microarchitecture provide software and architectural scalability
- 64-bit computing with Intel 64 enables faster access to DDR2 memory with Intel Pentium 4 processors 651, 551 and 531 with HT Technology
- Support for uni-processor designs
- Fully compatible with existing Intel architecture-based software

Product Highlights (continued)

- Enhanced floating-point and multi-media unit expands floating-point registers to a full 128-bit and adds an additional register for data movement
 - 144 Streaming SIMD Extensions 2 (SSE2) instructions
 - 13 Streaming SIMD Extensions 3 (SSE3) instructions
- Execute Disable Bit can prevent certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system
- μ PGA-478 package plugs into a standard PGA-478 socket for full scalability with other Intel® processors including Intel Pentium 4, Intel® Celeron® D, and Intel® Celeron® processors
- Embedded lifecycle support
- Along with a strong ecosystem of hardware and software vendors, including members of the Intel® Communications Alliance (intel.com/go/ica), Intel helps cost-effectively meet development challenges and speed time-to-market

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Product Number	Core Speed	Front-Side Bus Speed	L2 Cache	Thermal Design Power	Voltage ²	Tcase ³	Package	Process Technology
HH80552PG0962M	3.4 GHz	800 MHz	2 MB	65W	1.2000-1.3375V	5-69.2° C	LGA-775	65nm
HH80547PG0961MM	3.4 GHz	800 MHz	1 MB	84W	1.2000-1.4250V	5-67.7° C	LGA-775	90nm
HH80547PG0801MM	3.0 GHz	800 MHz	1 MB	84W	1.2000-1.4250V	5-67.7° C	LGA-775	90nm
NE80546PG0801M	3.0 GHz	800 MHz	1 MB	89W	1.25-1.4 V	5-69.1° C	FC- μ PGA4	90nm

¹ Intel® 64 requires a system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64. Processor will not operate (including 32-bit operation) without an Intel 64 -enabled BIOS. Performance will vary depending on your hardware and software configurations. See <http://developer.intel.com/technology/intel64/index.htm> for more information including details on which processors support Intel 64 or consult with your system vendor for more information.

² Variable VID voltage. The Intel Pentium 4 processor with HT Technology ships with different voltage settings. For more detailed information, please refer to our Web site at <http://developer.intel.com/design/intarch/pentium4/pentium4.htm>

³ Tcase specification is based on Intel thermal profile. See processor data sheet for details.

⁴ Hyper-Threading Technology requires a computer system with an Intel® Pentium® 4 processor supporting Hyper-Threading Technology and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/products/ht/hyperthreading_more.htm for more information including details on which processors support HT Technology.

⁵ Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number for details.

Intel Access

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