IDT WinChip™ C6™ Frequently Asked Questions (FAQ)

What is the IDT WinChip C6 processor?

The IDT WinChip C6™ processor is a plug-compatible alternative to the Intel® Pentium® and Pentium processor with MMX™ technology. The IDT WinChip C6 processor is cost-optimized to deliver superior price/performance for the sub-$1,000 desktop PC and sub-$2,000 notebook product categories.

IDT WinChip C6 Processor Speed Grades:
180MHz   60MHz bus
200MHz   66MHz bus
225MHz   75MHz bus (Production shipments in 1998)
240MHz   60MHz bus (Production shipments in 1998)

IDT WinChip C6 Processor Voltage Ranges:
3.52V (3.45V-3.6V)
3.3V   (3.135V-3.465V)

Who is Integrated Device Technology and what is the relationship with Centaur?

Integrated Device Technology (IDT) is a semiconductor design and manufacturing company with a product mix which consists of advanced communications products and specialty memories, high-speed SRAM, logic and X86 and MIPS RISC microprocessors. Headquartered in Santa Clara, Calif., with manufacturing facilities located in California and Oregon, IDT employs approximately 4,600 people worldwide.

Centaur Technology Inc., is an Austin, Texas-based X86 microprocessor design and development company which designed the IDT WinChip C6 processor. Centaur Technology is a wholly owned subsidiary of IDT. The IDT WinChip C6 will be manufactured and sold through IDT. More information on both companies and their products can be found on the www.idt.com and www.winchip.com web sites.

What makes the IDT WinChip C6 MMX-enabled processor a smart Windows solution?

The IDT WinChip C6 processor implements very specific design trade-offs to provide competitive system performance versus other Pentium-class processors with MMX technology. Design goals include hardware optimization for the most frequently used x®86 instructions and a focus on maintaining a small die size which translates to lower manufacturing costs. In addition, the IDT WinChip C6 delivers very low power dissipation, making it suitable for sub-$2000 mobile systems.

Die Size Comparison:
IDT WinChip C6   88mm^2
Intel Pentium with MMX   128mm^2

AMD K6	162mm^2
Cyrix 6x86MX	197mm^2

Is the IDT WinChip C6™ processor compatible with existing PC hardware and software?

The IDT WinChip C6 processor has been tested for compatibility by Microsoft's Windows Hardware Quality Lab (WHQL). All IDT WinChip C6 processors will carry the "Designed for Microsoft Windows 95" logo. The processor has also received XXCAL (www.xxcal.com) Platinum certification. This provides assurance that the IDT WinChip C6 processor is compatible with software and hardware products used by major corporations and end users throughout the world. The processor runs all leading operating systems including Windows 95®, Windows NT®, Windows 3.x, MS-DOS®, Novell® NetWare, OS/2 Warp, Unix®, Linux, and Solaris™, as well as other software packages and the latest MMX-enabled multimedia applications.

The IDT WinChip C6 processor is Socket 7-compatible for use with a broad array of established, cost-effective motherboard designs, industry standard chipsets (ALI, VIA, SIS, Intel), and BIOS (Award, AMI, Phoenix, and SystemSoft).

Does the IDT WinChip C6 processor support MMX to enhance multimedia performance?

Yes. The IDT WinChip C6 supports the 57 industry standard MMX instructions designed to enable the latest multimedia software, from audio to video to 3-D graphics, to run on your PC. The IDT WinChip C6 is software-compatible with Intel's MMX technology.

Why is the IDT WinChip C6 processor's power dissipation so low?

The IDT WinChip is optimized for desktop and mobile (notebook) systems and provides both static and dynamic power management. The IDT WinChip C6 supports the five static power management modes of the Pentium processor with MMX technology. In addition, the IDT WinChip C6 uses dynamic power management to reduce power consumption, eg. processor caches are dynamically turned off when not in use.

According to Linley Gwenapp, Editor-in-Chief for *Microprocessor Report*, The IDT WinChip C6..."fits easily into the thermal envelope of most notebook PCs while offering performance similar to that of Intel's best notebook chips."

Is the IDT WinChip C6 a dual-voltage processor?

No. Current 180MHz and 200MHz offerings are single-voltage-selectable at 3.52V or 3.3V. The IDT WinChip C6 will work in either single-voltage or dual-voltage motherboards, given appropriate jumper settings. The 225MHz and 240MHz processors will also support single voltage (3.52 or 3.3V) operation. Future versions of the IDT WinChip C6 processor will offer dual-voltage support.

How does the IDT WinChip C6 differ from other Pentium-class microprocessors from AMD, Intel and Cyrix?

The following tables summarize the major features of the IDT WinChip C6 processor and its primary competitors. The information is as specified in the competitive processor's data sheets and is accurate only as of the time this FAQ is written. The features are those that characterize the primary capabilities of a x86 processor.

The IDT WinChip C6 processor has equivalent or better cache (double the cache versus the Pentium with MMX technology) and translation look-aside buffer (TLB) capabilities. These are critical to system performance for modem PC operating systems and applications.

Major Features	C6	P55	K6	6x86MX
I-Cache Size	32KB	16KB	32KB	256
Data Ways	2	4	2	assoc
D-Cache Size	32KB	16KB	32KB	64 KB unified I & D cache
Data Ways	2	4	2	4
TLB Size (I/D)	64/64	32/64	64/128	16
Ways	4	assoc	?	direct
L2 TLB	N	N	N	64 X 6
Page Dir Cache	8 entries	N	N	N

The IDT WinChip processor has a very simple instruction execution architecture. This results in a very small die size for the functions provided (and thus facilitates its low price and low power).

Major Features	C6	P55	K6	6x86MX
Decode	Single In-order	2 Insts In-order	3 Insts In-order	2 Insts In-order
Issue & Execute	Single In-order	2 Insts In-order	3 Insts Out-order	2 Insts Out-order
Branch Prediction	N	Y	Y	Y
Call/Return Stack	8 entries	Y	16 entries	N

The IDT WinChip C6 processor has very competitive internal frequency. This high frequency, combined with the large caches, yields very good *system* performance.

Major Features	C6	P55	K6	6x86MX

Clock Multiplier Ratios (vs. Bus frequency)	2x, 3x, 4x 5X	2x,3x, 3/2x, 5/2x	2x,3x, 3/2x, 5/2x	2x,3x, 3/2x, 5/2x
Bus Speed (MHz)	60,66,75	60,66	66	66,75
Max Internal Freq (MHz)	240	233	233	187.5 (233PR)

The IDT WinChip C6 processor has a much smaller die size which results in lower manufacturing costs. In addition, IDT uses a lower cost (4 layer metal) CMOS process to manufacture the IDT WinChip C6. Many of the competitors are using a more expensive 5 layer metal process.

Major Features	C6	P55	K6	6x86MX
Technology Metal	.35µ	.35µ	.35µ	.35µ
Poly	.28µ			
	4LM CMOS	4LM CMOS	5LM+LI CMOS	5LM
Voltage I/O Core	3.3/3.52 same	3.3 2.8/2.45	3.3 2.9/3.2	3.3 2.9
Die Size	88 mm^2	128 mm^2	162 mm^2	197 mm^2

The IDT WinChip C6 processor has superior (reduced) power dissipation versus other Pentium-class processors.

Major Features	C6	P55	K6	6x86MX
MHz	200	200	200	166 (PR200)
Worst Case Watts 3.52V 3.3V	10.4 8.9	15.7 (2.8V)	20.0 (2.9V)	20.2 (2.9V)

What is the performance of the IDT WinChip C6 processor business applications?

The IDT WinChip C6 is optimized to deliver superior price/performance to the sub-$1000 desktop PC and sub-$2000 mobile systems. Please refer to www.winchip.com to get the latest benchmarking information.

Winstone 97 Business Performance--Socket 7-compliant processors:

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IDT WinChip C6 MMX        200MHz        43.5
Intel Pentium w/MMX              200MHz        43.2
AMD K6 MMX               200MHz        44.8
Cyrix 6x86MX             200MHz        46.1
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IDT WinChip C6 Benchmarking configuration:

Holco Shuttle 565 Motherboard: Socket 7
Intel 430 TX Chip Set
Award 4.5x BIOS
512 KB Level 1 Cache
32 MB EDO DRAM 60 ns
Diamond Stealth 3D 2000 (S3 Virge) w/2MB EDO DRAM
Western Digital Caviar 1.6 GB IDE Hard Disk
Samsung 24x CDROM
ESS 1768 PnP Sound Card
1.44 MB floppy
Baby AT Case w/230 Watt Power Supply

Will the IDT WinChip C6 work with my motherboard?

Check to see if your motherboard is listed on our Motherboard Compatibility List
(http://www.winchip.com).

If your motherboard is not listed, the IDT WinChip C6 will work in most Socket 7 motherboards depending upon the BIOS manufacturer and revision. The IDT WinChip C6 is supported by the following BIOS manufacturers: AMI, AWARD, Phoenix, and SystemSoft. Centaur Technology is working with additional vendors for BIOS support. If your BIOS is not listed or you are not certain, contact your motherboard manufacturer for IDT WinChip C6 support.

Older BIOS revisions from the following vendors may not allow proper operation due to the BIOS's inability to recognize the IDT WinChip processor. The BIOS can act as a lock, preventing unsupported CPU's from running, by checking the CPUID string or writing to proprietary Model Specific Registers. Verify your BIOS with the following:

- AMI BIOS version 6.27.02 or later.
Some earlier AMI BIOS releases do not work with an IDT WinChip C6, AMD K6, or Cyrix 6x86MX processor. AMI BIOS will only work with CPU's that the motherboard manufacturer explicitly supports. Most motherboards recently released (September 1997) with AMI BIOS will support the IDT WinChip C6.

- Award BIOS Compile date of September 1, 1997 or later will support the IDT WinChip C6 processor.
Older Award BIOS releases will allow an IDT WinChip C6 to boot even though it does not recognize the CPU. The IDT WinChip C6 may be identified as a MMX CPU, 80486DX2, etc. The system will function normally. Contact your motherboard manufacturer for a BIOS update that will correctly identify the IDT WinChip C6.

- Phoenix BIOS Compile date of October 13, 1997 or later will support the IDT WinChip C6.

- SystemSoft BIOS Compile date of September 1 or later.

If your notebook supports a Socket 7 CPU, then older revisions of SystemSoft BIOS will allow a C6 to work but incorrectly identifies the CPU. Contact your notebook manufacturer for a BIOS upgrade that fully supports the C6.

What bus frequencies and clock ratios are supported on the IDT WinChip C6?
The IDT WinChip bus frequencies and clock ratios are listed in the following table:

IDT WinChip C6 Model	Bus	Clock Radio	BF2 Pin (W-35)	BF1 Pin (X-34)	BFO Pin (Y-33)
180-MHz	60-MHz	3X	1	0	1
200-MHz	66-MHz	3X	1	0	1
225-MHz	75-MHz	3X	1	0	1
240-MHz	60-MHz	4X	1	1	1

A clock ratio comparison between the IDT WinChip C6 and the Pentium is listed here:

BF2	BF1	BF0	IDT WinChip C6 Clock Ratio	P55 Clock Ratio
1	0	0	*reserved*	5/2x
1	0	1	3x	3x
1	1	0	2x	2x
1	1	1	4x	3/2x
0	0	0	*reserved*	
0	0	1	5x	
0	1	0	4x	
0	1	1	*reserved*	

Can I replace the 60, 66, 75, 90, 100, 120, 133, and 150MHz Pentium processor on my motherboard with the IDT WinChip C6 processor?

Yes and No. The IDT WinChip C6 processor is Socket 7-and bus-compatible with the Pentium processor. Existing Socket 7 motherboards which support the 75, 90 MHz and higher MHz Pentium and Pentium processor with MMX technology processor families, will work with the IDT WinChip C6 with certain modifications for processor clock speed, system bus speed, voltage setting, and most recent BIOS revision. Because the IDT WinChip C6 processor operates at a single voltage, it is an ideal upgrade to older single-voltage, 3.52V or 3.3V Pentium (75-150MHz) motherboards that cannot take advantage of new, higher-performance, dual-voltage processors from Intel, AMD, and Cyrix.

The 60 and 66 MHz Pentium processors use an older (5 Volt) motherboard design and processor socket. An upgrade product is needed to support these older motherboards with Socket 7 processors from IDT, Intel, AMD and Cyrix.

If you have questions about the specific requirements for your motherboard or PC to support upgradabiliity to the IDT WinChip C6 processor, please contact your systems vendor or motherboard supplier.

Where can I purchase the IDT WinChip C6 processor or processor-based PC's?

IDT WinChip C6 processor-based PCs are available from a variety of PC vendors. For a current list of companies and models visit our web site at www.winchip.com.

What is the warranty for the IDT WinChip C6 processor?

Any warranty covering your WinChip C6 processor is provided to you by your point of purchase. All warranty requests on processors not purchased directly from IDT should be directed to your point of purchase.

I am a reseller or end user, how can I get information on the IDT WinChip C6?

Please visit our web site (www.winchip.com) or call 1-800-winchip to get the latest information.

How do I get answers to questions not covered by the FAQ?

Please visit our web site (www.winchip.com) or call 1-800-winchip to get latest information.