Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

1. Apacer DDR2 PC4300 CL4

Apacer DDR2 PC4300 CL4 Go

Apacer® Apacer was founded in 1997 while two years later, it was ranked as the fourth-largest third-party manufacturer in the highly competitive global memory module market. Apacer's product line has evolved from memory modules and flash cards to include a full range of memory modules for notebooks, desktops, servers and a range of proprietary applications; portable flash memory solutions; ATA disk chips and modules (ADC/ADM); and the brand-new, stand-alone DISC STENO system.

Apacer uses Elpida's memory chipsets for its Memory modules.

Specs by Apacer

- 240pin DIMM,240pin ECC DIMM,200pin SO DIMM
- 256MB/512MB/1GB
- x64bit.x72bit,FBGA
- 1.8V CL4

Apacer DDR2 PC4300 CL4

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- JPEG Patent Case Progress

Home > Hardware Reviews > PC Parts

Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

2. Transcend DDR2 PC4200

Transcend DDR2 PC4200 Go

Transcend was founded in 1988 and has its headquarters in Taipei, Taiwan. The company's product portfolio has grown to include over 2,000 memory modules of every type, flash memory cards, USB pen drives, portable HDDs, multimedia products, graphics cards and accessories. Transcend products are available for proprietary equipment, as well as for mass marketed PCs.

Transcend is the first memory module manufacturer in Taiwan and the second in the world to receive ISO 9001 Certification.

- Memory Description & Specs

The memory we have has the model number TS64MLQ64V5J and is a 64M x 64bits DDR2-533 Unbuffered DIMM. The TS64MLQ64V5J consists of 8 pieces of 64Mx8bits DDR2 SDRAMs in 60 ball FBGA packages and a 2048 bits serial EEPROM on a 240-pin printed circuit board. The TS64MLQ64V5J is a Dual In-Line Memory Module and is intended for mounting into 240-pin edge connector sockets. Synchronous design allows precise cycle control with the use of system clock. Data I/O transactions are possible on both edges of DQS. Range of operation frequencies, programmable latencies allow the same device to be useful for a variety of high bandwidth, high performance memory system applications.

Transcend uses Samsung's memory chipsets for its Memory modules.

Features

- JEDEC standard 1.8V ± 0.1V Power supply
- VDDQ=1.8V ± 0.1V
- Max clock Freq: 267MHZ; 533Mb/S/Pin.
- Posted CAS
- Programmable CAS Latency: 3,4,5
- Programmable Additive Latency :0, 1,2,3 and 4
- Write Latency (WL) = Read Latency (RL)-1
- Burst Length: 4,8(Interleave/nibble sequential)
- Programmable sequential / Interleave Burst Mode
- Bi-directional Differential Data-Strobe (Single-ended data-strobe is an optional feature)
- Off-Chip Driver (OCD) Impedance Adjustment
- MRS cycle with address key programs.
- On Die Termination - Refresh and Self Refresh Average Refresh Period 7.8us at lower then TCASE 85°C, 3.9us at 85°C < TCASE < 95 °C
- Serial presence detect with EEPROM

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- New External Hard Disk Withstands Falls From Great Height
- JPEG Patent Case Progress

Home > Hardware Reviews > PC Parts

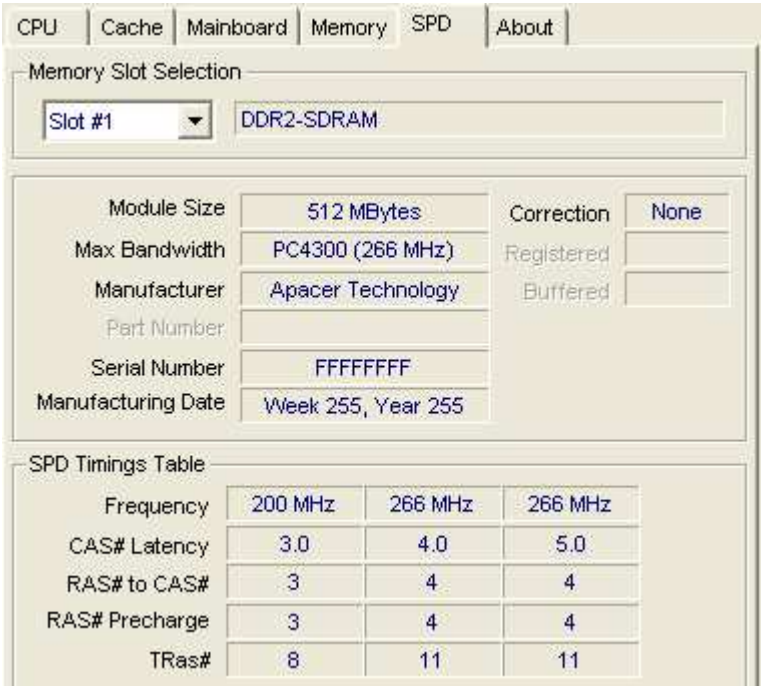
Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

3. Test Configuration & System

Test Configuration & System Go

After installing the four memory modules in our test system, two from Apacer and two from Transcend, both dual channel, we ran CPU-Z in order to see how they were identified under WinXP (SP2).



CPU | Cache | Mainboard | Memory | SPD | About

Memory Slot Selection

Slot #1 — DDR2-SDRAM

Module Size	512 MBytes	Correction	None
Max Bandwidth	PC4300 (266 MHz)	Registered	
Manufacturer	Transcend Information	Buffered	
Part Number	TS64MLQ64V5J		
Serial Number	0001AEA3		
Manufacturing Date	Week 05, Year 05		

SPD Timings Table

Frequency	200 MHz	266 MHz	266 MHz
CAS# Latency	3.0	4.0	5.0
RAS# to CAS#	3	4	4
RAS# Precharge	3	4	4
TRas#	8	11	11

The first tests were done at 533Mhz with timings left to SPD settings. We selected this mode because a beginner will most likely set everything in the BIOS to auto and avoid any advanced settings configuration. Below you can see details of the configuration for both memories:

	Apacer	Transcend
Timings		
Frequency	267.6 MHz	269.7 MHz
FSB:DRAM	3:4	3:4
CAS# Latency	3.0 clocks	4.0 clocks
RAS# to CAS# Delay	3 clocks	4 clocks
RAS# Precharge	4 clocks	4 clocks
Cycle Time (Tras)	8 clocks	11 clocks

CPU			
Clocks		Clocks	
Core Speed	3010.6 MHz	Core Speed	3033.7 MHz
Multiplier	x 15.0	Multiplier	x 15.0
FSB	200.7 MHz	FSB	202.2 MHz
Bus Speed	802.8 MHz	Bus Speed	809.0 MHz

Then, we increased the frequency, looking for the upper limit for the DDR2 modules, with the help of Memtest86+. The timings were left at 4-4-4-11. The limit for both was the same, at **654MHz**. At 655MHz, Memtest86+ reported errors. The bandwidth, as it was reported by Memtest86+, was **3493MHz** for the Apacer set and **3425MHz** for the Transcend. The FSB at this point was set at 245 instead of 200 and the CPU was running at 3.68GHz.

Apacer	Transcend

Timings		
Frequency	327.3 MHz	327.3 MHz
FSB:DRAM	3:4	3:4
CAS# Latency	4.0 clocks	4.0 clocks
RAS# to CAS# Delay	4 clocks	4 clocks
RAS# Precharge	4 clocks	4 clocks
Cycle Time (Tras)	11 clocks	11 clocks

CPU			
Clocks		Clocks	
Core Speed	3681.9 MHz	Core Speed	3681.9 MHz
Multiplier	x 15.0	Multiplier	x 15.0
FSB	245.5 MHz	FSB	245.5 MHz
Bus Speed	981.8 MHz	Bus Speed	981.8 MHz

Finally, we tried to find the higher limit for each memory, once again with Memtest86+. Although Transcend at **693MHz** had a marginally higher limit than Apacer at 691MHz, Apacer had better timings and higher bandwidth in Memtest86+, **3710MHz** instead of **3319MH**z. Also notice that the bandwidth for Transcend at 693MHz is lower than at 654MHz. More details on the timings and the CPU clock can be found in the following table.

	Apacer	Transcend
Timings		
Frequency	345.9 MHz	347.3 MHz
FSB:DRAM	3:4	3:4
CAS# Latency	4.0 clocks	5.0 clocks
RAS# to CAS# Delay	4 clocks	5 clocks
RAS# Precharge	4 clocks	5 clocks
Cycle Time (Tras)	11 clocks	15 clocks

CPU			
Clocks		Clocks	
Core Speed	3891.8 MHz	Core Speed	3906.8 MHz
Multiplier	x 15.0	Multiplier	x 15.0
FSB	259.5 MHz	FSB	260.5 MHz
Bus Speed	1037.8 MHz	Bus Speed	1041.8 MHz

In the following pages, you can see the difference in performance between the two memory sets from Apacer and Transcend.

Here's a rundown of our **testbed**:

System Specifications
CPU: Intel Pentium 4 3.00Ghz 530
Cooler: Arctic Cooling Freezer 7
Case: Antec
Motherboard: Asus P5WD2 Premium
Power supply: CoolerMaster 450W
Memory: Apacer, Transcend PC4300 (dual channel)
VGA: Aopen Aeolus 6800Ultra PCI-E
Hard Disk Drive: WD800JD 80GB 7200RPM
OS: Windows XP Pro SP2
Drivers: 7.1.8.4
DirectX: v9.0c

Motherboard			
Manufacturer	ASUSTeK Computer INC.		
Model	P5AD2-E-Premium	Rev 1.xx	
Chipset	Intel	i925XE	Rev. C2
Southbridge	Intel	82801FB (ICH6)	
Sensor	Winbond	W83627EHF	

BIOS	
Brand	American Megatrends Inc.
Version	1005.002
Date	03/23/2005

Benchmarks & Applications used

- Memtest86+-1.60
- Sisoft Sandra 2005
- PcMark04
- Performance Test V5.0 (PassMark)
- Half Life 2 - VST
- CPU-Z v1.29

Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

4. SiSoft Sandra 2005

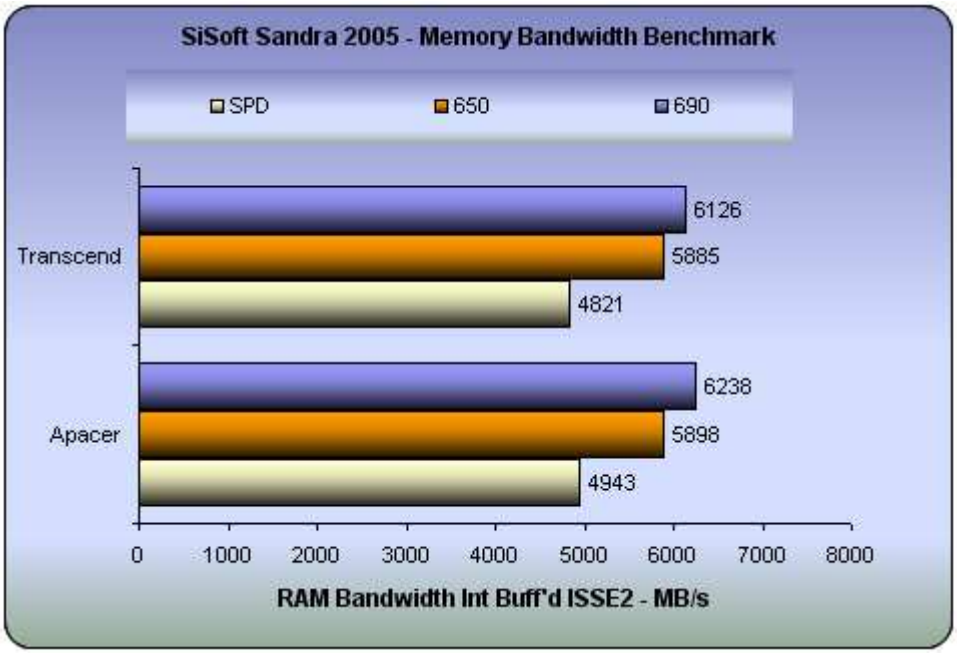
SiSoftware Sandra is a 32 and 64-bit Windows system analyser that includes benchmarking, testing and listing modules. It tries to go beyond other utilities to show you more of what is really going on under the hood so you draw comparisons at both a high and low-level in a single product.

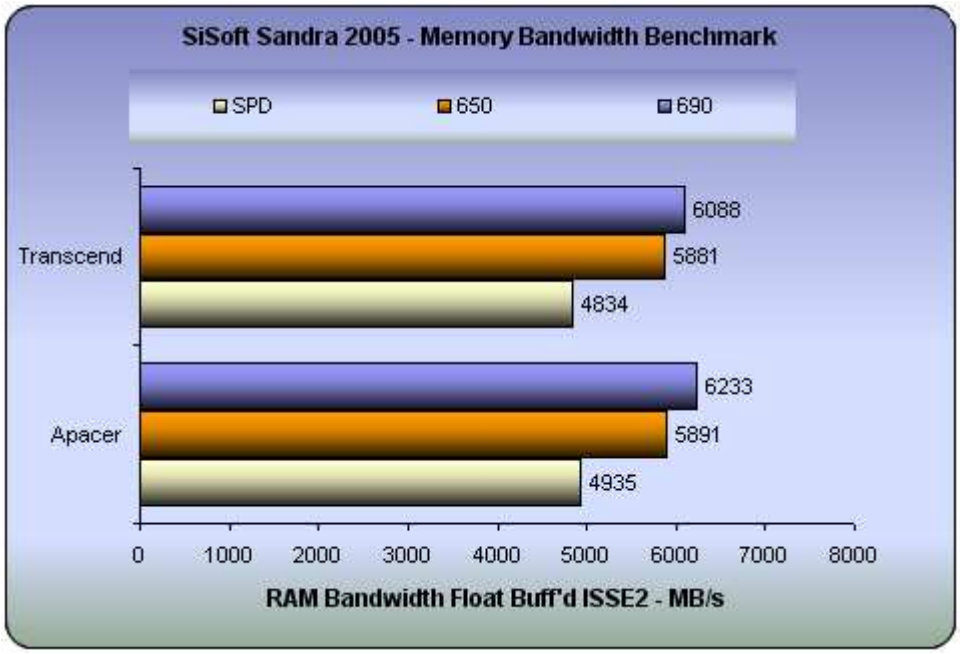
You can get information about the CPU, chipset, video adapter, ports, printers, sound card, memory, network, Windows internals, AGP, ODBC Connections, USB2, Firewire etc. You can save/print/fax/e-mail/post/upload or insert into ADO/ODBC databases reports in text, HTML, XML, SMS/DMI or RPT format.

This version supports multiple sources of information gathering including: remote computers, PDAs, Smart Phones, ADO/ODBC databases or saved system reports. All benchmarks are optimised for both SMP & SMT (Hyper-Threading), up to 32/64 CPUs depending on the platform.

Memory Bandwidth Benchmark

Tests how your memory sub-system compares to other systems with the same or similar memory in other systems. The benchmark is based on the well-known STREAM memory bandwidth benchmark.



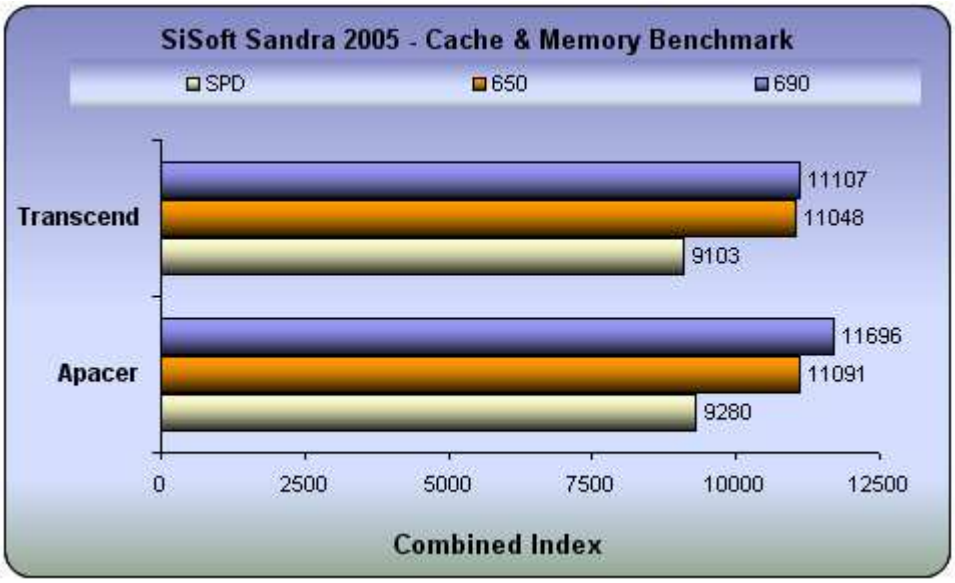


Cache & Memory Benchmark

Tests how your CPU cache and memory sub-system(s) compares to other systems with the same or similar CPU & memory in other systems. The benchmark is based on the Memory Bandwidth Benchmark test.

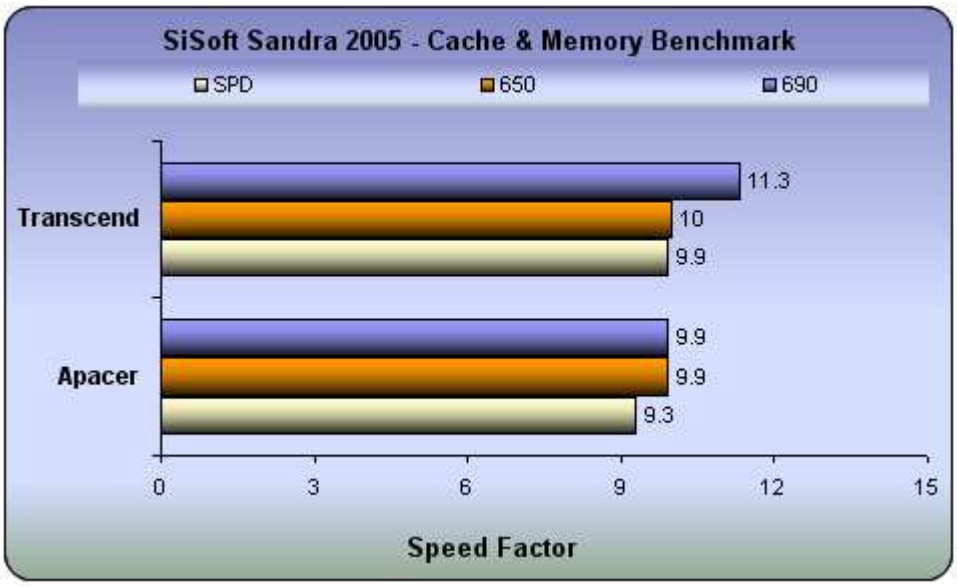
***Combined Index**: is a composite figure representing the overall performance rating of the entire Cache-Memory performance in terms of MB/s. The value is the logarithmic average of all the results for the entire address space. (**Higher is better**, i.e. better performance)*

For block sizes that could not been tested - the average of previous blocks is used, thus the size of the memory (as long as it is not comparable to largest cache size) is not significant; all cache sizes are significant - larger caches will result in a higher index.



Speed Factor*: is a figure representing the speed differential between the CPU's cache and memory. The value is the ratio of the fastest cache (i.e. L1) bandwidth to the main memory bandwidth. (**Lower is better**, i.e. the memory is not very much slower than CPU's cache)*

As the factor is a ratio, it is useful only in comparing different CPUs and memory sub-systems rather than having a direct, physical interpretation associated to its numerical value.



Apacer was faster in all cases. No matter what the speed, Apacer reported better performance.

Although Apacer was better in the memory tests than Transcend, with Transcend, the CPU proved to operate faster, with both memory sets running at their limits.

Apacer	**3.68GHz**	Dhrystone ALU 10762 MIPS Whetstone FPU/iSSE2 4396/7582 MFLOPS
	3.89GHz	Dhrystone ALU 11395 MIPS Whetstone FPU/iSSE2 4632/8095 MFLOPS
Transcend	**3.68GHz**	Dhrystone ALU 10776 MIPS Whetstone FPU/iSSE2 4428/7642 MFLOPS
	3.90GHz	Dhrystone ALU 11409 MIPS Whetstone FPU/iSSE2 4675/8053 MFLOPS

Thursday, July 21, 2005

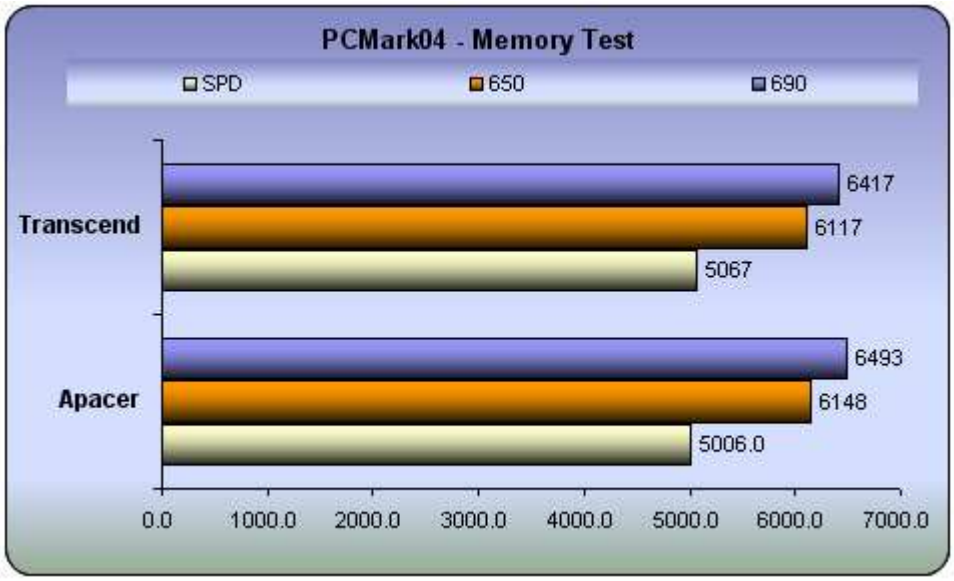
Apacer VS Transcend (DDR2 533MHz)

5. PCMark04

PCMark04 Go

PCMark04 is an application-based benchmark and a premium tool for measuring overall PC performance. It uses portions of real applications instead of including very large applications or using specifically created code. This allows PCMark04 to be a smaller installation as well as to report very accurate results. As far as possible, PCMark04 uses public domain applications whose source code can be freely examined by any user.

PCMark04 includes 4 categorized suites for benchmarking your computer. These include CPU, Graphics, Memory and a Hard Disk Drive benchmark. In our case, we selected to run only the Memory test suite.



According to PCMark's total score, Apacer was faster at 650MHz and at 690MHz while Transcend had slightly better performance only at 533MHz.

If you take a look at the following table, you'll notice that in quite a few cases, Transcend reported higher transfer rates.

PCMark04 Memory Test	SPD		650		690	
	Apacer	Transcend	Apacer	Transcend	Apacer	Transcend

Raw Block Read - 8 MB	6184.4	6058.9	7365.2	7346.9	7749.3	7702.5
Raw Block Read - 4 MB	6480.5	6404.6	7729.5	7609.9	8025.6	7997.9
Raw Block Read - 192 KB	23650.5	23826.5	28873.1	28873.5	30555.9	30680.5
Raw Block Read - 4 KB	39879.6	40175.1	48615.3	48500.1	51348.9	51736.1
Raw Block Write - 8 MB	4061.4	4092.3	4956.5	4944.9	5231.0	5267.2
Raw Block Write - 4 MB	4061.2	4092.7	4956.4	4947.2	5239.6	5265.3
Raw Block Write - 192 KB	10163.6	10241.8	12404.1	12369.1	13108.6	13183.6
Raw Block Write - 4 KB	10196.8	10269.4	12436.4	12414.5	13147.4	13221.1
Raw Block Copy - 8 MB	2255.8	2140.8	2642.0	2578.8	2822.1	2626.5
Raw Block Copy - 4 MB	2507.3	2380.5	2915.5	2873.4	3082.9	2888.6
Raw Block Copy - 192 KB	7966.2	8021.3	9713.5	9692.1	10262.2	10324.5
Raw Block Copy - 4 KB	10190.0	10275.3	12441.0	12415.1	13147.3	13208.5
Random Access - 8 MB	3809.1	3486.3	4292.0	4274.2	4533.9	4418.5
Random Access - 4 MB	3803.0	3546.2	4283.8	4277.4	4533.6	4402.8
Random Access - 192 KB	6273.5	6296.5	7169.7	7431.3	7743.7	8256.5
Random Access - 4 KB	4765.1	10188.3	12374.0	12357.8	12976.0	13145.8

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Home > Hardware Reviews > PC Parts

Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

6. Performance Test v5.0

Performance Test v5.0 Go

Passmark PerformanceTest is an award winning PC hardware benchmark utility that allows everybody to quickly assess the performance of their computer and compare it to a number of standard 'baseline' computer systems.

Twenty seven standard benchmark tests are available in seven test suites plus, there are five advanced testing windows for custom benchmarking. CPU Tests, 2D Graphics Tests, 3D Graphics Tests, Disk Tests, Memory Tests and CD/DVD Tests. In our case we selected the Memory suite Tests.

- Memory Benchmarks

This suite contains a number of tests that exercise the memory sub-system of the computer. (Random Access Memory- RAM)

Memory - Allocate small block
This test measures the time taken to allocate & free small zeroed memory blocks (around 100KB block size)

Memory - Cached
This test measures the time taken to read a small block of memory. The block is small enough to be held entirely in cache (if one is present)

Memory - UnCached
This test measures the time taken to read a large block of memory. The block is too large to be held in cache.

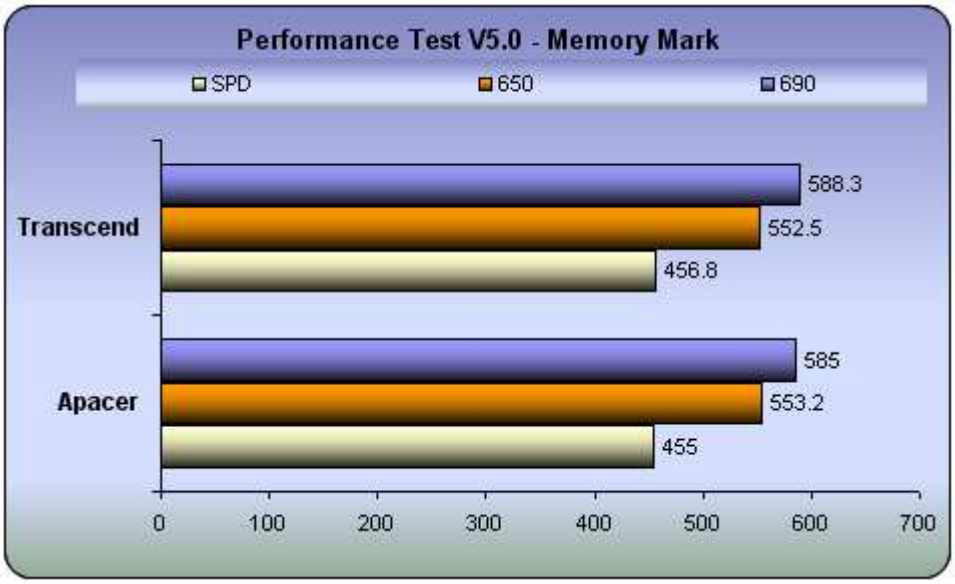
Memory - Write
This test measures the time taken to write information into memory.

Apacer	SPD	650MHz	690MHz

Memory - Allocate Small Block	Result	Result	Result
This Computer	1119.9	1369.8	1448.0
Memory - Read Cached	**Result**	**Result**	**Result**
This Computer	1391.6	1699.2	1796.4
Memory - Read Uncached	**Result**	**Result**	**Result**
This Computer	1341.1	1614.6	1708.9
Memory - Write	**Result**	**Result**	**Result**
This Computer	813.9	990.0	1046.4
Memory Mark	**Result**	**Result**	**Result**
This Computer	455.0	553.2	585.0
PassMark Rating	**Result**	**Result**	**Result**
This Computer (Partial result)	81.9	99.6	105.3

Transcend	SPD	650MHz	690MHz
Memory - Allocate Small Block	**Result**	**Result**	**Result**
This Computer	1131.0	1368.6	1455.6
Memory - Read Cached	**Result**	**Result**	**Result**
This Computer	1402.1	1695.9	1805.1
Memory - Read Uncached	**Result**	**Result**	**Result**
This Computer	1331.6	1614.5	1721.4
Memory - Write	**Result**	**Result**	**Result**
This Computer	820.1	987.6	1051.5
Memory Mark	**Result**	**Result**	**Result**
This Computer	456.8	552.5	588.3
PassMark Rating	**Result**	**Result**	**Result**
This Computer (Partial result)	82.2	99.4	105.9

This time, Performance Testv5.0 reported that Transcend was better at 533MHz and 690MHz while Apacer only at 650MHz but with a negligible difference.



- Advanced Memory Benchmark

Memory Speed Per Access Step Size
The first test type, 'Memory Speed Per Access Step Size' accesses a large block, of memory in various sized steps. First, it runs through the block of memory sequentially, accessing every value. Next it runs through the same block again, except this time it accesses every second value. On this occasion, it runs through the block twice in order to access the same amount of data as the initial step. Next it runs through the same block again, except this time it accesses every fourth value and so makes four passes. And so on, until a certain maximum step size is reached.

The size of the block of memory used for this test is one quarter the amount of system RAM. The size of the steps varies from 1 (continuous sequential access), to one quarter the size of the block of memory (i.e. one sixteenth of the system RAM).

Memory Speed (MB/Sec. per Step Size)	SPD (MB/s)	650MHz (MB/s)	690MHz (MB/s)
Apacer			
Block Read Speed	31.49	36.71	38.87
Block Write Speed	21.91	25.65	27.11
Transcend			
Block Read Speed	31.11	36.47	37.49
Block Write Speed	21.09	25.48	25.26

Memory Speed Per Block Size
When a computer program wants to use a section of memory to store data, it makes a request to Windows for the amount of memory it requires. Windows allocates the memory to the program (unless system resources are very low) and returns to the requesting program the address of the first memory slot in the allocated block. It is possible that some programs may request very large amounts of memory. The 'Memory Speed Per Block Size' test like the 'Memory Speed Per Access Step Size' test, is composed of many steps. During each step of the test, PerformanceTest requests a block of memory and runs through the block measuring the average access time. However on each subsequent step the size of the requested memory is increased, until finally a block close to the size of the system RAM is requested. In this way it is possible to observe the different access speeds for the different sizes of blocks.
Typically it is possible to see very fast memory access for blocks which are small enough to fit entirely into the L2 RAM cache, and slower access times for larger blocks accessed from main RAM. In the case where system resources are low, swapping to the disk may even be required for very large blocks.

Memory Speed (MB/Sec. per Block Size)	SPD (MB/s)	650MHz (MB/s)	690MHz (MB/s)
Apacer			
Block Read Speed	343.06	420.33	443.51
Block Write Speed	239.00	291.72	308.40
Transcend			
Block Read Speed	343.84	416.49	445.78
Block Write Speed	240.52	289.71	307.66

In this advanced memory benchmark, Apacer proved to be faster at both reading and writing than the Transcend.

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Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

7. Half Life 2

Half Life 2 Go

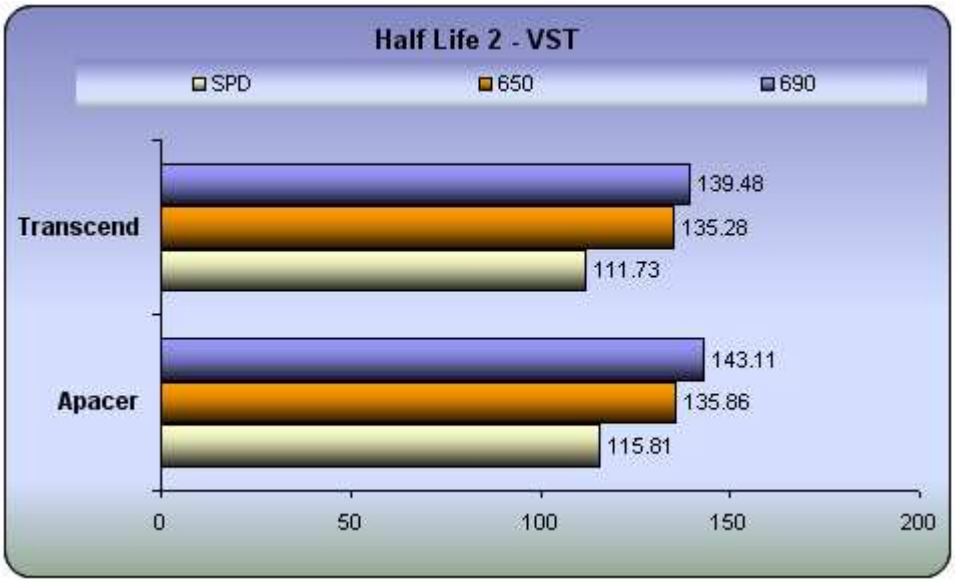
Half life 2 is no doubt the most anticipated pc game of all times. Gamers having the excellence of Half Life 1 in mind, as well as the remarkable E3 demo preview, have been anxiously waiting for the much delayed release of HL2.

Physics - From pebbles to water to 2-ton trucks respond as expected, as they obey the laws of mass, friction, gravity, and buoyancy.

Graphics - Source's shader-based renderer, like the one used at Pixar to create movies such as Toy Story® and Monster's, Inc.®, creates the most beautiful and realistic environments ever seen in a video game.



AI - Neither friends nor enemies charge blindly into the fray. They can assess threats, navigate tricky terrain, and fashion weapons from whatever is at hand.



With games, the increased FSB in combination with the memory speed, boosted the performance. Apacer reported higher frame rates at 533MHz and 690MHz than Transcend, while at 650MHz both module sets had similar performance.

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Thursday, July 21, 2005

Apacer VS Transcend (DDR2 533MHz)

8. Conclusion

Conclusion Go

Apacer® VS Transcend

The overall performance for both memory sets was good if we keep in mind that we are dealing with inexpensive DDR2 solutions. The fact that both sets were capable of running at 690MHz is rather good, especially for the Apacer modules which had lower timings and higher bandwidth, according to Memtest86+. The Apacer modules managed to retain the 4-4-4-11 at 693MHz while the Transcend had to be decreased to 5-5-5-15. The highest bandwidth with Memtest86+ was 3710MHz for the Apacer at 693MHz, and 3425MHz for the Transcend when running at 654MHz.

According to our tests, Apacer proved to be better and faster than Transcend no matter what the speed was. SiSoft Sandra 2005, PCMark04 reported higher performance for the Apacer while in PerformanceTest v5.0, Apacer was faster at both read and write than Transcend. In games, the overclocked CPU in combination with the increased memory speed raised the performance, which one more time was slightly better with the Apacer modules. On the other hand, with Transcend modules installed, the CPU was slightly better when operating at limits.

At e-market, it is much easier to locate Transcend's memory modules than Apacer's. Prices are around US$45 for the Transcend 512MB module while the same module from Apacer costs approximately US$55.

Conclusion Go XML