

## Performance Comparison of Intel Celeron on Intel D845GLVA Motherboards and AMD Sempron on ECS KM400-M2 Motherboards

### For Intel Corporation

#### Executive summary

Intel Corporation (Intel) commissioned Principled Technologies (PT) to run a set of benchmarks and performance tests on four custom-built PCs, two using Intel Celeron processors on Intel D845GLVA motherboards and there other two using AMD Sempron processors on ECS KM400-M2 motherboards. Intel identified the processors; PT selected and purchased the components for the systems, built them, and executed all tests. We tested all systems with Windows XP, Service Pack 2 and all Windows updates applicable as of April 29, 2005.

Other than the benchmarks and the programs they required, we did not install any additional software on the systems. To accommodate specific requirements and/or issues of some of the tests, we had to make some system changes; we note all such changes in the notes below the test results. In the Test methodology section below, we document the methodologies we followed with each test.

We executed the following benchmarks and performance tests.

- SYSmark 2004
- WebMark 2004
- PCMark04 CPU test
- SiSoft Sandra 2005
  - CPU Arithmetic Benchmark
  - CPU Multi-Media Benchmark
  - Memory Benchmark (Bandwidth)
  - Cache & Memory Benchmark (Bandwidth)

We report the mean of three test runs with each benchmark unless we note otherwise in the Test methodology section. We normalized all results to those of the systems with the Intel Celeron 2.10 GHz and the Intel Celeron 2.40 GHz processor. Thus, those systems' results are 1.00 for each of the tests in the charts. In Figure 1, we compared the system with the Intel Celeron 2.10 to system with the AMD Sempron 2200+. In Figure 2, we compared the system with the Intel Celeron 2.40 to the system with the AMD Sempron 2600+. For the AMD Sempron systems, results greater than 1.00 indicate performance above that of the Celeron 2.10 and 2.40 systems, while results below 1.00 indicate slower performance.

Processor Manufacturer and Model Type / Motherboard	Intel Celeron 2.10 / Intel D845GLVA	AMD Sempron 2200+ / ECS KM400-M2
PCMark04 1.20 – CPU	1.00	0.81
WebMark 2004 + Patch 1 - Geomean (overall score) - OFF LINE	1.00	1.04
SYSmark 2004 + Patch 2 - Overall score	1.00	0.95
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Whetstone FPU MFLOPS	1.00	1.23
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Dhrystone ALU MFLOPS	1.00	0.90

Processor Manufacturer and Model Type / Motherboard	Intel Celeron 2.10 / Intel D845GLVA	AMD Sempron 2200+ / ECS KM400-M2
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Whetstone iSSE2 MFLOPS	1.00	N/A
SiSoft Sandra 2005 - CPU Multi-Media Benchmark - Integer x8 iSSE2 - it/s	1.00	0.87
SiSoft Sandra 2005 - CPU Multi-Media Benchmark - Float x4 iSSE2 -it/s	1.00	0.75
SiSoft Sandra 2005 - Memory Benchmark - RAM Bandwidth Int Buff'd iSSE2 - MB/s	1.00	0.95
SiSoft Sandra 2005 - Memory Benchmark - RAM Bandwidth Float Buff'd iSSE2 - MB/s	1.00	0.87
SiSoft Sandra 2005 - Cache/Memory Benchmark - Combined Index results - MB/s	1.00	0.74
SiSoft Sandra 2005 - Cache/Memory Benchmark - Speed factor	1.00	0.58

**Figure 1: Results of the performance tests on Intel Celeron 2.10 and AMD Sempron 2200+ systems, normalized to the results of the system with the Intel Celeron 2.10 GHz processor.**

Processor Manufacturer and Model Type / Motherboard	Intel Celeron 2.40 / Intel D845GLVA	AMD Sempron 2600+ / ECS KM400-M2
PCMark04 1.20 – CPU	1.00	0.86
WebMark 2004 + Patch 1 - Geomean (overall score) - OFF LINE	1.00	1.12
SYSmark 2004 + Patch 2 - Overall score*	1.00	1.00
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Whetstone FPU MFLOPS	1.00	1.33
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Dhystone ALU MFLOPS	1.00	0.96
SiSoft Sandra 2005 - CPU Arithmetic Benchmark - Whetstone iSSE2 MFLOPS	1.00	N/A
SiSoft Sandra 2005 - CPU Multi-Media Benchmark - Integer x8 iSSE2 - it/s	1.00	0.93
SiSoft Sandra 2005 - CPU Multi-Media Benchmark - Float x4 iSSE2 -it/s	1.00	0.79
SiSoft Sandra 2005 - Memory Benchmark - RAM Bandwidth Int Buff'd iSSE2 - MB/s	1.00	0.94
SiSoft Sandra 2005 - Memory Benchmark - RAM Bandwidth Float Buff'd iSSE2 - MB/s	1.00	0.88
SiSoft Sandra 2005 - Cache/Memory Benchmark - Combined Index results - MB/s	1.00	0.78
SiSoft Sandra 2005 - Cache/Memory Benchmark - Speed factor	1.00	0.60

**Figure 2: Results of the performance tests on Intel Celeron 2.40 and AMD Sempron 2600+ systems, normalized to the results of the system with the Intel Celeron 2.40 GHz processor.**

\*For SYSmark 2004 testing on the AMD Sempron 2600+/ECS KM400-M2 system, we ran multiple three-iteration tests to generate the Full Disclosure Report (FDR), but were consistently unsuccessful due to errors that caused the applications to crash or due to high variability. We were forced to run SYSmark 2004 with a single iteration and generate an FDR based on that run. These results are reflected in Figure 2 above.

Appendix A provides the cost of the hardware components we used to build all the systems and Appendix B shows the total cost of each system. Appendix C provides details of their configurations and Appendix D shows configuration details that the CPU-Z, Version 1.28 software utility reported.

## Test methodology

To create a level testing environment, we custom-built all four systems using as much common hardware as possible. Figure 3 summarizes key aspects of the configurations of all four systems; Appendix B provides detailed configuration information.

Processor	Intel Celeron 2.10	Intel Celeron 2.40	AMD Sempron 2200+	AMD Sempron 2600+
Motherboard	Intel D845GLVA	Intel D845GLVA	ECS KM400-M2	ECS KM400-M2
Chipset	845GL	845GL	VIA-KM400	VIA-KM400
RAM (512MB in each)	2 x 256MB PC2700	2 x 256MB PC2700	2 x 256MB PC2700	2 x 256MB PC2700
Hard drive (80GB in each)	Seagate ST380011A	Seagate ST380011A	Seagate ST380011A	Seagate ST380011A
DVD-ROM in each	Dynex DX-DVDR100	Dynex DX-DVDR100	Dynex DX-DVDR100	Dynex DX-DVDR100

**Figure 3: Summary of system configurations.**

We did not purchase monitors with the systems, so we used monitors from our test stock. (See Appendix C for the standard graphics adapter settings we used.)

After building each system, we then installed Windows XP, Service Pack 2 using the following process:

1. Pressed Next to set up Windows XP.
2. Selected United States, English and U.S. keyboard.
3. Selected Eastern Time.
4. Selected "Yes" to both the manufacturer (if present) and Microsoft End User License Agreements.
5. Selected "No" to automatic updates, because we wanted to manually control and monitor which updates we applied to each system to make sure the systems had comparable updates.
6. We named each computer after its maker and speed (e.g., Celeron2400).
7. We left each machine description blank.
8. Selected "Skip" during the How will this computer connect to the Internet?
9. Selected "No" to registering with Microsoft.
10. Selected "Finish".

We used the CDs that came with each motherboard to install the drivers for all motherboard components, such as chipsets, IDE controllers, integrated graphics and audio adapters, and network LAN adapters.

We then ran the Windows Update feature through Microsoft's Web site. We applied the following updates on 4/29/2005 to all systems:

- Critical Updates
  - KB886185
- Security Updates
  - KB891781
  - KB888113
  - KB873333
  - KB888302

- KB890175
- KB893086
- KB893066
- KB890859
- KB885835
- KB885250
- KB873339
- KB885836
- Security Updates for Windows Messenger
  - KB887472
- Update for Windows XP
  - KB887742
- Windows Malicious Software Removal Tool – April 2005
  - KB890830
- Cumulative Security Update for Internet Explorer for Windows XP Service Pack 2
  - KB890923
- Microsoft Windows Installer 3.1
- Windows Media Player 10
- Update for Windows Media Connect
- Cumulative Update for Outlook Express
  - KB887797
- Microsoft Windows Journal Viewer (Windows XP)
- Microsoft .NET Framework version 1.1
- Microsoft .NET Framework 1.1 Service Pack 1
  - KB886903
- Update for Windows XP HighMat Support in CD Writing Wizard
  - KB831240

The Windows Update site suggested the following update for the AMD Sempron 2200+ and AMD Sempron 2600+ systems, so we applied that update.

- VIA Technologies Inc. – Networking – VIA Rhine II Fast Ethernet Adapter – Released 3/14/2005

We then used Symantec's Ghost product to capture an image of each system's disk over our local network to a server. (To avoid perturbing any system's disk, we did not make a local Ghost image on that system's disk.) We then burned each Ghost image to a DVD.

*Standard process before starting each benchmark or test*

Each time we were to run a new benchmark or test on a machine, we used the Ghost image DVD for that system to return the machine to its original, just-set-up image. We then installed the software necessary to run the benchmark or test, made any system changes necessary to let the benchmark or test run, and rebooted.

After we completed each run of a benchmark or test, we rebooted before running the next iteration of that benchmark or test.

The following sub-sections summarize the steps we followed to run each of the benchmarks/tests in this report. These steps are the ones we followed to get successful runs of each benchmark/test. (In some cases we had to experiment to find workarounds for issues with the test; the sections below include the steps we discovered after that experimentation.)

SYSmark 2004 Office Productivity and Internet Content Creation (with Patch2)

We performed the following steps on each PC to make it ready to run this benchmark:

1. Perform the steps BAPCo recommends for readying a PC to run SYSmark 2004:
  - a. Right-click My Computer and choose Properties->Advanced tab. Choose the Settings button under the Performance heading. Choose the Advanced tab. Click the Change button under the Virtual memory heading. Select the Custom size radio button. Set the Windows XP Virtual memory size to twice the physical memory size (e.g., with 512MB of physical RAM set the Virtual memory to 1024MB) by entering that figure for both the Initial size and Maximum size fields. Click OK and close all My Computer windows.
  - b. Via the Printers and faxes option on the Control panel, uninstall any printers or faxes currently on the system by right-clicking each installed printer and fax and selecting Delete. The benchmark requires this step.
  - c. Right-click My Computer and choose Properties->System Restore tab. Select Turn off System Restore on all drives to turn off System Restore. The benchmark requires this step.
  - d. Right-click My Computer and choose Properties->Automatic Updates tab. Select Turn off Automatic Updates to disable Windows Update.
  - e. Reboot the system.
2. Install SYSmark 2004.
  - Place SYSmark 2004 CD in the DVD-ROM drive.
  - Click Next at the SYSmark 2004 Setup dialog box.
  - Accept the license agreement, and click Next.
  - Fill out the User Name, Company Name, and Serial Number fields in the Customer Information dialog box, and click Next.
  - Click Next at the Destination Directory dialog box.
  - Click Next at the Select Program Folder dialog box.
  - Click Yes at the Question dialog box.
  - Click Finish at the Installation Complete dialog box, and let the system reboot.
3. Install SYSmark 2004 patch 2.
  - Click Yes at the Question dialog box.
  - Click Finish at the Installation Complete dialog box.

We rebooted before the first SYSmark 2004 run (it reboots itself during its three real runs) and then followed this process to run the benchmark:

1. Launch SYSmark 2004.
2. Click Run on the left-side menu.
3. Select "Official Run", and choose three iterations. SYSmark 2004 will automatically reboot the system.
4. When the benchmark has completed the three official runs, the main SYSmark 2004 menu will appear. Select the Reports button, then Official Report scores, to view SYSmark 2004's test scores.

This benchmark produces, among other results, an Overall score that reflects the three runs; higher scores are better. Because the benchmark itself uses all three runs to compute its Overall score, we report that score (as opposed to the median three runs) in Figures 1 and 2.

#### WebMark 2004 (with Patch 1; offline)

We performed the following steps on each PC to make it ready to run this benchmark:

We first installed WebMark 2004:

1. Perform the steps BAPCo recommends for readying a PC to run SYSmark 2004:
  - a. Right-click My Computer and choose Properties->Advanced tab.
  - b. Choose the Settings button under the Performance heading.
  - c. Choose the Advanced tab.
  - d. Click the Change button under the Virtual memory heading.

- e. Select the Custom size radio button.
  - f. Set the Windows XP Virtual memory size to twice the physical memory size (e.g., with 512MB of physical RAM set the Virtual memory to 1024MB) by entering that figure for both the Initial size and Maximum size fields.
  - g. Click OK, and close all My Computer windows.
  - h. Right-click My Computer and choose Properties->System Restore tab.
  - i. Select Turn off System Restore on all drives to turn off System Restore. The benchmark requires this step.
  - j. Click OK, and close all My Computer windows.
  - k. Right-click My Computer and choose Properties->Automatic Updates tab.
  - l. Select Turn off Automatic Updates to disable Windows Update.
  - m. Reboot the system.
2. Place WebMark 2004 CD in the DVD-ROM drive.
  3. Click Next at the Install Shield Wizard dialog box.
  4. Click the Client install button, and click Yes at the Question dialog box.
  5. Accept the license agreement by clicking Yes.
  6. Enter "Default" for Company Name, and click Next at the Customer Information dialog box.
  7. Click Next at the Destination Directory dialog box.
  8. Enter the registration code, and click Next.
  9. Click OK at the Congratulations dialog box.
  10. Click Finish at the Installation Complete dialog box.
  11. Place the WebMark CD in the DVD-ROM of the system, and double-click the WebMark Patch 1 update installation file.
  12. When prompted, click on the Client Version button to update the benchmark.
  13. Click Finish at the Installation Complete dialog box.
  14. Reboot the system.

We rebooted before each run, then followed this process to run the test:

1. Double-click on the WebMark 2004 desktop icon.
2. In the Web-based interface, click on Run Benchmark.
3. Under Project name, enter the name of the system (e.g., INTELCELERON21 (no spaces)).
4. Select Offline mode.
5. Select Custom Run.
6. Select one iteration (changing it from three iterations). We did this because the benchmark could not reliably complete three runs on most test systems.
7. Click Run Project, and the benchmark will begin.
8. Once it completes, the WebMark Web interface reappears with the results.
9. Click Generate FDR.
10. Once the FDR is complete, click Export FDR and save the WMR file.
11. Reboot the system, and repeat two more times to generate three individual test runs.

The benchmark produces, among other results, an overall score; higher scores are better. When performing the Office Run tests, WebMark does not produce multiple scores for each run; rather, it computes its own geometric mean of the three runs. In our tests, however, WebMark 2004 could not generate an official FDR report due to high variances between the three test results. To complete the WebMark 2004 tests, we chose to perform three different individual test runs. We presented in Figures 1 and 2 the normalized median result of those three runs.

#### PCMark04 CPU Test

We performed the following steps on each PC to make it ready to run this benchmark:

1. PCMark04 requires Windows Media Encoder 9, so download Windows Media Encoder 9 from Microsoft's Web site (<http://www.microsoft.com/windows/windowsmedia/9series/encoder/default.aspx>).

2. Double-click on the downloaded file, and accept all default settings.
3. Click Finish at the Installation complete dialog box
4. Place the PCMark04 Business Edition CD in the DVD-ROM drive.
5. Click Next at the Install Shield Wizard dialog box.
6. Click the "I accept the terms of the license agreement" check box at the License Agreement dialog box.
7. Click Next at the Choose Destination Location dialog box.
8. Click Install at the Installation dialog box.
9. Enter the registration code, and click Next.
10. Click OK at the Congratulations dialog box.
11. Click Finish at the Installation Complete dialog box.

We rebooted before each run and then followed this process to run the test:

1. Launch PCMark04.
2. Under the Tests menu, click Select.
3. Click on the CPU Test Suite check box to select all tests available under the CPU category. Make sure no other tests have been selected.
4. Click the Run PCMark button to run the tests.
5. When the test completes, a message box appears. Click on the Details button towards the bottom of the box.
6. Record the overall CPU score.
7. Click on the Details tab at the top, and expand the CPU category. Record all the individual test results. In all cases, higher results are better.

The benchmark produces, among other results, an overall score; higher scores are better in all cases.

#### SiSoft Sandra 2005 tests

We performed the following steps on each PC to make it ready to run this benchmark:

1. Place the Sandra 2005 CD in the DVD-ROM drive. A Web installation interface appears.
2. Click on English (EN).
3. Click on "Install Sandra Professional 2005.SR1"
4. At the File Download prompt, click Run.
5. At the Security Warning, click Run.
6. Select English at the Select Setup Language prompt.
7. Use all the default settings for installation. Make sure the radio button is filled to select the following options (which are the default settings):
  - o Windows 32-bit x86 version
  - o Disable remote services
  - o Internal (Jet) Database
8. Leave the Launch SiSoftware Sandra Professional check in the check box, and click Finish.
9. Enter the serial number to complete the full installation.
10. Shutdown Sandra 2005.
11. Reboot the system.

We rebooted before each run and then followed the processes below to run the Sandra 2005 tests. We ran each test three times.

To run the CPU Arithmetic Benchmark (FPU):

1. Double-click on the SiSoft Sandra 2005 icon on the desktop to open the management console.
2. In the section titled Benchmarking Modules, double-click on the CPU Arithmetic Benchmark icon.
3. In the CPU Arithmetic Benchmark console, press F5 to start the benchmark.
4. Once it completes, record the Whetstone FPU, Dhrystone ALU, and Whetstone iSSE2 results.

5. Reboot the system.

To run the CPU Multi-Media Benchmark:

1. Double-click on the SiSoft Sandra 2005 icon on the desktop to open the management console.
2. In the section titled Benchmarking Modules, double-click on the CPU Multi-Media Benchmark icon.
3. In the CPU Multi-Media Benchmark console, press F5 to start the benchmark.
4. Once it completes, record the Integer x8 iSSE2 and Float x4 iSSE2 results
5. Reboot the system.

To run the Memory Bandwidth Benchmark:

1. Double-click on the SiSoft Sandra 2005 icon on the desktop to open the management console.
2. In the section titled Benchmarking Modules, double-click on the Memory Bandwidth Benchmark icon.
3. In the Memory Bandwidth Benchmark console, press F5 to start the benchmark.
4. Once it completes, record the RAM Bandwidth Int Buff'd iSSE2 and RAM Bandwidth Float Buff'd iSSE2 results.
5. Reboot the system.

To run the Cache & Memory Bandwidth Benchmark:

1. Double-click on the SiSoft Sandra 2005 icon on the desktop to open the management console.
2. In the section titled Benchmarking Modules, double-click on the Cache & Memory Bandwidth Benchmark icon.
3. In the Cache & Memory Bandwidth Benchmark console, press F5 to start the benchmark.
4. Once it completes, record the Combined Index (MB/s) and Speed Factor results.
5. Reboot the system.



## Appendix A: Hardware purchase information

Because we built each of these systems, we had to purchase a variety of components. This appendix presents the costs of all the components.

Figure 4 presents the pricing information for the four motherboards.

System	Intel D845GHVA	ECS KM400-M2
Processor	Intel Celeron 2.10 and 2.40	AMD Sempron 2200+ and 2600+
Online purchase site	Hyper Microsystems, Inc. (hypermicro.com)	NewEgg.com
Online Inventory Number	D845GLVAL PGA478 MATX VIDEO LAN	N82E16813135193
Unit price (\$)	55.00	37.50
Tax (\$) <sup>(1)</sup>	0.00	0.00
Shipping (\$) <sup>(2)</sup>	49.19	6.49
Total we paid (\$)	104.19	43.99
Number of units	2	2
Extended total we paid (\$)	208.38	87.98

**Figure 4: Purchase information for the two different motherboards we used in the four systems.**

Notes:

<sup>(1)</sup> [www.newegg.com](http://www.newegg.com) and [www.hypermicro.com](http://www.hypermicro.com) did not charge tax.

<sup>(2)</sup> We assigned each motherboard a prorated portion of the total shipping charge we paid for each order.

Figure 5 presents the pricing information for the four processors.

Processor	Intel Celeron 2.10 GHz	Intel Celeron 2.40 GHz	AMD Sempron 2200+ (1.50 GHz)	AMD Sempron 2600+ (1.833 GHz)
Online purchase site	Spartan Tech (spartantech.com)	NewEgg.com	Mwave.com	NewEgg.com
Online Inventory Number	INC478-2100OEM	N82E16819112176	BA20818	N82E16819104212
Unit price (\$)	63.00	79.49	52.50	80.99
Tax (\$) <sup>(1)</sup>	0.00	0.00	0.00	0.00
Shipping (\$) <sup>(2)</sup>	20.00	2.99	19.48	23.59
Total we paid (\$)	83.00	82.48	71.98	104.59

**Figure 5: Purchase information for the four processors in the systems.**

<sup>(1)</sup> [www.mwave.com](http://www.mwave.com), [www.newegg.com](http://www.newegg.com), and [www.spartantech.com](http://www.spartantech.com) did not charge tax.

<sup>(2)</sup> We assigned each processor a prorated portion of the total shipping charge we paid for each order.

Figure 6 below presents the pricing information for the common hardware components for all four systems. We purchased some of these components locally at retail outlets. For all such purchases, tax reflects the North Carolina sales tax rate of 7.0%. We also paid no shipping on any such equipment, because we picked it up at the following stores:

Best Buy #299  
Pleasant Valley Promenade  
6254 Glenwood Avenue  
Raleigh, NC 27612

Best Buy #147  
Cary Crossroads Center  
237 Crossroads Blvd.  
Cary, NC 27511

Intrex  
Parkway Pointe Shopping Center  
2448 SW Cary Parkway  
Cary, NC 27513

Tiger Direct  
3131 Capital Blvd. Suite 101  
Raleigh, NC 27604

Equipment	Memory (KVR333X64C25/256)	Hard drive (ST380011A)	Optical drive (DX-DVDR100)	Athenatech Micro-ATX Case with Power Supply (CAS-A100)	CPU fan for Celeron 2.10 GHz processor only (ULT31424)
Purchase Site	NewEgg	NewEgg	Best Buy	Intrex	Tiger Direct
Online or local inventory number	N82E16820 141302	N82E16822 148015	6302707	CAS-A100	ULT31424
Unit price (\$)	29.11	62.70	49.99	45.99	14.99
Tax (\$) <sup>(1)</sup>	0.00	0.00	3.50	3.22	1.06
Shipping (\$) <sup>(2)</sup>	3.18	4.01	0.00	0.00	0.00
Total we paid (\$)	32.29	66.71	53.49	49.21	16.05
Number of units	6	3	3	3	1
Extended total we paid (\$)	193.74	200.13	160.47	147.53	16.05

**Figure 6: Purchase information for the common components, such as cases, disk drives, and DVD-ROM drives, in the systems.**

<sup>(1)</sup> [www.newegg.com](http://www.newegg.com) did not charge tax

<sup>(2)</sup> We assigned each item we purchased online a prorated portion of the total shipping charge we paid for each order.

Figure 7 shows the prices of the copies of Windows XP, Service Pack 2 we purchased.

Software	Windows XP, Service Pack 2 – OEM version	Windows XP, Service Pack 2 – OEM version (Three pack)
Purchase site	eBargain Software	eBargain Software
Online or local inventory number	E85-02178-SP2-1PACK	E8503013-3PK
Unit price (\$)	132.50	395.00
Tax (\$) <sup>(1)</sup>	0.00	0.00
Shipping (\$) <sup>(2)</sup>	5.00	0.00
Total we paid (\$)	137.50	395.00

**Figure 7: Purchase information for the Windows XP licenses in the systems.**

<sup>(1)</sup> <sup>(2)</sup> [www.ebargainsoftware.com](http://www.ebargainsoftware.com) did not charge tax or shipping.

## Appendix B: Cost comparison information

Figure 8 presents the total cost of the components in each of the systems we built.

Processor Manufacturer and Model Type / Motherboard	Intel Celeron 2.10	Intel Celeron 2.40	AMD Sempron 2200+	AMD Sempron 2600+
Processor	63.00	79.49	52.50	80.99
CPU Fan (if purchased separately)	14.99	N/A	N/A	N/A
Motherboard	55.00	55.00	37.50	37.50
Memory (PC2700 RAM)	29.11	29.11	29.11	29.11
Hard Drive	62.70	62.70	62.70	62.70
DVD-ROM Drive (16x)	49.99	49.99	49.99	49.99
Case (with 200W power supply)	45.99	45.99	45.99	45.99
<b>Total</b>	<b>320.78</b>	<b>322.28</b>	<b>277.79</b>	<b>306.28</b>

**Figure 8: Complete system cost comparison.**

## Appendix C: Test system configuration information

This appendix provides detailed configuration information about each of the four test systems.

Processor	Intel Celeron 2.10	Intel Celeron 2.40	AMD Sempron 2200+	AMD Sempron 2600+
<b>General</b>				
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P1C1L / UP	1P1C1L / UP	1P1C1L / UP	1P1C1L / UP
Number of physical processors	1	1	1	1
Single/Dual Core processors	Single core	Single core	Single core	Single core
System Power Management Policy	AC/AlwaysOn	AC/AlwaysOn	AC/AlwaysOn	AC/AlwaysOn
<b>CPU</b>				
Segment	Desktop	Desktop	Desktop	Desktop
Vendor	Intel	Intel	AMD	AMD
Name	Celeron	Celeron	Sempron	Sempron
Code name	Northwood	Northwood	Thoroughbred	Thoroughbred
Model number	Celeron	Celeron	Sempron 2200+	Sempron 2600+
Stepping	7	9	1	1
Socket type	Socket 478	Socket 478	Socket A/462	Socket A/462
Core frequency	2100	2400	1500	1833
Front-side bus frequency	400	400	533	533
L1 Cache	8K + 12K	8K + 12K	64KB + 64KB	64KB + 64KB
L2 Cache	128KB	128KB	256KB	256KB
<b>Platform</b>				
Vendor and model number	Intel 845GL	Intel 845GL	ECS KM400-M2	ECS KM400-M2
Motherboard model number	Intel D845GLVA	Intel D845GLVA	VIA KM400	VIA KM400
Motherboard chipset	i845GL	i845GL	KM400	KM400
Motherboard chipset codename	Brookdale	Brookdale	N/A	N/A
Motherboard revision number	0	0	3.0	3.0
Motherboard serial number	BQVA34604548 AA C30423-203	BQVA34604548 AA C30423-203	H98200E508028 13	H98200E508028 12
BIOS name and version	Intel version 9/26/2003 - VA84510A.86A. P08.030926150 1	Intel version 9/26/2003 - VA84510A.86A. P08.030926150 1	Phoenix Technologies version 6.00 PG (0/6/2004- KM400A-8237- 6A6LYE1BC-00)	Phoenix Technologies version 6.00 PG (0/6/2004- KM400A-8237- 6A6LYE1BC-00)
BIOS settings	Default	Default	Default	Default
Chipset INF driver	Intel version 4.4.1005.0	Intel version 4.4.1005.0	VIA version 5.1.0.200	VIA version 5.1.0.200
<b>Memory module(s)</b>				
Vendor and model number	Kingston KVR333X64C25 -256 256MB 333MHz DDR PC2700	Kingston KVR333X64C25 -256 256MB 333MHz DDR PC2700	Kingston KVR333X64C25 -256 256MB 333MHz DDR PC2700	Kingston KVR333X64C25 -256 256MB 333MHz DDR PC2700
Type	PC2700 DDR 333	PC2700 DDR 333	PC2700 DDR 333	PC2700 DDR 333

Speed (MHz)	333	333	333	333
Speed in the system currently running @ (MHz)	166	166	166	166
Timing/Latency (tCL-tRCD-tRP-tRASmin)	2.5-3-3-7	2.5-3-3-7	2.5-3-3-7	2.5-3-3-7
Size	512MB	512MB	512MB	512MB
Number of sticks	2x256MB	2x256MB	2x256MB	2x256MB
Chip organization	Single-sided	Single-sided	Single-sided	Single-sided
Channel	Single	Single	Single	Single
<b>Hard disk</b>				
Vendor and model number	Seagate Barracuda ST380011A	Seagate Barracuda ST380011A	Seagate Barracuda ST380011A	Seagate Barracuda ST380011A
Size	80 GB	80 GB	80 GB	80 GB
Buffer Size	8 MB	8 MB	8 MB	8 MB
RPM	7200	7200	7200	7200
Type	Ultra ATA 1333	Ultra ATA 1333	Ultra ATA 1333	Ultra ATA 1333
Controller	Intel 82801DB ICH4 Ultra ATA	Intel 82801DB ICH4 Ultra ATA	Integrated VIA VT8237 SATA controller	Integrated VIA VT8237 SATA controller
Driver	Intel: version 2.3.0.2160	Intel: version 2.3.0.2160	Microsoft: version 5.1.3597.0	Microsoft: version 5.1.3597.0
<b>Operating system</b>				
Name	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional
Build number	Build 2600	Build 2600	Build 2600	Build 2600
Service pack	SP2	SP2	SP2	SP2
Windows update date	4/29/05	4/29/05	4/29/05	4/29/05
File system	NTFS	NTFS	NTFS	NTFS
Kernel	ACPI Uniprocessor PC	ACPI Uniprocessor PC	ACPI Uniprocessor PC	ACPI Uniprocessor PC
Language	English	English	English	English
Microsoft DirectX version	DirectX 9.0c	DirectX 9.0c	DirectX 9.0c	DirectX 9.0c
<b>Graphics</b>				
Vendor and model number	Intel 82845G/GL Graphics Controller	Intel 82845G/GL Graphics Controller	VIA/S3G UniChrome IGP	VIA/S3G UniChrome IGP
Chipset	Intel 845GL	Intel 845GL	VIA/S3G UniChrome IGP	VIA/S3G UniChrome IGP
BIOS version	Intel Video BIOS	Intel Video BIOS	A8.D0.00.14	A8.D0.00.14
Type	Integrated	Integrated	Integrated	Integrated
Memory size	64 MB shared DDR	64 MB shared DDR	32 MB shared DDR	32 MB Shared DDR
Resolution	1024 x 768 x 32-bit color	1024 x 768 x 32-bit color	1024 x 768 x 32-bit color	1024 x 768 x 32 bit color
Driver	Intel version 6.13.1.3317	Intel version 6.13.1.3317	VIA/S3 Graphics version 6.14.10.113	VIA/S3 Graphics version 6.14.10.113
<b>Sound card/subsystem</b>				
Vendor and model number	Sigma Tel C-Major Audio	Sigma Tel C-Major Audio	Integrated Realtek AC'97 6 Channel Audio	Integrated Realtek AC'97 6 Channel Audio
Type	Integrated	Integrated	Integrated	Integrated

Driver	Sigma Tel version 6.14.1.3751	Sigma Tel version 6.14.1.3751	Realtek version 5.10.0.5720	Realtek version 5.10.0.5720
<b>Network card/subsystem</b>				
Vendor and model number	Intel Pro/100 VE LAN	Intel Pro/100 VE LAN	VIA VT6102 Rhine II Fast Ethernet Adapter 10/100 Mb	VIA VT6102 Rhine II Fast Ethernet Adapter 10/100 Mb
Type	Integrated	Integrated	Integrated	Integrated
Driver	Intel version 8.0.15.0	Intel version 8.0.15.0	VIA version 3.44.0.429	VIA version 3.44.0.429
<b>Optical drive</b>				
Vendor and model number	Dynex DVD-ROM Drive (16x DVD Read, 48x CD Read)	Dynex DVD-ROM Drive (16x DVD Read, 48x CD Read)	Dynex DVD-ROM Drive (16x DVD Read, 48x CD Read)	Dynex DVD-ROM Drive (16x DVD Read, 48x CD Read)
Type	DVD-ROM	DVD-ROM	DVD-ROM	DVD-ROM
Interface	Internal	Internal	Internal	Internal
<b>USB ports</b>				
# of ports	6	6	6	6
Type of ports (USB1.1, USB2)	4 are USB 1.1 2 are USB 2.00	4 are USB 1.1 2 are USB 2.00	4 are USB 1.1 2 are USB 2.00	4 are USB 1.1 2 are USB 2.00
<b>Monitor</b>				
Vendor and model number	Samsung SyncMaster 997DF	Samsung SyncMaster 997DF	Samsung SyncMaster 997DF	Samsung SyncMaster 997DF
CRT type	Plug and Play	Plug and Play	Plug and Play	Plug and Play
CRT refresh rate	75Hz	75Hz	75Hz	75Hz

**Figure 9: Detailed system configuration information for all test systems.**

## Appendix D: CPU-Z Version 1.28 test system configuration information

This appendix provides detailed configuration information from the CPU-Z, Version 1.28 software utility about each of the four test systems.

Processor	Intel Celeron 2.10	Intel Celeron 2.40
<b>Processor Information</b>		
Number of CPUs	1	
APIC ID	0	
Name	Intel Celeron	Intel Celeron
Code name	Northwood	Northwood
Specification	Intel(R) Celeron(R) CPU 2.10GHz	Intel(R) Celeron(R) CPU 2.40GHz
Family/Model/Stepping	F27	F29
Extended Family/Model	0/0	0/0
Brand ID	10	10
Package	mPGA-478	mPGA-478
Core Stepping	C1	D1
Technology	0.13μ	0.13μ
Instructions Sets	MMX, SSE, SSE2	MMX, SSE, SSE2
Clock Speed	2099.7 MHz	2399.7 MHz
Clock multiplier	x21.0	x24.0
Front Side Bus Frequency	100.0 MHz	100.0 MHz
Bus Speed	400.0 MHz	400.0 MHz
Stock frequency	2100 MHz	2400 MHz
L1 Data Cache	8 KBytes, 4-way set associative, 64 Bytes line size	8 KBytes, 4-way set associative, 64 Bytes line size
L1 Trace Cache	12 Kμops, 8-way set associative	12 Kμops, 8-way set associative
L2 Cache	128 KBytes, 2-way set associative, 64 Bytes line size	128 KBytes, 2-way set associative, 64 Bytes line size
L2 Speed	2099.7 MHz (Full)	2399.7 MHz (Full)
L2 Location	On Chip	On Chip
L2 Data Prefetch Logic	yes	yes
L2 Bus Width	256 bits	256 bits
<b>Chipset</b>		
Northbridge	Intel i845GL rev. A1	Intel i845GL rev. A1
Southbridge	Intel 82801DB (ICH4) rev. 1	Intel 82801DB (ICH4) rev. 1
Memory Type	DDR	DDR
Memory Size	512 MBytes	512 MBytes
Memory Frequency	133.3 MHz (3:4)	133.3 MHz (3:4)
CAS#	2	2
RAS# to CAS#	3	3
RAS# Precharge	3	3
Cycle Time (tRAS)	6	6
DRAM Idle Timer	16	16
<b>Memory SPD</b>		
<i>DIMM #1</i>		
General		



Memory type	DDR-SDRAM	DDR-SDRAM
Manufacturer (ID)	Kingston (7F98000000000000)	Kingston (7F98000000000000)
Size	256 MBytes	256 MBytes
Max bandwidth	PC2700 (166 MHz)	PC2700 (166 MHz)
Part number	K	K
Serial number	4414EEB1	4114F1B1
Manufacturing date	Week 15/Year 05	Week 15/Year 05
<i>Attributes</i>		
Number of banks	1	1
Data width	64 bits	64 bits
Correction	None	None
Registered	no	no
Buffered	no	no
<i>Timings table</i>		
Frequency (MHz)	133	133
CAS#	2	2
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	6	6
<i>Timings table</i>		
Frequency (MHz)	166	166
CAS#	2.5	2.5
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	7	7
<i>DIMM #2</i>		
General		
Memory type	DDR-SDRAM	DDR-SDRAM
Manufacturer (ID)	Kingston (7F98000000000000)	Kingston (7F98000000000000)
Size	256 MBytes	256 MBytes
Max bandwidth	PC2700 (166 MHz)	PC2700 (166 MHz)
Part number	K	K
Serial number	4414EFB1	4214EFB1
Manufacturing date	Week 15/Year 05	Week 15/Year 05
<i>Attributes</i>		
Number of banks	1	1
Data width	64 bits	64 bits
Correction	None	None
Registered	no	no
Buffered	no	no
<i>Timings table</i>		
Frequency (MHz)	133	133
CAS#	2	2
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	6	6
<i>Timings table</i>		

Frequency (MHz)	166	166
CAS#	2.5	2.5
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	7	7
<b>DMI</b>		
<i>DMI BIOS</i>		
BIOS #1		
vendor	Intel Corp.	Intel Corp.
version	VA84510A.86A.0023.P08.0309261501	VA84510A.86A.0023.P08.0309261501
date	09/26/2003	09/26/2003
<i>DMI System Information</i>		
System #1		
manufacturer	unknown	unknown
product	unknown	unknown
version	unknown	unknown
serial	unknown	unknown
UUID	AFDCB196-15B111D8-BB8700E0-1888972E	AFDCB1C1-15B111D8-BB8700E0-1888972E
<i>DMI Baseboard</i>		
Baseboard #1		
vendor	Intel Corporation	Intel Corporation
model	D845GLVA	D845GLVA
revision	AAC30423-203	AAC30423-203
serial	BQVA34604548	BQVA34604988
<i>DMI System Enclosure</i>		
System enclosure #1		
manufacturer	unknown	unknown
chassis type	2X	2X
chassis serial	unknown	unknown
<i>DMI Processor</i>		
CPU #1		
manufacturer	Intel	Intel
model	Intel(R) Celeron(R) processor	Intel(R) Celeron(R) processor
clock speed	2100.0MHz	2400.0MHz
FSB speed	100.0MHz	100.0MHz
multiplier	21.0x	24.0x
<i>DMI Memory Controller</i>		
Memory Controller #1		
correction	64-bit ECC	64-bit ECC
Max module size	1024MBytes	1024MBytes
<i>DMI Memory Module</i>		
Memory Module #1		
designation	DIMM1	DIMM1
size	256MBytes (double bank)	256MBytes (double bank)
Memory Module #2		
designation	DIMM2	DIMM2

size	256MBytes (double bank)	256MBytes (double bank)
<i>DMI Port Connector</i>		
Port #1		
designation	J1A1 (internal)	J1A1 (internal)
designation	PS2Mouse (external)	PS2Mouse (external)
port type	USB	USB
connector	PS/2	PS/2
Port #2		
designation	J1A1 (internal)	J1A1 (internal)
designation	Keyboard (external)	Keyboard (external)
port type	Keyboard Port	Keyboard Port
connector	PS/2	PS/2
Port #3		
designation	J3A1 (internal)	J3A1 (internal)
designation	COM 1 (external)	COM 1 (external)
port type	Serial Port 16550A	Serial Port 16550A
connector	DB-9 female	DB-9 female
Port #4		
designation	J4A2 (internal)	J4A2 (internal)
designation	LPT1 (external)	LPT1 (external)
port type	Parallel Port ECP/EPP	Parallel Port ECP/EPP
connector	DB-25 male	DB-25 male
Port #5		
designation	J2G1 (internal)	J2G1 (internal)
designation	COM 2 (external)	COM 2 (external)
port type	Serial Port 16550A	Serial Port 16550A
connector	DB-9 female	DB-9 female
Port #6		
designation	JA5A1 (internal)	JA5A1 (internal)
designation	1st USB (external)	1st USB (external)
port type	USB	USB
connector	Access Bus (USB)	Access Bus (USB)
Port #7		
designation	JA5A1 (internal)	JA5A1 (internal)
designation	2nd USB (external)	2nd USB (external)
port type	USB	USB
connector	Access Bus (USB)	Access Bus (USB)
Port #8		
designation	J4A1 (internal)	J4A1 (internal)
designation	VIDEO (external)	VIDEO (external)
port type	Video Port	Video Port
connector	DB-15 male	DB-15 male
Port #9		
designation	JA5A1 (internal)	JA5A1 (internal)
designation	RJ-45 Type (external)	RJ-45 Type (external)
port type	Network Port	Network Port
connector	RJ-45	RJ-45
Port #10		

designation	J6A1 (internal)	J6A1 (internal)
designation	Audio Mic In (external)	Audio Mic In (external)
port type	Audio Port	Audio Port
connector	Mini Jack (headphones)	Mini Jack (headphones)
Port #11		
designation	J6A1 (internal)	J6A1 (internal)
designation	Audio Line In (external)	Audio Line In (external)
port type	Audio Port	Audio Port
connector	Mini Jack (headphones)	Mini Jack (headphones)
Port #12		
designation	J6A1 (internal)	J6A1 (internal)
designation	Audio Line Out (external)	Audio Line Out (external)
port type	Audio Port	Audio Port
connector	Mini Jack (headphones)	Mini Jack (headphones)
Port #13		
designation	J5C1 - +12V (internal)	J5C1 - +12V (internal)
Port #14		
designation	J4H1 - FDD (internal)	J4H1 - FDD (internal)
connector	On Board Floppy	On Board Floppy
Port #15		
designation	J6H2 - PRI IDE (internal)	J6H2 - PRI IDE (internal)
connector	On Board IDE	On Board IDE
Port #16		
designation	J6H1 - SEC IDE (internal)	J6H1 - SEC IDE (internal)
connector	On Board IDE	On Board IDE
Port #17		
designation	J6B1 - CDIN (internal)	J6B1 - CDIN (internal)
port type	Audio Port	Audio Port
connector	On Board Sound Input From CD-ROM	On Board Sound Input From CD-ROM
Port #18		
designation	J7A1 - AUX IN (internal)	J7A1 - AUX IN (internal)
port type	Audio Port	Audio Port
Port #19		
designation	J9G1 - FRONT PANEL HDR (internal)	J9G1 - FRONT PANEL HDR (internal)
Port #20		
designation	J2F1 - CPU FAN (internal)	J2F1 - CPU FAN (internal)
Port #21		
designation	J8H2 - FRONT CHASSIS FAN (internal)	J8H2 - FRONT CHASSIS FAN (internal)
Port #22		
designation	J1B1 - REAR CHASSIS FAN (internal)	J1B1 - REAR CHASSIS FAN (internal)
Port #23		
designation	J9H2 - BIOS CONFIG (internal)	J9H2 - BIOS CONFIG (internal)
Port #24		
designation	J9F2 - FRONT PANEL USB (internal)	J9F2 - FRONT PANEL USB (internal)

Port #25		
designation	J2H1 - PS (internal)	J2H1 - PS (internal)
Port #26		
designation	J8H1 - CH INTR (internal)	J8H1 - CH INTR (internal)
Port #27		
designation	J8H2 - PWR LED (internal)	J8H2 - PWR LED (internal)
DMI Extension Slot		
Slot #1		
designation	J7B2	J7B2
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
Slot #2		
designation	J8B1	J8B1
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
Slot #3		
designation	J9B1	J9B1
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
<i>DMI Physical Memory Array</i>		
Physical Memory Array #1		
location	Motherboard	Motherboard
usage	System Memory	System Memory
correction	None	None
max capacity	3072MBytes	3072MBytes
max# of devices	2	2
<i>DMI Memory Device</i>		
Memory Device #1		
designation	J6G1	J6G1
format	DIMM	DIMM
type	DDR	DDR
total width	64bits	64bits
data width	64bits	64bits
size	256MBytes	256MBytes
speed	10MHz	10MHz
Memory Device #2		
designation	J6G2	J6G2
format	DIMM	DIMM
type	DDR	DDR
total width	64bits	64bits
data width	64bits	64bits
size	256MBytes	256MBytes
speed	10MHz	10MHz

**Figure 10: CPU-Z information for the two systems running Intel Celeron processors on Intel D845GLVA motherboards.**

Processor	AMD Sempron 2200+	AMD Sempron 2600+
<b>Processor Information</b>		
Number of CPUs	1	1
Name	AMD Sempron	AMD Sempron
Code name	Thoroughbred	Thoroughbred
Specification	AMD Sempron(tm) 2200+	AMD Sempron(tm) 2600+
Family/Model/Stepping	681	681
Extended Family/Model	08-Jul	08-Jul
Package	Socket A	Socket A
Core Stepping	B0	B0
Technology	0.13μ	0.13μ
Instructions Sets	MMX, Extended MMX, 3DNow!, Extended 3DNow!, SSE	MMX, Extended MMX, 3DNow!, Extended 3DNow!, SSE
Clock Speed	1494.0 MHz	1825.9 MHz
Clock multiplier	x9.0	x11.0
Front Side Bus Frequency	166.0 MHz	166.0 MHz
Bus Speed	332.0 MHz	332.0 MHz
Stock frequency	1500 MHz	1833 MHz
P-Rating	2200+	2600+
L1 Data Cache	64 KBytes, 2-way set associative, 64 Bytes line size	64 KBytes, 2-way set associative, 64 Bytes line size
L1 Instruction Cache	64 KBytes, 2-way set associative, 64 Bytes line size	64 KBytes, 2-way set associative, 64 Bytes line size
L2 Cache	256 KBytes, 16-way set associative, 64 Bytes line size	256 KBytes, 16-way set associative, 64 Bytes line size
L2 Speed	1494.0 MHz (Full)	1825.9 MHz (Full)
L2 Location	On Chip	On Chip
L2 Data Prefetch Logic	yes	yes
L2 Bus Width	64 bits	64 bits
<b>Chipset</b>		
Northbridge	VIA KM400 rev. 0	VIA KM400 rev. 0
Southbridge	VIA VT8237 rev. 0	VIA VT8237 rev. 0
Graphic Interface	AGP	AGP
AGP Revision	3.5	3.5
AGP Transfert Rate	4x	4x
AGP SBA	supported, enabled	supported, enabled
AGP Aperture	128 MBytes	128 MBytes
Memory Type	DDR	DDR
Memory Size	512 MBytes	512 MBytes
Memory Frequency	166.0 MHz (1:1)	166.0 MHz (1:1)
DRAM Interleave	4-way	4-way
CAS#	2.5	2.5
RAS# to CAS#	3	3
RAS# Precharge	2	2
Cycle Time (tRAS)	7	7
<b>Memory SPD</b>		
DIMM #1		
General		

Memory type	DDR-SDRAM	DDR-SDRAM
Manufacturer (ID)	Kingston (7F98000000000000)	Kingston (7F98000000000000)
Size	256 MBytes	256 MBytes
Max bandwidth	PC2700 (166 MHz)	PC2700 (166 MHz)
Part number	K	K
Serial number	4114EEB1	4214E9B1
Manufacturing date	Week 15/Year 05	Week 15/Year 05
<i>Attributes</i>		
Number of banks	1	1
Data width	64 bits	64 bits
Correction	None	None
Registered	no	no
Buffered	no	no
<i>Timings table</i>		
Frequency (MHz)	133	133
CAS#	2	2
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	6	6
<i>Timings table</i>		
Frequency (MHz)	166	166
CAS#	2.5	2.5
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	7	7
<i>DIMM #2</i>		
<i>General</i>		
Memory type	DDR-SDRAM	DDR-SDRAM
Manufacturer (ID)	Kingston (7F98000000000000)	Kingston (7F98000000000000)
Size	256 MBytes	256 MBytes
Max bandwidth	PC2700 (166 MHz)	PC2700 (166 MHz)
Part number	K	K
Serial number	4314F0B1	4314EDB1
Manufacturing date	Week 15/Year 05	Week 15/Year 05
<i>Attributes</i>		
Number of banks	1	1
Data width	64 bits	64 bits
Correction	None	None
Registered	no	no
Buffered	no	no
<i>Timings table</i>		
Frequency (MHz)	133	133
CAS#	2	2
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	6	6
<i>Timings table</i>		
Frequency (MHz)	166	166

CAS#	2.5	2.5
RAS# to CAS# delay	3	3
RAS# Precharge	3	3
TRAS#	7	7
<b>DMI</b>		
<i>DMI BIOS</i>		
BIOS #1		
vendor	Phoenix Technologies, LTD	Phoenix Technologies, LTD
version	6.00 PG	6.00 PG
date	08/06/2004	08/06/2004
<i>DMI System Information</i>		
System #1		
manufacturer	unknown	unknown
product	unknown	unknown
version	unknown	unknown
serial	unknown	unknown
UUID	FFFFFFFF-FFFFFFFF-FFFFFFFF- FFFFFFFF	FFFFFFFF-FFFFFFFF-FFFFFFFF- FFFFFFFF
<i>DMI Baseboard</i>		
Baseboard #1		
vendor	unknown	unknown
model	unknown	unknown
revision	unknown	unknown
serial	unknown	unknown
<i>DMI System Enclosure</i>		
System enclosure #1		
manufacturer	unknown	unknown
chassis type	Desktop	Desktop
chassis serial	unknown	unknown
<i>DMI Processor</i>		
CPU #1		
manufacturer	AMD	AMD
model	AMD Sempron(tm)	AMD Sempron(tm)
clock speed	1500.0MHz	1833.0MHz
FSB speed	166.0MHz	166.0MHz
multiplier	9.0x	11.0x
<i>DMI Memory Controller</i>		
Memory Controller #1		
correction	unknown	unknown
Max module size	32MBytes	32MBytes
<i>DMI Memory Module</i>		
Memory Module #1		
designation	A0	A0
size	256MBytes (single bank)	256MBytes (single bank)
Memory Module #2		
designation	A1	A1
size	256MBytes (single bank)	256MBytes (single bank)
<i>DMI Port Connector</i>		



Port #1		
designation	PRIMARY IDE (internal)	PRIMARY IDE (internal)
connector	On Board IDE	On Board IDE
Port #2		
designation	SECONDARY IDE (internal)	SECONDARY IDE (internal)
connector	On Board IDE	On Board IDE
Port #3		
designation	FDD (internal)	FDD (internal)
port type	8251 FIFO Compatible	8251 FIFO Compatible
connector	On Board Floppy	On Board Floppy
Port #4		
designation	COM1 (internal)	COM1 (internal)
port type	Serial Port 16450	Serial Port 16450
connector	9 Pin Dual Inline (pin 10 cut)	9 Pin Dual Inline (pin 10 cut)
connector	DB-9 male	DB-9 male
Port #5		
designation	COM2 (internal)	COM2 (internal)
port type	Serial Port 16450	Serial Port 16450
connector	9 Pin Dual Inline (pin 10 cut)	9 Pin Dual Inline (pin 10 cut)
connector	DB-9 male	DB-9 male
Port #6		
designation	LPT1 (internal)	LPT1 (internal)
port type	Parallel Port ECP/EPP	Parallel Port ECP/EPP
connector	DB-25 female	DB-25 female
connector	DB-25 female	DB-25 female
Port #7		
designation	Keyboard (internal)	Keyboard (internal)
port type	Keyboard Port	Keyboard Port
connector	PS/2	PS/2
connector	PS/2	PS/2
Port #8		
designation	PS/2 Mouse (internal)	PS/2 Mouse (internal)
port type	Mouse Port	Mouse Port
connector	PS/2	PS/2
connector	PS/2	PS/2
Port #9		
designation	USB0 (external)	USB0 (external)
port type	USB	USB
Port #10		
designation	AUDIO (external)	AUDIO (external)
port type	Audio Port	Audio Port
<i>DMI Extension Slot</i>		
Slot #1		
designation	PCI0	PCI0
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
Slot #2		

designation	PCI1	PCI1
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
Slot #3		
designation	PCI2	PCI2
type	PCI	PCI
width	32 bits	32 bits
populated	no	no
Slot #4		
designation	AGP	AGP
type	AGP	AGP
width	32 bits	32 bits
populated	no	no
<i>DMI Physical Memory Array</i>		
Physical Memory Array #1		
location	Motherboard	Motherboard
usage	System Memory	System Memory
correction	None	None
max capacity	2048MBytes	2048MBytes
max# of devices	2	2
<i>DMI Memory Device</i>		
Memory Device #1		
designation	A0	A0
format	DIMM	DIMM
type	unknown	unknown
size	256MBytes	256MBytes
Memory Device #2		
designation	A1	A1
format	DIMM	DIMM
type	unknown	unknown
size	256MBytes	256MBytes

**Figure 11: CPU-Z information for the two systems running AMD Sempron processors on ESC KM400-M2 motherboards.**



Principled Technologies, Inc.  
4813 Emperor Blvd., Suite 100  
Durham, NC 27703  
info@principledtechnologies.com

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