PC Performance Benchmark
(PC133 vs. PC800)

October 2001

Memory Division

Contents

Summary

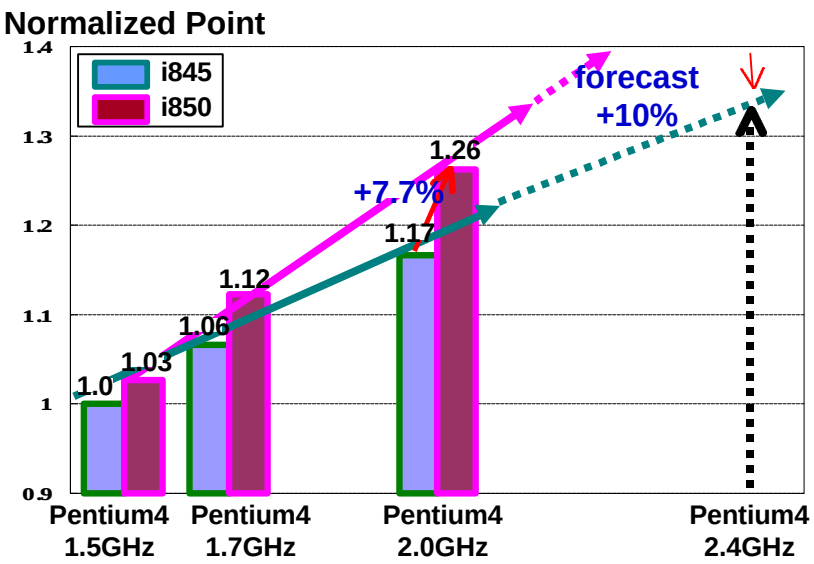
- ✓ **Memory bandwidth is becoming important for office and multimedia and 3D graphic application**
- ✓ **RDRAM is best solution of performance headroom for coming CPU Frequency (> 2.0GHz)**
- ✓ **Upgrade memory solution for bandwidth and density is the most cost effective solution in PC performance enhancement**

Performance Comparison of i850 with i845

I850 vs. I845 (in office application)

Business Winstone2001

< 128MB Memory Size >



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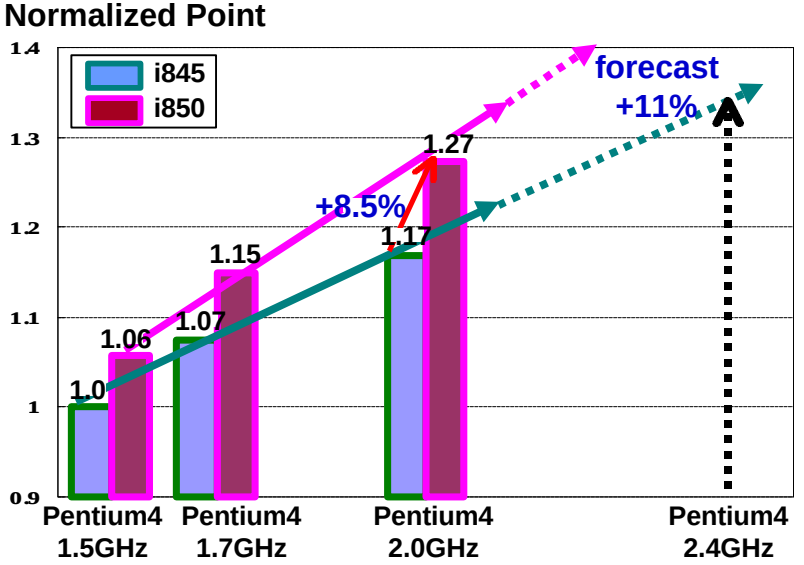

*** Test Conditions**

- OS: WinXP RC2
- Main B'd: D850GB, OEM i845
- INF:Inf 3.20.1008
- CPU: Pentium4 1.5/1.7/2.0GHz 423/478pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800/PC133(2-2-2)
- ATA Driver: Intel ATA 6.20
- Resolution: 1024x768x16bit

*** PC133 Result is based on 2-2-2. With PC133 3-3-3, 11.7% performance difference between i850 and i845 @2.0GHz, 256MB**

RDRAM System shows better performance as much as ~10% in office environment

I850 vs. I845 (in office application)

Content Creation Winstone2001

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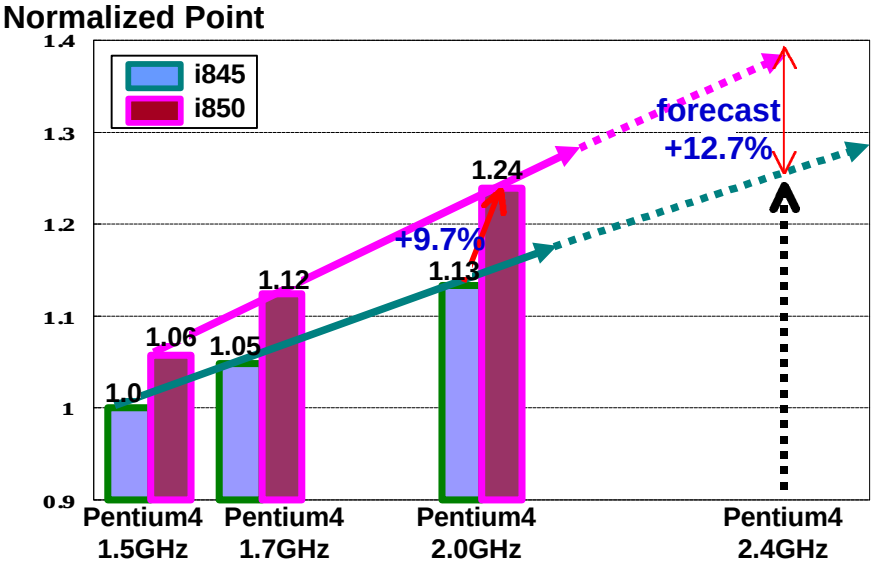

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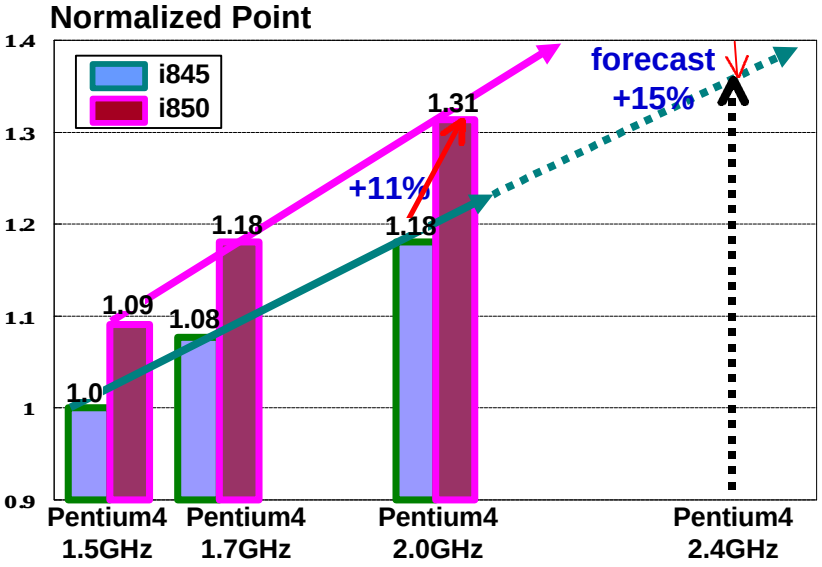

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- ATA Driver: Intel ATA 6.20
- Resolution: 1024x768x16bit

*** PC133 Result is based on 2-2-2. With PC133 3-3-3, 14% performance difference between i850 and i845 @2.0GHz, 256MB**

RDRAM based systems benefits more and more in performance as CPU frequency increases

I850 vs. I845 (Multi media environment)

3DMark2001

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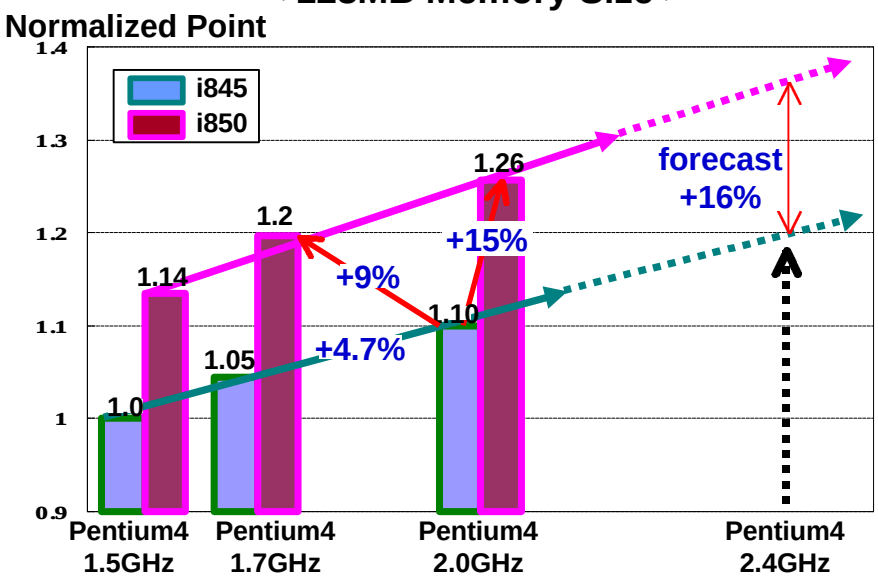

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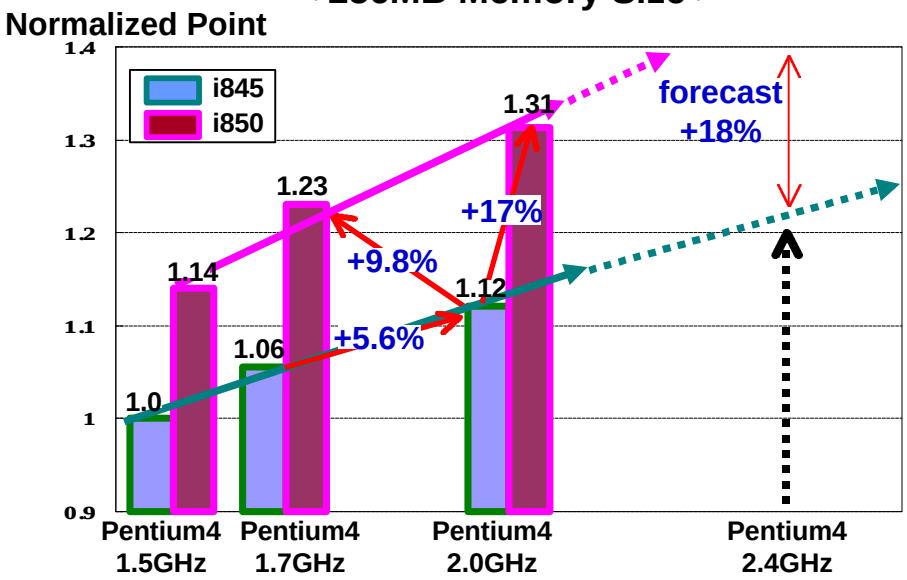

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- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800/PC133(2-2-2)
- ATA Driver: Intel ATA 6.20
- Resolution: 640x480x16bit

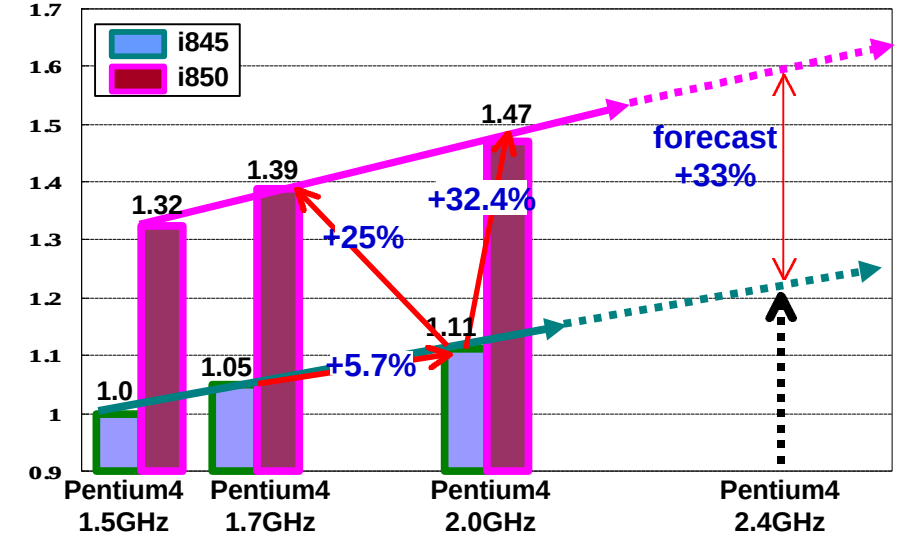
* PC133 Result is based on 2-2-2. With PC133 3-3-3, 19% performance difference between i850 and i845 @2.0GHz, 256MB

RDRAM based systems significantly outperform PC133 in 3D Graphic environment

I850 vs. I845 (Multi media environment)

Quake3

< 128MB Memory Size >



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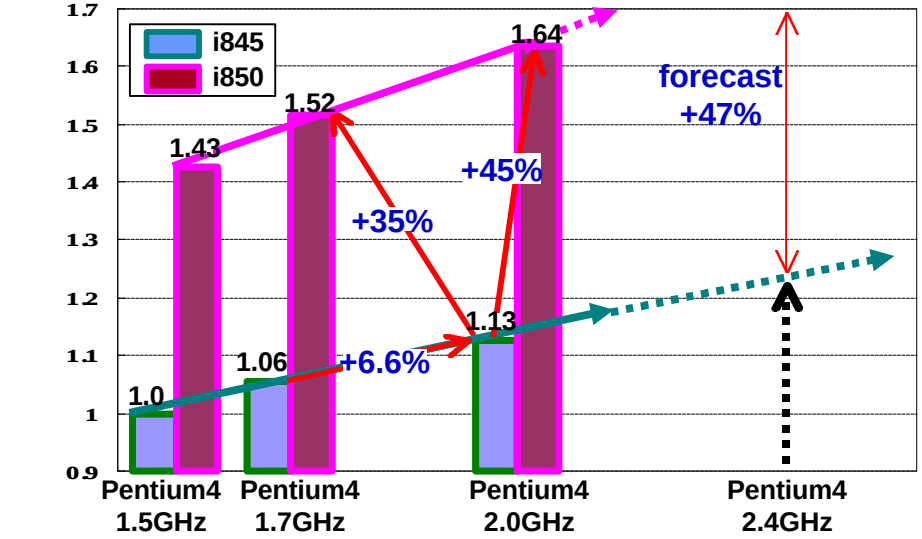

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- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800/PC133(2-2-2)
- ATA Driver: Intel ATA 6.20
- Resolution: 640x480x16bit

* PC133 Result is based on 2-2-2. With PC133 3-3-3, 47% performance difference between i850 and i845 @2.0GHz, 256MB

RDRAM is more cost effective solution than CPU upgrade for system performance in 3D environment

- **SUMMARY**

✓ **RDRAM Based system shows better performance than PC133 based system across all application program**

- **Office environment : ~13%(max.)**
- **Game environment : ~47%(max.)**

✓ **The performance gap between i850 and i845 becomes wider and wider as CPU frequency increases**

✓ **RDRAM is cost effective solution improving multimedia performance**

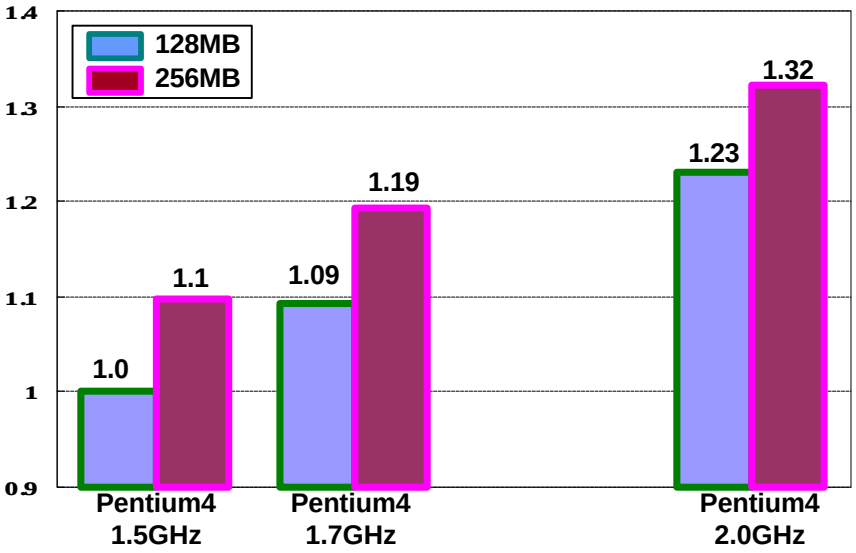
Performance Comparison of 256MB with 128MB

- Trend of performance in line with memory size

128MB vs. 256MB (In RDRAM based system)

Business Winstone2001

Normalized Point



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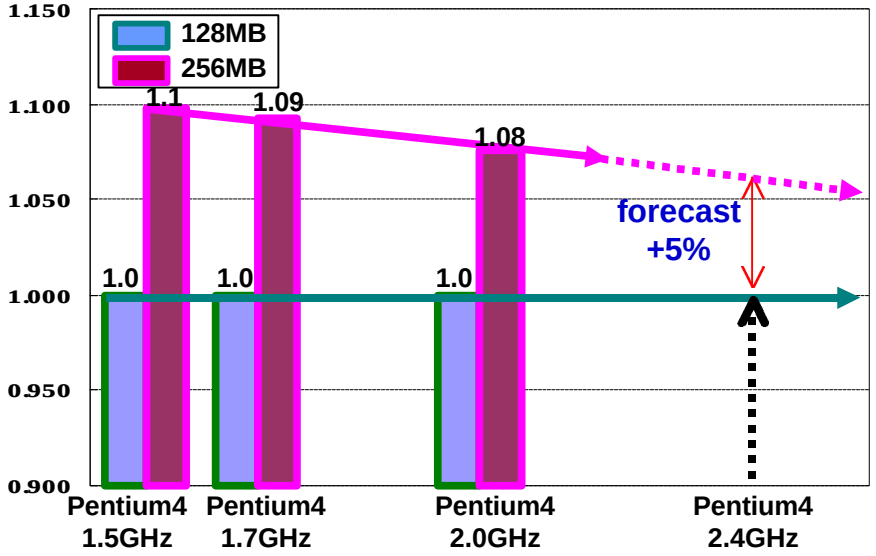

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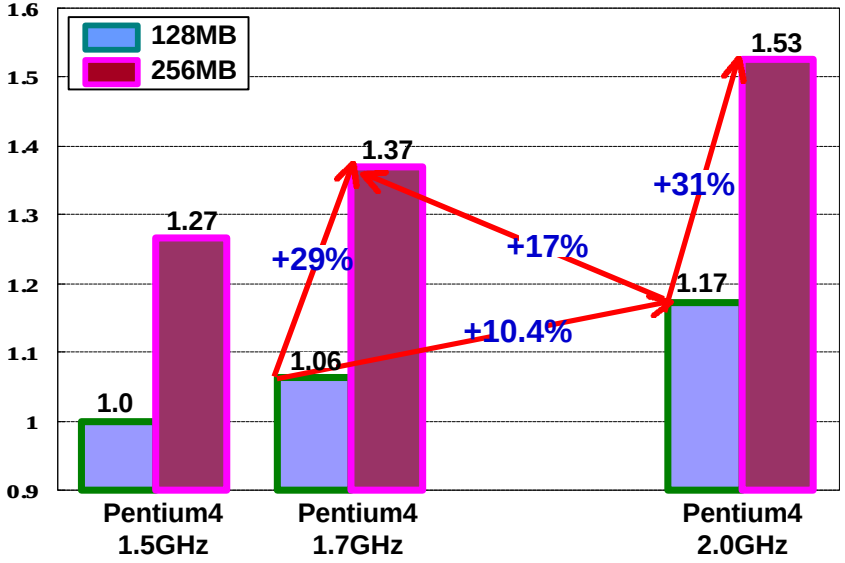
- CPU: Pentium4 1.5/1.7/2.0GHz 423pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800
- ATA Driver: Intel ATA 6.20
- Resolution: 1024x768x16bit

256MB Memory shows ~10% better performance in WinXP than 128MB Memory

128MB vs. 256MB (In RDRAM based system)

Content Creation Winstone2001

Normalized Point



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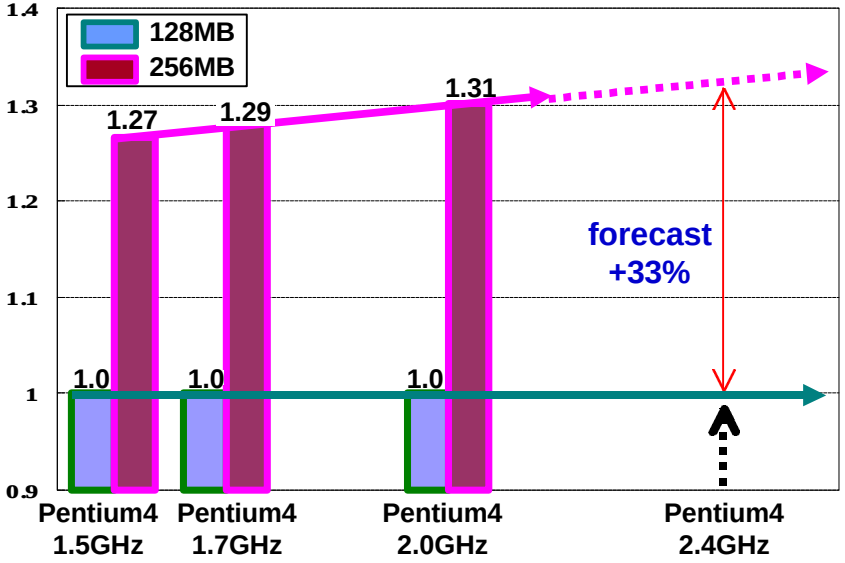

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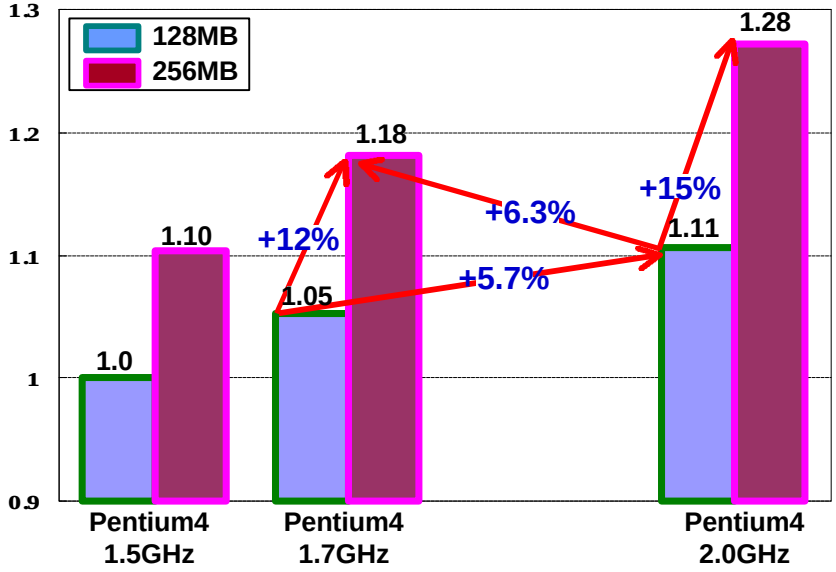
- OS: WinXP RC2
- Main B'd: D850GB
- INF:Inf 3.20.1008
- CPU: Pentium4 1.5/1.7/2.0GHz 423pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800
- ATA Driver: Intel ATA 6.20
- Resolution: 1024x768x16bit

More Memory size is more cost effective than CPU upgrade

128MB vs. 256MB (In RDRAM based system)

3DMark2001

Normalized Point



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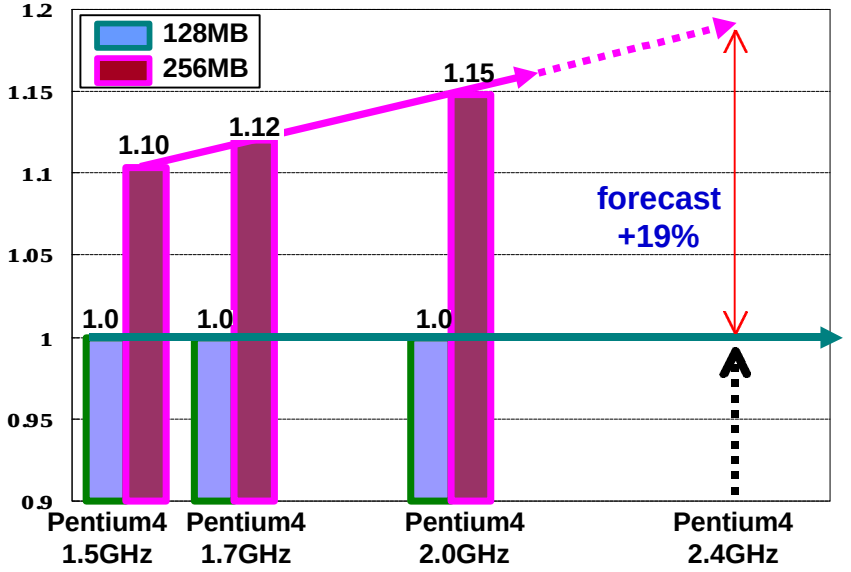


*** Test Conditions**

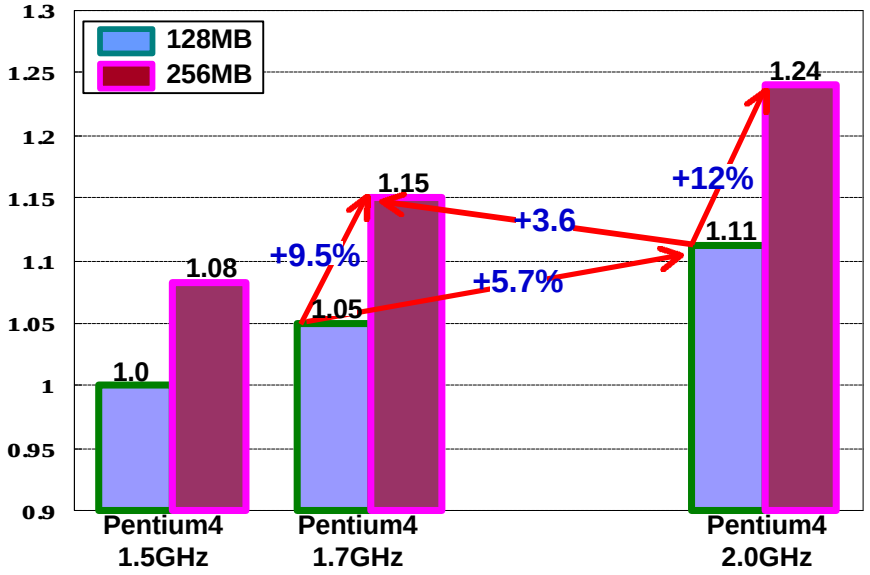
- OS: WinXP RC2
- Main B'd: D850GB
- INF:Inf 3.20.1008
- CPU: Pentium4 1.5/1.7/2.0GHz 423pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800
- ATA Driver: Intel ATA 6.20
- Resolution: 640x480x16bit

More Memory size Provides more benefits as CPU frequency increases in 3D environment

128MB vs. 256MB (In RDRAM based system)

Quake3

Normalized Point



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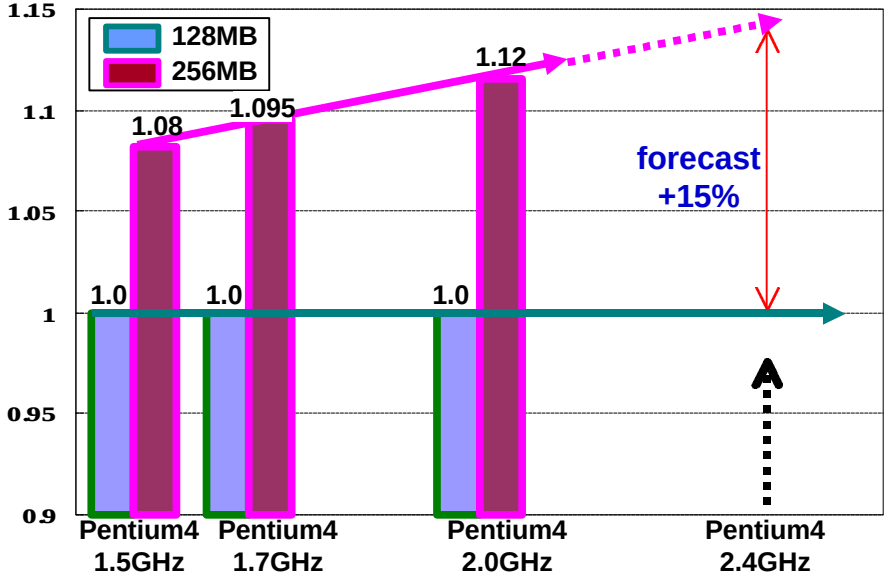

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- OS: WinXP RC2
- Main B'd: D850GB
- INF:Inf 3.20.1008
- CPU: Pentium4 1.5/1.7/2.0GHz 423pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 21.81
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800
- ATA Driver: Intel ATA 6.20
- Resolution: 640x480x16bit

More Memory is the most cost effective solution for performance improvement in Game

- **SUMMARY**

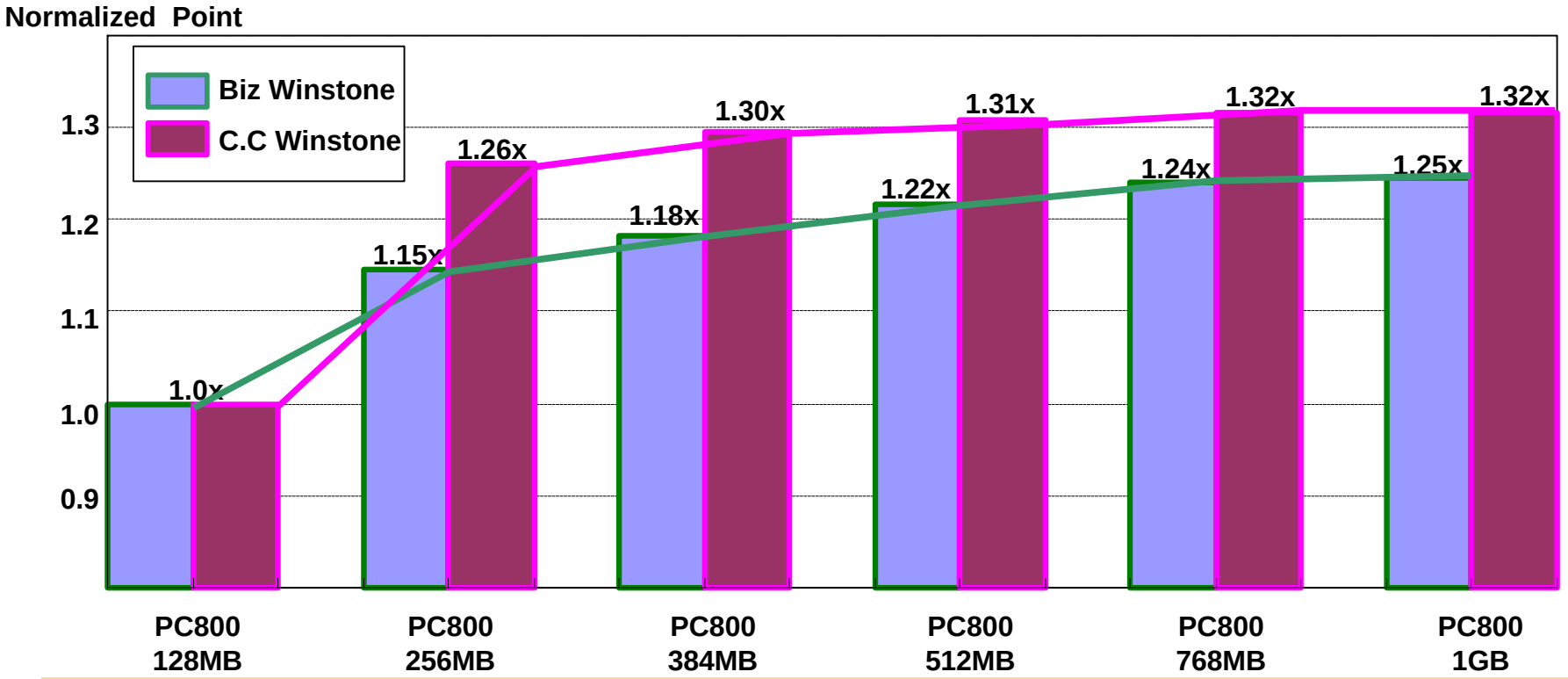
✓ **RDRAM System can benefit from upgrading memory size to 256MB**

- **Office and Multimedia : around 10% (Min.) ~ around 30% (max)**

✓ **More Memory is more cost effective solution in improving system performance than CPU upgrade**

✓**More memory effects becomes more significant as CPU freq. increases**

Performance trend with Memory Size

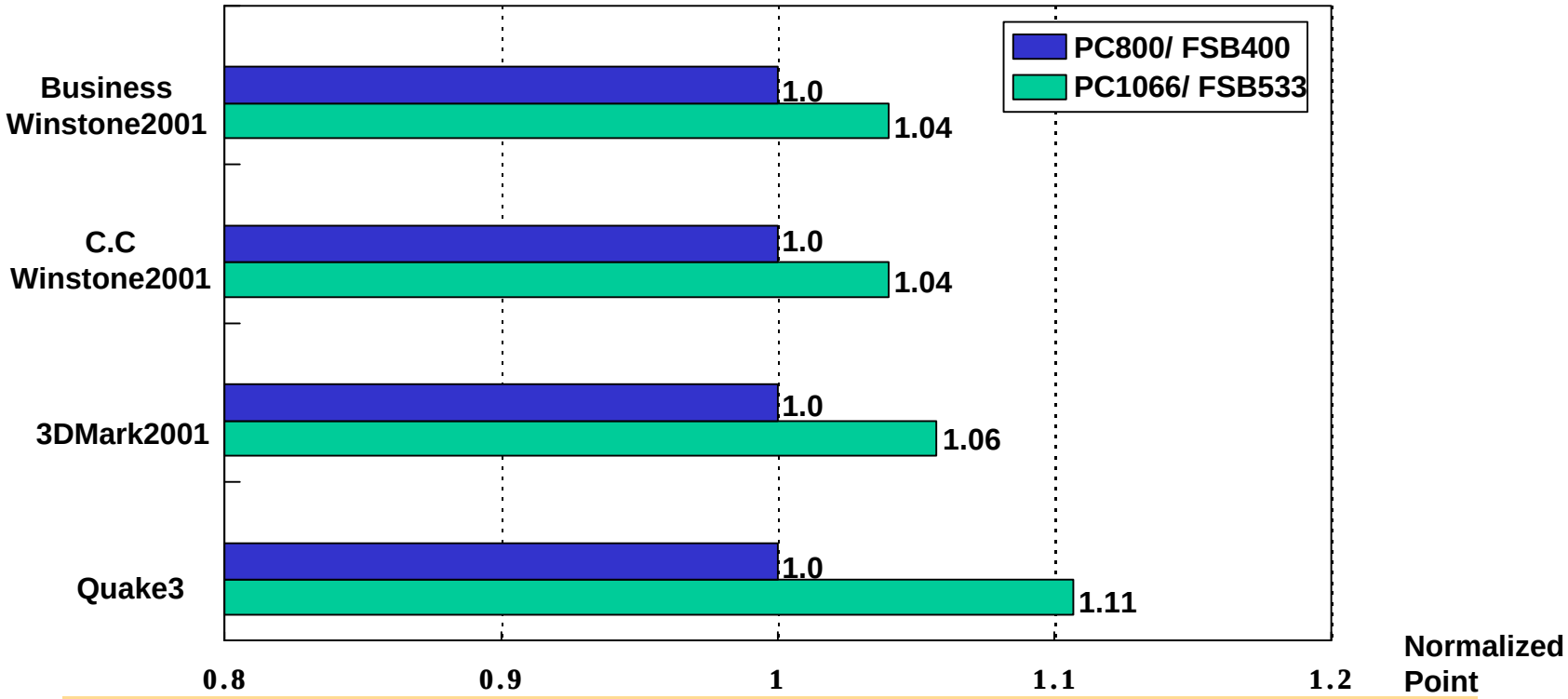


*** Test Conditions**

- OS:Windows2000 SP2
- Main B'd: D850GB
- INF:Inf 2.90.006
- CPU: Pentium4 1.5 423pin
- HDD: IBM DLTA 40GB 7200RPM ATA100
- GFX Driver: Detonator 6.5
- VGA: GeForce2 GTS 32MB DDR
- Memory: PC800
- ATA Driver: Intel ATA 6.1
- Resolution: 1024x768x16bit

More memory size required for better performance

PC1066 vs. PC800 (In RDRAM based system)



*** Test Conditions**

- OS: WinXP RC2
- CPU: Pentium4 2.0GHz 423pin
- VGA: GeForce2 GTS 32MB DDR
- Main B'd: ASUS P4T
- HDD: IBM DLTA 40GB 7200RPM ATA100
- Memory: PC800+FSB400 / PC1066+FSB533
- INF:Inf 3.20.1008
- GFX Driver: Detonator 21.81
- ATA Driver: Intel ATA 6.20
- Resolution: 1024x768x16bit@ Biz. & CC. Winstone2001, 640x480x16bit @3DMark2001 & Quake3

Memory Bandwidth became important factor of system performance in P4 systems