

Test Drive Report for Sapphire RADEON X800 AGP

Introducing the Sapphire RADEON X800 AGP

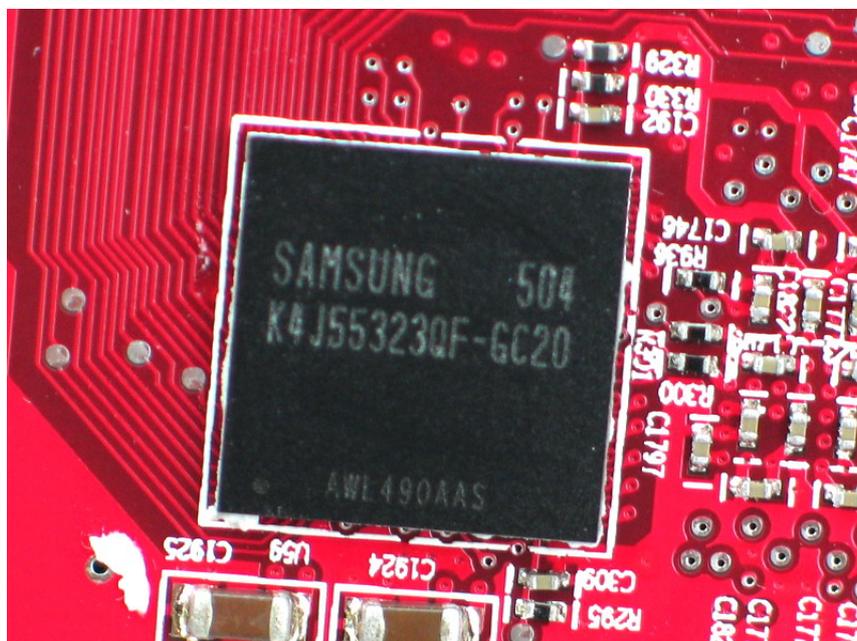
The R430-based RADEON X800 series consists of two products: the 16 pixel pipeline RADEON X800 XL, and the 12 pixel pipeline and 6 vertex pipeline RADEON X800. The R430 core is a native PCI Express design, but worry not because it has been bridged in order to work on the AGP platform.



It's hard to tell the RADEON X800 XL AGP and RADEON X800 AGP apart when they are side by side. They are so alike that it's nearly impossible to identify one from the other. What this also means is that the RADEON X800 XL AGP and RADEON X800 AGP share the same PCB and cooling system, giving the latter assured quality.

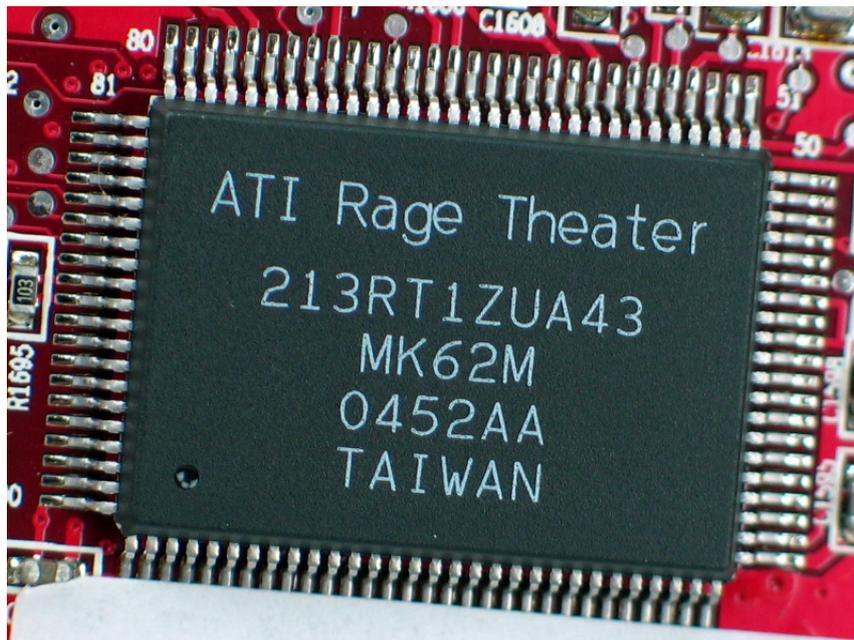


The Sapphire RADEON X800 AGP is rated at 392MHz core frequency and 700MHz (350MHz x 2) memory frequency as intended by ATI. The same PCB used by the X800 XL means that the X800 keeps the 2.0ns GDDR3 memory modules that should be good for 1GHz maximum operating frequency and theoretically, at least, lots of room left for overclocking. Can the card be overclocked like crazy? We find out a little later.

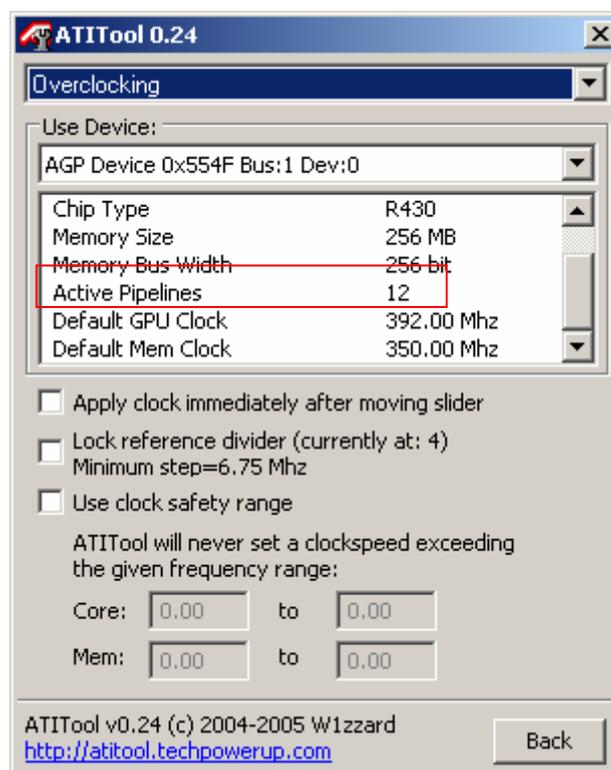


On the rear side of the card we see the ATI Rage Theater chip. This chip is used to provide complete ViVo support. This is a praiseworthy and valuable addition as the X800 is a product of lower positioning compared to the X800

XL, which also features the ATI Rage Theater chip.



To ensure we had the X800 and not the X800 XL in our hands, we performed a quick check with the ATI Tool utility and found that indeed we had a 12 pixel pipeline RADEON X800 AGP graphics card in our hands.

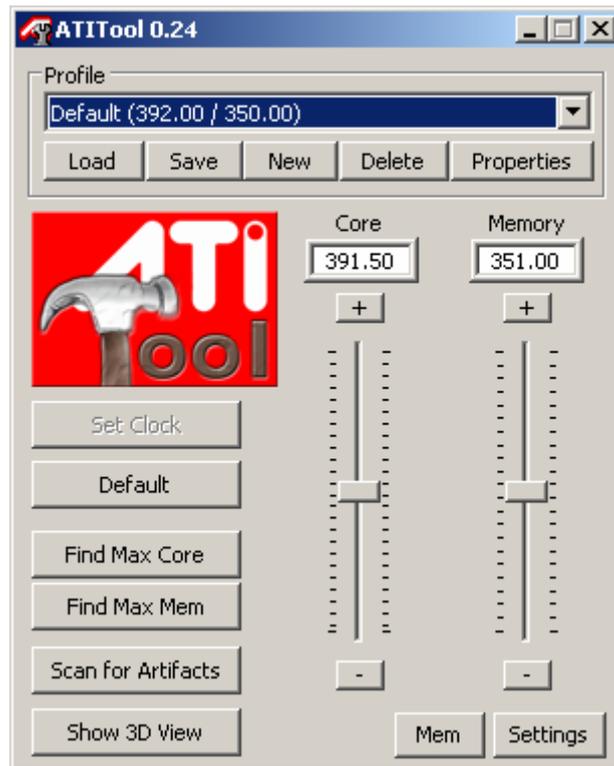


Test Platform

Hardware	
CPU	Intel Pentium 4 2.8G
Motherboard	ASUS P4C800-E
Memory	Kingston KHX4000/256 256MB x2
HDD	Maxtor DiamondMax plus 9 160GB,SATA
Display	Viewsonic P95f+
PSU	Century Star 500W
Graphics cards	Sapphire RADEON X800 XL AGP RADEON X800 XT
Software and Drivers	
OS	Windows XP Professional + SP2
DirectX	9.0c
Intel INF	6.3.0
Display driver	ATI CATALYST 5.7
Benchmarking applications	3DMark01 Build 330
	3DMark03 Build 360
	3DMark05 Build 120
	AquaMark3 Commercial Edition Detail: Very High
	Far Cry v1.3 + FarCry benchmark v1.4 Demo HardwareOC Volcano Detail: Maximum
	Half Life 2 TimeDemo: CplusE Demo Advanced Configuration: Model detail: High Texture detail: High Water detail: Reflect world Shader detail: High Shadow detail: High Vsync: Disabled
	Doom3 Timedemo: demo1 Quality: High

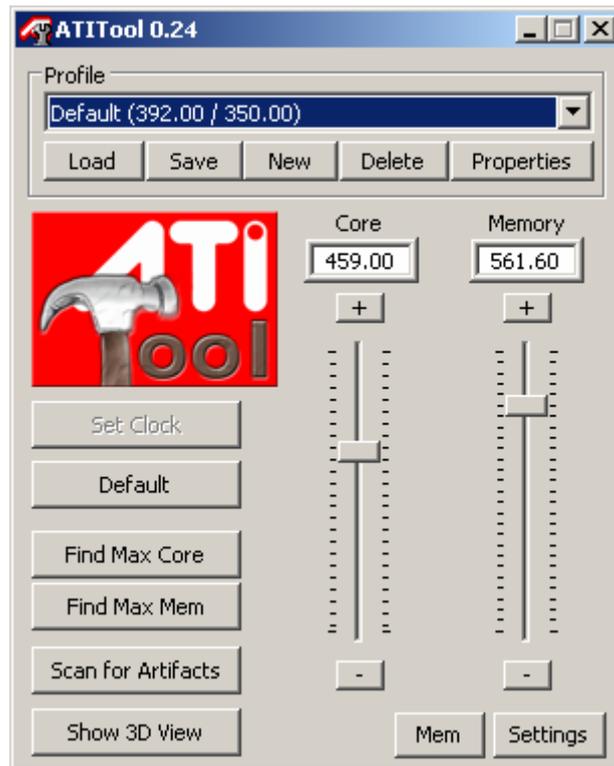
Overclocking

As mentioned in the introductory paragraph, the RADON X800 AGP's 2.0ns memory should have a lot of overclocking potential. We find out if that's the case.



Default frequencies

The ATI Tool utility allowed us to reach a pleasurable 460MHz on the core side – this is higher than that achieved by the X800 XL, which went from 400 to 420MHz. The Sapphire RADEON X800 AGP is a much more willing subject. Its memory went all the way to 1120MHz – far higher than the default 700MHz level.



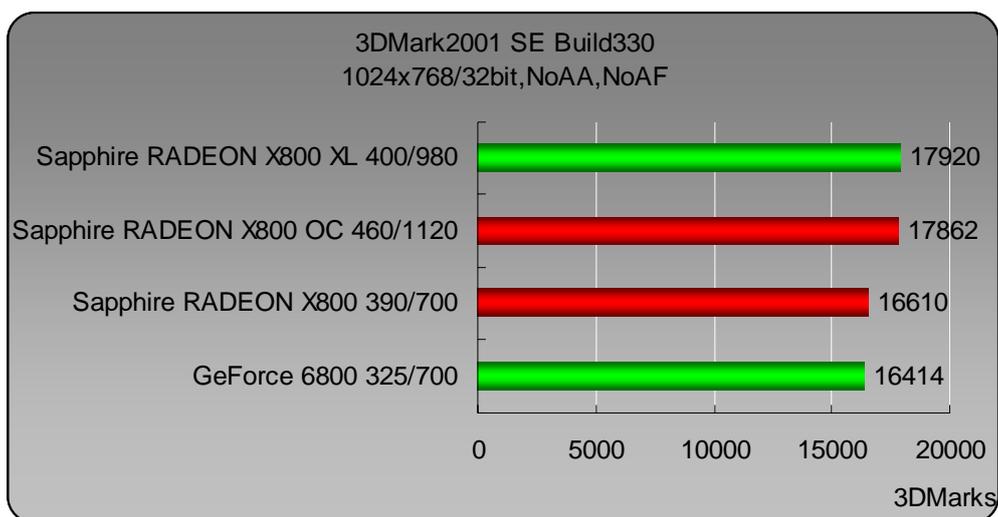
Overclocked settings

In the following pages we will take a look at the Sapphire RADEON X800 AGP's benchmarking performance results for both default mode and overclocked mode.

Performance Benchmarking

3DMark2001 SE

Most tests in the 3DMark2001 SE are DirectX 7 based – these include Game Tests 1 through 3, but not Game Test 4, which is a DirectX 8.1 test. This is an older benchmarking title, but its value as a 3D performance test tool is unquestionable to this day. Many DIYers continue to use the 3DMark2001 SE benchmark to this day to achieve the highest score possible. As the benchmark is hardly a challenge for contemporary graphics cards, the system performance bottleneck becomes the CPU instead



3DMark2001 SE shows the Sapphire RADEON X800 AGP and the GeForce 6800 to be completely equal. The overclocked article runs the RADEON X800 XL extremely close. Of course, 3DMark2001 SE is really just kid's play for today's high-end graphics cards, so we should look at some more data before making any conclusions.

3DMark03

Released in 2003 by the FutureMark Corporation, 3DMark03 is a professional graphics card performance benchmark application and the first of its kind to support DirectX 9 performance testing.

According to FutureMark, "There are 4 game tests - each one is designed to represent a certain type of 3D game, and thereby offer a wider range of 3D

game workloads. 3DMark03 records the total number of frames rendered. Using the length of time for the test, an average frame rate is produced. A higher average framerate is better. The results from the four game tests are then collated to produce the total 3DMark score".

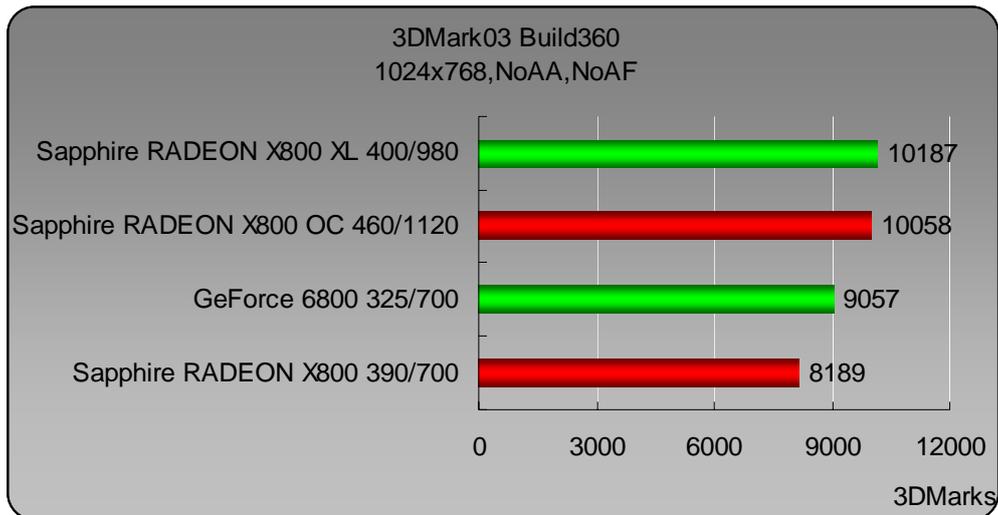
"The 3DMark total score is calculated using the following formula:

$$\text{3DMark score} = (\text{GT1fps} * 7.3) + (\text{GT2fps} * 37) + (\text{GT3fps} * 47.1) + (\text{GT4fps} * 38.7)$$

GT1fps refers to the average frame rate measured in game test 1".

In essence, the higher the score, the higher performance of the tested graphics card. Should a card not support DirectX 9, it will be unable to run GT4, and its total score significantly lower compared to cards supporting DirectX 9. 3DMark03 also features other benchmarks such as the CPU Test, Fill Rate test, and Pixel Shader & Vertex Shader tests, all of which can help the user to better understand the various performance aspects of his/her graphics card.





Here the Sapphire RADEON X800 AGP is approximately 10% in arrears of the GeForce 6800's performance. Overclocking does the Sapphire a world of good though, boosting its performance by 22% to allow it to follow the Sapphire RADEON X800 XL nose to tail.

3DMark05

Released as the successor to 3DMark03, 3DMark05 is a professional graphics card performance benchmark application. 3DMark05 completely forgoes support for DirectX 7 and DirectX 8 and focuses solely on the DirectX 9 API. As such, only graphics card that support (as supposed to being compatible with) DirectX 9 will be able to run and complete the benchmark.

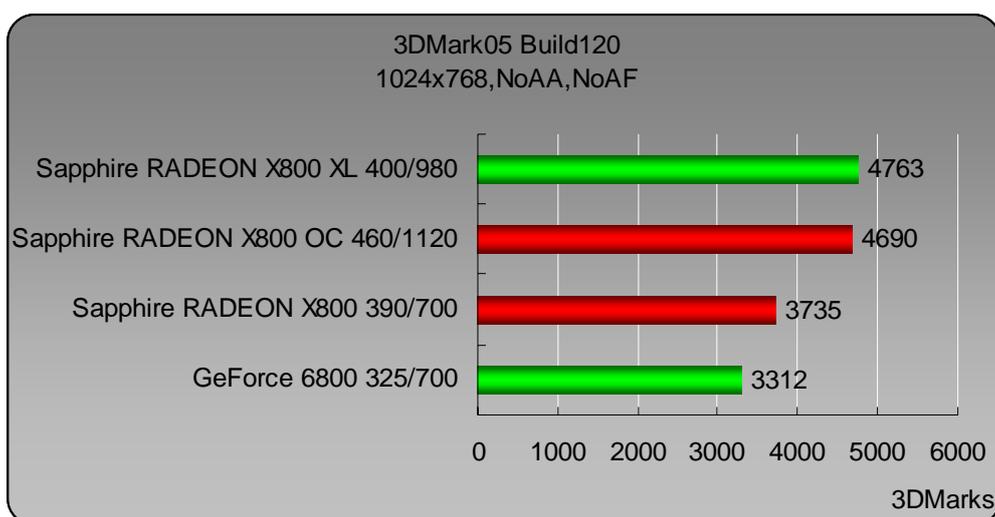
According to FutureMark, "There are 3 game tests - each one is designed to represent a certain type of 3D game, and thereby offering a variety of 3D game workloads. 3DMark05 records the total number of frames rendered. Using the length of time for the test, an average frame rate is calculated. A higher average framerate is better. The results from the three game tests are then collated to produce the total 3DMark score by taking a geometric mean of the game tests' average framerates."

"The 3DMark total score is calculated using the following formula:

$$3DMark\ score = (GT1fps * GT2fps * GT3fps)^{1/3} * 250$$

GT1fps refers to the average frame rate measured in game test 1."

In essence, the higher the score, the higher performance of the tested graphics card. 3DMark03 also features other benchmarks such as the CPU Test, Fill Rate test, and Pixel Shader & Vertex Shader tests, all of which can help the user to better understand the various performance aspects of his/her graphics card.



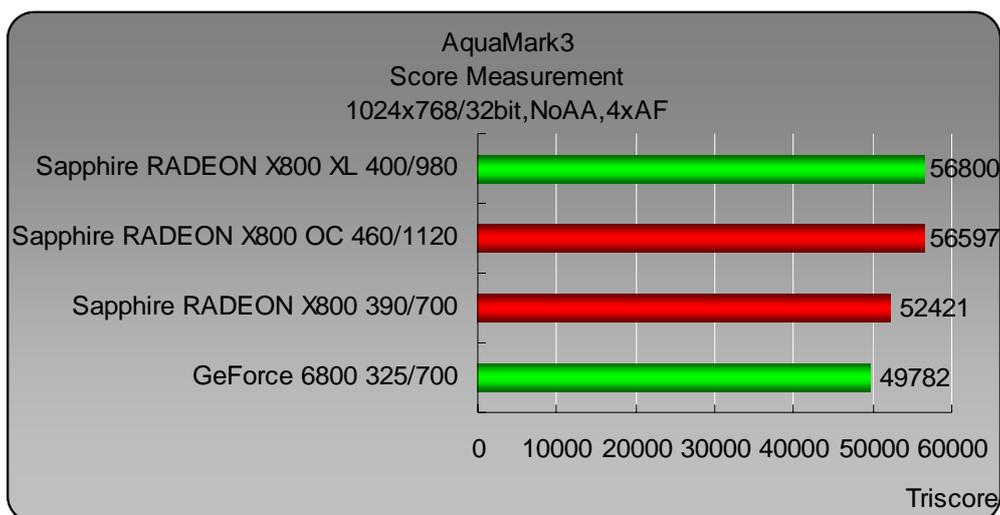
Much to our delight the overclocked Sapphire RADEON X800 AGP again is nipping at the Sapphire RADEON X800 XL's heels in 3DMark05. Even in the default mode Sapphire RADEON X800 AGP is about 12% ahead of the GeForce 6800.

AquaMark3

From the Massive Development Team comes the AquaMark3 3D "Reality Benchmark" application which makes full use of the hardware-accelerated effects supported by the DirectX 9 API. The Krass game engine in AquaMark3 is a real game engine used to generate the 3D scenes seen during benchmarking - results are therefore indicative of a graphics card's true in-game performance.

The AquaMark3 Score Measurement benchmark (and the resultant Triscore) employs methodology similar to the 3DMark series, but here the resolution is fixed at 1024x768, with anti-aliasing disabled and 4X anisotropic filtering enabled, and textures set to Very High. Users are unable to reconfigure these settings.

The Advanced Measurement system is a calculation of the average framerate performance in the various test scenes. Here users can make changes to resolution, anti-aliasing, and anisotropic filtering settings in order to achieve the clearest picture possible regarding the performance of their graphics cards.



AquaMark3 results are quite similar to 3DMark05, and the Sapphire RADEON X800 AGP turns in a small 5% advantage over the GeForce 6800. The

benchmark's Score Measurement test isn't much of a challenge for contemporary performance graphics cards – therefore the CPU tends to have greater influence on score.

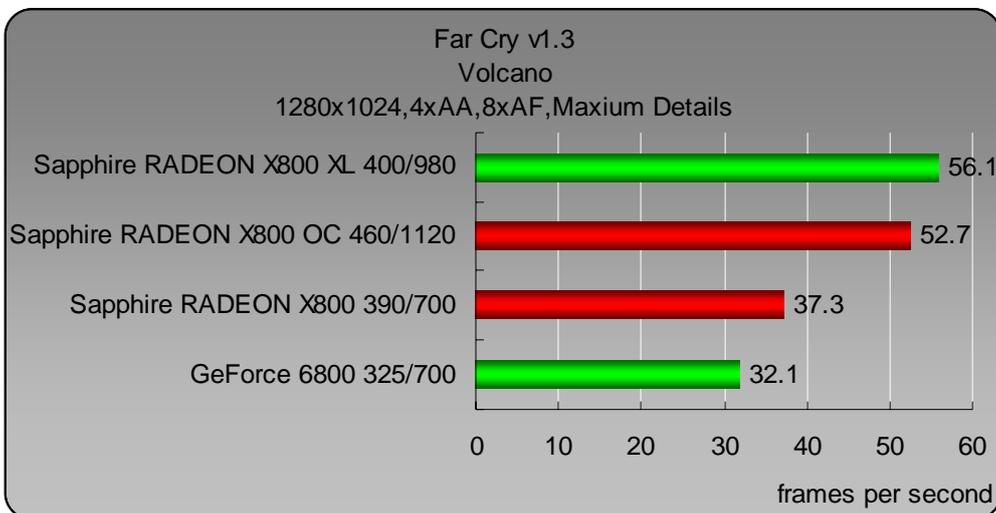
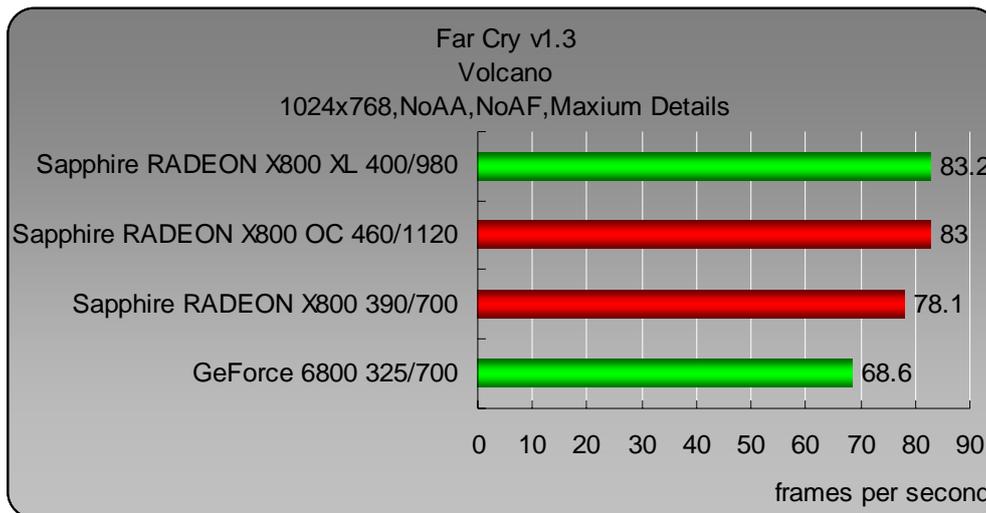
Far Cry

Released in early 2004, Far Cry features exceptionally lush and vivid environments, realistic enemy AI and explosive gun fights so stunning that it captured the top prize in that year's E3 convention. Behind this success is the CryEngine, which requires a very high-level DirectX 9 graphics card to push frame rates into playable territory.

Far Cry also supports HDR (High Dynamic Range) technology beginning with patch 1.3. What HDR does is increase the dynamic range (the ratio between brightest and darkest details in an image) to better approximate/simulate the dynamic range of the human eye. Developer UbiSoft has also provided a 64-bit patch in order to provide support 64-bit operating systems.

For our test we will use the Far Cry Benchmark utility provided by Hardware OC, and run the HardwareOC Volcano demo. The higher the average framerate achieved, the better the result.





In pure speed mode (NoAA, NoAF), we see the same kind of performance evident in the previous benchmarks. The stock Sapphire RADEON X800 AGP is well ahead of the GeForce 6800 here and matches the RADEON X800 XL after the former is overclocked. In eye candy mode (4xAA, 8xAF, 1280x1024), there is a noticeable gap between the overclocked RADEON X800 AGP and RADEON X800 XL AGP, but the performance boost from overclocking is undeniably significant at over 40%. This result is also particularly realistic as eye candy mode settings tend to reduce the CPU's effect on performance.

Half Life 2

In what seems to be a lifetime ago, in November 1998, Valve unleashed Half Life, a game whose beautiful storyline and graphics plus creative combat weaponry took the FPS gaming world by storm. The number of awards bestowed upon this title has been countless.

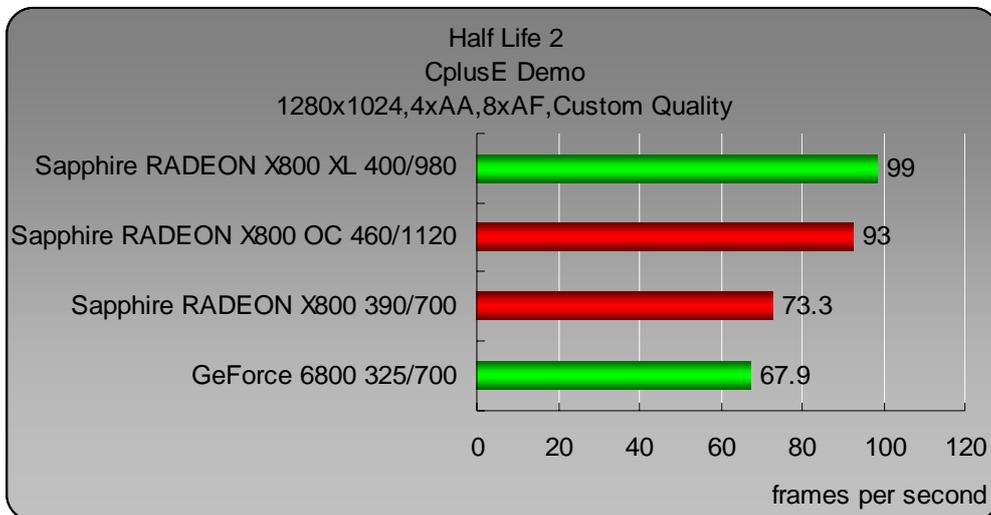
In 2004 Half Life 2 made its debut. This epic uses the Source Engine and

emphasizes natural environments with special effects such as water reflection taking in-game images ever closer to reality. Worth even higher praise is the physics engine which has been taken to a hitherto unseen level of realism – the shattering effect of bullets flying into brick walls, boats rocking violently after a character jumps on – everything reacts as you expect them to in real life, making every part of the gaming process a mighty visual feast.

To make all this possible requires a strong DirectX 9 graphics card - anything less will result in a slow-speed slideshow. ATI's close working relationship with Valve means that an ATI graphics card is likely to perform better than graphics cards of the same class from rival manufacturers. Of note, while the GeForce FX series support DirectX 9, they operate in DirectX 8.1 mode while running Half Life2.

Using the in-game record command, we record a clip and use the Timedemo replay function to check the average framerate. A higher framerate indicates better performance.





Half Life 2 in pure speed mode relies rather heavily on the CPU, which has the effect of bunching up the participating graphics cards, but it is still clear that the Sapphire RADEON X800 AGP is ahead of the GeForce 6800; but that is what we expect in Half Life 2, which has generally been an ATI strong suit. In eye candy mode the Sapphire RADEON X800 AGP the overclocked performance of the Sapphire RADEON X800 AGP continues to be impressive, recording a 26% boost in frame rate.

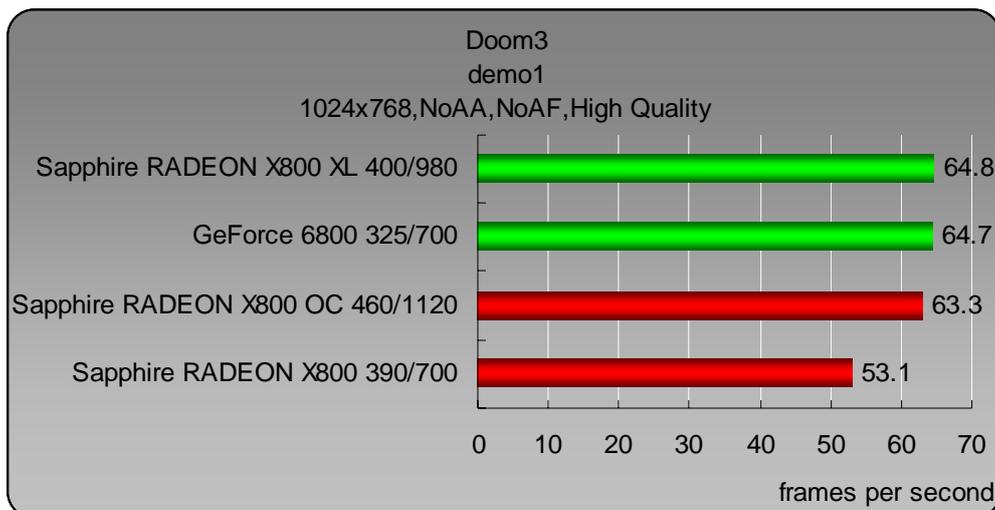
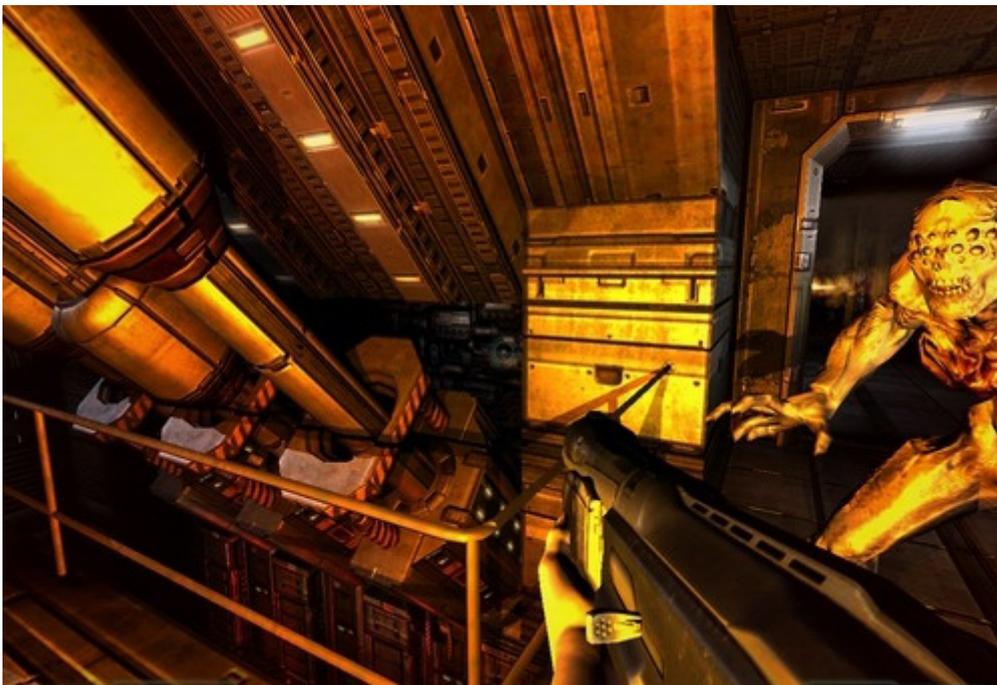
Doom3

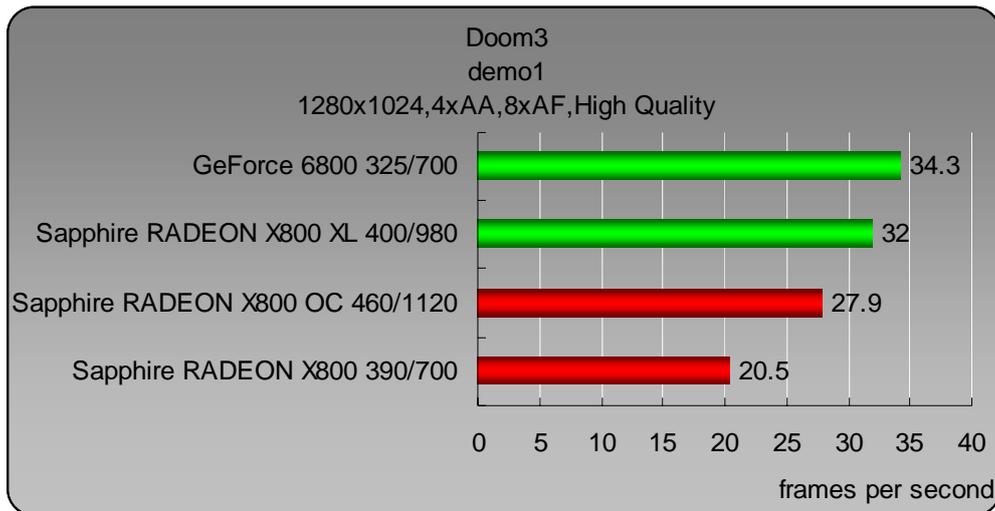
This OpenGL first person shooter master works arrived in 2004 from ID Software, a company that has always been at the forefront of 3D graphics technology. Using the latest in special effects, Doom3 is demanding on the graphics hardware to say the very least. NVIDIA graphics cards have traditionally held the upper hand with OpenGL games, allowing them users a smoother gaming experience over rival graphics cards of the same class. The current GeForce FX and GeForce 6 series cards also support

UltraShadow/UltraShadow II technology for significant load reduction during shadow processing. Naturally, this translates into improved overall performance.

Not willing to go down without a fight, ATI offers optimized Doom3 performance with its CATALYST driver (there is optimization for some other predefined games as well) to allow their graphics cards to produce higher framerates with no impact to image quality.

This test uses the built-in Timedemo function running Demo1. The higher the framerate achieved, the higher the performance of the graphics card.





Doom3 results are a world apart – it is the GeForce 6800 that takes top honors and that's none too surprising giving NVIDIA's affinity for OpenGL games. The 6800 is, in pure speed mode, on par with the pricier RADEON X800 XL, which is itself slightly ahead of the RADEON X800 AGP, which requires going into overclocked mode just to keep up.

In eye candy mode, the overclocked RADEON X800 AGP, is simply outclassed, while the GeForce 6800 keeps a few steps ahead of the X800 XL. In percentage terms, the overclocked performance increase of the RADEON X800 AGP is satisfying at 36%.

Summary

The purpose of the ATI R430 RADEON X800 is to lower the entry point to the company's top graphics card series. At a price below \$250 on Newegg.com, it is a lot more affordable than the early close-on \$400 price tags of the RADEON X800 PRO. Moreover Sapphire RADEON X800 AGP is configured with 256MB of memory with full support ViVo functions. The Sapphire RADEON X800 AGP also inherits the X800 XL's PCB and GDDR3 memory, allowing it to achieve impressive levels of overclocking performance that put it on par with the XL's performance.

Overall the Sapphire RADEON X800 AGP represents a solid value for entry-level high-end users.