


**TOP 10 GRAPHICS CARDS**

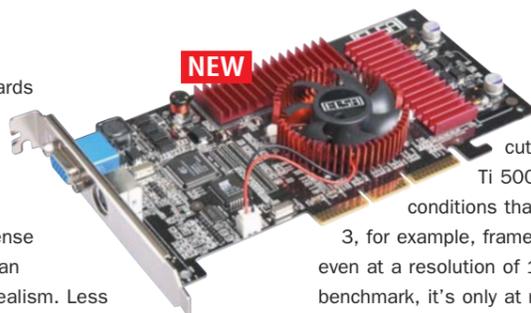
Details	Last month's position	First reviewed	Price (ex VAT)	Warranty	Graphics processor	Installed RAM	DDR RAM	Ramdac	4xAGP	Graphics core	Memory interface	Maximum resolution @refresh rate	Windows 98/Me	Windows 2000	Windows XP	DVI	TV
<b>1</b> Elsa Gladiac 721 020 7294 0114 www.elsa.com	<b>NEW</b>	Jan 02	£170	6-year	nVidia GeForce3 Titanium 200	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>2</b> ATI Radeon 8500 01628 477 788 www.ati.com	<b>NEW</b>	Jan 02	£212	3-year	ATI Radeon 8500	64MB	Y	400MHz	Y	128bit	128bit	2,048x1,536@85Hz	Y	Y	Y	Y	Y
<b>3</b> Hercules 3D Prophet III Titanium 200 020 8686 5600 www.hercules-uk.com	<b>NEW</b>	Jan 02	£212	3-year	nVidia GeForce3 Titanium 200	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>4</b> Hercules 3D Prophet III Titanium 500 020 8686 5600 www.hercules-uk.com	<b>NEW</b>	Jan 02	£280	3-year	nVidia GeForce3 Titanium 500	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	Y	Y
<b>5</b> Gainward GeForce2 Ti/500 XP Golden Sample 0151 709 0900 www.gainward.de	<b>NEW</b>	Jan 02	£128	3-year	nVidia GeForce2 Ti	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>6</b> Videologic VividXS 01923 277 488 www.videologic.com	1	Aug 01	£85	5-year	STMicro Electronics Kyro 2	32MB	N	300MHz	Y	128bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>7</b> Gainward GeForce2 Pro/450 Golden Sample 0151 709 0900 www.gainward.de	2	Dec 01	£130	3-year	nVidia GeForce2 Pro	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>8</b> Hercules 3D Prophet 4500 020 8686 5600 www.hercules-uk.com	3	Nov 01	£99	3-year	STMicro Electronics Kyro 2	32MB	N	300MHz	Y	128bit	128bit	1,920x1,440@75Hz	Y	Y	Y	N	N
<b>9</b> Absolute Multimedia Morpheus GeForce3 01635 278 587 www.absolutemm.com	<b>NEW</b>	Jan 02	£254	4-year	nVidia GeForce3	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y
<b>10</b> Elsa Gladiac 920 020 7294 0114 www.elsa.com	5	Oct 01	£298	6-year	nVidia GeForce3	64MB	Y	350MHz	Y	256bit	128bit	2,048x1,536@75Hz	Y	Y	Y	N	Y

**1** Elsa Gladiac 721

The original GeForce3 cards were a sensation for graphics professionals and games programmers. The enormous firepower, superlative rendering, quality detail and immense flexibility of the chips allowed for an unprecedented level of graphics realism. Less enthused was the budget-conscious public and it's a sign of the GeForce3's capabilities that sales have been fairly good despite the extortionate price tags. So for anyone waiting to welcome the GeForce3 into their home without having to actually sell their house first, the Elsa Gladiac 721 will come as a breath of fresh air.

The Gladiac 721's chip, the GeForce3 Titanium 200, is the mid-range option in nVidia's new line of Titanium processors. Whereas the top GeForce3 Ti 500 slotted into place above the existing GeForce3, the Ti 200 drops in just behind it, coming with a slightly reduced core clock speed (175MHz rather than 200MHz).

You won't be missing out on much by buying this chip, though, and it comes with the same essential hardware enhancements – such as the nFinite FX engine or the Lightspeed Memory Architecture. This last feature ensures that memory is used as effectively as possible, and aims to get the most out of the 64MB of fast 4ns (nanoseconds) DDR (double data rate) RAM.



Load up a few games and you'll be astounded by the smooth animation. Although the Ti 200 doesn't have the cutting-edge acceleration of the GeForce3 Ti 500, it's only under the most demanding conditions that you'll notice the difference. On Quake 3, for example, frame rates on a 1GHz PC run close to 100 even at a resolution of 1,600x1,200. Subjected to the Aquanox benchmark, it's only at resolutions of 1,600x1,200 and above that the Gladiac 721 starts to fall behind the Ti 500.

The top-of-the-range Ti 500 is the only choice for those who want to run at the highest resolutions with FSAA (full scene anti-aliasing) and no drop in frame rates. For the rest of us, though, the Ti 200 will do the goods for less than two thirds of the price.

When it's the graphics chip that tends to command the attention, it's easy to forget about the contributions of the board manufacturer. But Elsa has done the GeForce3 Ti 200 proud with the Gladiac 721. It hasn't gone overboard on connectors – although TV-out is included, a DVI (digital video interface) will only be built into the 921, Elsa's deluxe Ti 500 version. Better still is the price tag: £170 is still a lot to pay for a graphics card, but this is an excellent deal considering the ability of the hardware.

Hardened gamers may opt for the Ti 500 or take a gamble on the potentially all-conquering ATI Radeon (just £42 more than the 721). However, for affordable graphics firepower with no strings attached, the Gladiac is a Titanium for the masses.

**2** ATI Radeon 8500

The standard of graphics might have improved immeasurably with nVidia's presence, but the lack of competition has done little to stem the ever-increasing prices. But with Kyro chips attacking the lower end of the market and ATI fighting for the title of fastest graphics card, consumers can only benefit from the evolution of the Radeon chip.

The latest incarnation, the 8500, offers a host of stunning features on paper. Hydravision enables multimonitor support, while TruForm breaks up surfaces into a number of smaller sections, allowing graphics to be more detailed. SmoothVision is another innovation that builds on FSAA (full scene anti-aliasing) – that is, replacing the jagged lines in computer graphics with straight ones – by offering a number of different FSAA techniques for the programmer to experiment with.

However, this is the problem with the Radeon 8500. Most of these features need to be implemented by the programmers, so the latest batch of nVidia-centric games won't harness the Radeon's capabilities. In fact, not all of the features had even been implemented in the drivers that we used to test the card.

Add to this the 8500's unstable performance (the ATI Radeon crashed our tests more than all of the other cards put together) and lacklustre Windows XP performance and you have a card that



appears to have been rushed out several months before it's ready.

We still place the Radeon 8500 in the number two position because the £212 price tag is excellent. Plus, should ATI get properly tested drivers in place, this card has more than enough potential to beat even the GeForce3 Ti 500. In Windows tests (particularly 98 and Me), the Radeon matched and even eclipsed the GeForce3s in some OpenGL applications (Quake III, for instance). DirectX 7/8 support needs the most work, though, as it failed to hang on to the GeForce3 Ti 500 in such games as Giants and Unreal.

The GeForce3 Ti 200 still looks the safest bet for those who can't afford the ultra-stable Ti 500. But if you fancy gambling on ATI perfecting its drivers, the well priced Radeon could sprint ahead of the field. We'll be keeping an eye on ATI's next driver release, so watch this space.

**3** Hercules 3D Prophet III Titanium 200

The Elsa Gladiac 721 may be the best value for money, but should availability prove to be a problem, the Hercules 3D

Prophet III Titanium 200 offers more of the same for just a little extra cash. The GeForce3 Ti 200 chip is just



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as impressive, as is the glut of fantastic features that accompanies the GeForce3 family – the Lightspeed Memory Architecture, for instance, which manages the 64MB of fast DDR (double data rate) RAM, or the stunning graphics quality delivered by the programmable nFinite FX engine.

As with the Elsa Gladiac 721, Hercules has decided not to equip the Titanium 200 with a DVI (digital video interface). The uptake of digital devices has proven surprisingly sluggish and, while DVI might be a useful feature in the future, Hercules has kept the price down by not including it in the mid-range Titanium 200. The TV-out connector, smooth installation routine and strong board build are up to Hercules' usual standards.

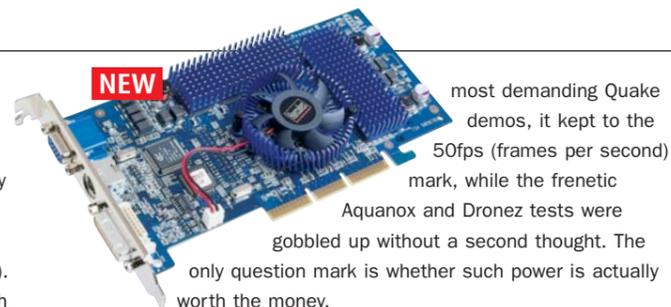
In terms of speed, the Hercules is slightly slower than the Elsa Gladiac 721. However, as this amounts to little more than a frame or two, the average gamer will be pushed to detect any difference. The Ti 200 chip is no slouch, though, and only the pricey Ti 500 was noticeably faster. Even then, this was only at resolutions of 1,600x1,200 with high detail levels. FSAA (full scene anti-aliasing) can be switched on at a resolution of 1,280x1,024 without severely hitting frame rates, and the Ti 200 has the power to revolutionise your gaming experience.

The real problem for the Hercules isn't the cheaper Elsa Gladiac, however, but the ATI Radeon. Matching the Hercules on price, the Radeon looks to have more potential. Should ATI perfect the drivers, the 3D Prophet III could be left in the dust.

**4** Hercules 3D Prophet III Titanium 500

If the GeForce3 Ti 200 is impressive enough then it's the Ti 500, with a 500MHz memory sub-system and the ability to perform 960 billion operations per second, that proves astonishing. The most amazing feature of the top Titanium is not its huge frame rate at lower resolutions – in excess of 125 in Quake III – but its ability to keep up the pace.

Its score in Quake, for instance, dropped only a few frames at a resolution of 1,600x1,200 with 32bit colour. Even under our



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most demanding Quake demos, it kept to the 50fps (frames per second) mark, while the frenetic Aquanox and Dronez tests were gobbled up without a second thought. The only question mark is whether such power is actually worth the money.

Aside from the mass of intensive graphics techniques that will be working their way into the games arena, you now have enough spare power to make full use of high-resolution anti-aliasing (smoothing the jagged edges on graphics) and guarantee the highest quality images yet seen on home PCs. For all this, though, the Hercules Ti 500's price tag is a lot to pay when the far cheaper Ti 200 keeps a respectable distance behind. If you can afford this card you won't regret it, but for the average user our top two cards remain the more tempting purchases.

**5** Gainward GeForce2 Ti/500 XP Golden Sample

The Gainward GeForce2 Ti/500 XP poses an interesting dilemma. More than six months on from the release of the GeForce3 chip, and with the latest games finally beginning to take advantage of its abilities, is a card based around the older GeForce2 technology doomed to a swift death? In typical Gainward style, however, this is no ordinary GeForce2 card, and the Titanium enhancements promise plenty of speed.

The Titanium GeForce2 is virtually identical to the older Ultra chips, but the 64MB of fast 4ns (nanosecond) memory and superb XP support will add spice. In performance, the Golden Sample easily dispatches the likes of the GeForce2 Pro/450 and the Kyro 2 cards. And while it might



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A smooth performer: frame rates explained

**T**raditionally, drawing perfectly smooth lines on a computer screen has been high impossible. However, with a little trickery this problem can be hidden. In anti-aliasing, additional washed out pixels are added and, although this results in blurred edges, the effect is surprisingly smooth lines.

Although anti-aliasing technology has been around for years, it's only with the incredible power of modern graphics cards that the technology can be used effectively without cutting into performance significantly.

Indeed, the nVidia GeForce3 family has plenty of spare power to devote to anti-aliasing without the frame rate dropping below an acceptable level. Measured in terms of frames per second, or fps, the frame rate reflects the number of times a second the image is refreshed – the more refreshes, the smoother the effect will be.

Anything less than 25-30fps and the results will be jerky. In reality, you shouldn't need more than 50 or 60. If you can achieve a frame rate above 100, you're better off spending some of the excess frames on higher levels of detail,

more colours, anti-aliasing and so on. Alternatively, you could go up a resolution. With most cards expect 100fps or more at a resolution of 800x600, with 25-30fps more likely at 1,600x1,200.

There are plenty of additional graphics techniques that can consume frame rates. MIP Mapping, for example, improves the quality of graphics by creating copies at low and high resolutions and blending them together. Bump mapping, on the other hand, adds depth to graphics. Embossed designs, for instance, are extremely realistic using this technology.

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be no match for the GeForce3 range, it did measure up to the underdeveloped ATI Radeon on a couple of occasions. If you're not bothered about getting the maximum from the latest clutch of games, this card will satisfy your every need.

**6** Videologic VividXS

Just as gamers and graphics enthusiasts had got used to the idea of paying upwards of £250 for a decent card, the emergence of the Kyro 2 chip proved that you didn't have to remortgage the house to render your latest games in glorious technicolour.

A range of clever tricks and techniques – for instance, tile-based rendering which maximises efficiency by only drawing the parts of the scene that the player can see – culminated in highly palatable frame rates. The Videologic's £85 price tag made it a true prospect. But while this card is still value for money, the increased firepower and superior DirectX 8.0 and Windows XP support of the latest GeForce Titanium cards make it look sub-standard. If you keep the resolutions down to 1,024x768 you will get high frame rates, but with the new batch of games beginning to place severe demands on your PC, now is the time to be setting your sights a little higher than the Kyro 2 chip.

**7** Gainward GeForce2 Pro/450 Golden Sample

Gainward's GeForce2 Pro/450 was unlucky enough to arrive on the scene just as nVidia was applying the final touches to its new-look GeForce range. Undoubtedly, this card would have been a contender for the top spot three months ago.

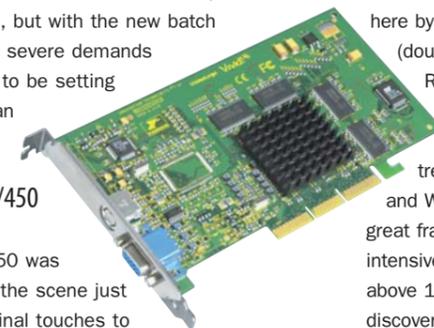
However, Gainward's own (and highly commendable) GeForce2 Ti card has the extra turn of speed required to put the Pro/450 in its place. This is despite an impressive list of hardware components, and the extra 50MHz of speed and blisteringly fast 4.5ns (nanoseconds) DDR (double data rate) RAM coaxes a relatively strong performance out of this ageing chip. Even at a resolution of 1,600x1,200 (formerly a no-go area for anything that wasn't a GeForce3) the card manages to keep the frame rate above 50.

The Kyro 2 cards are still better value for money but, in truth, if you can't afford the GeForce3 Ti 200, Gainward's newer GeForce2 Ti should be your next port of call.

**8** Hercules 3D Prophet 4500

In many respects the same card as our former Best Buy Videologic VividXS, the Hercules 3D Prophet 4500 comes equipped with an identical Kyro 2 chip but loses out due to its slightly higher price tag.

This is the 32MB version (the same memory configuration as the VividXS), although you may prefer to jump straight to the



64MB version for increased speed. To be honest, though, while the Kyro 2 cards are still the perfect solution for budget-conscious gamers, the new range of GeForce Titanium cards mean that they no longer look such outstanding value for money. Even the GeForce2 Ti card was able to outstrip the Hercules frame for frame, and for intensive gameplay at higher resolutions the Kyro 2 chip will struggle to keep up.

**9** Absolute Multimedia Morpheus GeForce3

This is the first glimpse that we've had of Absolute Multimedia's nVidia GeForce3 entrant, and it's unfortunately a case of the right card at the wrong time. The GeForce3 Ti 500 chip might be grabbing the praise, but it's really only a standard GeForce3 with extra running space. Buy this card and you'll still get the advanced memory architecture – joined here by 64MB of DDR (double data rate)

RAM – and excellent graphics quality. You'll also be treated to superb DirectX 8.0 and Windows XP coverage and some great frame rates. Able to cope with our intensive Aquanox and Dronez tests, and capable of frame rates above 100 in Quake III, the Absolute is a high performer – as you'll discover when you dip into the Morpheus' extensive games pack.

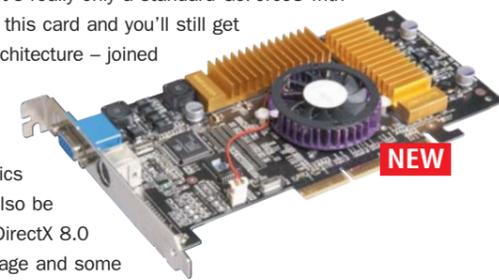
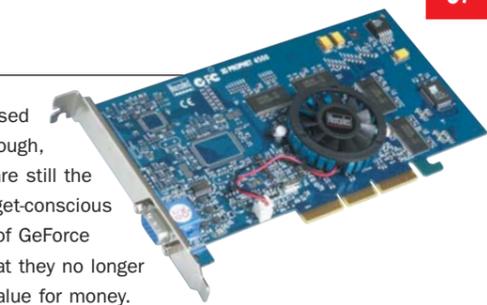
Despite its many good points, though, the Absolute Multimedia Morpheus comes across as something of a compromise. With the GeForce3 Ti 500 and ATI Radeon 8500 now setting the pace at the top, and the Ti 200 offering better value for money, the Morpheus is left with nowhere to go.

**10** Elsa Gladiac 920

Like the Absolute Multimedia Morpheus one place above it, Elsa's Gladiac 920 is a card whose days are numbered – literally in the case of the Gladiac, as Elsa's new Ti 500 board is due to replace it very shortly.

As with the Morpheus, the 920 is a card that still has plenty of life left in it. Only the Ti 500 cards can boast significantly more in the way of top-line speed – although the Morpheus does just about beat it frame for frame. The hardware specifications are as good as any on the market and the extras (software pack, TV-out) are more than reasonable. The six-year warranty ensures that the card will be protected far beyond its useful lifetime.

As far as GeForce3 cards go, this is a reasonable package, but compared to the might of the ATI and Ti 500 cards, or the low price tag of the Ti 200s, it simply can't compete.



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