

While game engine advancements are slowing down (or companies are just designing them for the Xbox 360), graphics hardware advancements continue, which means that now you can run games at their prettiest for less money. The ATI Radeon HD 4770, based on the new RV740 GPU, is a prime example. This is the first graphics card to feature 40nm transistors, and the smaller transistors allow for greater clock speeds and less power consumption. It's amazing that ATI has managed to pack 826 million transistors into a 144mm<sup>2</sup> die, and that a card costing about £80 has 640 stream processors clocked at 750MHz.

The HD 4770 uses 512MB of GDDR5 rather than the slower GDDR3 of most modern Radeons (and all Nvidia cards) – previously, only flagship cards such as the HD 4870, HD 4890 and HD 4870 X2 used GDDR5. The GDDR5 of a standard HD 4770 runs at 800MHz (3.2GHz effective), but the skinny 128-bit memory interface limits the card to 51.2GB/sec of memory bandwidth. Even so, the GDDR3-equipped HD 4850 has only 63.3GB/sec of memory bandwidth, so the HD 4770 isn't too far behind.

**+4770**  
Faster than GeForce 9800 GT; lots of overclocking potential; decent value for money

**-4570**  
Cheap cooler, could be quieter; no PWM fan

## THE CARDS ON TEST

The majority of Radeon HD 4770s that we've had sent in from partner companies thus far are all but identical, so we've chosen cards from Gigabyte and HIS to find out if the similarities are more than just cosmetic. Neither card deviates from ATI's specified clock speeds, but both companies have customised their cards in other ways.

For example, the same capacitors and MOSFETs have been removed from both cards, presumably to cut costs – the solder holes and blueprint lines are a giveaway. Both cards use the same cooler, which incorporates an anodised aluminium heatsink (it only looks like copper) and 80mm fan. This cooler isn't the noisiest we've heard, but it could be quieter. To be fair to Gigabyte and HIS, every HD 4770 card we've seen also has the same components missing and the same underwhelming cooler. Both cards have two DVI ports and a composite video out, and both cards require one 6-pin PCI-E power connection from your PSU before any gaming pleasure can commence.

Thankfully, some differentiation can be found in the bundles. The Gigabyte ships

with two DVI to D-SUB adaptors while the HIS ships with one DVI to D-SUB and one DVI to HDMI. The Gigabyte also ships with a component RGB to composite video adaptor and a three-year warranty, while HIS only offers one year of cover.

## PERFORMANCE

The HD 4770 goes up against Nvidia's 9800 GT – unbranded versions of these cards can be found for around £80. You should therefore be comparing the top two bars of the graphs below with the dark green one.

Crysis Warhead is the most demanding game we use, even if we do use DirectX 9 mode and the Gamer settings. Even at the lowest test resolution of 1,280 x 1,024 with 2x AA and 16x AF, the minimum frame rate was a full 5fps short of what we consider smooth. Dropping the AA and AF will net you a playable frame rate on an HD 4770, however. This is a great result for a sub-£80 card, and the GeForce 9800 GT offers roughly the same amount of performance at 1,280 x 1,024. However, at 1,680 x 1,050, the performance of the 9800 GT drops off dramatically, so the HD 4770 is the superior card for Warhead.

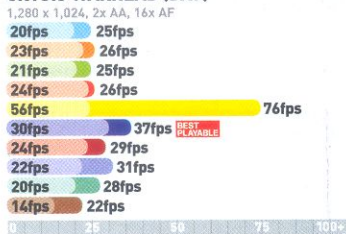
We found similarly low minimum frame rates from the HD 4770 in S.T.A.L.K.E.R.: Clear Sky as we did in Crysis – clearly the dynamically created and lit Zone environment was just too much for the HD 4770 even at 1,280 x 1,024. The 19fps and 20fps minimum of the two cards is a touch

## WHERE TO BUY

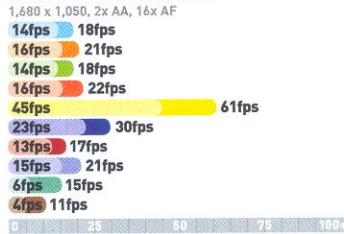
Card	Price	Supplier	Manufacturer	SKU number
Gigabyte GV-R477D5-512H-B	£85.62 inc VAT	www.scan.co.uk	www.giga-byte.co.uk	GV-R477D5-512H-B
HIS HD 4770 512MB	£79.10 inc VAT	www.scan.co.uk	www.hisdigital.com	H477F512P

## PERFORMANCE

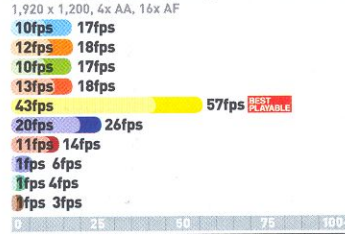
### CRYSIS WARHEAD (DX9)



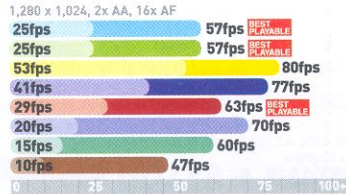
### CRYSIS WARHEAD (DX9)



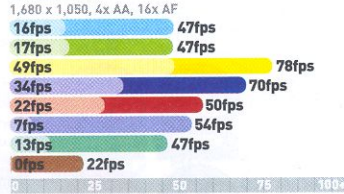
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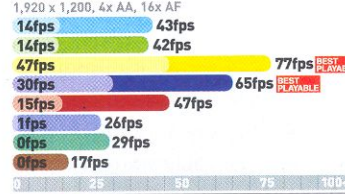
### FALLOUT 3



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■ Gigabyte HD 4770 min/avg  
■ ATI Radeon HD 4870 X2 2GB min/avg  
■ Nvidia GeForce 9800 GT 512MB min/avg  
■ Gigabyte HD 4770 overclocked min/avg  
■ ATI Radeon HD 4870 1GB min/avg  
■ Nvidia GeForce 9600 GSO 384MB min/avg  
■ HIS HD 4770 min/avg  
■ ATI Radeon HD 4850 512MB min/avg  
■ HIS HD 4770 overclocked min/avg  
■ Nvidia GeForce GTS 250 512MB min/avg

## FOLDING@HOME

GRAPHICS CARD	ppd*
Gigabyte HD 4770	2,229
HIS HD 4770	2,231
ATI Radeon HD 4870 X2 2GB	5,171
ATI Radeon HD 4870 1GB	2,988
ATI Radeon HD 4850 512MB	2,572
Nvidia GeForce GTS 250 512MB	5,559
Nvidia GeForce 9800 GT 512MB	4,046
Nvidia GeForce 9600 GSO 384MB	4,236

\*points per day

## DRIVERS

Gigabyte ATI Catalyst 9.4  
 HIS ATI Catalyst 9.4  
 Palit Nvidia ForceWare 185.68  
 ATI comparison cards ATI Catalyst 9.4  
 Nvidia comparison cards Nvidia ForceWare 185.68  
 Test kit: 3.2GHz Intel Core i7-940 overclocked to 3.7GHz, MSI Eclipse, 6GB of Corsair TR3X6G1333C9 DDR3 RAM, Windows Vista 64-bit



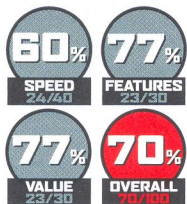


These Radeon HD 4770 cards are essentially the same

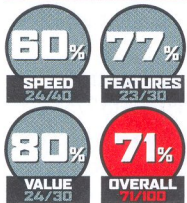
amount of power, with the test PC with either card installed using 226W to further medical research. The GeForce 9800 GT is a thirstier card, causing our test PC to consume up to 245W when folding and 275W when gaming.

The memory of the two cards overclocked identically, hitting 890MHz (3.56GHz effective). We now saw the Gigabyte card push 24fps in Crysis Warhead at 1,280 x 1,024, a gnat's whisker from our definition of a smooth frame rate.

### SCORES GIGABYTE



### SCORES HIS



### OVERCLOCKING

After carbon-copy performance from both cards, the Gigabyte and HIS also overclocked very similarly. We had to resort to trickery to get the most from the cards though, as the OverDrive tool of the Catalyst Control Center only allows an overclock of up to 830MHz. To overclock the two HD 4770s we used RivaTuner and added the phrase '94B3h' to the rivatuner.cfg file under the '[GPU\_1002]' section so that it read 'RV770 = 9440h-9442h,944Ch,94B3h' [our thanks to Hilbert from Guru3D for the tweak].

Now that RivaTuner could address the HD 4770 GPU, we could push Gigabyte's HD 4770 from 750MHz to 905MHz and HIS's to 895MHz. These huge overclocks show a lot of promise for the 40nm GPUs.

### CONCLUSION

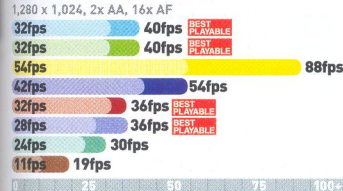
As the Gigabyte and HIS HD 4770 are essentially the same card, it's the HIS card that's better, as it's £6 cheaper. The alternative card in this price range is an unbranded GeForce 9800 GT but the HD 4770 betters this card in everything but folding. If you need a cheap card, the Radeon HD 4770 is a good bet.

mark mackay

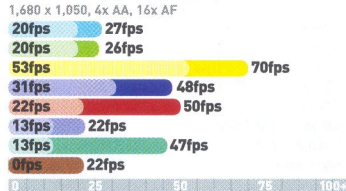
### IN DETAIL RADEON HD 4770

<b>Graphics processor</b>	ATI Radeon HD 4770, 750MHz
<b>Pipeline</b>	800 stream processors (750GHz), 16 ROPs
<b>Memory</b>	512MB GDDR5, 3.2GHz effective
<b>Bandwidth</b>	51.2GB/sec, 128-bit interface
<b>PCI-E</b>	16x (PCI-E 2.0)
<b>Compatibility</b>	DirectX 10.1 OpenGL 3.0
<b>Anti-aliasing</b>	2x, 4x, 8x, 16x HQ AF
<b>Anisotropic filtering</b>	2x, 4x, 8x, 16x
<b>Connections</b>	2 x DVI, TV-out, 2 x CrossFire, 6-pin PCI-E power

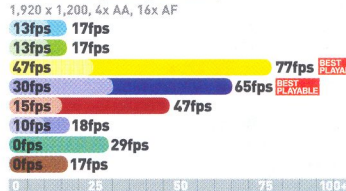
### FAR CRY 2 (DX10/DX10.1)



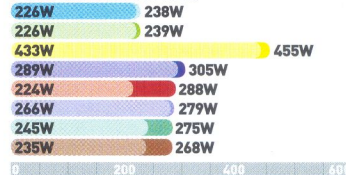
### FAR CRY 2 (DX10/DX10.1)



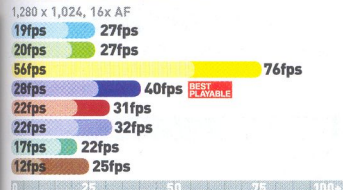
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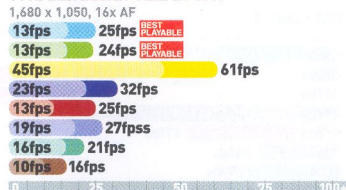
### PEAK TOTAL SYSTEM POWER CONSUMPTION



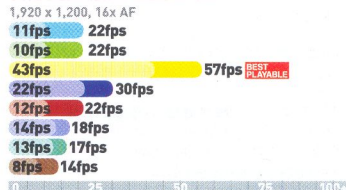
### S.T.A.L.K.E.R.: CLEAR SKY



### S.T.A.L.K.E.R.: CLEAR SKY



### S.T.A.L.K.E.R.: CLEAR SKY



- Gigabyte HD 4770 folding/gaming
- HIS HD 4770 folding/gaming
- ATI Radeon HD 4870 X2 2GB folding/gaming
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- Nvidia GeForce GTS 250 512MB folding/gaming
- Nvidia GeForce 9800 GT 512MB folding/gaming
- Nvidia GeForce 9600 GSO 384MB folding/gaming

### HOW WE TEST

Thorough testing is essential to evaluating if a graphics card is worth the asking price, or whether there's a better card for your money. The comparative graphs on these pages show how a new card performs against the established hierarchy of graphics cards, from the cheapest gaming card to the fastest. See p61 for more details.

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