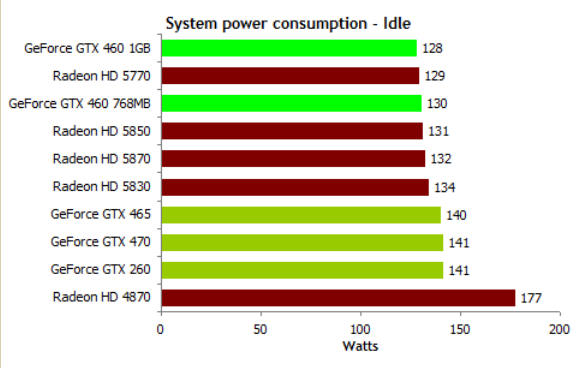
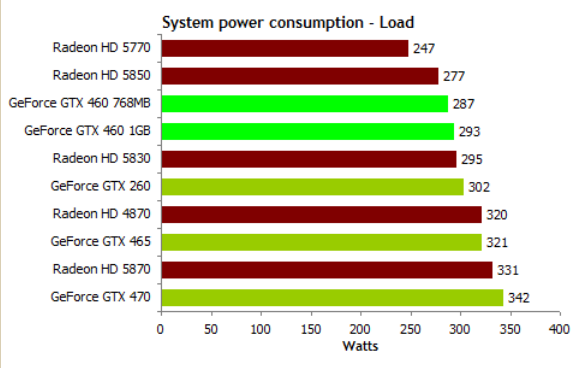
Power consumption

We measured total system power consumption at the wall socket using an our fancy new Yokogawa WT210 digital power meter. The monitor was plugged into a separate outlet, so its power draw was not part of our measurement. The cards were plugged into a motherboard on an open test bench.

The idle measurements were taken at the Windows desktop with the Aero theme enabled. The cards were tested under load running *Left 4 Dead* at a 1920x1200 resolution with 4X AA and 16X anisotropic filtering. We test power with *Left 4 Dead* because we've found that this game's fairly simple shaders tend to cause GPUs to draw quite a bit of power, so we think it's a solidly representative peak gaming workload.





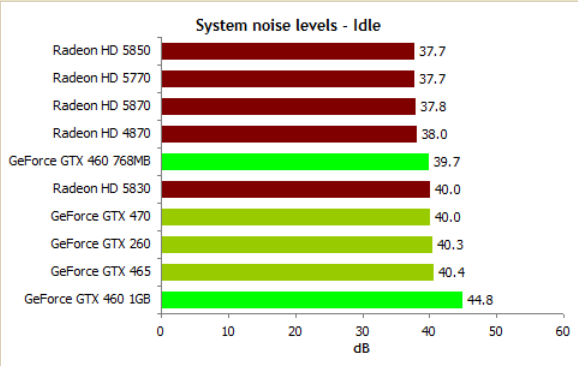
Overall, the new GeForces look quite decent on power draw. Interestingly, the Radeon HD 5850 draws less power under load than either flavor of GTX 460, yet the slower Radeon HD 5830 draws more. There's a simple reason for that: the GPU on 5830 has more units disabled, but it also has a higher clock speed than the 5850. Higher clock frequencies increase power draw, and higher voltages are often required to reach them. With a larger board and higher clocks the 5830 isn't particularly efficient.

The GF104 looks like real progress for Nvidia. The GTX 460 1GB pulls less power at idle and under load than the GTX 465 or the GTX 260, yet it usually matches or outperforms them both.

Noise levels

We measured noise levels on our test system, sitting on an open test bench, using an Extech model 407738 digital sound level meter. The meter was mounted on a tripod approximately 8" from the test system at a height even with the top of the video card. We used the OSHA-standard weighting and speed for these measurements.

You can think of these noise level measurements much like our system power consumption tests, because the entire systems' noise levels were measured. Of course, noise levels will vary greatly in the real world along with the acoustic properties of the PC enclosure used, whether the enclosure provides adequate cooling to avoid a card's highest fan speeds, placement of the enclosure in the room, and a whole range of other variables. These results should give a reasonably good picture of comparative fan noise, though.



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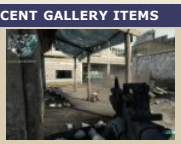


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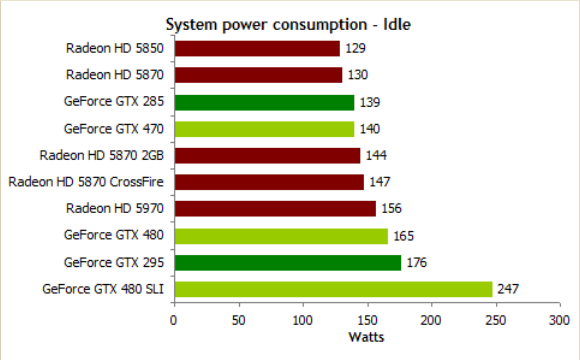
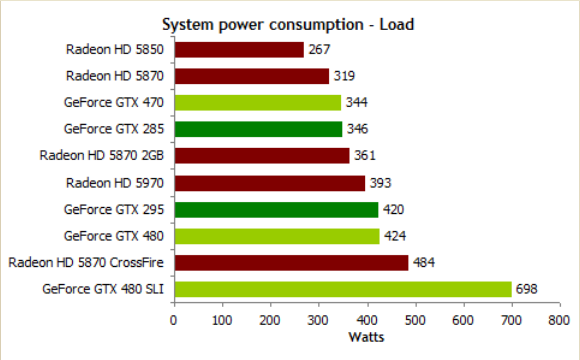
The idle measurements were taken at the Windows desktop with the Aero theme enabled. The cards were tested under load running *Left 4 Dead* at a 2560x1600 resolution with 4X AA and 16X anisotropic filtering. We test power with *Left 4 Dead* because we've found that this game's fairly simple shaders tend to cause GPUs to draw quite a bit of power, so we think it's a solidly representative peak gaming workload.





Well, that's not very good. At idle, the GTX 470's power draw isn't too scary, but the GTX 480 pulls more juice than the dual-GPU Radeon HD 5970. Two idle GTX 480s in SLI draw just 20W less than a Radeon HD 5850 does *while running a game*.

The new GeForces draw substantially more power when running a game, too, than the competing Radeons. You've gotta take power circuitry inefficiencies into account, of course, but our GTX 480 system pulls 105W more under load than the same system with a Radeon HD 5870 installed. Wow.

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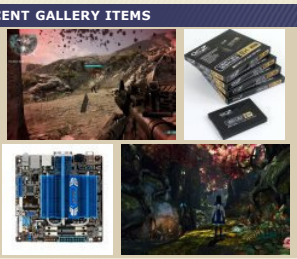

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Test notes

All of our test systems benefited greatly in terms of power consumption and performance from the addition of solid-state drives for fast, local storage.

The folks at OCZ helped equip our test systems with enterprise-class Vertex EX SSDs. The single-level-cell flash memory in these drives can endure more write-erase cycles than the multi-level-cell flash used in consumer drives, so it's better suited for server applications. SLC memory writes data substantially faster than MLC flash, as well. The only catch is that SLC flash is quite a bit pricier, as are the drives based on it. For the right application, though, a drive like the Vertex EX can be very much worth it. Heck, we even noticed the effects of these drives during our test sessions. Boot times were ridiculously low for all of the systems, and program start-up times were practically instantaneous.

We've also beefed up our lab equipment by stepping up to a Yokogawa WT210 power meter. The Extech unit we've used in the past would occasionally return an obviously erroneous value, and for that reason, the Extech hasn't been sanctioned for use with SPECpower_ssj when the results are to be published via SPEC. The WT210 is a much more accurate meter that meets with SPEC's approval and integrates seamlessly with the SPECpower_ssj power measurement components.

Our testing methods

As ever, we did our best to deliver clean benchmark numbers. We typically run each test three times and report the median result. In the case of the SPEC benchmarks, though, we've reported the results from the single best run achieved.

Our test systems were configured like so:

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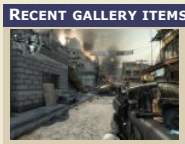



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Etc.

by Scott Wasson — 9:43 AM on June 4, 2010

Today is (was, really) the last day of Computex for Cyril, who's been there on site this week, as you know. I think he still has a number of interesting things to write up from the past week, and we should see a few of them shortly.

Meanwhile, I've been working on two projects: testing server CPUs, and benchmarking desktop GPUs. I typically don't interleave testing work between two different things, but this week has been strange. Now, if only I could turn this interleaving into productive multitasking, I'd really have something.

Instead of being productive yesterday, though, I was trying to get my spiffy new digital power meter, a Yokogawa WT210, up and running.

This meter is approved by SPEC for SPECpower testing, and it should be somewhat more accurate than the Extech I've used in the past. But getting the thing talking to a computer for logging purposes has been more of an adventure than I expected. Turns out this advanced piece of equipment outputs data via, yes, a 25-*pin serial port*. The Extech requires a serial connection, too, but at least it's a 9-pin—and old enough to have an excuse. Some digging in the prodigious Damage Labs storage area produced a 25-pin to 25-pin RS-232 cable, along with some 3dfx Voodoo VGA pass-through cables and various other assorted uselessness, but nothing that converts from 25 pins to 9 pins in the right genders. So I ran out to the store and bought an adapter, only to discover after the fact that the Yokogawa wants a *null modem cable*. As if it were a computer or something! That led to an order on Newegg, 'cause wow, I haven't seen one of those for over a decade. Maybe I can Laplink to the power meter and keep all of my settings.

I will be taking suggestions in the comments for this evening's Friday Night Topic. The parameters will be familiar to many of you, but to refresh your memory, we're looking for a topic of *discussion*—about which people might want to converse—that's not too boring, too inflammatory, or too closely related to the usual tech-oriented mission of the site. If you have ideas, let us know. The FNT would be more consistent in its appearances if we had a decent cache of potential topics.

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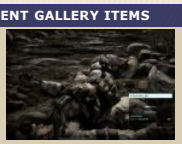


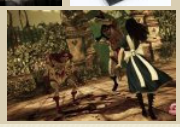

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