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Reviewer: OklahomaWolf

Product: Antec CP-850 850W

Product Link: http://www.antec.com/Believe_it/product.php?id=NzIw

Supplied By: Antec

Price: \$117.79 @ Provantage

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The PS/2 form factor has been with us for a long, long time now. And for the most part, our power supplies have conformed to this twenty plus year old form factor, even as they grew more and more powerful. This has led to kilowatt power supplies in long, heavy cases that were hard to cool and cramped for their powerful innards.

Antec recently decided to freshen things up, and came up with a new form factor that took both interior space for circuitry and silence into account. My test subject for today is the very first example of a unit designed for this new CPX standard, the CP-850.

Currently, there are but three Antec cases on the market that can take a CPX power supply. Will this unit make us want to go and buy one of them? This is part one of my look at this new form factor... part two will see me build a system around the CP-850 inside an Antec Twelve Hundred.

Allow me to wax nostalgic for a moment. The year was 1987, and I was living in the small city of Swift Current, Saskatchewan. The music industry had just come up with the cassette single idea, Guns 'N Roses was being played non stop by every FM radio station in town (all one of them), and a certain electronics technician with a penchant for being as weird as humanly possible was just starting his career in the trade while helping out his folks with the family music store and simultaneously working through the eighth grade. 1987 marked another important milestone, when IBM decided to unleash the Personal System 2 on us consumers, better known as the PS/2.

What does this have to do with today's review? Plenty, says I, for a lot of the things IBM started with the PS/2 are still with us. We still have those PS/2 mouse and keyboard ports on most of our mainboards, but more relevant to today's review is the power supply. Yes, friends, your standard everyday ATX power supply is built on the PS/2 form factor.

Somebody over at Antec woke up one day and came to this realization: in looking at the backs of our cases at that power supply mount, we're dealing with a form factor over twenty years old now. While it has served us well over the years, power supplies have gotten bigger and bigger, to the point some of us are now stuffing 1600W units into that little opening. Antec figured they had a better idea: why not enlarge the PSU housing so there was not only more room for the guts, but less restrictions to hinder cooling? The result of this brainwave is the unit I'm looking at today, the CP-850. This is the very first product in Antec's new CPX form factor, and they're really hoping it catches on.

But before that can happen, it's gotta get past me. Muahahahaha!



Now, before I get started on the review proper, I just want to clue you in on one important detail: there are only three Antec cases right now that will take a CPX power supply. Those cases are the Twelve Hundred, the P183, and the P193. Any other case will need modding, assuming there's enough space. "But Wolf," you ask, "how well will it integrate into those Antec cases?" Fear not, intrepid readers, for I have a Twelve Hundred on hand that I will be reviewing next week. We're going to see just how well this new form factor integrates into that case, yes we will.

Another important point is that the CPX form factor starts and stops with the enclosure dimensions. These units will remain compliant with your usual ATX components. In other words, electrically these are still ATX units.

Meantime, let's come back to the CP-850. Going by the above box, Antec is taking the new form factor seriously by building in a 120mm PWM fan and seeking out 80 Plus certification. And if the above box is any indication, the CP-850 is one huge power supply, for the box was almost big enough to park my 1992 Chrysler Imperial in. Buy CP-850, you

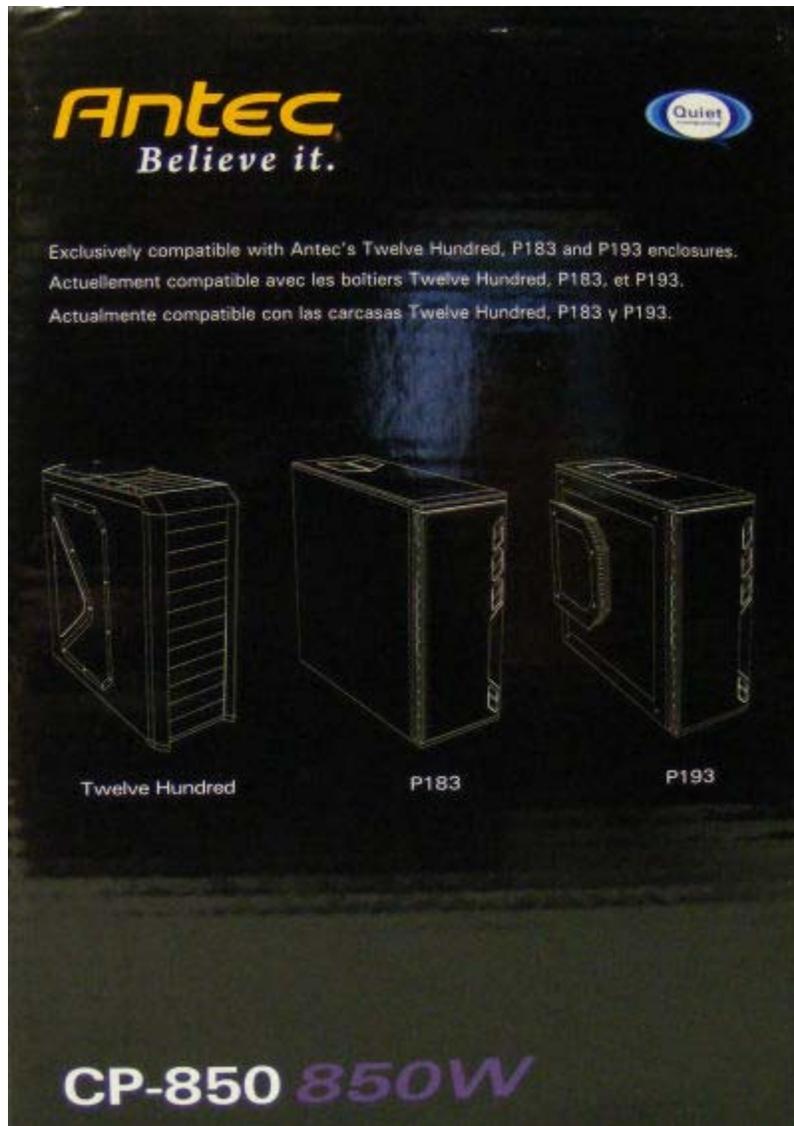
get free cardboard garage.



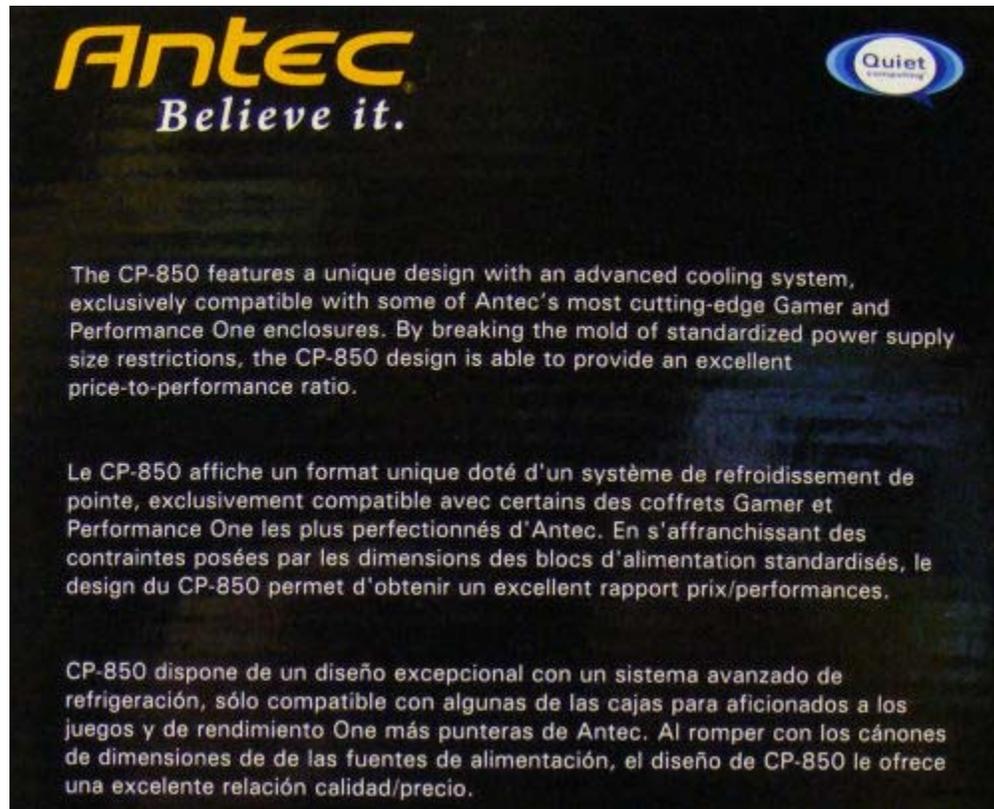
Going to the back of the box, which involved the use of a golf cart, we see a number of marketing bullet points. They're a bit hard to read, so I'll reprint them for you:

- Unique power supply construction compatible with many new Antec cases, including the Twelve Hundred, P183, and P193
- NVIDIA™ SLI™-ready certified
-ready certified? What? Huh? Que? Is it ready to be certified? Is it certified to be ready?
- Meets 80 PLUS® certification standards
- Electrical compliance with ATX12V version 2.3 and EPS version 2.91
- Dual PCB layout optimizes cooling efficiency and allows for heavy duty components
-uh, not to burst your bubble, Antec, but the PS/2 form factor did fine with heavy duty components. It just got hot with them in there, is all.
- Quiet 120mm PWM cooling fan
- Four +12V output circuits
- Safety protection circuitry prevents damage resulting from short circuits, over current and over voltage
-that's good, we wouldn't want our computers coming to life, escaping the lab, and having all sorts of wacky adventures while repeating "Number Five is alive!" would we? Yeah, you're right, I'd like that too.
- Universal input with Active PFC
-universal voltage input is part of the APFC design
- Two 8-pin(6+2) PCI-E connectors and two 6-pin PCI-E connectors
- SATA connectors for Serial ATA drives
-aw, I was kind of hoping they'd throw in some SATA connectors for floppy drives too

- MTBF: 100,000 hours
- Safety approval: UL, FCC, TÜV, CE, C-tick, CCC, CB
-C-tick? Yes I do. I C him right now. Spooooooooooooooooooooon!!! Yes, I know I need professional help.



Believe it or not, this might just be an Antec. This side of the box shows you which current cases you can use with the CP-850W.



Antec
Believe it.

Quiet
Cooling

The CP-850 features a unique design with an advanced cooling system, exclusively compatible with some of Antec's most cutting-edge Gamer and Performance One enclosures. By breaking the mold of standardized power supply size restrictions, the CP-850 design is able to provide an excellent price-to-performance ratio.

Le CP-850 affiche un format unique doté d'un système de refroidissement de pointe, exclusivement compatible avec certains des coffrets Gamer et Performance One les plus perfectionnés d'Antec. En s'affranchissant des contraintes posées par les dimensions des blocs d'alimentation standardisés, le design du CP-850 permet d'obtenir un excellent rapport prix/performance.

CP-850 dispone de un diseño excepcional con un sistema avanzado de refrigeración, sólo compatible con algunas de las cajas para aficionados a los juegos y de rendimiento One más punteras de Antec. Al romper con los cánones de dimensiones de de las fuentes de alimentación, el diseño de CP-850 le ofrece una excelente relación calidad/precio.

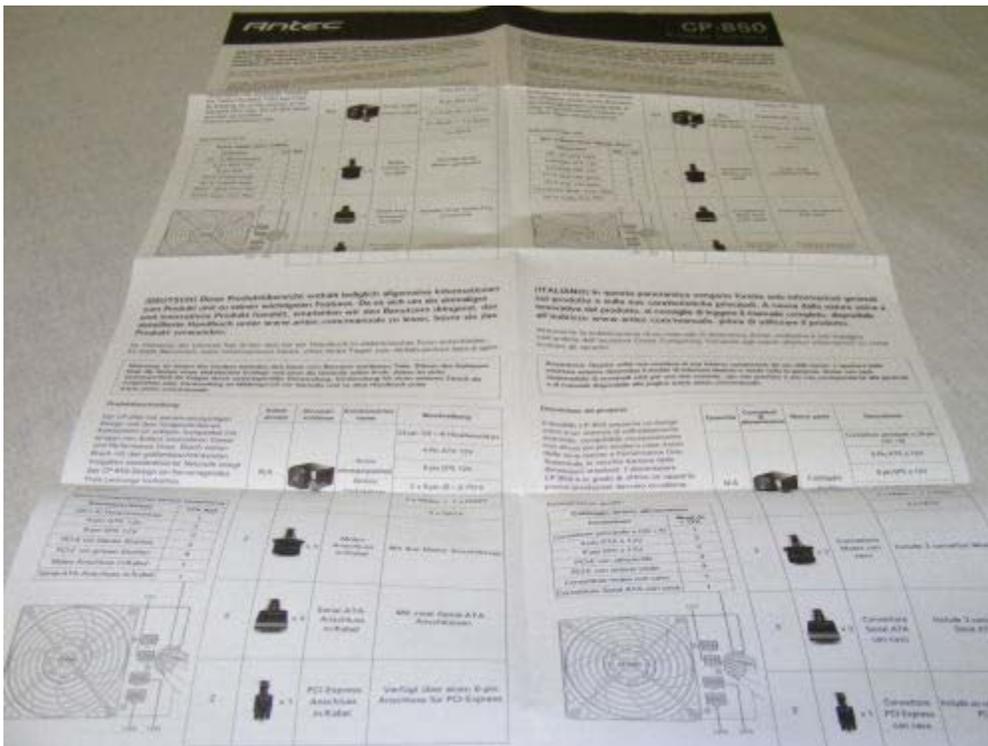
Here's some more marketing for you. Excellent price-performance ratio? Is that before or after you spend a mint on the case that goes with this big boy?



Opening up our cardboard garage reveals that it's occupied by a bus. Oh wait, that's not a bus, it's a power supply. Let me just unpack here.



The contents of the box include that there CP-850 power supply, some modular cables, some black screws, a manual, and a power cord.



The manual is a half hearted attempt at manual-ing that only lists some basic information, opting to instruct the reader to go get a more detailed manual at the Antec website if one wants or needs more info.



It's, uh, not a small unit, is it?

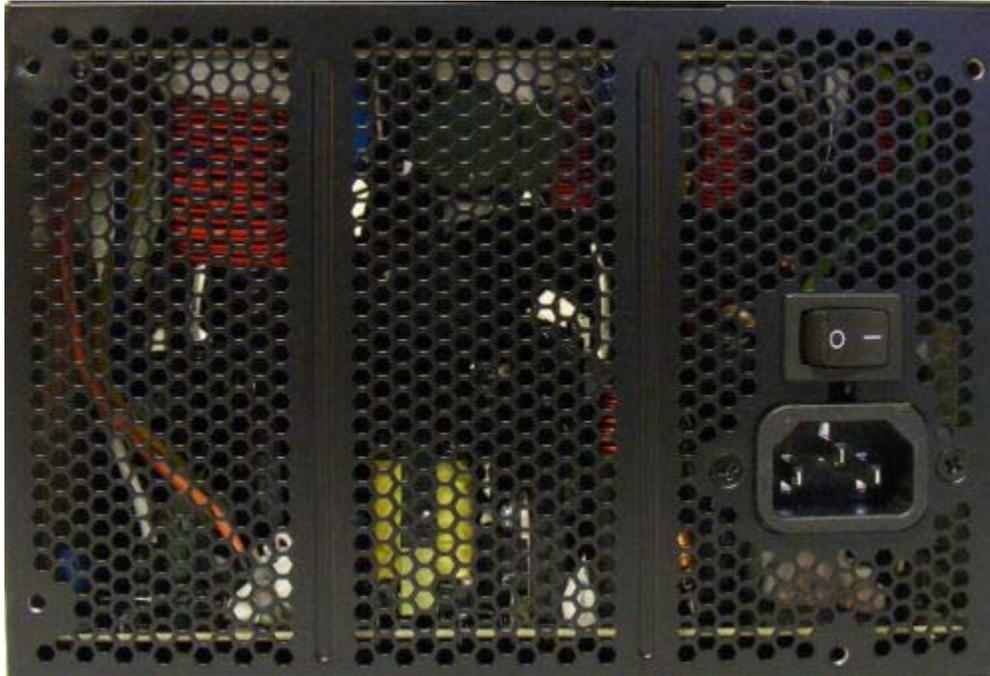


Interesting. That modular connector panel looks a lot like the one on the Signature 850W. Another Delta sourced unit, perhaps? We'll find out for sure on page three. Say, wouldn't it be awesome if it turned out to *be* a Signature in there?



That's our 120mm fan right there. You know, with the sheer size of this thing, I can't help but wonder why they couldn't find room for that fan to go inside the case? It moggles the bind.

As you can see, the 12V rail assignments are printed next to each modular cable connector.



Taking this shot required nerves of steel. I kept waiting for the unit to drive forward and run me over. This thing looks like the front end of a Peterbilt from this angle. Hey, is that a food court in there?



Just for the ZOMG factor, I took this picture of the CP-850 next to my Signature 850W. Yes, I think that is a food court I see in there. It's big enough for one.



No clues to the OEM can be gleaned from the UL file number here, for it traces back to Antec. The hope that I might be dealing with a Signature in a big case increased when I saw this, for the 12V rails are rated identically. However, the 3.3V and 5V rails are not rated like an SG-850, so I'm still going to have to do my homework on page three. Also, the 12V combined rating is 1A lower on this model at 64A.

Antec CP-850	3.3V	5V	12V1	12V2	12V3	12V4	-12V	5VSB
	24A	30A	22A	22A	25A	25A	0.6A	3A
Max Power	160W		768W			7.2W		15W
	850W							



The tentacle shot kind of disappointed me for one reason above all others - Antec has seen fit to include both an ATX12V cable and an EPS12V cable. In addition to a single chain of Molexes and a single chain of SATA connectors. Again. Just like the [Truepower New](#). Come on, Antec, you made this thing modular, how about making the hardwired stuff less cluttered? This is going to cost a point or two again.



And here are the modular cables. Red connectors for the PCI-E cables, and black for everything else.

Type of connector:	Antec CP-850	
ATX connector (630mm)	20+4 pin	
5.25" Drive (540mm+150mm+150mm)	3	
3.5" Drive connectors (+150mm)	1	12V1
SATA (540mm+150mm+150mm)	3	
8 pin EPS12V (650mm)	1	12V2
4 pin ATX12V (650mm)	1	
6+2 pin PCIe (460mm)	2	12V3/ 12V4
Modular Cables		
5.25" Drive (545mm+150mm+150mm)	6	12V1
SATA (550mm+150mm+150mm)	6	
6 pin PCIe (460mm)	2	12V3/

12V4

Unit Dimensions(L x W x H)

175mm x 170mm x 120mm*

*;aye carumba!

Page 2:

Ok, now we're going to get serious, here. It's time to load test the CP-850 and find out if we're dealing with a great big Signature design or something else entirely. As always, the SunMoon SM-268 will be the Hall to my Oates, and... wait a minute here, I wanna be Hall. I'm being Hall and you can't stop me, Oates. Hey, your kiss ain't on *my* list, bub. You're out of touch, and I'm out of time with this argument. No, you're not going to hire private eyes to watch me - I can't go for that.

Where was I? Right, explaining how this all works. Oates there will be joined by a Brand 4-1850 power meter, a Kill-A-Watt power meter, a USB Instruments Stingray DS1M12 oscilloscope, and a dual LM35DZ thermometer. Testing goes in three parts, with loads chosen based on the maximum combined limits from the load table.

Part the first will test the unit at room temperature. A set of five balanced progressive loads have been chosen, ranging from about 20%-100% of full rated power. To these, a set of two crossload tests will be added. Various measurements will be taken during each to see how stable the CP-850 is, how efficient it is, and how hot the exhaust gets.

Part the second will be a set of three overshoot transient tests. Oates there will be set for a 100% load while I measure turn on spikes on the 5VSB and 12V with the scope to see if anything goes out of spec. The spec calls for the spikes to be no more than 10% above each rail's mean value, and no negative voltages. All units have these spikes, it's just a matter of which control them better.

Part the third will be a repeat of part the first. This time, with the unit in a specially made hot box that gets all the heat from the load tester channeled into it. This will tell us how well the unit handles your nice warm PC case.

Since this is a quad 12V unit, I will once again be combining all four 12V rails down to one.

Results from Antec CP-850 850W COLD load tests

Test #	+3.3V	+5V	+12V	DC Watts/ AC Watts	Eff.	Intake/ Exhaust
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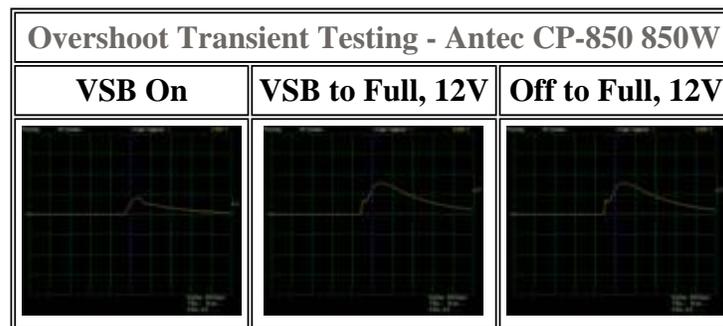
Simulated system load tests

Test	2.5A	2.5A	12A	188W/	22°C/
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	1	3.35V	5.06V	12.03V	227W	82.8%	27°C
Test	5A	5A	24A	352W/			23°C/
	2	3.33V	5.04V	12.00V	414W	85.0%	31°C
Test	8A	8A	36A	519W/			23°C/
	3	3.31V	5.01V	11.97V	611W	84.9%	34°C
Test	10.5A	10.5A	48A	683W/			24°C/
	4	3.29V	5.01V	11.94V	815W	83.8%	34°C
Test	13A	13A	60A	845W/			24°C/
	5	3.27V	5.00V	11.92V	1031W	82.0%	34°C
Test	19A	19A	1A	192W/			24°C/
CL1	3.28V	5.02V	12.02V	271W		70.8%	35°C
Test	1A	1A	64A	794W/			24°C/
CL2	3.32V	5.03V	11.94V	953W		83.3%	34°C

I don't know about you, but there are some pretty numbers up there. Let's start with the voltage readings, where the 3.3V and 5V rails are so stable you can almost stand on them. Almost. In fact, these results are very strongly reminiscent of the Signature platform. Unfortunately, the resemblance stops at the 12V readings, where the unit isn't quite as solid. Don't get me wrong, a 0.11V drop at 12V is still excellent performance holding to a mighty nice 1% regulation number, it's just not as transcendently awesome as the Signature 850W was, where the 12V rail barely exceeded 0.5% regulation.

But if that's the bad news, and I really don't think it is, the efficiency results are the good news. Not only did my sample meet 80 Plus requirements, it also passed Bronze qualifications. Sweet! This thing is only rated standard, guaranteeing only 80% efficiency between 20% and 100% load levels, but it seems like my CP-850 wants to do better than that and I'm going to go ahead and let it. What about CL1, you ask? Well, such a number is actually normal for a modern unit powering such a lopsided heavy 3.3V/5V load. This is because modern systems are 12V heavy, and the other two rails have become almost an afterthought. The only time that number would come up for you is if you were powering Grandma's old Pentium 3 with it.



Now, these tests were implemented after I did my Signature reviews, so I can't really

compare against them here. But, I can compare them to the very awesome performance I got with the [Seasonic M12D 850W](#) and Antec's own [Truepower New 750W](#), both of which have almost set the standard for these tests. Unfortunately, the 5VSB spike isn't quite as well controlled as those units were. But look - the two 12V readings sure are, with the spike staying below 8V. This is about a country mile from the ATX spec, and these results are awesome.

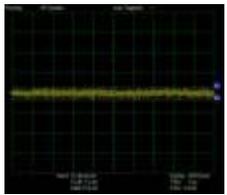
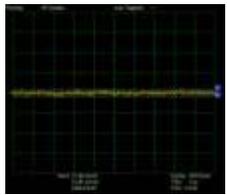
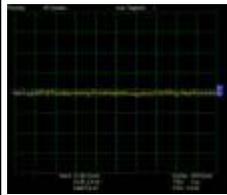
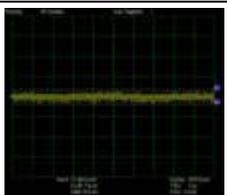
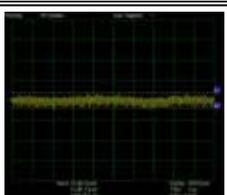
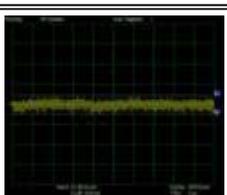
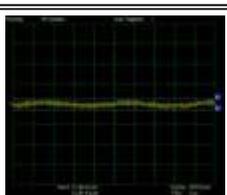
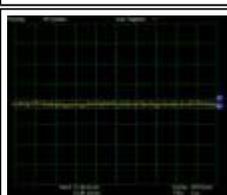
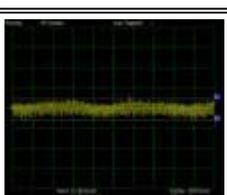
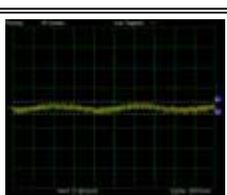
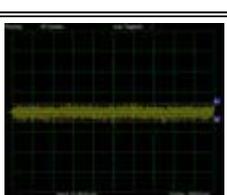
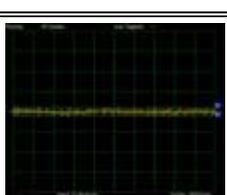
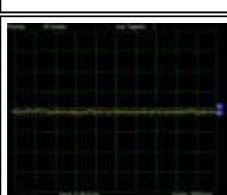
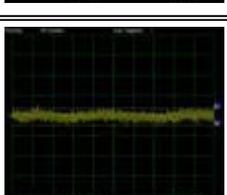
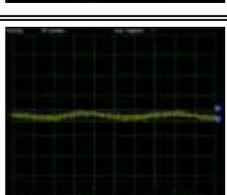
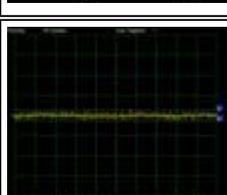
Results from Antec CP-850 850W HOT load tests

Test #	+3.3V	+5V	+12V	DC Watts/ AC Watts	Eff.	Intake/ Exhaust
Simulated system load tests						
Test 1	2.5A	2.5A	12A	187W/ 227W	82.4%	30°C/ 33°C
Test 2	5A	5A	24A	352W/ 416W	84.6%	37°C/ 42°C
Test 3	8A	8A	36A	520W/ 612W	85.0%	42°C/ 55°C
Test 4	10.5A	10.5A	48A	682W/ 818W	83.4%	48°C/ 59°C
Test 5	13A	13A	60A	843W/ 1034W	81.5%	55°C/ 63°C
Test CL1	19A	19A	1A	192W/ 278W	69.1%	37°C/ 52°C
Test CL2	1A	1A	64A	792W/ 956W	82.8%	54°C/ 62°C

Hot boxing this unit was fun. And by fun, I mean challenging. And by challenging, I mean insanely difficult. Friends, my hot box is an old ATX desktop case with a standard PS/2 sized power supply mount located directly above the motherboard I/O panel opening. I had to stand this thing on its side inside the case and point it at both the PSU opening and the I/O opening. Even then, the CP-850 nearly came up high enough to keep me from putting the top panel back on. As a result, the hot box rose to insane temperatures, up to 55 degrees. But if you look at the above numbers, the CP-850 didn't seem to care. It just shrugged and said, "whatever, man, this is nothing to me."

As usual, when the heat came on the efficiency came down a bit, and the rails came down a bit, but that was about it. I couldn't even hear that 120mm fan, that's how dull the hot box phase was. Looks like Antec's vision of a more efficient cooling system works.



Oscilloscope Results - Antec CP-850 850W			
Test #	+3.3V	+5V	+12V
Test 1			
Test 2			
Test 3			
Test 4			
Test 5			
Test CL1			
Test CL2			

Oh, good golly. Am I in heaven? I was almost sure this unit wasn't a Signature anymore from

the load test numbers, but would you look at these scope shots for a second? Not only did I have to zoom the scope in to even see what little ripple there was, I had to struggle to not jump around and yelp with glee. I even turned on the cursors to show you how awesome the view was. Seriously, read this number and tell me you're not excited: 11.2mV at 12V, test five. Did I just hear some of you faint? Sorry... I did too the first time I saw that. That's actually *better* than my Signature 850W did. Same with the other two rails.

Let me repeat that - my CP-850 can outperform a *Signature* unit for ripple and noise suppression!!! Come on, let's hit the next page. I can't wait, I have to see right now if this unit is hiding a Signature in that massive case.

Page 3:



Antec would like you to know the CPX was their idea. Just in case you were thinking about opening it up or something, and thought maybe... oh, say, Toyota had a hand in it. This here piece of plastic is actually an airflow deflector, there to be sure the fannage goes where it's supposed to.



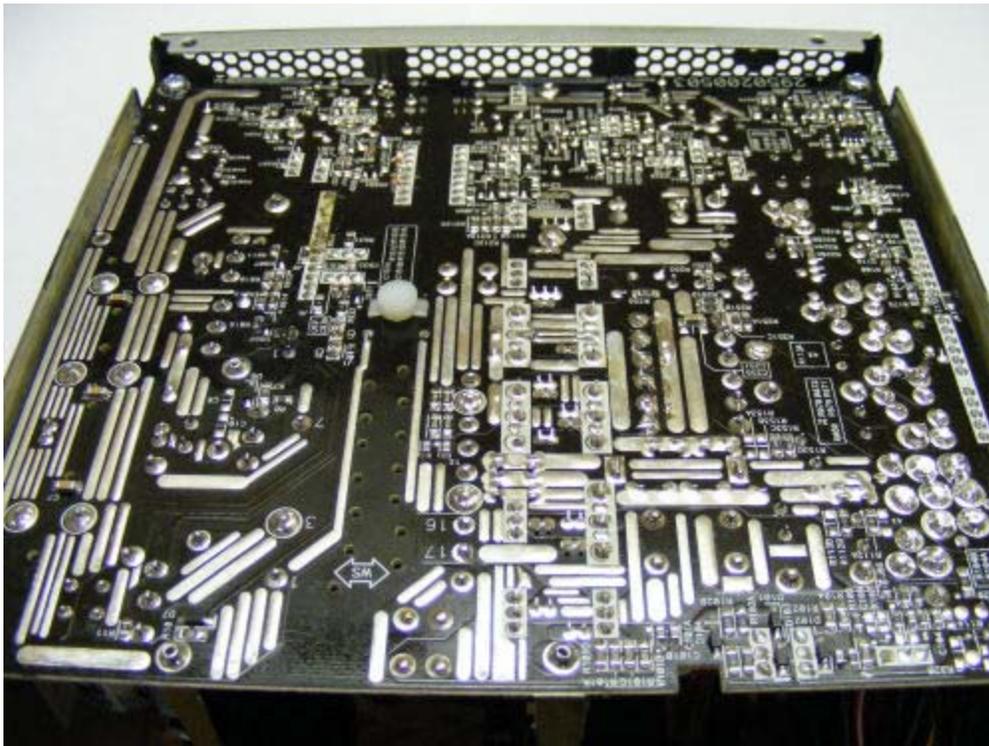
This is the first thing you see when you take the cover off. Kind of hard to see anything from this angle, isn't it? Don't worry, I'll take it apart as far as I need to. The OEM, as if it's any surprise by now, is Delta Electronics.



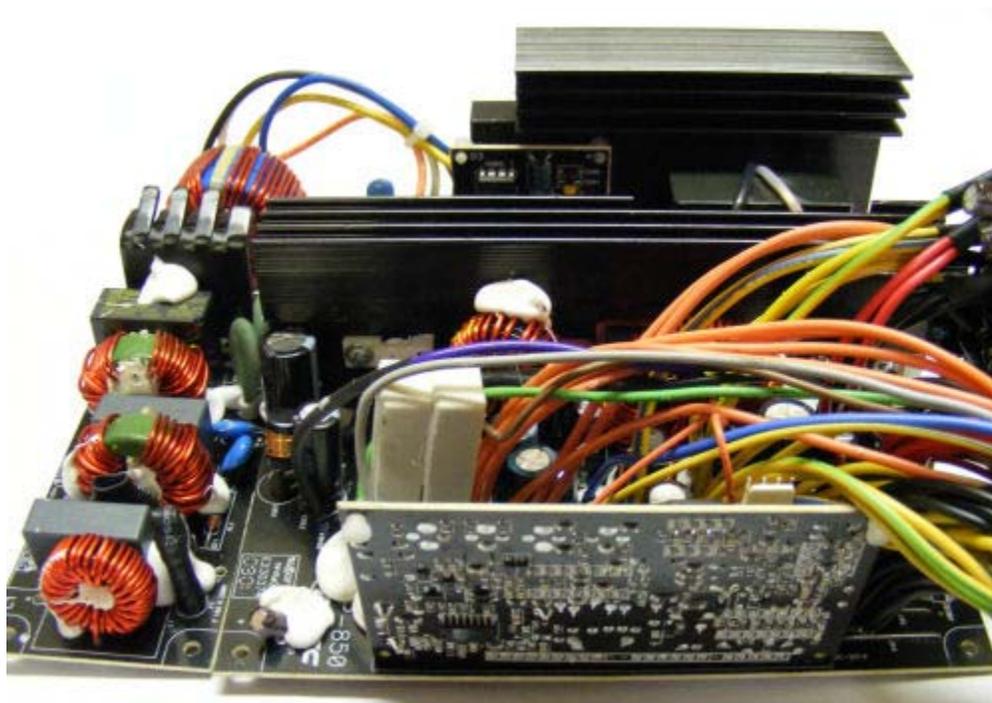
PWM fan by Protechnic. Uh-ohhhhhh, it's magic.



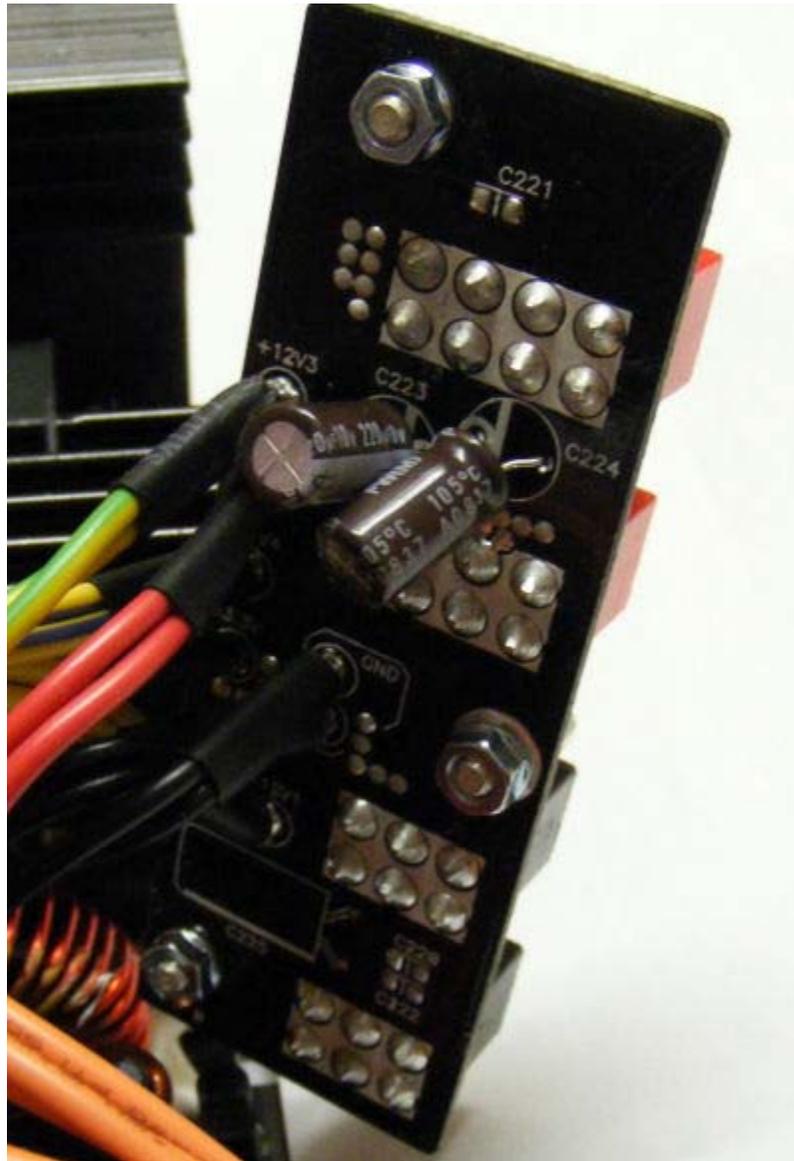
Looks like a magic fan gets magic blue threadlocker on the mounting screws.



Once again, it appears that Delta has Adrian Monk overseeing the quality control of the soldering. Flawless.



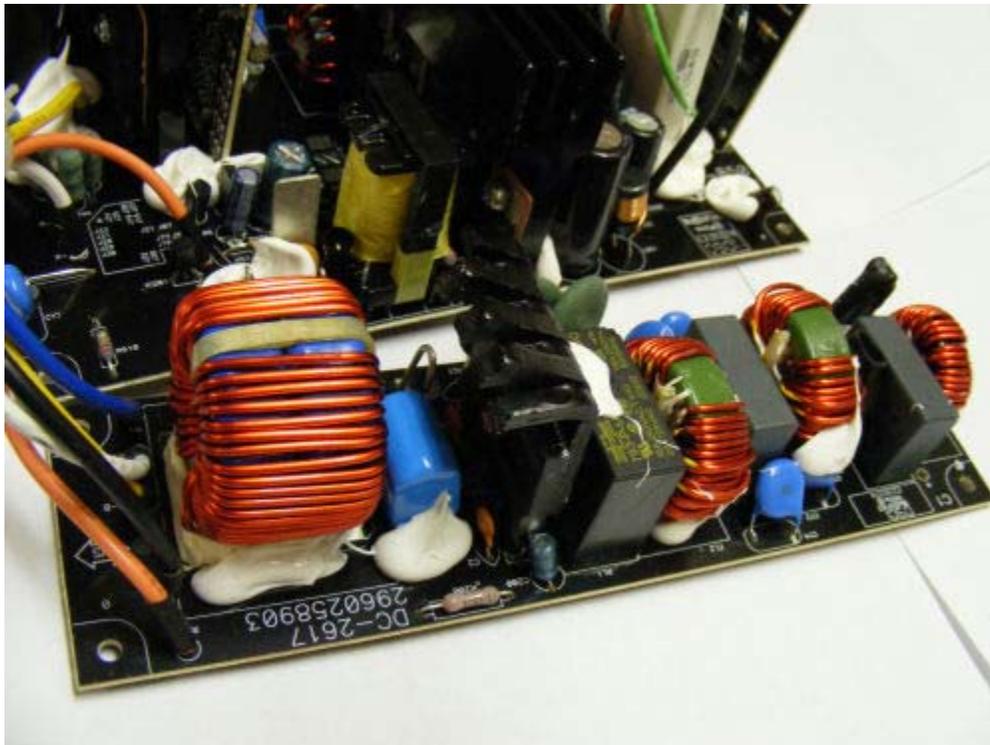
Wow - that's a lot of guts. It was about this point that I realized something, and was absolutely stunned by that realization - this is *not* the Signature design. If anything, it looks like someone took an [Earthwatts 650W](#) and gave it a steady diet of HGH, steroids, and protein supplements.



Here's the modular connector panel. Very clean.

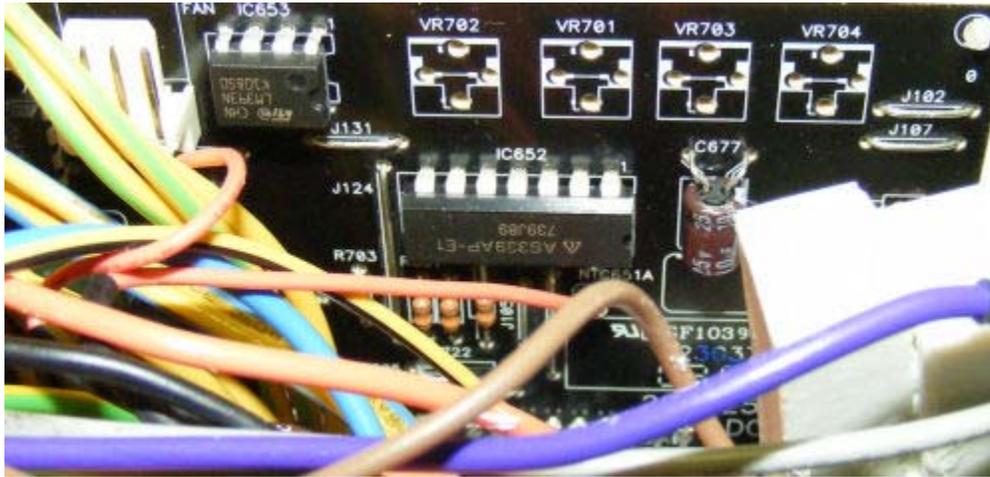


This is the primary side. Three big main filter capacitors from Samxon can be seen at the bottom of the pic. That big coil over there in the foreground on the transient filter board is the PFC coil.

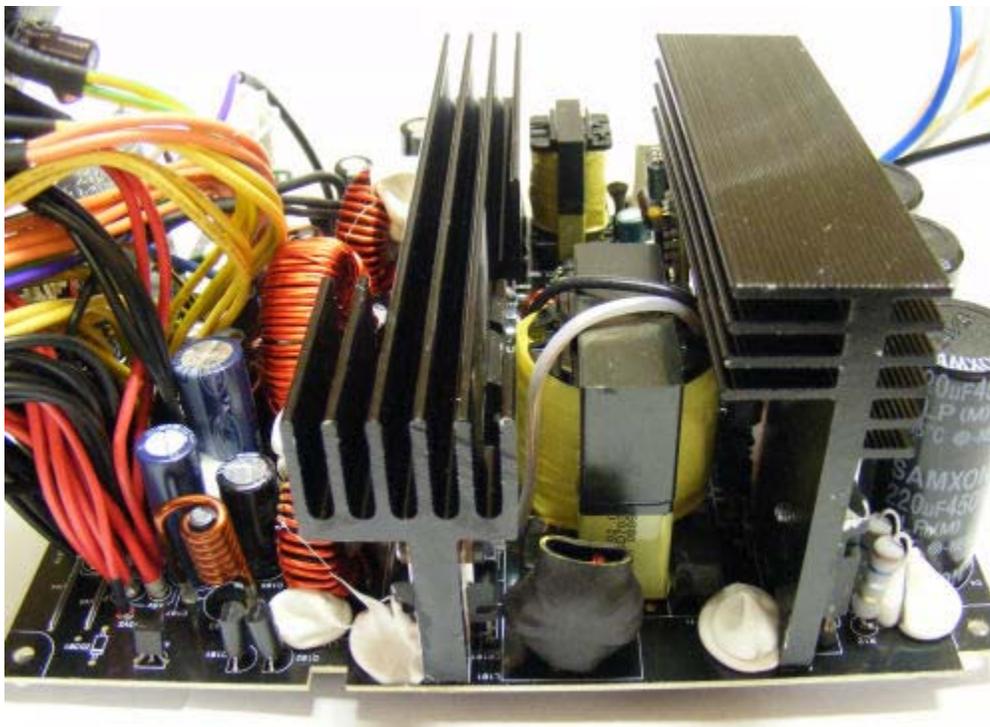


Here's a better look at the transient filter PCB. The filter itself consists of three coils, two X

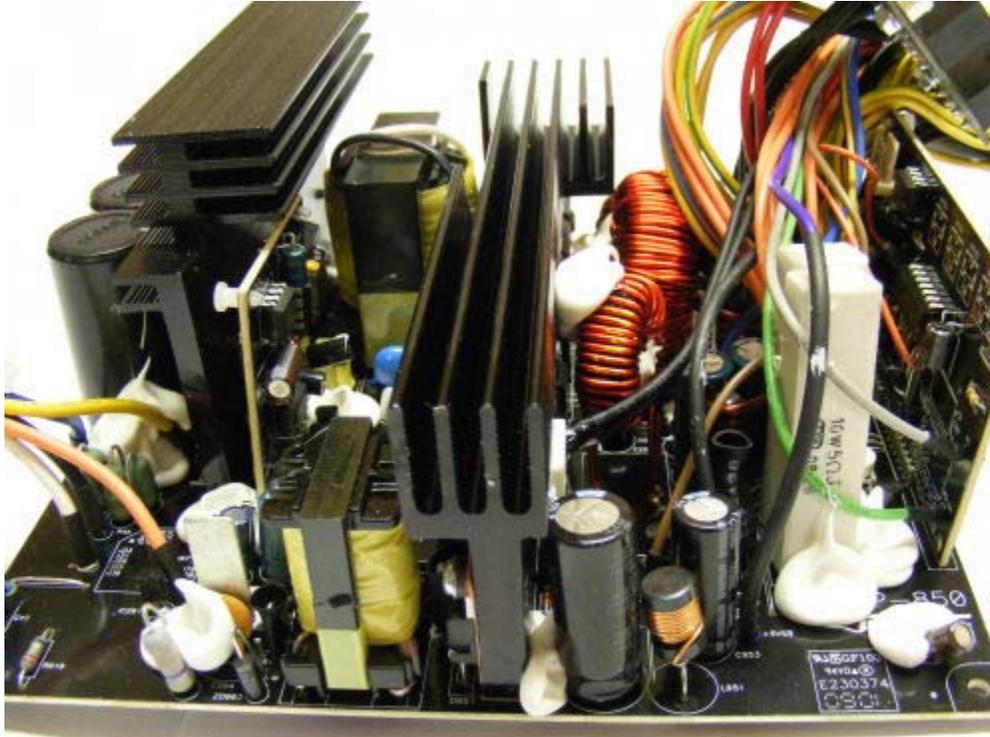
capacitors, four Y capacitors, and a MOV. The bridge rectifier is a D25XB60.



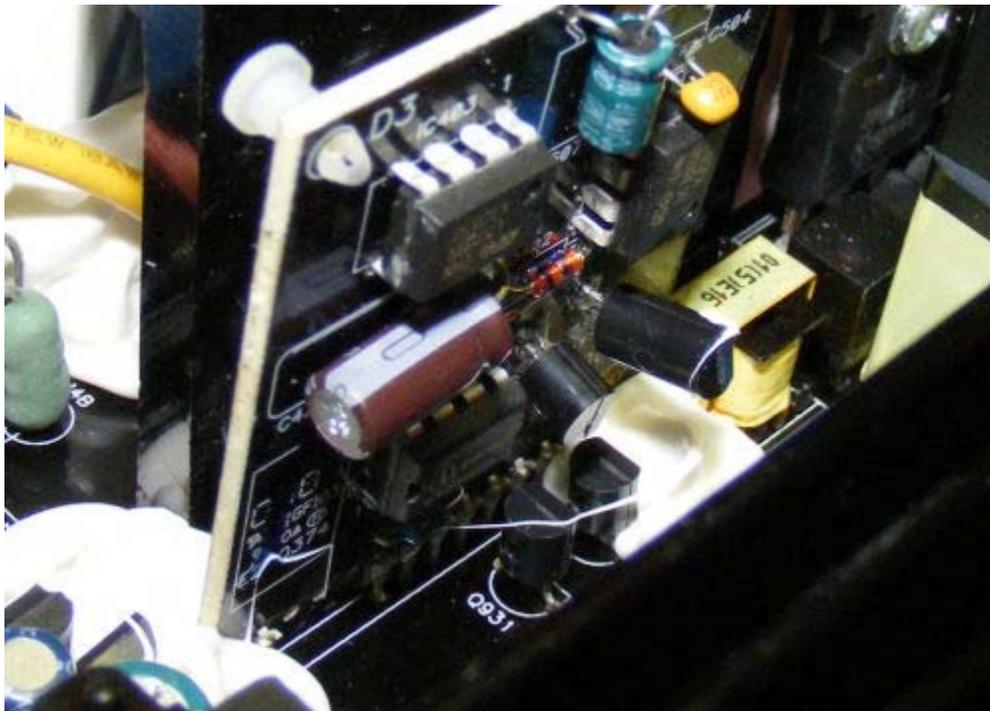
This is the fan control and protection PCB. As you can see, it is marked for potentiometers that were not installed. The PWM fan controller centers on a MC1455P1 timer.



Secondary side capacitors consist of Nichicon, Ltec, Taicon, Rubycon, and Aishi (gesundheit!) parts.



The daughterboard sticking up between the heatsinks has the PWM controller, a UC3845B. Primary topology appears to be active clamp single forward, but I could be wrong. I'm being blinded by all the awesome I'm seeing.



A better shot of that daughterboard.

I hear some of you asking why there are no heatsink pics. Well, it's because a unit this big also means enough space to ID the parts without pulling heatsinks. So, here they are.

Primary: two 20N60C3's for switchers, another two 20N60C3's and a diode for PFC.

Secondary: three STPS30L45CT's in parallel for each of the 3.3V and 5V rails, and no less than FIVE S60SC6M's in parallel for 12V. Seriously. This thing is so overbuilt, it's scary. Five 60A rated parts for a combined 12V rating of 64A. Read that sentence again, so it sinks in. *300A of capacity for a 64A combined 12V limit*. Who do they have working at Delta anyway, Tim "The Toolman" Taylor? Doc Brown perhaps? No wonder ripple was so low - these parts weren't even breathing hard at full power.

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Performance (40% of the final score) - okay. Let's figure this out here. On second thought, what's to figure out? We have an Antec 850W that performs better than a Signature that appears to cost less than a Signature. We have a unit that was promised to do 80 Plus standard, but ended up doing Bronze. No, the unit didn't quite match the Signature in terms of voltage stability, but it came real close. And to be honest, the differences in voltage readings were so small you could put them down to connector resistance. And since the ripple and noise suppression more than made up for the slightly less stable voltages... **10**.

Functionality (20% of the final score) - I'm going to have to spoil a bit of next week's review here, because after all, this unit was designed for certain Antec cases. In installing the unit into my Twelve Hundred review sample, I found that the unit's cable lengths fit with that unit like a hand in a glove. But that's no shock, because the company that designed the case also designed the PSU. What I didn't care for, however, were the redundant hardwired cables. My board takes an EPS12V connector, so I had to go hide the ATX12V cable out of sight. And because I have no video card that needs them, I had to go hide the PCI-E cables, too. That was easier said than done, as you will see next week. But for now, I have to give the CP-850 an **8**.

Value (30% of the final score) - this unit is listed for... let's see here... doodly dum da dee... ah, here we go. \$117.79 at Provantage. Faint. Wha... what happened? Oh yeah, the price on the CP-850. Just under a hundred twenty for a Signature ripple beater. Faint. **10**.

Aesthetics (10% of the final score) - I like matte black, yes I do. And you have to admit, matte black on a unit the size of the CP-850 looks intimidating. This is Andre the Giant's power supply, right here. A point comes off for incomplete sleeving, and a fan bolted to the back rather than inside the case where there does look to be room. **9**.

Performance	10
Functionality	8
Value	10

Aesthetics	9
Total Score	9.5



Summary

Antec has made a bold move in releasing their own power supply form factor standard, and it goes without saying that the battle will be an uphill one for them. After all, how many bajillions of ATX cases are out there that can't take a CPX sized unit? I have to be honest though... if I didn't have a Twelve Hundred I'm reviewing for next week, and had just load tested this unit without said case, I'd probably want to go buy one just to have a case to go with it. If the CPX form factor catches on, the CP-850 will be flat out untouchable. It is completely unmatched by any ATX unit on the market I can think of. You'd have to spend twice as much as this thing costs to find the next best thing, performance wise. I'd like to see some better capacitors in there, but you just can't fault the CP-850's performance here.

I don't know how Antec managed something this awesome for such a low price, but they must really want the CPX form factor taking off if this is the performance we're getting.

I'll see you folks next week, when I take on the Twelve Hundred and use it to build a system around the CP-850.

The Good:

- outperformed my SG-850 for ripple suppression
- very quiet, even in the hot box
- exceptionally stable voltage regulation
- did better efficiency than 80 Plus' sample and cleared Bronze
- waaaaaaaaay overbuilt

The Bad:

- proprietary to three Antec cases... all others must be modded (if there's room)

The Mediocre:

- it's huuuuuuuuuuuuuuuuuuuge and tried to run me over

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