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1. General

1.1 Scope

This specification defines the performance characteristics of a single phase 850 watts, 8 output power supply : +5V, +12V1, +12V2, +12V3, +12V4, +12V5, -12V, +3.3V & +5VSB, and it will provide power to all system components. This specification also defines worldwide safety and electromagnetic compatibility requirements for the power supply which is intended for use in computer products.

2. Input Characteristics

2.1 Input Voltage

Nominal Voltage	Voltage Variation Range
100 - 240 Vrms	90 - 264 Vrms

2.2 Input Frequency

Nominal Frequency	Frequency Variation Range
50-60 Hz	47 Hz to 63 Hz

* The power supply must operate at above frequency with 90-264 VACrms input voltage range.

2.3 Max.Input AC Current

Max.Input Current	Measuring Range
11A	100-240 Vrms

2.4 Inrush Current

The power supply must meet inrush requirements for any rated AC voltage, during turn on at any phase of AC voltage, during a single cycle AC dropout condition, during repetitive ON/OFF cycling of AC, and over the specified temperature range. The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device).

2.5 Efficiency

HPC-850-G14C provides an efficiency of 80% minimum when measured at Light Load、Typical Load and full load under 115V/60Hz & 230V/50Hz condition.

3. Output characteristics

3.1 Normal Operation Output

Output Voltage	Load MIN	Range MAX	Regulation	Ripple P-P Max.	Ripple & Noise P-P Max.
1. +5V	0.5A	30.0A	±5%	70mV	100mV
2. +12V1	1.0A	16.0A	±5%	120mV	200mV
3. +12V2	1.0A	16.0A	±5%	120mV	200mV
4. +12V3	1.0A	16.0A	±5%	120mV	200mV
5. +12V4	1.0A	16.0A	±5%	120mV	200mV
6. +12V5	1.0A	12.0A	±5%	120mV	200mV
7. –12V	0.0A	0.5A	±10%	150mV	200mV
8. +3.3V	0.5A	24.0A	±5%	70mV	100mV
9. +5Vsb	0.0A	3.0A	±5%	70mV	100mV

NOTE:
Noise test should be measured with 20 MHz bandwidth frequency oscilloscope. The output terminal shall add a tantalum capacitor of 10uF in parallel with a ceramic capacitor of 0.1uF.

3.2 Remote On/Off Controlled mode

The PSON# signal is required to remotely turn on/off the power supply, PSON# is an active low signal that turns on the output power rails. When this is not pulled low by the system, or left open, the outputs (except the +5VSB) turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply.

TTL level "H" 2.0 V - 5.25 V
"L" 0.0 V – 1.0 V

3.3 Regulation

The cross regulation defined as follows, the output regulation should be within the specified range.

Load	+5V	+3.3V	+12V1	+12V2	+12V3	+12V4	-12V	+5Vsb
Light Load	3.4 A	3.4 A	2.78 A	2.78 A	2.8 A	2.8 A	0.2 A	1.2 A
Typical Load	8.5 A	8.5 A	7.0 A	6.9 A	7.0 A	7.0 A	0.4 A	3.0 A
Full Load	17.0 A	17.0 A	13.9 A	13.9 A	14.0 A	14.0 A	0.8 A	6.0 A

3.4 Rise Time

DC output rise time is less than 20 mS at nominal line and full load.

3.5 Hold-up Time

DC +5V output maintains at least 16mS after power off which hold within para 3.1 under 115V/63Hz and 230V/47Hz condition.

3.6 5VSB

5VSB is requierd for the implementation of PS-ON described above. 5VSB is a tandby voltage that may be used to power circuits that require power input during the powered-down state of all power rails. The 5 VSB pin should deliver 5V ± 5% at a minimum of 6.0 A for PC board circuits to operate. Conversely, PC board should draw no more than 6.0A maximum form this pin. This power may be used to operate circuits such as soft power control.

3.7 PG-OK

PG-OK is a power good signal and should be asserted high by power supply to indicate that the +5 VDC and +3.3 VDC outputs are above the under-voltage thresholds of the power supply. When this signal is asserted high, there should be sufficient mains energy stored by the converter to guarantee continuous power operation within specification. Conversely, when either the +5VDC or the +3.3VDC output voltage falls below the under-voltage threshold, or when mains power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PG-OK should be deasserted to a low state. See Figure 1 for a representation of the timing characteristics of the PG-OK,PS-ON, and germane power rail signals.

3.8 3.3V Sense

A default 3.3V sense line should be implemented pin 13 of the connector.

3.9 Capacitive Load

The power supply should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs.

Output	Capacitive load (uF)
+5V	12,000
+12V	11,000
+3.3V	12,000
-12V	350
+5VS	350

4. Protection

4.1 Input Protection

In primary circuit of the power supply , a protected fuse is inserted. Only internal fault of the power supply will cause the fuse blown. Any overload or short circuit at DC output will keep from fuse brown or fire hazard.

4.2 Output Protection

4.2.1 Under voltage protection

The +5V/+12V/+3.3V DC output are protected against the under voltage condition . range value can't be exceed 3.3~3.7V at 5V terminal and 8.5~9.5V at 12V, 2.0~2.4V at 3.3V.

4.2.2 Over Voltage Protection

The +5V/+12V/+3.3V DC output are protected against the over voltage condition . Maximum value can't be over 6.5V at 5V terminal and 15.5V at 12V, 4.3V at 3.3V.

4.2.3 Over Power Protection

The power supply can be used electronic circuit to limit the output current against exceeding 60% of surge output power or protected against excessive power delivery since short circuit of any output or over total power at high line.

4.2.4 Short Circuit Protection

Short circuit placed on +5V,+12V,+3.3V,-12V will latch off. +5VSB will auto-recovery.

5. Start Stability

5.1 No Load Start

When power is applied to HPC-850-G14C with no load connected or under minimum oad connected, neither damage to power supply nor hazards to users will occur.

5.2 Cold Start

The power supply shall operate properly when first applied at normal input voltage and or so maximum load after 4 hours storage in 0? environment.

6. Environments

6.1 Temperature and Humidity

6.1.1 Operating

Temperature	0 to 45 ^{O}C (See Figure 2)
Relative Humidity	20 to 90 %

6.1.2 Storage

Temperature	-40 to 70 ^{O}C
Relative Humidity	20 to 95 % noncondensing

6.2 Altitude

The power supply can operate normally at any altitude between 0 to 10000 feet.

6.3 Vibration and Shock

6.3.1 Sweep and resonance search for each of X,Y,Z, axis at the sweep.

RATE of 1/OCTAVE/Min.

Frequency	Duration	Amplitude
5-55-10 Hz	30 minutes	0.35mm

7. Conducted EMI

8. Product Safety

8.1 Safety Requirement

8.2 Leakage Current

The AC leakage current is less than 3.5mA when the power supply connect to 254Vac/50Hz .

8.3 Insulation Resistance

The insulation resistance should be not less than 30M ohm after applying of 500VDC for 1 minute.

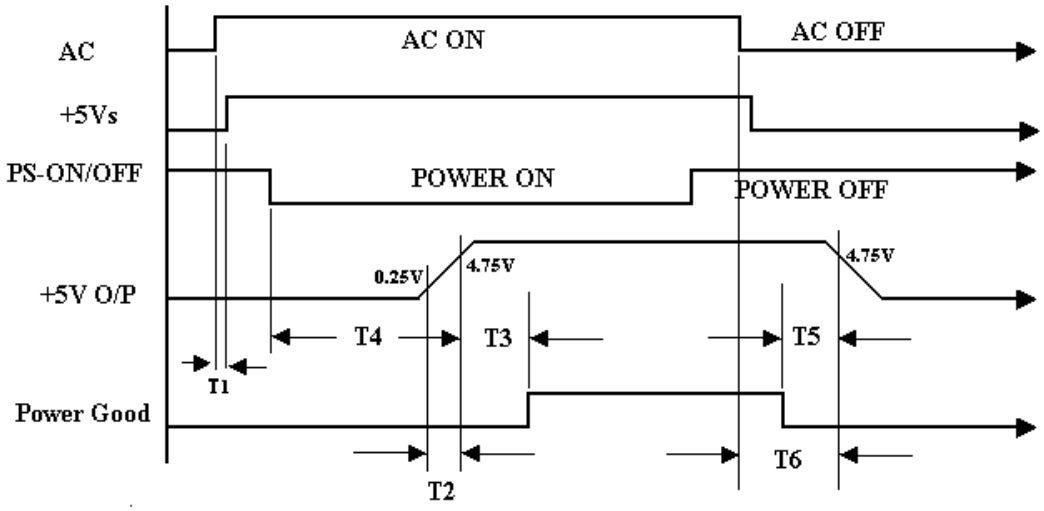
8.4 Dielectric Voltage Withstand

The power supply shall withstand for 1 minute without breakdown the application of a 60Hz 1500V AC voltage applied between both input line and chassis (20mA DC cut-off current). Main transformer shall similarly withstand 3000Vac applied between both primary and secondary windings for a minimum of one minute.

9. Power Good Signal

A TTL compatible signal for the purpose of initiating an orderly start-up procedure under normal input operating conditions. During power up, this signal is asserted (low) until +5V is under regulation and AC reaches min. line specification range. After all voltage are going appropriate level, the system may have a turn on delay of 100mS, but no greater than 500mS. During power off the signal should go to low level before +5V is out of regulation. The low level is 0 to 0.8V and high level is 4.75 to 5.25V. The " Power Good "signal can drive up to 6 standard TTL loads.

Time Diagram Figure 1



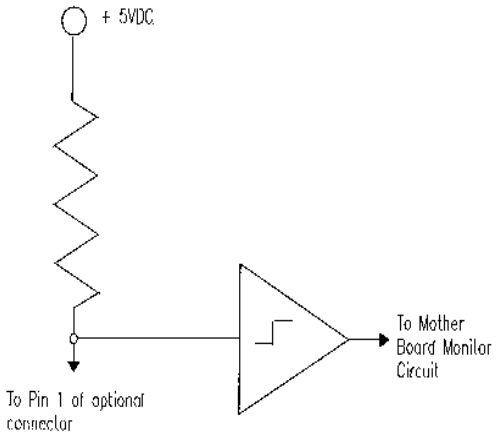
* T1 : Turn on time (2 sec. Max.)
* T2 : Rise time (? 20mS Max.)
* T3 : Power good turn on delay time (100 < T3 < 500 mS)
* T4 : Switch on time (0.5 sec. Max.)
* T5 : Power good turn off delay time (1.0 mS Min.) PS-ON/OFF
* T6 : Power hold-on time (16 mS Min.)
* Power on-off cycle :

  When the power supply is turned off for a minimum of 2.0 sec. and turn on again, the power good signal will be asserted.

10. FanM signal

The FanM signal is an open collector, 2 pulse per revolution tachometer signal from the power supply fan. The signal stops cycling during a lock rotor state; the level can be either high or low. This signal allows the system to monitor the power supply for fan speed or failures. Implementation of this signal would allow a system designer to gracefully power down the system in the case of a critical fan failure. The monitoring circuit on the motherboard should use a 1k Ohm to 10k Ohm pullup resistor for this signal. The output should be fed into a high impedance gate for the motherboard implementation. Figure 3 shows a simple illustration of the basic circuit requirements. If this signal is not implemented on the motherboard, it should not impact the power supply function.

Figure 3



11. MTBF

The MTBF of the power should be 100,000 hours min.

12. Burn-In

12.1 Input Voltage

Applying 220Vac for 230V model.

12.2 Test Condition

Applying 75% loads for the power supply in 45 (+/-5) ^{O}C chamber for 4 hours.

13. Harmonics

The product shall meet requirement for EN61000-3-2 & EN61000-3-3 :1995 standard of class D, test at 230Vac 50Hz.

14. Power Factor

The power supply with active power factor correction, and meet EN61000-3-2 standards, The power factor is greater than 0.95 at 230V/50Hz, Max. load.

15. Mechanical Specification

15.1 Outline Dimension

Please refer the mechanical drawing of HPC-850-G14C.

15.2 Weight

Maximum weight is 3.2 Kgs.

15.3 Pin Designation :

15.3.1 DC CONNECTOR REQUIREMENTS

List or recognized component appliance wiring material(AVLV2), CN, rated min 85^0C , 300VAC shall be used for all output wiring.

15.3.2 BASEBOARD CONNECTOR

PA

Connector：MOLEX 39-01-2200 or Approved Equivalent

18 AWG Wire	Signal	Pin	Pin	Signal	16 AWG Wire
Orange	+3.3 VDC	13	1	+3.3 VDC	Orange
Brown (22AWG)	+3.3V Positive				
Blue	-12 VDC	14	2	+3.3 VDC	Orange
Black	COM	15	3	COM	Black
Green (22AWG)	PS-ON	16	4	+5 VDC	Red
Black	COM	17	5	COM	Black
Black	COM	18	6	+5 VDC	Red
Black	COM	19	7	COM	Black
	None	20	8	PG_OK	Gray (22 AWG)
Red	+5 VDC	21	9	+5 Vsb	Purple
Red	+5 VDC	22	10	+12 V1 DC	Yellow
Red	+5 VDC	23	11	+12 V1 DC	Yellow
Black	COM	24	12	+3.3 VDC	Orange

15.3.3 Peripheral Connectors

PC1, PC2, PC3

Connector : AMP 1-480424-0 or MOLEX 8981-04P or approved equivalent

Contacts : AMP 61314-1 terminals or equivalent

Pin	Signal	18 AWG Wire
1	+12 V3 DC	Yellow
2	COM	Black
3	COM	Black
4	+5 VDC	Red

PK1, PK2, PK3, PK4, PK5, PK6

Connector : AMP 1-480424-0 or MOLEX 8981-04P or approved equivalent

PQ1, PQ2

Connector : AMP 171822-4 or approved equivalent

Contacts : AMP 61314-1 terminals or equivalent

Pin	Signal	18 AWG Wire	Pin	Signal	22 AWG Wire
1	+12 V DC	Yellow	1	+5 VDC	Red
2	COM	Black	2	COM	Black
3	COM	Black	3	COM	Black
4	+5 VDC	Red	4	+12 V DC	Yellow

15.3.4 +12V Power Connector

PB1

Connector : Molex 39-01-2040 or quivalent

Pin	Signal	18 AWG Wire
1	COM	Black
2	COM	Black
3	COM	Black
4	COM	Black
5	+12 V3 DC	Yellow
6	+12 V3 DC	Yellow
7	+12 V3 DC	Yellow
8	+12 V3 DC	Yellow

PH1

Connector : MOLEX 88751 or

Pin	Signal	18 AWG Wire
1	COM	Black
2	COM	Black
3	+12 V2 DC	Yellow
4	+12 V2 DC	Yellow

PH2

Connector : MOLEX 88751 or

Pin	Signal	18 AWG Wire
1	COM	Black
2	COM	Black
3	+12 V4 DC	Yellow
4	+12 V4 DC	Yellow

15.3.5 Serial ATA Power Connector

PF

Connector : MOLEX 88751 or equivalent

Pin	Signal	18 AWG Wire
1	+3.3V DC	Orange
2	COM	Black
3	+5 VDC	Red
4	COM	Black
5	+12V3 DC	Yellow

PG1-PG2

Connector : MOLEX 88751 or equivalent

Pin	Signal	18 AWG Wire
1	+3.3V DC	Orange
2	COM	Black
3	+5 VDC	Red
4	COM	Black
5	+12V2 DC	Yellow

15.3.6 Case FAN control Connector

P3 (FAN speed signal)
Connector : AMP 1-480424-0 or
MOLEX 8981-04P or approved equivalent

Pin	Signal	22 AWG Wire
1	COM	Black
2		
3	FAN M	Yellow

15.3.7 PCI Power Connector

PD
Connector : Molex 39-01-2040 or equivalent

Pin	Signal	18 AWG Wire
1	+12 V3 DC	Yellow
2	+12 V3 DC	Yellow
3	+12 V3 DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black

PE
Connector : Molex 39-01-2040 or equivalent

Pin	Signal	18 AWG Wire
1	+12 V4 DC	Yellow
2	+12 V4 DC	Yellow
3	+12 V4 DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black

PS
Connector : Molex 39-01-2040 or equivalent

Pin	Signal	18 AWG Wire
1	+12 V DC	Yellow
2	+12 V DC	Yellow
3	+12 V DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black

PW
Connector : Molex 39-01-2040 or equivalent

Pin	Signal	18 AWG Wire
1	+12 V DC	Yellow
2	+12 V DC	Yellow
3	+12 V DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black

PR
Connector : Molex P8-I4200K12A(RED) or equivalent

Pin	Signal	18 AWG Wire
1	+12 V DC	Yellow
2	+12 V DC	Yellow
3	+12 V DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black
7	COM	Black
8	COM	Black

PT

Pin	Signal	18 AWG Wire
1	+12 V DC	Yellow
2	+12 V DC	Yellow
3	+12 V DC	Yellow
4	COM	Black
5	COM	Black
6	COM	Black
7	COM	Black
8	COM	Black

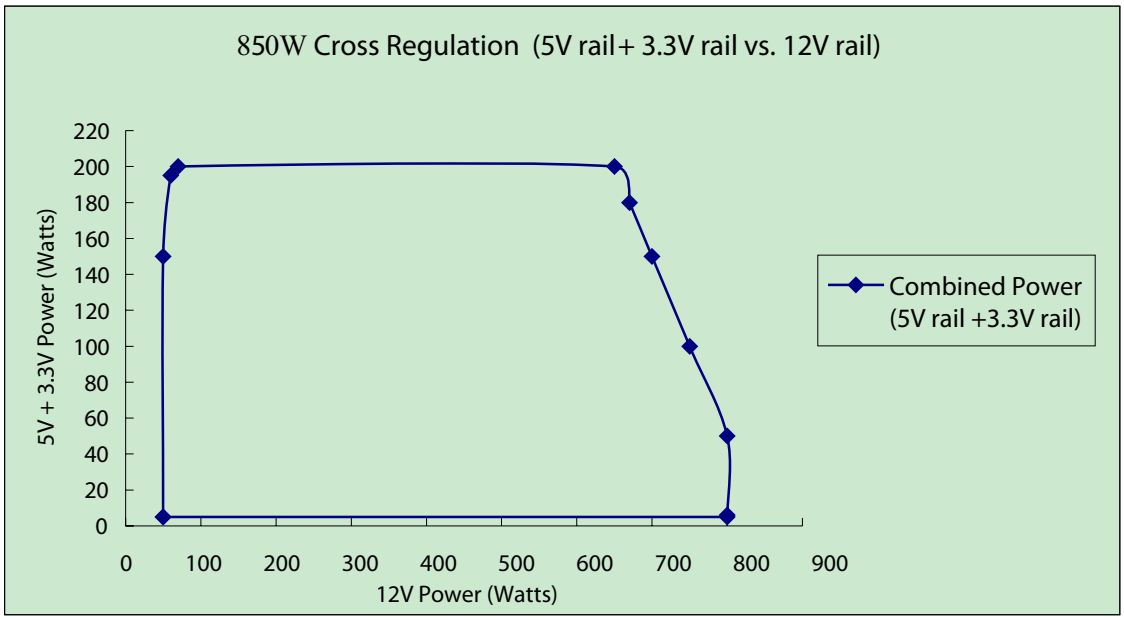


Figure 1 Output Power Distribution for HPC-850-G14C Configuration

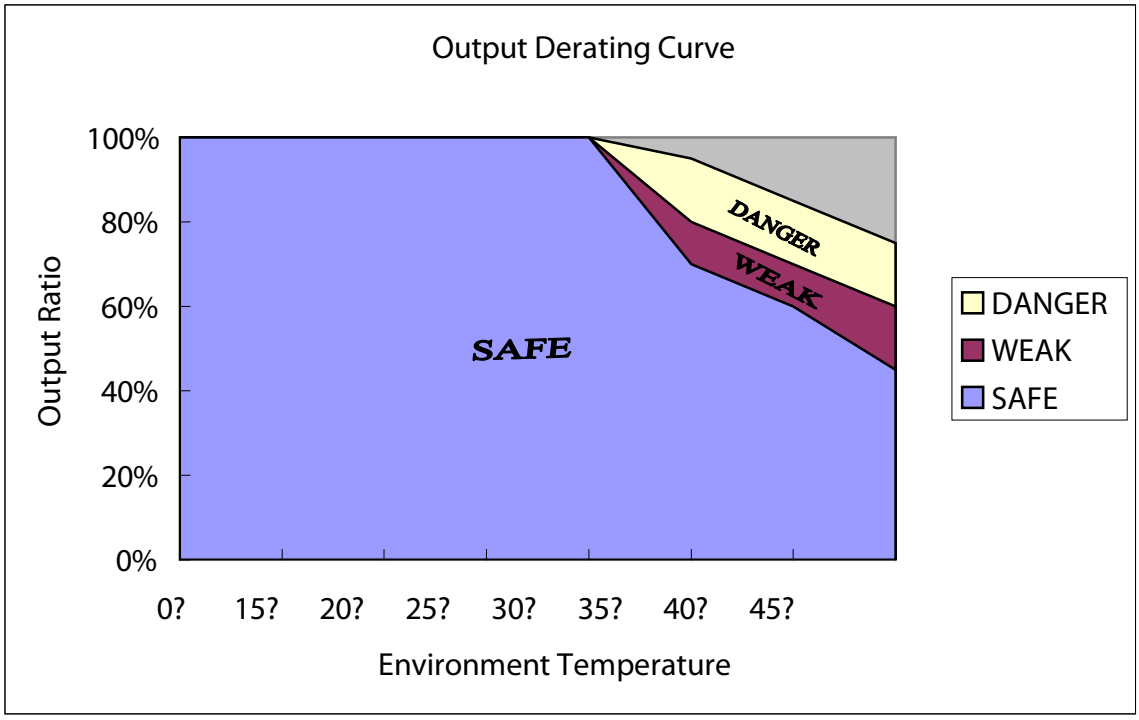


Figure 2 Output Derating Rate