



SILVERSTONE

HELA Series

HELA 2500Rz

Cybenetics Platinum 2500W ATX 3.1 & PCIe 5 Fully Modular ATX Power Supply

- Compliant with ATX 3.1 and PCIe Gen 5 standards, supporting 12V-2x6 PCIe connectors
- 4 x native 12V-2x6 connectors with cables included, supporting RTX 40/50 series GPUs.
 - High efficiency with Cybenetics Platinum certification
 - 24/7 continuous power output with 50°C operating temperature
- Fully modular design with SilverStone's 3rd generation modular interface
- Silent running 135mm Fluid Dynamic Bearing (FDB) fan with delayed shut-off function
 - Compact 200mm depth design allows for easy system integration

SPECIFICATION

SilverStone HELA Series

HELA 2500Rz

SST-HA2500R-PM

ATX Switching Power Supply
Cybenetics Platinum efficiency certified.
2500W

1.General

1.1 Scope

This specification defines the performance characteristics of a single phase 2500Watts, 5 output power supply. 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

Nominal Voltage

200-240 Vrms(For 2500W)
115-240 Vrms(For 1650W)
100-240 Vrms(For 1350W)

Voltage Variation Range

90 - 264 Vrms

2.2 Input Frequency

Nominal Frequency

50-60 Hz

Frequency Variation Range

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
----- 20A	----- 90 - 264 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

Efficiency versus Load for ENERGY STAR* with 2500W

Loading	Full Load (100%)	Typical Load (50%)	Light Load (20%)	Low Load (2%)	PFC@ 50%Load
Minimum Efficiency	90%	94%	92%	60%	≥0.9

3.Output characteristics

3.1 Normal Operation Output

Table1

(200-240 Vrms(For 2500W))

Output Voltage	Load MIN	Range MAX	Load Regulation	Total Regulation	Ripple & Noise P-P Max.
1. +5V	0.0A	22A	±3%	±5%	30mV
2. +12V	0.0A	208.3A	±3%	-7% /+5%	50mV
4. -12V	0.0A	0.5A	±10%	±10%	50mV
5. +5Vs	0.0A	3.0A	±3%	±5%	30mV
6. +3.3V	0.0A	22A	±3%	±5%	30mV

- Maximum continuous total DC output power should not exceed 2500W.
- Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 120W.
- Maximum combined load on +12V outputs shall not exceed 2500W.
- The 12V-2x6 Max load shall not exceed 50A(600W).

Table2

(115-240 Vrms(For 1650W))

Output Voltage	Load MIN	Range MAX	Load Regulation	Total Regulation	Ripple & Noise P-P Max.
1. +5V	0.0A	22A	±3%	±5%	30mV
2. +12V	0.0A	137.5A	±3%	-7% /+5%	50mV
4. -12V	0.0A	0.5A	±10%	±10%	50mV
5. +5Vs	0.0A	3.0A	±3%	±5%	30mV
6. +3.3V	0.0A	22A	±3%	±5%	30mV

- Maximum continuous total DC output power should not exceed 1650W.
- Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 120W.
- Maximum combined load on +12V outputs shall not exceed 1650W.
- The 12V-2x6 Max load shall not exceed 50A(600W).

Table3

(100-240 Vrms(For 1350W))

Output Voltage	Load MIN	Range MAX	Load Regulation	Total Regulation	Ripple & Noise P-P Max.
1. +5V	0.0A	22A	±3%	±5%	30mV
2. +12V	0.0A	112.5A	±3%	-7% /+5%	50mV
4. -12V	0.0A	0.5A	±10%	±10%	50mV
5. +5Vs	0.0A	3.0A	±3%	±5%	30mV
6. +3.3V	0.0A	22A	±3%	±5%	30mV

- Maximum continuous total DC output power should not exceed 1350W.
- Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 120W.
- Maximum combined load on +12V outputs shall not exceed 1350W.
- The 12V-2x6 Max load shall not exceed 50A(600W).

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 PS_ON# signal is required to remotely turn on/off the power supply, PS_ON# 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	+12V	-12V	+5Vsb
Low Load	0.27A	0.27A	3.94A	0.01A	0.06A
Light Load	2.74A	2.74A	39.44A	0.09A	0.57A
Typical Load	6.84A	6.84A	98.61A	0.24A	1.42A
Full Load	13.69A	13.69A	197.21A	0.47A	2.84A

3.4 Rise Time

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

3.5 +5V DC / +3.3V DC Power Sequencing

The +12V and +5V output levels must be equal to or greater than the +3.3V output at all times during power-up and normal operation. The time between any output of + 12V and +5V reaching its minimum in-regulation level and +3.3V reaching its minimum in-regulation level must be $\leq 20\text{mS}$.

3.6 Hold-up Time

PG output maintains at least 11mS after power off which hold within 80% loads under 230V/50Hz condition.

3.7 5VSB

5VSB is required for the implementation of PS-ON described above. 5VSB is a standby 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 $5\text{V} \pm 3\%$ at a minimum of 3.0 A for PC board circuits to operate. Conversely, PC board should draw no more than 3.0A maximum from this pin. This power may be used to operate circuits such as soft power control.

3.8 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.

3.9 3.3V Sense

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

3.10 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	3300
+12V	3300
+3.3V	3300
-12V	330
+5VS	3300

3.11 Support PCIE 12V-2X6 Connector Power

3.11.1 PCI Express* 12V-2X6 Connector Power Limits

Initial Permitted Power at System Power Up	Maximum Sustain Power after Software Configuration
375 W	600 W*4
225 W	450 W
150 W	300 W
100 W	150 W

3.11.2 PCIe* AIC and PSU Power Budget used for Peak Power Excursion

Power Excursion % of PSU Rated Size PSU ≤ 450 Watts & PSUs without 12V-2X6 Connector	Power Excursion % of PSU Rated Size PSU > 450 Watts & 12V-2X6 Connector present	Time for Power Excursion (TE)	Testing Duty Cycle
150%	200%	100 us	5%
145%	180%	1ms	8%
135%	160%	10ms	12.5%
110%	120%	100ms	25%
100%	100%	Infinite	--

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 10.3~11.0V at 12V terminal and 4.2~4.6V at 5V, 2.0~2.4V at 3.3V.

4.2.2 Over Voltage Protection

The +12V/ DC output are protected against the over voltage condition . Maximum value can't be over 15.6V at 12V terminal and 7.0V at 5V, 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 40%-70% 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.

4.2.5 Over-Current Protection

Current protection should be designed to limit the current to operate within safe operating conditions. Over current protection schemes where only the voltage output that experiences the over current event is shut off may be adequate to maintain safe operation of the power supply and the system; however, damage to the motherboard or other system components may occur. The recommended over current protection scheme is for the power supply to latch into the shutdown state. The setting of over current protection for each output rail is as following.

+5V is less than or equal to 24~35A.

+3.3V is less than or equal to 24~35A.

+12V is less than or equal to 270~354A.

4.2.6 Over-Temperature Protection

This power supply includes an over-temperature protection sensor, which can trip and shut down the power supply at $95^{\circ}\text{C} \pm 10^{\circ}\text{C}$

5. Start Stability

5.1 No Load Start

When power is applied to PSU with no load connected or under minimum load 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°C environment.

6. Environments

6.1 Temperature and Humidity

6.1.1 Operating

Temperature 0°C to 50°C
Relative Humidity 20% to 90 %

6.1.2 Storage

Temperature -40°C to 70°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

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	0.35 mm

7. Conducted EMI

CE,FCC

8. Product Safety

8.1 Safety Requirement

CB .cTUVus

8.2 Leakage Current

The AC leakage current is less than 3.5mA when the power supply connect to 264Vac/50Hz .

8.3 Insulation Resistance

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

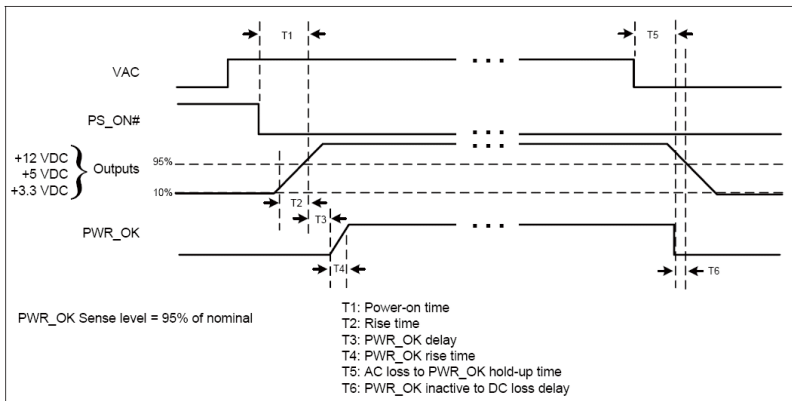
8.4 Dielectric Voltage Withstand

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 250mS. 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.

Power Supply Timing



- * T1 : Turn on time (200mS Max.)
- * T2 : Rise time (0.2~20 mS)
- * T3 : Power good turn on delay time (100~ 250 mS)
- * T4 : Switch on time (10mS Max.)
- * T5 : Power hold-on time (11 mS Min@80% LOAD)
- * T6 : Power good turn off delay time (1.0 mS Min@80% LOAD)
- * 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. MTBF

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

11. Burn-In

11.1 Input Voltage

Applying 220Vac

11.2 Test Condition

Applying 80% loads for the power supply in 40 (+/-5) °C chamber for 4 hours.

12. Harmonics

The product shall meet requirement for EN61000-3-2 & EN61000-3-3 :2005 standard of class D, test at 230Vac 50Hz.

13. Power Factor

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

14. Fan Function

14.1 Fan Less

When Zero RPM Fan Mode switch ON, it has Fan Less function, while on OFF, there is no Fan Less function. When the Fan Less function is turned on, in the cold state ,the fan does not rotate below 370W load, and starts to rotate between 370W load and 500W load.

14.2 Fan Delay

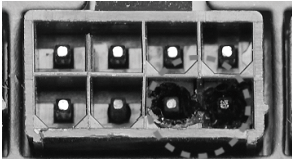
The power supply has the Fan Delay function. When PS-OFF the Fan turns and does not stop until after 60S.

15. Mechanical Specification

15.1 Outline Dimension

150X86X200mm

16. POWER SUPPLY CONNECTOR OVERUSE DEFINITION



- DE

Definition einer Überlastung des Netzanschlusses
- FR

Définition de l'utilisation excessive du connecteur d'alimentation électrique
- ES

Definición de uso excesivo del conector de la Fuente de alimentación
- IT

Definizione di uso eccessivo del connettore di alimentazione
- RU

Определение чрезмерной нагрузки на коннектор блока питания
- TW

電源供應器接頭過度使用定義
- TH

นิยามการใช้หัวจ่ายไฟเกินขีดจำกัดที่กำหนด
- KR

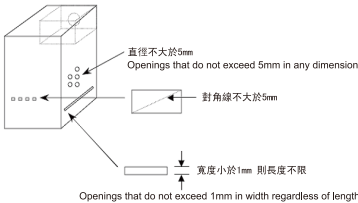
전원 공급 커넥터 과용 정의
- JPN

電力供給コネクタの使用限度超過に関する説明
- CN

電源供应器接头过度使用定义



1. 為了保護使用者及防火的目的，安裝此交換式電源供應器時，必須安裝於符合下列各項要求的外殼中，並且安裝妥當後，才可接上電源。
- 1-1. 外殼材質須為防火外殼。外殼材質須為防火外殼。
- 1-2. 外殼的上方及側邊之圓形開孔，最大內徑不可大於5mm。
- 1-3. 外殼的上方及側邊之長條型開孔，對角線距離不可大於5mm；若寬度小於1mm，則長度不受限制。
- 1-4. 外殼底部不可有開孔。外殼底部不可有開孔。



2. 本產品輸出含有危險能量，為避免操作時發生危險，須於裝入系統機殼並將所有設備安裝妥當後才可開啟電源。
3. 本產品之電源輸出非屬電力限制型電源，請連接使用具防火外殼之周邊，以避免火災危險發生。

BSMI ROHS 資訊
<http://www.silverstonetek.com/downloads/PSU/RSD.pdf>

开关电源供应器 有毒有害物质/元素及其化学含量表							
部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	
外壳	○	○	○	○	○	○	
接头	○	○	○	○	○	○	
风扇	○	○	○	○	○	○	
电子卡	○	○	○	○	○	○	
螺丝	○	○	○	○	○	○	
线材	○	○	○	○	○	○	
包材	○	○	○	○	○	○	

本表格係依据SJ/T 11364的规定编制

○：表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。

×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

10

产品合格证

QUALITY INSPECTION

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Model (safety certification):SST-AX2500MCPT-A

The equipment a Class | Switching Power Supply intended to use for information technology equipment or Audio and Video equipment.

- 本製品は2500Wの出力が可能な高出力電源となります。
- ・100V環境の場合、2500Wの出力を行う場合には19A以上の電流が必要となるため、20Aを許容する環境にてご利用ください。
- ・一般家庭のコンセント(1500W)の場合は、1300W未満の消費電力でご利用ください。
- ・日本国内向けに販売されている本製品の付属電源ケーブルは100V(最大15A)専用となります。
- ・本製品に200V用電源ケーブル、および100V/20A用電源ケーブルの同梱はございません。
- ・100V/15A以外の環境でご利用の際は、安全の為、必要な電源ケーブルを別途ご用意ください。

※付属の電源コードは当該製品専用です。他の機器に使用しないでください。

Please refer to SilverStone website for latest specifications updates.

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