

# HIGH POWER®

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*Part Name: 91.A2502.C04*

*Model No: SI-A250M2 REV:C0*

*Document Version:A3*

## PRODUCT SPECIFICATION

*Release Date: 2005/01/24*

**R/D Dept :**

|                      |                     |                      |
|----------------------|---------------------|----------------------|
| <i>Approved by :</i> | <i>Checked by :</i> | <i>Prepared by :</i> |
|                      |                     |                      |

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**Switching Power Supply**

**Specifications**

Model Name : 91.A2502.C04    SI-A250M2    REV:C0(JDR)

Version :A3

Issue Date :

Jan.24.2005

Subject : Change History of Specification

| DATE         | Ver. | Page mod. | Modified content  | REF NO.  |
|--------------|------|-----------|---|----------|
| Jul.15.2004  | A0   | --        | Initial   | --       |
| Sep.04.2004  | A1   | Page 11   | Added 12.3.2 FAN-M Connector P3 item                                      | N-93228  |
|              |      | Page 9    | Added 10. FanM signal   |          |
| Dec.03.2004  | A2   | Page 12   | Added S-ATA power connector:<br>13.3.7 Serial ATA Power Connector P5 item | S93-1203 |
| Jan .24.2005 | A3   | Page 9    | Safety standard not renewed: FIMKO,SEMKO,<br>NEMKO,DEMKO                  |          |
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**1. General**

**1.1 Scope**

This specification defines the performance characteristics of a single phase 250 watts, 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 Voltage**

| Nominal Voltage | Voltage Variation Range |
|-----------------|-------------------------|
| -----           | -----                   |
| 100 - 127 Vrms  | 90 - 132 Vrms           |
| 200 - 240 Vrms  | 180 - 264 Vrms          |

\*The power supply is designed to operate in two specified voltage range depending upon outside manual input voltage switch selected. Unless specified, the SI-A250M2 shall be set at 230Vac.

**2.2 Input Frequency**

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

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\* The power supply must operate at above frequency with both 90-132/180-264Vrms input voltage range.

**2.3 Max. Input AC Current**

| Measuring Range | Max. Input Current |
|-----------------|--------------------|
| 90 - 132 Vrms   | 6.0 A              |
| 180 - 264 Vrms  | 3.0 A              |

**2.4 Inrush Current**

Less then 60A (Cold), 80A (Warm) peak value at 132Vac/264Vac.

**2.5 Efficiency**

SI-A250M2 provides an efficiency of 65% minimum when measured at full load under 115V/60Hz and 230V/50Hz. condition.

**3. Output characteristics**

**3.1 Normal Operation Output**

| Output Voltage | Load MIN | Range MAX | Regulation | Ripple Peak-to-Peak Max. | Ripple & Noise Peak-to-Peak Max. |
|----------------|----------|-----------|------------|--------------------------|----------------------------------|
| 1. +5V         | 0.3 A    | 25.0 A    | ±5%        | 50mV                     | 100mV                            |
| 2. +12V        | 0.0 A    | 15.0 A    | ±5%        | 120mV                    | 200mV                            |
| 3. -12V        | 0.0 A    | 0.8 A     | ±10%       | 120mV                    | 200mV                            |
| 4. +5Vs        | 0.0 A    | 2.0 A     | ±5%        | 50mV                     | 100mV                            |
| 5. +3.3V       | 0.3 A    | 20.0 A    | ±5%        | 50mV                     | 100mV                            |

\* . *The max load can't be over 145W when both DC +5V and +3.3V are used.*

\* . *Output power shall peak 250 watts.*

**NOTE:**

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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

When AC power present, the power supply shall be in save mode operation and +5VS.B shall within its regulation window. When there comes a TTL "L" signal inserted, the power supply shall be on. When TTL signal "H" is inserted ,the power supply shall be off.

TTL level     "H" 3.0V - 5.5V  
                   "L" 0.0V - 0.8V

### 3.3 Cross Regulation

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

| Load                        | SYMBOL | +5V   | +3.3V | +12V  | -12V |
|-----------------------------|--------|-------|-------|-------|------|
| ALL Max.                    | HHHH   | 9.8A  | 17.0A | 10.8A | 0.5A |
| ALL Min.                    | LLLL   | 1.5A  | 0.3A  | 0.2A  | 0.0A |
| +5V Max<br>others Min       | HLLL   | 10.0A | 0.1A  | 1.0A  | 0.0A |
| +5V Middle<br>others Max.   | MHHH   | 6.0A  | 14.0A | 8.0A  | 0.5A |
| +12V Max.<br>others Middle. | MMHM   | 5.0A  | 8.0A  | 12.0A | 0.0A |

### 3.4 Rise Time

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

### 3.5 Hold-up Time

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DC +5V output maintains at least 16mS after power off which hold within parameter 3.1 under 115V/60Hz and 230V/50Hz condition.

### **3.6 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 5V  $\pm 5\%$  at a minimum of 2.0A for PC board circuits to operate. Conversely, PC board should draw no more than 2.0A maximum from 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 11 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    | 10,000               |



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|       |        |
|-------|--------|
| +12V  | 20,000 |
| +3.3V | 6,000  |
| -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 blown or fire hazard.

### **4.2 Output Protection**

#### **4.2.1 Over Voltage Protection**

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

#### **4.2.2 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.

#### **4.2.3 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 SI-A250M2 with no load connected or under minimum load connected, neither damage to power supply nor hazards to users will occur.

### **5.2 Cold Start**

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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 50 °C  
Relative Humidity    20 to 90 %

#### **6.1.2 Storage**

Temperature        -40 to 60 °C  
Relative Humidity    20 to 95 % noncondensing

### **6.2 Altitude**

The power supply can operate normally at any altitude between 0 to10,000 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 - 20 Hz   | 15 minutes | 0.38 mm   |
| 20 - 250 Hz | 15 minutes | 0.25G     |

## **7. Electromagnetic Compatibility (EMC)**

CE ( Standard CISPR 22 Class B ),FCC(PART-15-CLASS-B),檢磁.

## **8. Product Safety**

### **8.1 Safety Requirement**

UL/cUL,TUV, CB(IEC-60950)

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### **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 by 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.

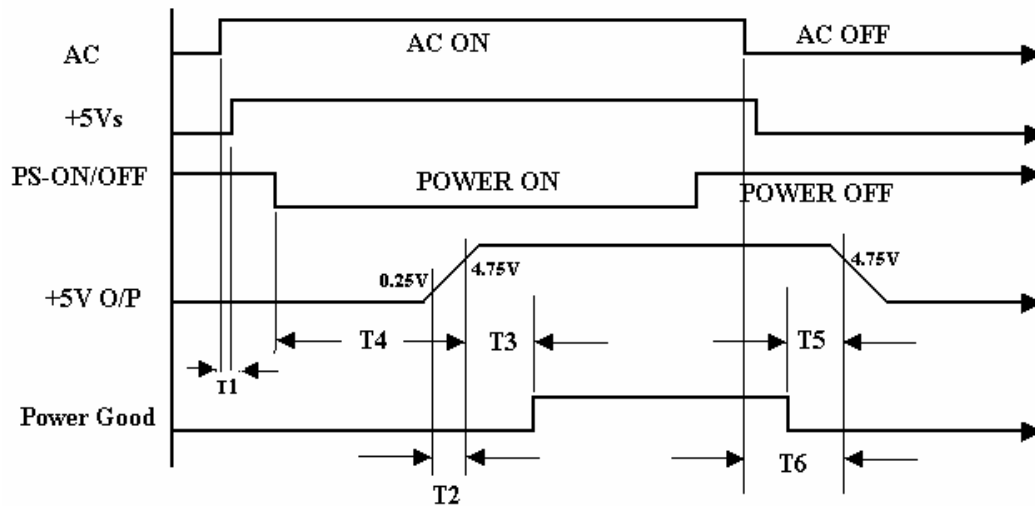
**Time**

**Diagram**

Figure 1

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- \* 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 ( 16mS Min.)
- \* Power on-off cycle :  
When the power supply is turned off for a minimum of 1.0 sec. and turn on again, the power good signal will be asserted.

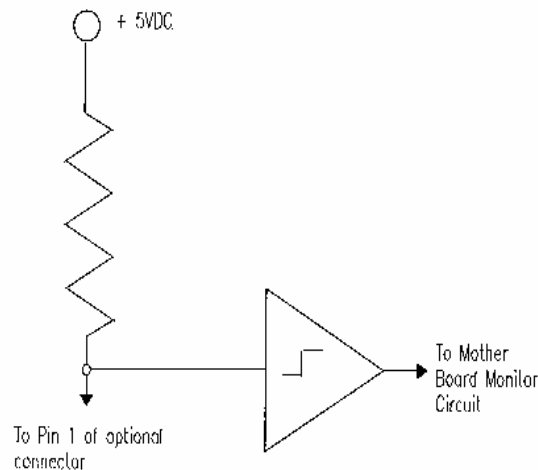
## 10. FanM signal

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 2 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.

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## 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, and 110Vac for 115V.

### 12.2 Test Condition

Applying 80% loads for the power supply in 45 (+/-5) °C chamber for 4 hours.

## 13. Mechanical Specification

### 13.1 Outline Dimension

Please refer the mechanical drawing of SI-A250M2.

### 13.2 Weight

Maximum weight is 2.0 Kgs.





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| Pin | Signal  | 18AWG  |
|-----|---------|--------|
| 1   | +3.3VDC | Orange |
| 2   | COM     | Black  |
| 3   | +5VDC   | Red    |
| 4   | COM     | Black  |
| 5   | +12V1DC | Yellow |