SPECIFICATION

Model: WSPM0005

REDUNDANT POWER SUPPLY
HOT-SWAPPABLE
With Active PFC
550W+550W, 5-Output,

Revision: A

Model No.: WSPM0005

Issue	CNTRL NO.	Description	Date
A	92-0606-02	New Release (STD)	June 6, 2003

Dept.	Approval	Signature
CQRA:	**Richard Lin**	
R&D	**Jeff Chen**	
Safety	**Wilson Yang**	
Issue by (Engineer)	**Wilson Yang**	
PM	**Tien Hsu**	

Table of Content

1.0 General

This specification describes the physical, functional and electrical characteristics of a 550 watts redundant power supply module with power factor correction and hot-swappable capabilities function.

1.1 Parameter Specifications

Unless specified otherwise, all parameters must be met over the limits of Temperature, load and input voltage.

2.0 Input Characteristics

2.1 Input Voltage

110 to 240 VAC

2.2 Input Waveform

The unit is capable of operating with a 10% distorted sine wave input as measured by a distortion analyzer. Its flattopping clipped 10% from the peak value of standard sine wave.

2.3 Input Frequency

47 Hz to 63 Hz

2.4 Input Current

8Amps – 4Amp

2.5 Power Factor Correction

The Power Supply shall incorporate universal power input with active power factor correction, which shall reduce line harmonic current in accordance with the EN61000-3-2 and JETI MITI standards.

2.5.1 Power Factor

PF ≥ 0.95, at Full Load

2.5.2 Harmonic Distortion

Meet the EN61000-3-2 standards

2.6 In-Rush Current

CONDITION	LIMITS
132/264 VAC, Full load. Turn off 1 sec; turn on at peak of input voltage cycle. 25℃ Air Ambient cold star	50A Max. at 115VAC, 100A Max. at 230VAC No damage shall occur or over stressed input fuse shall not blow

2.7 Line Regulation

CONDITIONS	LIMITS
Full load, 110 to 240VAC	+/1%

2.8 Isolation (Hi-pot)

1500Vrms, 50Hz for one (1) minute between each input AC line and the grounding conductor.
3000Vrms, 50Hz for one (1) minute between the input AC lines and secondary low voltage outputs and shields.

3.0 Output Characteristics

3.1 DC Output Characteristics

There are two choices as below, to be met under all combinations of loading.

Output # Voltage	V1 +5V	V2 +3.3V	V3 +12V	V4 -12V	V5 5VSB
Max. Load	30A	28A	35A	0.8A	2A
Min. Load	3A	1A	1A	0A	0A
Load Reg.	±5 %	±5 %	±5%	±5 %	±5%
Cross Reg.	±5%	±5%	±5%	±5 %	±5%
Line Reg.	±1%	±1%	±1%	±1 %	±1%
Ripple & Noise	50mV	50mV	120mV	120mV	50mV

Note 1: The +5 & +3.3 Volt total output shall not exceed 200 Watts.
Note 2: The +5, +3.3 & +12Volt total output shall not exceed 530Watts.
Note 3: Regul0ation tolerance shall include temperature change, warm up drift and dynamic load.

3.2 Remote Sensing

The +3.3V, +5V, +12V outputs should have provision for remote sensing to compensate for 200mV of cable, connector, and PCB trace drops.

3.4 Overshoot

Any output overshoot at TURN-ON shall not exceed 10% of nominal voltage value.

3.5 Efficiency

65% minimum at full load and nominal AC input.

4.0 Power Control Signal

4.1 Hold-Up Time Sequence

Unit shall continue to supply regulated DC outputs and power good signal for at least 16 milliseconds at 115/230 VAC full load after a loss of AC input voltage, which shall be represented by a short circuit at the AC input.

4.2 +5VSB (Standby)

The +5VSB output is always on (+5V Standby) when AC power is applied and power switch is turned on. The +5VSB line is capable of delivering at a maximum of 2.0A for PC board circuit to operate.

4.3 PS-ON (Remote ON/OFF)

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 +3.3 V, 5 V, 12 V, and –12 V power rails. When this signal is held high by the PC board, or left open circuited, outputs of the power rails should be OFF. The power supply then provides potential at the +3.3 V, 5 V, 12 V, and -12V power rails only when this signal is held at ground potential. This signal should be held at +5 VDC by a 1K pull-up resistor internal to the power supply's +5 VSB.

Table 4-1: PS-ON Signal Characteristics

Power On	PS-ON
ON	L
OFF	H

4.4 Power Good Signal (PS_OK)

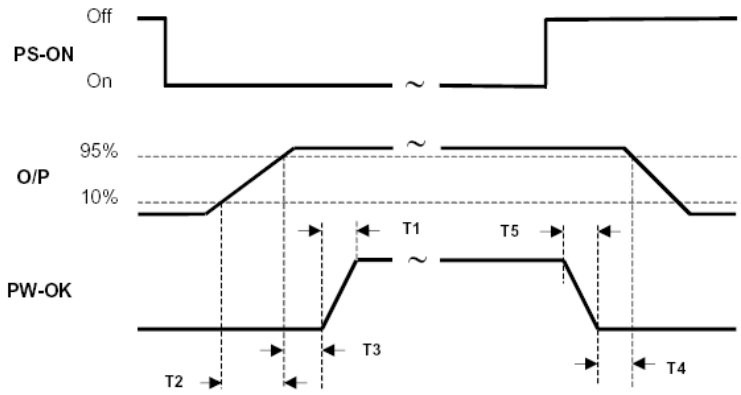

Figure 1

Note:

T2: The output voltage shall rise from <10% of nominal to within the regulation specified in Section 3.1 within 0.1 to 70 ms.(0.1ms ≤T2 ≤70ms)

T3、T4 and T5 are as following Table:

Table 4-1: PS-OK Signal Characteristics

Signal Type:	+5VDC,TTL compatible
Logic level low	<0.4V while sinking 4 mA
Logic level high	Between 2.4VDC and 5VDC output while sourcing 200μA
High state output impedance	1KΩ from output to common
PS-OK delay	100ms < T3 < 500 ms
PS-OK rise time	T5 ≤ 10 ms
Power down warning	T4 > 1 ms

4.5 Fan out Signal

Power Good output circuit shall consist of an active pull down component and a passive pull up resistor.

Power Good output voltage to be met under recommended loading conditions.

CONDITIONS	LIMITS
I_{OH}= -200uA Min.	V_{OH}= 2.7V Min.
I_{OL}= 4mA Min.	V_{OL}= 0.4V Max.

4.6 Output Rise Time

The each output current shall have a turn-on rise time of less than 70ms under all load conditions. Rise time is measured between 10% and 95%.

4.7 Start-up timing

All outputs shall be stable and in regulation in less then 2.0 second under all load and line conditions. Start-up time is measured between the AC turn-on and 4.75 volts on +5V output.

4.8 Dynamic Load Response Time

Transient response is measured by switching the output load from 70 to 100 to 70 percent of its full value at a frequency of 100 Hz and 50% duty cycle, step load change is 0.5A/us, The magnitude Vr is less than 5% of +5V, +3.3V and +12V outputs, the recovery time Tr is less than 1ms.

4.9 Power Fault Signal

The Hot-Swap Redundant Power Supply shall give fault signal (TTL compatible signal) that will indicate the status of the power supply operation.

This signal detects the following conditions:

- All output voltages V1 to V5 are within regulation.
- Fan is operating normally
- Power supply internal temperature is normal

This line has an internal 1KΩ pull up resistor to +5V, and is capable of sinking 20mA, and has a breakdown of 20V.

nGood Low Power Supply Fault	Vol ≤ 0.4V ; Iol ≤ 20mA
nGood High Power Supply Normal	Voh ≥ 3.5V ; Ioh ≤ 250uA

5.0 Protection

5.1 Over Current Protection

This power supply shut down all DC outputs when +5 VDC, +3.3 VDC and +12 VDC outputs are overloaded to the limit. The power supply logic shall into off state and auto restart when the circumstance dispelled. The +5VSB outputs will be internally current limited.

+5 VDC

CONDITIONS	LIMITS
110/240 VAC input	when output current is over to 110% - 130%

+3.3 VDC

CONDITIONS	LIMITS
110/240 VAC input	when output current is over to 110% - 130%

+12 VDC

CONDITIONS	LIMITS
110/240 VAC input	When output current is over to 110% - 130%

5.2 Over Voltage Protection

The power supply shall latch off if the +5 VDC or 3.3VDC or +12 VDC maximum voltage exceeds the limits shown. The AC must be recycled to restart.

+5 VDC

CONDITIONS	LIMITS
All operating	5.6 VDC — 6.5 VDC

+3.3 VDC

CONDITIONS	LIMITS
All operating	3.8 VDC — 4.3 VDC

+12 VDC

CONDITIONS	LIMITS
All operating	13.6 VDC — 15.6 VDC

5.3 Short Circuit Protection

A short circuit placed on +5V, +3.3V, +12V shall cause no damage to this unit. The power supply shall shutdown and latch off if the short circuit shown. This latch shall be cleared by toggling the PS_ON signal or by an AC power interruption.

5.4 Minimal Load Operation

When the primary power is applied, with minimal load on +5V, +3.3V and +12V output voltages, no damage or hazardous conditions shall occur. In such a case, the power supply shall power up and stabilize. Minimal load outputs characteristics see chapter **3.1**

5.5 Over Power Protection

The power supply shall shut down all DC outputs when outputs power are overloaded to 110~150%

5.6 Remote Sense

A remote +3.3VDC sense line connector allow for accurate control of the +3.3VDC line directly at load. Due to potential voltage drops across the connector and traces leading to the PCB components, it may be advantageous to implement a +3.3V sense line that remotely monitors the +3.3VDC power level at the load.

6.0 Indicator Function

6.1 LED Indicator

There will be a bi-color LED to indicate power supply status. When AC is applied to the supply and standby voltages are available the LED shall turn on RED. The LED shall turn on GREEN to indicate that all outputs are available. The LED shall turn on RED to indicate that the power Supply has failed.

7.0 Physical Characteristics

7.1 Size

W x H x D: 98.5x 40 x 267.7mm

7.2 Mounting Requirements

See attachment of mechanical drawing diagram

7.3 Weight

2.6Kg

7.4 Cooling

Airflow from the power supply should be in exhaust direction and shall be rated at 18 CFM maximal.

8.0 Connections

8.1 AC Input Connector

IEC 320 AC Inlet with EMI Filter, 10A/250V

8.2 DC Output Connector (Edge Finger Connector)

The power supply uses a blind mating type connector with edge fingers (see Figure 2) to connect the power supply's output voltages and signals to a connector located in the system. The card edge pin assignments are listed in Table 2. The connector located in the system is an AMP 1364999-1 or equivalent.

Signals that can be defined as low true or high true use the following convention: *signal#* = low true.

Top Side	Pin #	36	35	34-31	30~27	26~18	17~14	13	12	11	10	9	8~6	5~4	3	2~1
	Signal	3VSHR	12VSHR	+3.3V	+12V	GND	+5V	-12V	-5V	RS-	PSKILL	5VSB	N/C	AC-L	N/C	AC-N
Bottom Side	Signal	3VS+	12VS+	+3.3V	+12V	GND	+5V	PG	PFD	5VSHR	5VS+	PSON	N/C	AC-L	N/C	AC-N
	Pin #	72	71	70~67	66~63	62~54	53~50	49	48	47	46	45	44~42	41~40	39	38~37

9.0 Environmental

9.1 Temperature

9.1.1 Operating
0 to 40 °C

9.1.2 Non-Operating
-20 to 60°C

9.2 Relative Humidity

9.2.1 Operating
20 to 90 % non-condensing at 104°F (40 °C)

9.2.2 Non-Operating
5 to 95 % non-condensing at 122°F (50°C)

9.3 Altitude

9.3.1 Operating
Sea level to 10,000 feet

9.3.2 Non-Operating
Sea level to 40,000 feet

9.4 Shock

9.4.1 Operating
The power supply shall exhibit no sings of damage or degradation of performance when subjected to a shock of 5g`s for 11 ms, with a 1/2 sine wave for each of the perpendicular axes X, Y and Z.

9.4.2 Non-Operating
The power supply shall exhibit no sings of damage or degradation of performance when subjected to a shock of 30g's for 11 ms, with a 1/2 sine wave for each of the perpendicular axes X, Y and Z.

9.5 Vibration
9.5.1 Operating
The power supply shall be subjected to a vibration test consisting of a 10 to 500 Hz sweep at a constant acceleration of 0.5g for a duration of one (1) hour for each of the perpendicular axes X, Y and Z. The output voltages shall remain within specification.

9.5.2 Non-Operating
The power supply shall be subjected to a vibration test consisting of a 10 to 300 Hz sweep at a constant acceleration of 2.0g for a duration of one (1) hour for each of the perpendicular axes X, Y and Z.

The power supply shall not incur physical damage or degradation of any characteristics below the performance specifications.

9.6 Power Line Transient

Drop Out

With a full cycle input voltage drop-out at 50Hz, the unit shall operating within the prescribed voltages with a drop-out cycle repetition rate of 500ms.

CONDITIONS	LIMITS
Full load, Nom. Input AC Voltage	Meet all requirements

9.7 Acoustic Noise

The power supply shall be tested in accordance with the ANSIS12.10-1985 standard specifications. The "A" weighted overall sound pressure level as well as individual octave band levels from 63 Hz to 16,000 Hz is measured with the noise meter placed 1 meter from the nearest vertical surface of center of fan installed in power supply.

CONDITIONS	LIMITS
115 VAC Input, full load of +5V 0.5A of +12V	Acoustic noise is 50 db maximum

10.0 Regulatory Agency Certification

10.1 RFI/EMI Standards

The power supply, when installed in system, shall comply with the following radiated and conducted emissions standards:

a) Meet FCC part 15, Subpart B, Class B computing devices.

b) CISPR22 (EN55022) Class B.

10.2 Safety Standards

The power supply shall be certified with the following safety standards,

a) UL 1950 (Information Processing/Business equipment).

b) TUV Certification to IEC 950 1st edition with Amendment #1, #2, and EN60950

11.0 Reliability

11.1 Mean Time Between failures (MTBF)

Using MIL217F the calculated MTBF ＞ 100,000 hours at 25°C

11.2 Warranty

FIVE (5) years manufacture's warranty

Date code indicating week and year of manufacture.

Technical information in this specification is subject to change without notice.

The revision of specification will be marked on the cover.

Appendix I: Mechanical Drawing