ENGINEERING SPECIFICATION

65W AC Adaptor

Part Number: PA-1650-86AW

EFFECTIVE DATE: Aug. 01, 2011

Revision History

REV. NO.	ITEM	DESCRIPTIONS OF CHANGE		CHANGED DATE :	REF. DOC. NO.
		BEFORE	AFTER		
X01			INITIAL	20110801	
A			P/R stage	20111116	

Table Contents

1. General

1.1. Scope

This specification defines the performance characteristics of a grounded, single phase, 65W, 1 outputs power supply. This specification also defines worldwide safety and electromagnetic compatibility requirements for the power supply which is intended for use in notebook products.

1.2. Type of Power

Without power line harmonics and input 3pin model.

2. INPUT REQUIREMENTS

2.1. INPUT VOLTAGE

	MINIMUM	MAXIMUM	NOMINAL
LOW RANGE	90VAC	132VAC	100-120VAC
HIGH RANGE	180VAC	264VAC	200-240VAC

2.2. FREQUENCY

	MINIMUM	MAXIMUM	NOMINAL
SINGLE PHASE	47Hz	63Hz	50-60Hz

2.3. Voltage Section

A full range will be provided to select the appropriate range.

2.4. EPA Requirement

The Adaptor shall be designed to meet EPS requirement, No Load Power Loss shall be less than 0.1W at 115VAC and 230VAC. And Average Efficiency value of 25%, 50%, 75% and 100% load condition shall be more than 87% with both 115VAC/230VAC.

2.5. Input Current

Input Current will be 1.7 Amps maximum at input voltage 90Vac/47Hz and at maximum load conditions.

2.6. Inrush Current

The adapter inrush current shall be less than the ratings of its critical components for all conditions of line voltage.

Test Condition			Design Requirement
AC input	DC Output		
264V 63Hz	+19V	3.42A	Shall be meet fuse and bridge diode I^2t .(cold start)
264V 53Hz			Shall be meet fuse and bridge diode I^2t .(hot start)

2.7. TINY LOAD EFFICIENCY

Test condition	Design Requirement
115VAC/60Hz,230VAC/50Hz, load=0.5W	AC input power<1.0W
115VAC/60Hz,230VAC/50Hz, load=1.0W	AC input power<1.7W
115VAC/60Hz,230VAC/50Hz, load=1.5 W	AC input power<2.4W
115VAC/60Hz,230VAC/50Hz, load=11.6W	AC input power<14 W
115VAC/60Hz,230VAC/50Hz, load=18.7W	AC input power<22 W

3. OUTPUT REQUIREMENTS

3.1. STATIC DC LOAD

NOMINAL VOLTAGE (V)	LOAD CURRENT(A)		REGULATION
	MIN.	MAX.	
19	0	3.42	18.55V-19.95 V

3.2. PEAK LOAD

NOMINAL VOLTAGE (V)	LOAD CURRENT(A)	REGULATION
19	4.45 (5 sec. duration)	> 17V

*Duty: Ton=2ms (130%), Toff=98ms (100%)
*Load Condition: 100% - 130%

3.3. DYNAMIC LOAD

NOMINAL VOLTAGE (V)	LOAD CURRENT(A)		REGULATION
	MIN.	MAX.	
19	0	3.42	18.05V~19.95V

*Freq: 100 Hz
*Slew Rate: 1A/us
*Duty: 50%
*Load Condition: 0% - 50%, 50% - 100%
*AC input: 90Vac/60Hz & 240Vac/50Hz

3.4. RIPPLE AND NOISE

The ripple and noise of the outputs shall be measured at the load end if the output cables when terminated to load impedance as specified in paragraph 3.3.

OUTPUT VOLTAGE		RIPPLE & NOISE (P-P)	
19	V	380	mV

Note1: Use 20MHz Bandwidth frequency scope.
Note2: Filter capacitors are connected to each pins of the mating output connector. Capacitance values and material type are listed below.

VOLTAGE NOM.(V)	CAPACITANCE NOM. (uF)	MATERIAL TYPE
19	0.47uF/47uF	CERAMIC/ELE

3.5. CAPACITIVE LOAD

Plugging a 220uF capacitor to a live adapter, and adapter can't show down (Vo >17V within 1ms).

3.6. RISE TIME

The output rise time (measured from the 10% point to the 90% point on the waveform) shall be less than 100ms.

3.7. HOLD UP TIME

The power supply shall maintain voltage regulation within the specified limits in paragraph 3.1 for at least 5 milliseconds after lost of input voltage measure at 115 VAC/60Hz,240VAC/50Hz and at maximum output load.

3.8. OVERSHOOT

During power-on or power-off, the output voltage shall be monotonically increasing or decreasing with respect to the overshoot which shall neither exceed 20.5 volts.

4. NO LOAD OPERATION

The power supply shall be able to operate under no load condition. No damage to the power supply is allowed and internal component can not be stressed beyond its rating.

5. FREQUENCY OF OPERATION

To keep audible noise to a minimum, power supply shall be switched at frequencies higher than 20kHz (except no load operation)

6. TEMPERATURE COEFFICIENT

The temperature coefficient of the all outputs is 0.05% per degree centigrade maximum.

7. PROTECTION

7.1. Over voltage protection

The power supply should shutdown for any cause of over voltage conditions before any output exceeds its limits below.

NOMINAL OUTPUT VOLTAGE (V)	OVER VOLTAGE MAX.
19V	27

The power supply is latched and power on reset is required.

7.2. Short circuit Protection

A short circuit placed on DC output shall cause no damage to or shutting down the power supply. The power supply will latch-off. And average input power can not over 3W.

7.3. Over Current Protection

The power supply shall provide over current protection on output. Maximum current inception point of output shall be limited to the following values:

OUTPUT VOLTAGE (V)	CURRENT LIMIT (A)
19	>= 4.1A

The power supply will be latch-off.

7.4. Over Temperature Protection

The Adaptor shall provide Over Temperature Protection, and if the temperature rises to set temperature point, the PSU shall be latch-off. Case temperature can not over 95 degrees centigrade.

8. TURN ON TIME

The turn on time shall be less than 2 sec. for input AC115V/60Hz and Full load conditions. (Be measured from AC on point to the 90% point of the output voltage)

9. SAFETY REQUIREMENTS

9.1. DIELECTRIC STRENGTH

Primary to Secondary: 4242 VDC for 1 sec.
Primary to PE: 2150 VDC for 1 sec.

9.2. INSULATION RESISTANCE

Primary to secondary: 20 Meg. ohms Min., 500VDC

9.3. GROUND LEAKAGE CURRENT

The power supply ground leakage current shall be less than 75uA at 240Vac/50Hz.

10. ELECTROMAGNETIC COMPATIBILITY

Power supply for use with the host system will be tested to conform with the following emission standards.

10.1. LIGHTNING SURGE

A 1K volt (applied differential mode), and a 2K volt (applied common mode)

10.2. ESD

The power supply shall meet Contact discharge +-8KV and Air discharge +-15KV requirement, when power supply is operating at maximum load condition.

11. Environment

11.1. Operating

Temperature: 0 to 40 degrees centigrade.
Relative Humidity: 8 to 90 percent, non-condensing.

11.2. Shipping AND Storage

Temperature: -20 to +85 degrees centigrade.
Relative Humidity: 5 to 90 percent, non-condensing.

12. Temperature Rise of Case Surface

The case temperature of AC adaptor shall not exceed (△T) 45 degree C for the top case and (△T) 50 degree C for bottom case with 25℃ Amb/no air flow/ 100VAC/50Hz/full load, and amb. sensor*2 at A3 size board (10mm thickness) diagonal location.

13. Acoustic noise

The PSU set up measured should be made at 5cm distance between adapter and microphone. Acoustic noise test is at 100Hz~15kHz < 25db and at 15kHz~20kHz <31db with 100 Vac / 240Vac input voltage, test load is 0.1A, 0.2A, 0.3A, to full load.

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