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SPECIFICATION



ESD15013651

FSP550-70MUA

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SPECIFICATION

FSP550-70MUA



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MODEL: FSP550-70MUA**Revision History**

<u>Rev</u>	<u>Description</u>	<u>Date</u>	<u>Author</u>
0.1	1 st release.	Mar 19 '2015	Brian Lee
0.2			
0.3			
0.4			

1. GENERAL DESCRIPTION

Switching Mode Power Supply is designed to meet ATX 12V Rev 2.2 form factor. FSP550-70MUA is operated at 100-240 Vac that built Active PFC (Power Factor Correction), 8cm fan & real time battery backup feature for Lead-Acid battery.

2. INPUT ELECTRICAL SPECIFICATIONS

2.1 AC Input

- 2.1.1 Operation Voltage: 90Vac ~ 264Vac
- 2.1.2 Frequency : 47 Hz ~ 63Hz
- 2.1.3 AC mains steady-state RMS input current is bellow:
 - 8A maximum at 100Vac & 60Hz input.
 - 4A maximum at 240Vac & 50Hz input.
- 2.1.4 Power Factor > 0.9 @ 100% load.

2.2 Efficiency

Loading is defined as full load 500W (100%), Typical load 250W (50%) & Light load 100W (20%) that **without battery charger**. Minimum Efficiency is showed on bellow Table-2.

Table -2

Loading	+5V	+3.3V	+12V1	+12V2	+12V3	-12V	+5Vsb	Efficiency
500W	12.61	12.61	10.47	10.5	10.47	0.44	2.63	80%
250W	6.31	6.31	5.43	5.4	5.43	0.22	1.31	82%
100W	2.52	2.52	2.09	2.1	2.09	0.09	0.53	80%

3. OUTPUT ELECTRICAL SPECIFICATION

3.1 Output Rating

Output	Minimum Load	Nominal Load	Maximum Load	Load Regulation	Line Regulation	Ripple & Noise
+3.3V	0A	8A	20A	±5%	±1%	50mV P-P
+5V	0A	8A	20A	±5%	±1%	50mV P-P
+12V ₁	0A	8A	16A	±5%	±1%	120mV P-P
+12V ₂	0A	8A	16A	±5%	±1%	120mV P-P
+12V ₃	0A	8A	16A	±5%	±1%	120mV P-P
-12V	0A	0.25A	0.5A	±10%	±1%	120mV P-P
+5Vsb	0A	1A	3A	±5%	±1%	50mV P-P

- (1) +3.3V & +5V total output shall not exceed 120W.
 +12V₁ & +12V₂ & +12V₃ total output shall not exceed 432W.
 +5Vsb & -12V & +3.3V & +5V & +12V₁ & +12V₂ & +12V₃ Total output power shall not exceed 500W
- (2) Battery Charger Voltage 29.4V, Battery Charger Current < 2.5A,
- (3) Total output power with Battery Charger shall not exceed 550W

3.2 Load Condition

Unit: Amp

LOAD ID	3.3V	5V	12V ₁	12V ₂	12V ₃	N12V	5VSB	CHARGER	load table
FULL1	20	10.8	10	10.0	10	0.5	3	1.9	FULL1
FULL2	6	20	16	9.1	5	0.5	3	1.9	FULL2
FULL3	6	6	16	16.0	4	0.5	3	1.9	FULL3
FULL4	6	6	4	16.0	16	0.5	3	1.9	FULL4
Heavy	12.61	12.61	10.47	10.5	10.47	0.44	2.63	0	Heavy
Middle	6.31	6.31	5.43	5.4	5.43	0.22	1.31	0	Middle
Light	2.52	2.52	2.09	2.1	2.09	0.09	0.53	0	Light
LOAD1	0	0	0	0.0	0	0	0	1.9	LOAD1
LOAD2	0	0	0	0.0	0	0	3	1.9	LOAD2
LOAD3	20	0	0	0.0	0	0	0	0	LOAD3
LOAD4	0	20	0	0.0	0	0	0	0	LOAD4
LOAD5	0	0	16	0.0	0	0	0	0	LOAD5

3.3. OUTPUT TRANSIENT LOAD RESPONSE

The output voltages shall remain within the limits specified in 3.1 output rating table for the step loading and within the limits specified in Table 1 for the capacitive loading. The load transient repetition rate shall be tested between 50Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The step load may occur anywhere within the MIN load to the MAX load shown in Table 1.

Table 1: Transient Load Requirements

Output	Step Load Side	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	0.5A/us	4700uF
+5V	30% of max load	0.5A/us	4700uF
+12V1,+12V2,+12V3	40% of max load	1A/us	2200uF
+5VSB	25% of max load	0.5A/us	100uF

3.3 Battery Charger

3.3.1 Battery Charger ID 1. Seal Lead Acid 24V/2.5Ah (29.2V Charge)

3.3.2 Battery Charge mode

(Fast charge current < 2.5A)

(Floating charge current < 0.2A)

Smart Control 1.Battery ID detect

2. ENABLE charger

4. BATTERY PACK Reach fast charge conduction

4. Fast Charge < 2.5 A

5. Floating Charge Current < 0.2A

3.3.3 Battery max. discharge current is 20A

Power Supply will entry battery mode automatically if AC power line turned off.

4. PROTECTION

4.1 Over Voltage Protection

Output	Protection Point
+3.3V	3.76V ~ 4.3V
+5V	5.74V ~ 7.0V
+12V ₁ ~ +12V ₃	13.4V ~ 15.6V

4.2 Over Current Protection

Output	Protection Point
+3.3V & +5V	32A max.
+12V ₁ ~ +12V ₃	24A max.

4.3 Short Circuit Protection

Load for output short circuit is defined as a load less than 0.1 ohm. The PSU shall shut down & latch off without damage for shorting +3.3V, +5V, +12V, -12V rail to GND or any other rail circuit condition on any output of the power supply will shut down and latch off without damage to the power supply. The power supply shall return to normal operation after the short circuit condition has been removed and power switch has been turned Off and On.

5. POWER SIGNAL

POWER GOOD @115/230V, FULL LOAD	100 – 500 mS
POWER FAIL @115/230V, FULL LOAD	1 mS minimum

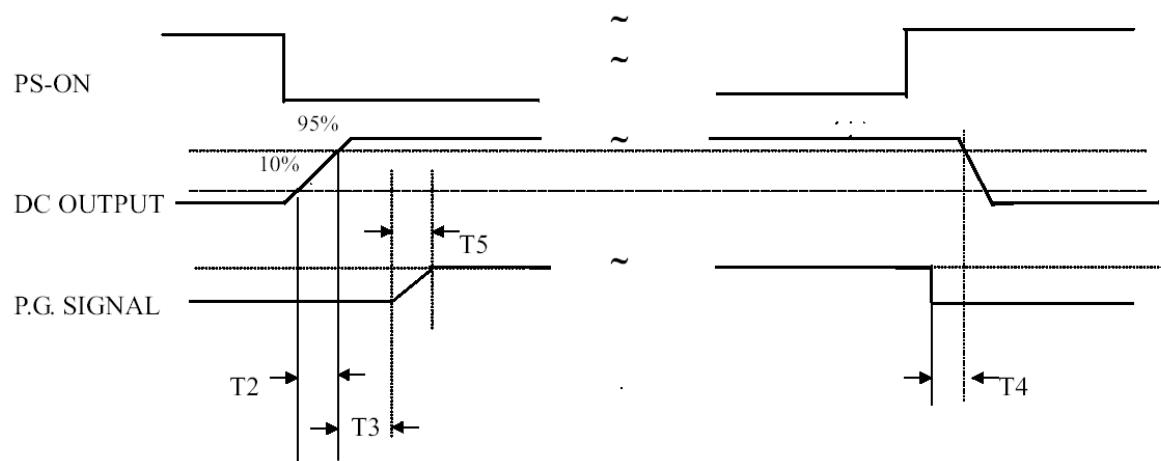


Figure 1

T2 : RISETIME < 20mS

T3 : POWER GOOD DELAY TIME 100mS-500mS

T4 : POWER FAIL DELAY TIME > 1mS

T5 : POWER GOOD RISETIME ≤ 10mS

6. MECHANICAL SPECIFICATIONS

6.1 Dimension 150 x 140 x 86 mm max. (W x L x H)

Please refer to mechanical drawing for the details of form factor, mounting holes location, output wires, connectors & other physical specifications for the subject power supply.

6.2 FAN Speed Control

Power supply is cooling by a self-contained fan. The rotation speed is according to PSU temperature & fan noise is less than 40 dB at 100% load.

7. ENVIRONMENTAL REQUIREMENTS

7.1 Temperature Range

Operating	0 ~ +50 °C
Storage	-20~ +80 °C

7.2 Humidity Range

Operating	5 ~ 95% RH, Non-condensing
Storage	5 ~ 95% RH, Non-condensing

7.3 Vibration

The subject power supply will withstand the following imposed conditions without experiencing non-recoverable failure or deviation from specified output characteristics.

Vibration Operating – Sine wave excited, 0.25 G maximum acceleration, 10 ~ 250 Hz swept at one octave / min. Fifteen minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times large than non-resonant excursions.

Plane of vibration to be along three mutually perpendicular axes.

8. REGULATORY COMPLIANCE

PSU is designed to meet following standard.

8.1 Safety Requirement: IEC 60601-1:2005 (CB Report)
ANSI/AAMI ES60601-1 (UL)
EN60601-1:2006 (TUV) (TBD)

8.2 EMC: IEC 60601-1-2:2007

8.3 Earth Leakage Current: < 300 uA (maximum at 264Vac input).

8.4 Legal Requirements regarding Creepage and Clearance Distances

	Creepage	Clearance
Primary circuits to frame ground	4.00 mm	2.50 mm
Primary circuits to secondary circuits	8.00 mm	5.00 mm

8.5 Dielectric Strength Production Test

Primary to Frame Ground: 2121Vdc for 2 Sec.

Primary to Secondary: 5656Vdc for 2 Sec

8.6 Insulation Resistance Production Test

Primary to Frame Ground: 20M ohms mini.

Primary to Secondary: 20M ohms mini.

9. RELIABILITY

The reliability is calculated by MIL-HDBK-217 latest revision & 100K hrs minimum @ 100% load, 25°C ambient temperature.

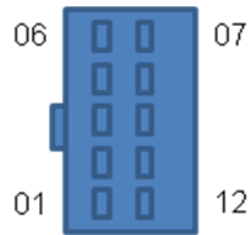
10. LABELLING

Label marking will be permanent, legible and complied with all agency requirements & include following information.

- Model no,
- Serial no.
- Manufacturer information

11. CONTROL PORT

11.1 Pin Definition

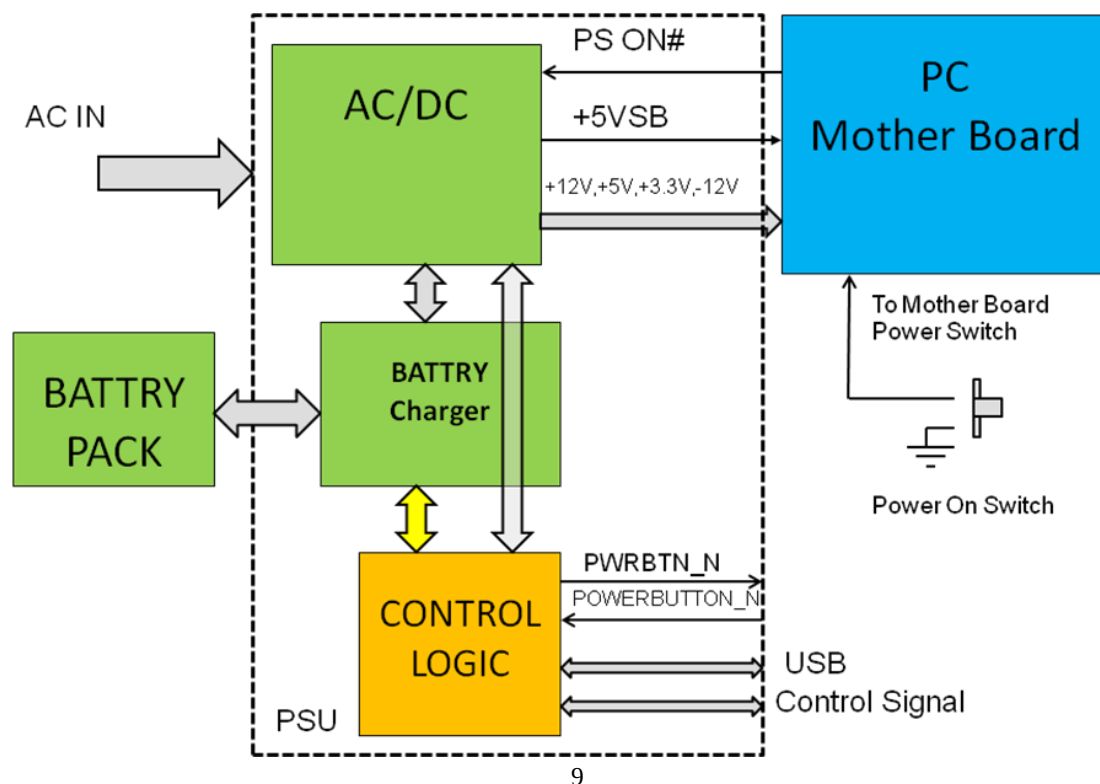


Pin1	AC_FAIL_T	Output
Pin2	SHUTDOWN_T	Output
Pin3	BATTERYLOW_T	Output
Pin4	USB_VCC	Input
Pin5	USBD-	i/o
Pin6	USBD+	i/o
Pin7	USB_GND	GND
Pin8	GND	GND
Pin9	PSON_N	Input
Pin10	POWERBUTTON_N	Input
Pin11	BEEP	Output
Pin12	PWRBTN_N	Output

11.2 Application

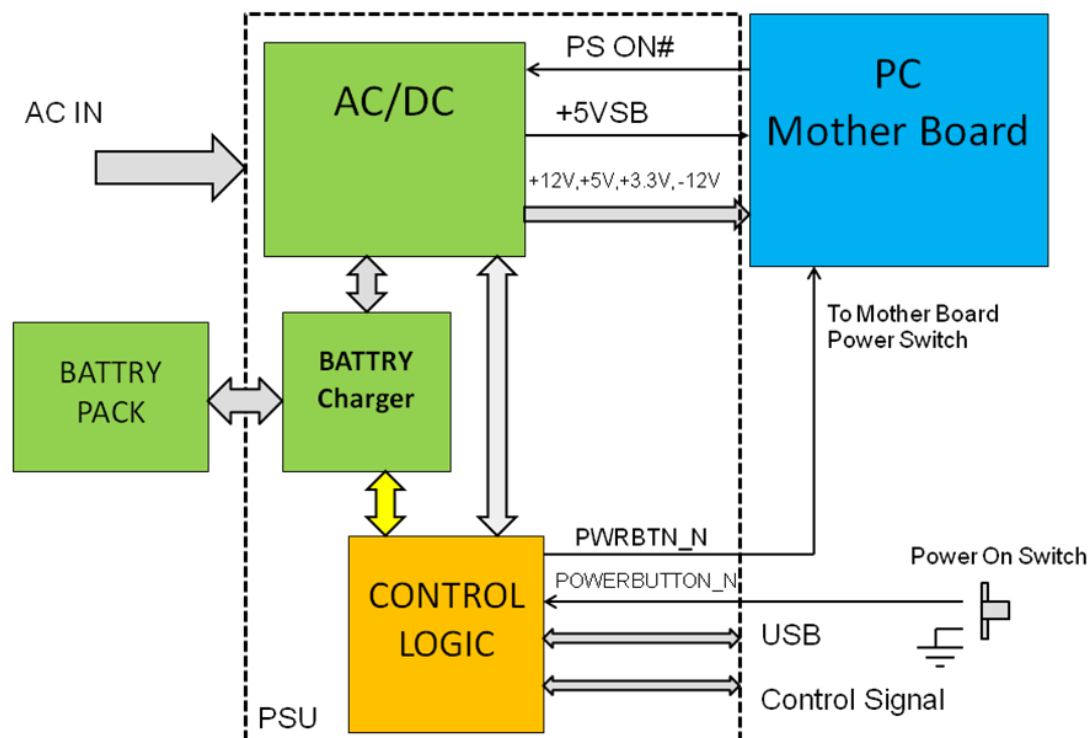
11.2.1 Power On Switch Connection Example1:

Working Mode1: +5VBS No Present After AC No Present, The Power Supply is not power up by battery mode Power when AC is Fail.



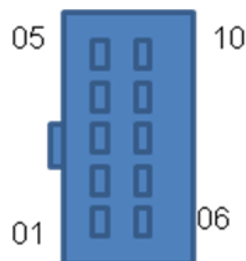
11.2.1 Power On Switch Connection Example2:

Working Mode 2: Support Power on by battery mode Solution when AC is Fail, +5VSB Off After AC No Present



12. BATTERY PORT

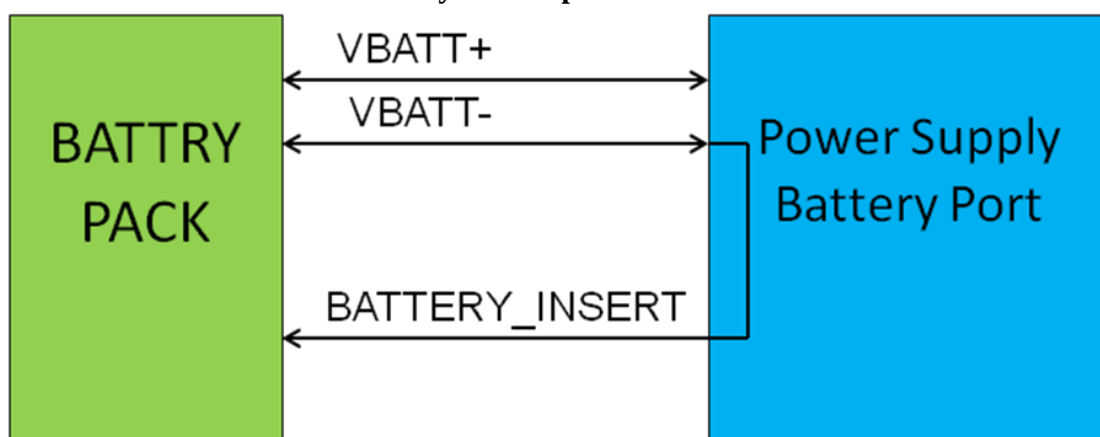
12.1 Pin Definition



Pin1	VBATT+	Power
Pin2	VBATT+	Power
Pin3	VBATT+	Power
Pin4	SMBDAT	I/O
Pin5	SMBCLK	CLK
Pin6	VBATT-	Power
Pin7	VBATT-	Power
Pin8	VBATT-	Power
Pin9	BATTERY_INSERT	Input
Pin10	BI	Out

12.2 Application

12.2.1 Seal Lead Acid 24V Battery Example:



Battery Pack BATTERY		
Battery Voltage	24	V
CELLS Q'ty	NA	cell
Cell Capacity	2.3	Ah
Max. Cell Charge Voltage	NA	V
Battery Pack Voltage	29.4	V
Battery Pack Wattage	59.57	Wh

13. Software for Power Supply Unit

Advanced Energy System (ADES) is an advanced software system for **Power Supply Unit (PSU)**. The following is the application specifications.

- Hardware interface : USB 2.0
- Support OS : Window 7 32-bit / Window 7 64-bit
- Offer **Graphical User Interface (GUI)**
- Offer **application programming interface (API)**

9.1 Definitions and abbreviations

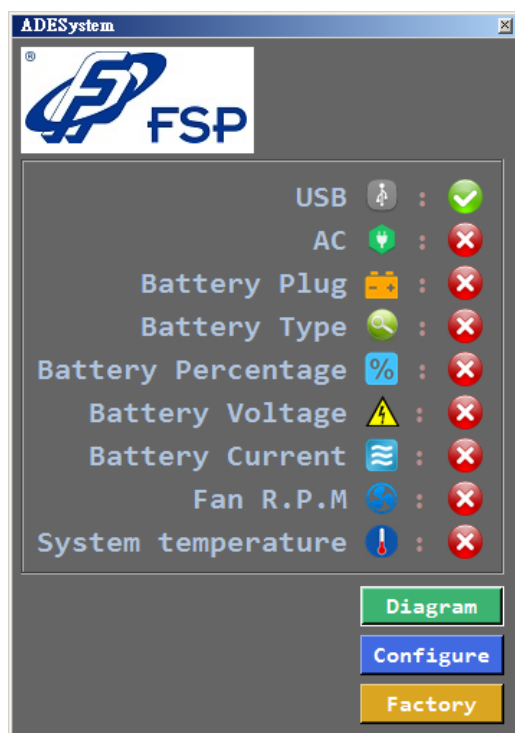
- **ADES** : Advanced Energy System
- **PSU** : Power Supply Unit
- **GUI** : Graphical User Interface
- **API** : Graphical User Interface

9.2 ADES for GUI

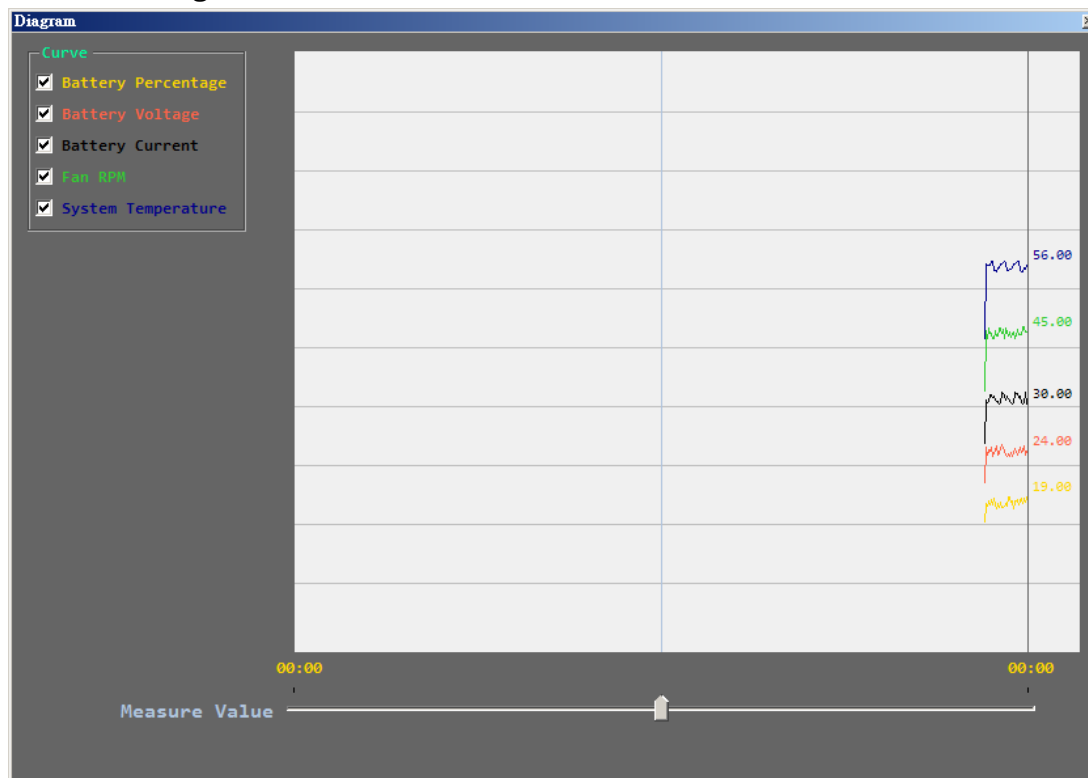
ADESystem is a graphical application of ADES. Users can use ADESystem to monitor, control and manage PSU. ADESystem has a corresponding icon of the PSU state in Windows

Taskbar.

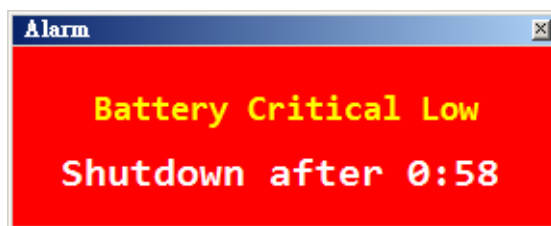
9.2.1 Main screen



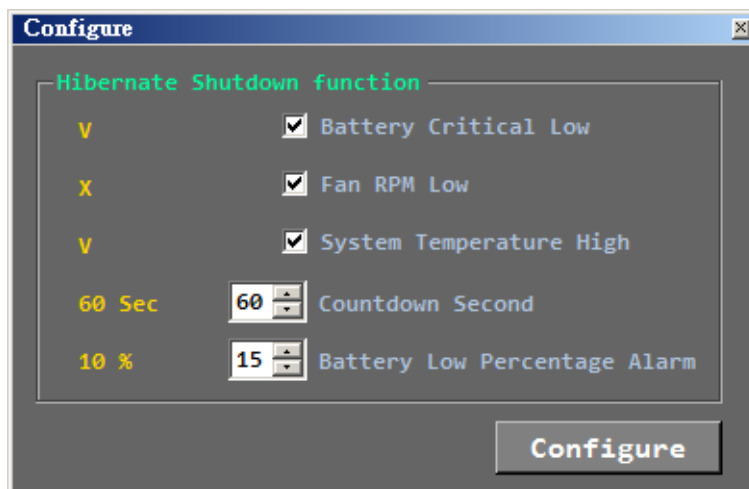
9.2.2 Data diagram screen



9.2.3 Alarm screen



9.2.4 Configure screen



9.2.5 Taskbar icon





9.3 ADES for API

9.3.1 Get battery type

9.3.2 Get battery percentage

9.3.3 Get battery voltage

9.3.4 Get battery current

9.3.5 Get fan R.P.M

9.3.6 Get system temperature

9.3.7 Get firmware version

9.3.8 Get product serial number