



深圳欧陆通电子股份有限公司

深圳欧陆通电子股份有限公司
SHENZHEN HONOR ELECTRONIC CO., LTD

ASPOWER

Electrical Specification

| | |
|--------------|------------------|
| Model Name | U1A-D10550-DRB-E |
| Version | S1 |
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Electrical Specification

(With +12V&+12VSB output for Optimized (SGCC))

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1.0 SCOPE

This specification defines the key characteristics for the 550W power supply, which is intended for worldwide use in IT equipment such as server application. This unit contains +12V and +12Vsb output ports. All the specifications are applicable under all operating conditions when installed in the end used system unless other noted.

2.0 INPUT PARAMETER

2.1 Input Voltage/Input Current/Frequency

The power supply shall operate within input limited voltage range as defined as Table 1, which includes the limited value of input current, input voltage, working frequency. The power supply shall be capable of start up from min load to max load at line input as low as 90VAC.

Table1.

| | Min | Rated | Max | Units |
|------------------|-----|--|-----|-------|
| AC input voltage | 90 | 100~240 | 264 | VAC |
| Frequency | 47 | 50-60 | 63 | Hz |
| DC input voltage | | 145~350 | | VDC |
| Input current | | <8A@100-240VAC @full load <8A@145-350VDC @full load | | |

2.2 Inrush Current

Cold start at normal input voltage at 25°C, when input power is applied to the power supply and any initial inrush current surge or spike longer than 1ms shall not exceed 40A peak @230Vac/330Vdc. Inrush current difference between line and neutral is under 0.1A per half cycle of input current and/or the phase difference between line and neutral is less than +/-20 degrees during each AC input voltage half-cycle.

The inrush shall be less than the ratings of the critical components. Any inrush current of the AC line shall not cause damage to the power supply. Surge current does not contain the current spike due to X-Cap and Y-Cap, but the peak current de-rating time should < 0.2ms.

2.3 Efficiency

The power supply achieves the 80 plus level by testing at the 230Vac/50Hz, 18degC-27degC ambient temperature and the loading condition show in Table 2. The efficiency testing delay time



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should be 30min after running the PSU, and so that the PSU is under steady state. Fan power loss must be ignored.

Table2.

| Load | +12V | +12Vsb | EFF |
|------|-------|--------|------|
| 20% | 9.0A | 0.16A | >88% |
| 50% | 22.5A | 0.4A | >92% |
| 100% | 45.0A | 0.8A | >89% |

Note:

1. Add external +12Vcc for fan and the fan power is not included in efficiency calculation.

2.4 Hold up Time

Hold up time is defined length of time from AC input drops to 0V to +12V dropping out of voltage regulation range at any phase of the AC input, the power supply should meet dynamic voltage range.

1. Hold up time $+12V_{out} \geq 12ms @ 100\% \text{ load}$ (115~230VAC).

2.5 AC Line Dropout

AC line dropout is the condition when AC input voltage drops to 0V at any phase of the AC line for any length of time. An AC line dropout of 10ms or less at 80% load shall not cause malfunction of control signals or protection circuit trip. If the AC dropout lasts longer than 16ms the power supply shall recover and meet all turn on requirements.

Any dropout of the AC line shall not cause damage to the power supply.

2.6 Power Factor

The power supply must meet the power factor requirements stated in the Energy Star Program Requirement for Computer Servers V2.0. The power factor shall meet the requirement as below table at 230Vac/50Hz and 115Vac/60Hz input voltage condition.

Table3.

| Load | 20% Load | 50% Load | 100% Load |
|------|----------|----------|-----------|
| PF | >0.75 | >0.9 | > 0.95 |



2.7 Surge and Sag

The dynamic conditions of mains input are defined as sag and surge. Sag is mains drop to below normal voltage, surge refers to the input voltage rises above the normal range, the PSU should meet sag and surge requirement.

Table4. AC Line Sag Transient Performance

| Duration | Sag | Input Voltage | Frequency | Performance Criteria |
|---------------|------|---------------|-----------|---|
| =1/2 AC cycle | 95% | 100~240VAC | 50/60Hz | No loss of function or performance |
| >1.0 AC cycle | >30% | 100~240VAC | 50/60Hz | Loss of function acceptable, power supply can turn on automatically |

Table5. AC Line Surge Transient Performance

| Duration | Surge | Input Voltage | Frequency | Performance Criteria |
|-------------------|-------|---------------|-----------|------------------------------------|
| Continuous | 10% | 100~240VAC | 50/60Hz | No loss of function or performance |
| 0 to 1/2 AC cycle | 30% | 100~240VAC | 50/60Hz | No loss of function or performance |

3.0 OUTPUT PARAMETER

3.1 Output Current

The following table defines the output current ratings. The combined output power of all outputs shall not exceed the rated output power (550W). The power supply shall meet both static, dynamic voltage regulation and timing requirements for all loading conditions defined in specification.

Table6.

| Output Voltage | Min Current | Max current |
|----------------|-------------|-------------|
| +12V | 0 A | 45A |
| +12Vsb | 0A | 2.1A |



Note:

1. The continuous total output power is 550W max for 90~264Vac input.

3.2 Voltage Regulation

The power supply output voltages must stay within the following voltage limits shown in below table when operating at steady state, dynamic loading conditions. All outputs are measured with reference to the return remote sense (ReturnS) signal.

Table7.

| Output Voltage | Min | Rated | Max | Tolerance |
|----------------|-------|-------|-------|-----------|
| +12V | 11.4V | 12.0V | 12.6V | +/-5% |
| +12Vsb | 11.4V | 12.0V | 12.6V | +/-5% |

3.3 Ripple & Noise

Table8.

| Output voltage | Ripple & noise |
|----------------|----------------|
| +12V | <120mV |
| +12Vsb | <120mV |

Note:

1. The ripple & noise is measured over a bandwidth of 20MHz at the power supply output connectors. A 10μF Electrolytic capacitor in parallel with a 0.1μF ceramic capacitor is placed at the point of measurement.

3.4 Timing

These timing requirements for power supply operation include alone module's output and multi modules' outputs. All outputs shall rise and fall monotonically. In additional, PSU timing must meet the requirement of mother board. The timing characteristics must be evaluated and verified when in design stage and system test stage.

Table9. Turn On/Off Timing

| Item | Description | Min | Max | Units |
|-------------|--|-----|-----|-------|
| Tvout_rise | Output voltage rise from 10% to 90% time for +12V. | 5 | 70 | ms |
| T12Vsb_rise | Output voltage rise from 10% to 90% time for +12Vsb. | 1 | 25 | ms |

**Table10. Turn On/Off Timing**

| Item | Description | Min | Max | Units |
|----------------|---|-----|------|-------|
| Tsb_on_delay | Delay from AC being applied to +12Vsb being within regulation. | | 1500 | ms |
| Tac_on_delay | Delay from AC being applied to +12V being within regulation. | | 2500 | ms |
| Tsb_vout | Delay from +12Vsb being in regulation to +12V being in regulation at AC turn on. | 50 | 1000 | ms |
| Tpson_on_delay | Delay from PSON active to output voltages being within regulation limits. | 5 | 400 | ms |
| Tpwok_on | Delay from output voltages within regulation limits to PWOK asserted at turn on. | 100 | 500 | ms |
| Tvout_holdup | Time 12V output voltage dropping to 11.4V after loss of AC. | 12 | | ms |
| Tpwok_holdup | Delay from loss of AC to de-assertion of PWOK. | 11 | | ms |
| T12Vsb_hold up | Time the +12Vsb output voltage stays within regulation after loss of AC. | 70 | | ms |
| Tpwok_off | Delay from PWOK de-asserted to output voltages dropping out of regulation limits. | 1 | | ms |
| Tpwok_low | Duration of PWOK being in the de-asserted state during an OFF/ON cycle using AC or the PSON signal. | 100 | | ms |
| Tpson_pwok | PWOK being de-asserted delay from PSON deactivate. | | 5 | ms |

Note:

1. Rise Time (Tvout_rise): The 12V must rise from 10% to 90% within regulation limits within 5 to 70ms.

For 12Vsb, it is allowed to rise up within 1.0 to 25ms. All outputs must rise monotonically.

2. Tvout_on & Tvout_off: The 12V must be within regulation of each other within 50ms.

The 12V must leave regulation within 400ms.

3. Tsb-on & Tac-on Delay Time: The Tsb-on delay time for 12Vsb should be $\leq 1.5s$ at 115Vac/230Vac when full load.

The Tac-on delay time for 12V should be $\leq 2.5s$ at 115Vac/230Vac when full load.



4. Main Output Delay Time (T_{sb_vout}): The 12V main output being in regulation delay from 12Vs_b being in regulation should be 50 to 1000ms when at AC turn on.

5. $T_{pson_on_delay}$: The 12V output must be within regulation after PSON active for 5 to 400ms.

6. Power Work OK Delay (T_{pwok_on}): PWOK should delay from 12V output within regulation for 100 to 500ms.

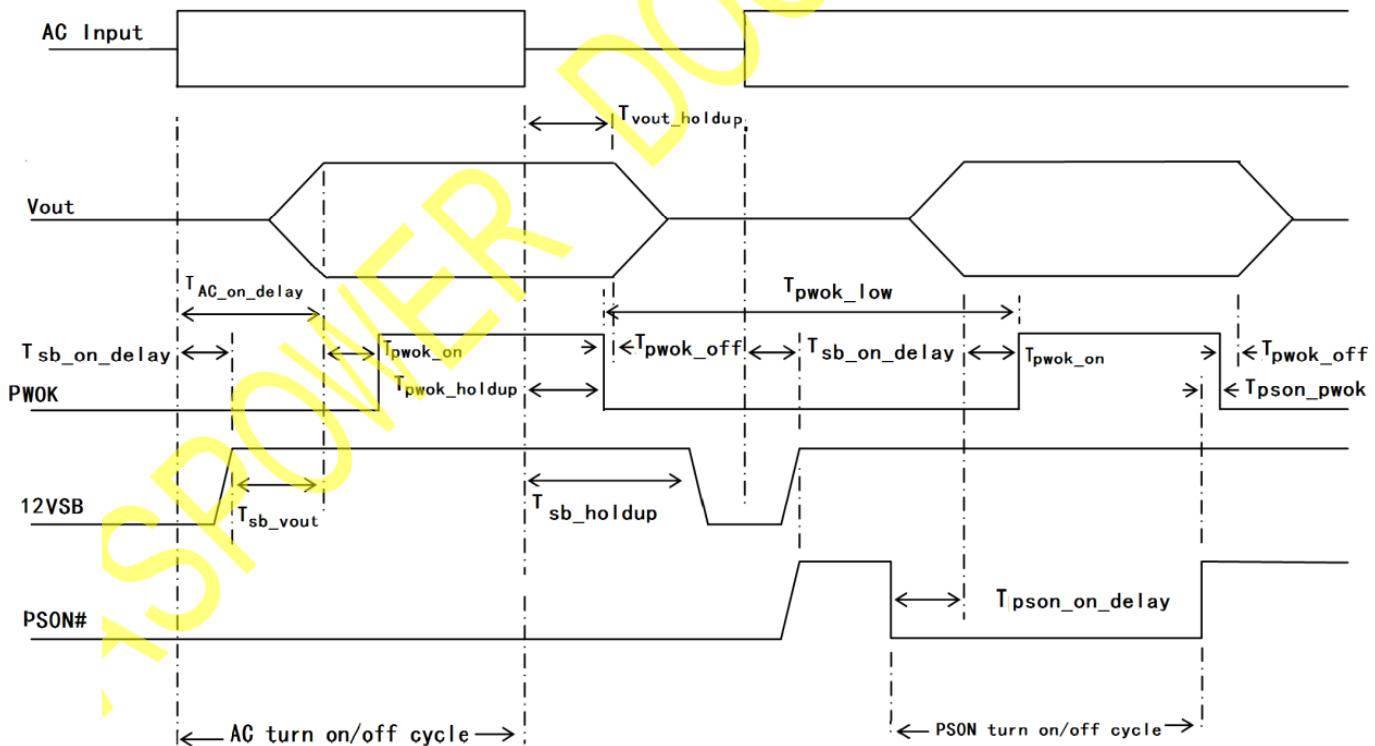
7. Hold up Time(T_{vout_holdup}): The hold up time for 12V should \geq 12ms at 115Vac/230Vac input when 100% full load.

The hold up time for 12Vs_b should \geq 70ms at 115Vac/230Vac input and full load.

8. Power Fail Delay Time (T_{pwok_off}): 12V dropping out of regulation delay from PWOK should \geq 1ms when power off at full load.

9. Duration Time for PWOK (T_{pwok_low}): During time of PWOK when OFF/ON cycle using AC or the PSON signal should \geq 100ms.

10. PWOK Delay PSON Deactivate (T_{pson_pwok}): PWOK being de-asserted should delay from PSON deactivate \leq 5ms.





3.5 Overshoot

Output voltage overshoot is less than 10% with 30% load step and any input voltage, the output rising up waveform should be kept flat and smoothly.

Table11.

| Output Voltage | Overshoot (Max) |
|----------------|-----------------|
| +12V | 12.6V |

3.6 Dynamic

The output voltage shall remain within limits specified for the step loading, slew rate, and capacitive loading in below table.

The load transient repetition rate shall be tested between 50Hz to 5KHz at 50% duty cycles. The test shall be at least in 50 Hz/1KHz/5KHz condition. The output current transient repetition rate is only a test specification.

Table12.

| Output Voltage | Transient Step (A) Percent of Rated Current | Slew rate (A/us) | Frequency (Hz) | Cap (uF) |
|----------------|--|------------------|----------------|----------|
| +12V | 60% of max load | 0.5 | 50-5K | 2800 |
| +12Vsb | 1.0 | 0.25 | 50-5K | 470 |

3.7 Capacitive Loading

The power supply shall be stable and meet all requirements with the following capacitive loading range. The PSU is not damaged include normal turn on timing, running under all load conditions.

Table13.

| Output Voltage | +12V | +12Vsb |
|-------------------------|-----------|---------|
| Capacitive loading (uF) | 500~20000 | 20~2200 |

3.8 Current Sharing

All outputs shall be capable of operating in a redundant current share mode. A maximum (four) of power supplies may be operated in parallel. All outputs shall incorporate an isolation diode for fault isolation. The +12Vsb current sharing shall be a droop type. The +12V current sharing shall be a single wire type. Connecting the load share bus pins of each power supply together shall enable the current share feature. With the current share pins tied together, the +12V output load current shall be balanced to within 20% when output at 10~20% full load and within 10% when output at $\geq 25\%$ full load. For



example 1+1 redundant mode the current sharing precision calculating formula is $| I_{out1}-I_{spec} | /I_{spec}$. Shorting or opening of a current share pin shall not cause the output voltage to go out of steady state regulation. From 50% to 100% full load the LS voltage must be linear change and at 100% full load the LS voltage shall be $8 \pm 0.6V$ for one single power supply.

Table14.

| Total Load | I-share Voltage | Tolerance | Number of Power Supply |
|------------|-----------------|-----------|------------------------|
| 10% | 0.8 | 20% | 1 |
| 15% | 1.2 | 20% | 1 |
| 20% | 1.6 | 20% | 1 |
| 25% | 2.0 | 10% | 1 |
| 30% | 2.4 | 10% | 1 |
| 35% | 2.8 | 10% | 1 |
| 40% | 3.2 | 10% | 1 |
| 45% | 3.6 | 10% | 1 |
| 50% | 4.0 | 10% | 1 |
| 55% | 4.4 | 10% | 1 |
| 60% | 4.8 | 10% | 1 |
| 65% | 5.2 | 10% | 1 |
| 70% | 5.6 | 10% | 1 |
| 75% | 6.0 | 10% | 1 |
| 80% | 6.4 | 10% | 1 |
| 85% | 6.8 | 10% | 1 |
| 90% | 7.2 | 10% | 1 |
| 95% | 7.6 | 10% | 1 |
| 100% | 8.0 | 10% | 1 |

3.9 Hot Swap Requirement

Hot swapping is the process of inserting and extracting a power supply from an operating power system. During this process the output voltage shall remain within the limits. The hot swap test must be conducted when the system is operating under static, dynamic and no loading conditions. The power supply shall use a latching mechanism to prevent insertion and extraction of the power supply when the



AC power cord is inserted into the power supply. The power supplies must be able to operate in a hot-swap/redundant configuration.

3.10 Control Signal

3.10.1 Control and Status Signals

All control signals shall be TTL compatible with respect to the output return and shall be isolated from the primary circuit and be SELV (safety extra-low voltage circuit) rated.

3.10.2 Input OK Signal

Input OK signal is an input voltage OK signal and will be asserted low when the power supply to indicate that the input voltage are within range. When input voltage is out of range, the input OK signal will be pulled to a high state. This signal is an output signal pulled up to +3.3Vs with a 10Kohm current limit resistor in module.

Table15. DC Fail Signal Characteristic

| Signal Type | Power State | Logic Level (Min) | Logic Level (Max) |
|----------------------|---------------------|-------------------|-------------------|
| Input OK Signal=Low | Input OK | 0V | 0.4V |
| Input OK Signal=High | Input Fail of Range | 2.4V | 3.46V |

3.10.3 PSON Input Signal

The PSON signal is required to remotely turn on/off the power supply. PSON is an active low signal that turn on the +12V power rail. When this signal is not pulled low by the system, or left open, the outputs turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply. Refer to section2.2 for the timing diagram. This signal accepts an open collector/drain input from the system and a 5.1K resistor pull-up to +3.3Vs located in module.

Table16. PSON Signal Characteristic

| Signal Type | Power State | Logic Level (Min) | Logic Level (Max) |
|----------------------|-------------|-------------------|-------------------|
| PSON=Low | ON | 0V | 0.5V |
| PSON=High or Open | OFF | 2.0V | 3.46V |
| Source Current (Low) | ON | | 4mA |



3.10.4 PWOK (Power OK) Output Signal

PWOK is a power OK signal and will be pulled high when the power supply to indicate that all the outputs are within the regulation limits of the power supply. When any output voltage falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PWOK will be de-asserted to a low state. The start of the PWOK delay time shall inhibited as long as any power supply output is in current limit. This signal is open collector/drain output and a 5.1K resistor pull-up to +3.3Vs located in module.

Table17. PWOK Signal Characteristic

| Signal Type | Power State | Logic Level (Min) | Logic Level (Max) |
|-------------------------|--------------|-------------------|-------------------|
| PWOK=Low | Power Not OK | 0V | 0.4V |
| PWOK=High | Power OK | 2.4V | 3.46V |
| Sink Current (Low) | | | 0.4mA |
| Source Current (High) | | | 2mA |
| PWOK Rise and Fail Time | | | 0.1ms |

3.10.5 SMBAlert Signal

This is low active, sideband and open collector signal indicates that the power supply is experiencing a problem, warning or fault that the user should investigate. The signal shall activate in the case of critical component temperature reached a warning threshold, general failure, over current, over voltage, under voltage, failed fan. It's also to be asserted in parallel with LED turning solid Amber or blink Amber. This signal is open collector/drain output and a 5.1K resistor pull-up to +3.3Vs located in module.

Table18. SMBAlert Signal Characteristic

| Signal Type | Power State | Logic Level (Min) | Logic Level (Max) |
|-----------------------------|-----------------|-------------------|-------------------|
| SMBAlert=Low | Alert to system | 0V | 0.4V |
| SMBAlert=High | Power OK | 2.4V | 3.46V |
| Sink Current, SMBAlert=Low | | | 4mA |
| SMBAlert Rise and Fail Time | | | 0.1ms |



3.10.6 SDA and SCL Signal

SDA and SCL pins (for I2C bus) is designed to operate at +3.3Vs volts. The main pull-up resistors are provided by the system and may be connected to +3.3Vs only.

3.10.7 A0, A1 Signal

PSU module address line 0 and line 1. This signal line is provided for determining the address for the specific PSU FRU and SMBus address. Two 10Kohm pull-up resistors should be located in the PSU and the pull-up voltage should be limited to +3.3Vs. The address line should be either float or pull low with equal to or less than 100ohm in the motherboard design.

3.10.8 SM_Bus Signal

Power supplies that support cold redundancy can be enabled to go into a low power state (that is cold redundant / standby redundant mode state) in order to provide increased power usage efficiency when system loads are such that both power supplies are not needed. When the power subsystem is in cold redundant mode, only the needed power supply to support the best power delivery efficiency is ON. Any additional power supplies; including the redundant power supply, is in cold standby state.

Each power supply has an additional signal (SM_Bus—Standby Mode Bus) that is dedicated to supporting cold redundancy. This signal is a common bus between all power supplies in the system. SM_BUS is asserted when there is a fault in any power supply or the power supplies output voltage falls below the Vfault threshold or the system's load >84% etc. Asserting the SM_Bus signal causes all power supplies in cold standby state to power ON. Enabling power supplies to maintain best efficiency is achieved by looking at the load share bus voltage and comparing it to a programmed voltage level through a PMBus command. Whenever there is no active power supply on the cold redundancy bus driving a high level on the bus all power supplies are ON no matter their defined cold redundant role (active or cold standby). This guarantees that incorrect programming of the cold redundancy states of the power supply will never cause the power subsystem to shut down or become over loaded. The default state of the power subsystem is all power supplies ON. There needs to be at least one power supply in cold redundant active state or standard redundant state to allow the cold standby state power supplies to be cold standby state.

**Table19. SM_Bus Signal Characteristic**

| Signal Type | Power State | Logic Level (Min) | Logic Level (Max) |
|-------------|------------------------|-------------------|-------------------|
| SM_Bus=Low | Active Redundant Mode | 0V | 0.4V |
| SM_Bus=High | Standby Redundant Mode | 2.4V | 3.46V |

3.10.9 EEPROM

The power supply shall have a Microchip 24LC02 256 bytes serial EEPROM, which contains power supply specific information, this device will be programmed by the unit vendor with detailed information on the unit. This device shall have its highest order address bit (A2 internally wired to ground). The A0 & A1 address bit are wired to the output connector.

Table20. Address Signals

| A1 | A0 | EEPROM Address | MCU Address | PSU |
|----|----|----------------|-------------|-----|
| 0 | 0 | A0 | B0 | 1 |
| 0 | 1 | A2 | B2 | 2 |
| 1 | 0 | A4 | B4 | 3 |
| 1 | 1 | A6 | B6 | 4 |

4.0 PROTECTION

When the main12Voutput OVP is triggered, the power supply will shut down and latched off. The latch can be cleared by toggling the PSON signal or by an AC power interruption. When the input UVP/OVP, +12Voutput's UVP /OCP, +12Vsb output's UVP/OVP/OCP, OTP or high ambient temperature protection is triggered, the power supply will shut down and self-recovery when the fault condition removed.

4.1 Input Under and Over Voltage Protection (Input UVP/OVP)

The input UVP should be $74V \pm 5V_{ac}$ or $130V \pm 4V_{dc}$ and recover point should be $84V \pm 5V_{ac}$ or $134V \pm 5V_{dc}$.

The input OVP should be $305V_{ac} \pm 10V_{ac}$ or $415V_{dc} \pm 10V_{dc}$ and recover point should be $285V_{ac} \pm 10V_{ac}$ or $400V_{dc} \pm 10V_{dc}$.

4.2 Over Voltage Protection (OVP)

The power supply should have over voltage protection to prevent the outputs from exceeding limits, If the +12V OVP occurred, the power supply should shut down and latch-off, The latch will



be cleared by toggling the PSON signal or an AC on/off cycle operation, +12Vsb will be auto recovery after removing OVP limit.

The OVP range is shown in below table.

Table21.

| Voltage | Min(V) | Max(V) |
|---------|--------|--------|
| +12V | 13.3 | 15.6 |
| +12Vsb | 13.3 | 15.6 |

4.3 Over Temperature Protection (OTP)

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In over temperature protection (OTP) condition the PSU will shut down. When the power supply temperature drops to within specified limits, the power supply shall restore power automatically, while the +12Vsb remains always on.

The first temp sensors is on the transformer PCB board to sense the synchronous MOSFET copper temperature, The second sense resistor on the control board and located at the air intake to sense the ambient temperature.

Table22.

| The temp sensors | Over temperature warning | Over temperature protection | Self-recovery temperature |
|------------------|--------------------------|-----------------------------|---------------------------|
| First components | 80±10°C | 95±10°C | 50±10°C |
| Second ambient | 50±5°C | 55±5°C | 45±5°C |

4.4 Short Circuit Protection (SCP)

The power supply shall be protected from damage due to faults between output (+12V or +12Vsb) and GND. Short circuit of the power supply outputs shall not result in fire hazard, shock hazard, or damage to the power supply. Components shall not be damaged during the short circuit conditions. If the +12V shorted to GND, the power supply will shut down and self-recovery after the short circuit condition removed. All outputs shut down upon a short circuit of the +12Vsb and when the short is removed, the power supply shall self-recovery.



4.5 Over Current Protection (OCP)

The power supply should have over current protection to prevent the outputs from exceeding limits, if the +12V OCP occurred, the power supply should shut down and later 5 seconds will be auto recovery. If the +12Vsb OCP occurred, the power supply should shut down and will be auto recovery after removing OCP limit.

Table23. OCP Limited Table

| Item | Min | Max |
|-----------------|-----|-----|
| +12Vsb OCP | 4A | 6A |
| +12V OC Warning | 47A | 52A |
| +12V OCP | 52A | 62A |

4.6 Output LED Description

There will be a dual color LED lamp on the case's front panel; the color is green and orange to indicate the power supply status. There will be a (slow) blinking green to indicate that AC is applied to the PSU and the standby voltage is available. It shall go steady to indicate that all the power outputs are available. This same LED will (slowly) blink or be solid ON orange to indicate that the power supply has failed or reached a warning status and therefore a replacement of the unit is/maybe necessary. The LED operation is defined as below table. The LED shall be visible on the power supply's exterior face. The LED locations shall meet ESD requirements. The LED shall be securely mounted in such a way that incidental pressure on the LED will not cause it to become displaced.

Table24. LED Requirement

| Power Supply Status | LED Status |
|--|------------------|
| Output ON and OK. | Green |
| No AC power to all power supplies. | OFF |
| AC present/Only 12Vsb on (PS off). | 1Hz Blink Green |
| AC cord unplugged or DC power lost; with a second power supply in parallel still with AC input power. | Orange |
| Power supply warning events where the power supply continues to operate: high temperature, Over current. | 1Hz Blink Orange |
| Power supply critical event causing a shutdown: | Orange |



| | |
|---|---|
| UVP, OVP, OCP, OTP ,Fan Fail. | |
| When the power in cold redundant state. | 0.33Hz Blink Green 1s off and 2s Green |

5.0 OPERATE ENVIRONMENT

5.1 Operate Temperature

Operate temperature: 0°C to +50°C

5.2 Storage Temperature

Storage temperature: -40°C to +70°C.

5.3 Operate Humidity

Operate Humidity (non-condensing): 10% to 90%.

5.4 Storage Humidity

Storage Humidity (non-condensing): 5% to 95%.

5.5 Operate Altitude

Operate Altitude: 0 to 5000m.

5.6 Storage Altitude

Storage Altitude: 0 to 10000m.

6.0 SAFETY

6.1 Hi-pot

Primary to secondary, Hi-pot Withstand voltage: 10mA max 3000Vac, 50/60Hz or 5mA max 4242Vdc for 60 seconds when PCBA;

Primary to Earth, Hi-pot Withstand voltage: 10mA max 1500Vac, 50/60Hz or 5mA max 2121Vdc for 60 seconds.

6.2 Grounding Impedance Test

Grounding impedance test using grounding current 32A for 60S and the impedance is less than 100mohm.



6.3 Leakage Current

In order to ensure that the leakage current of the power supply case not cause leakage damage to the human body, after inserting the AC power, the leakage current of the power supply should meet the requirements of safety. Under 264Vac/60Hz conditions to be less than 1.75mA test with customer system.

6.4 Smokeless

Parts failure in the power supply shall not have smoke and flame. And it is necessary to put a fuse in the front of DC-DC conversion circuit or equivalent circuit to prevent smoke and diffusion. Parts failure will trigger the fuse open. All power components are not limited in safety components, but it should be required to verify in the smoke-less testing.

6.5 Warning

1. The PSU must have insulation protection.
2. To avoid electric shock and injury, the PSU must not be energized before finishing installation.
3. This PSU only allows professional maintenance.

6.6 Insulation Resistance

Primary to Secondary: 500Vdc for 60S, the insulation resistance shall not be less than 10Mohm.



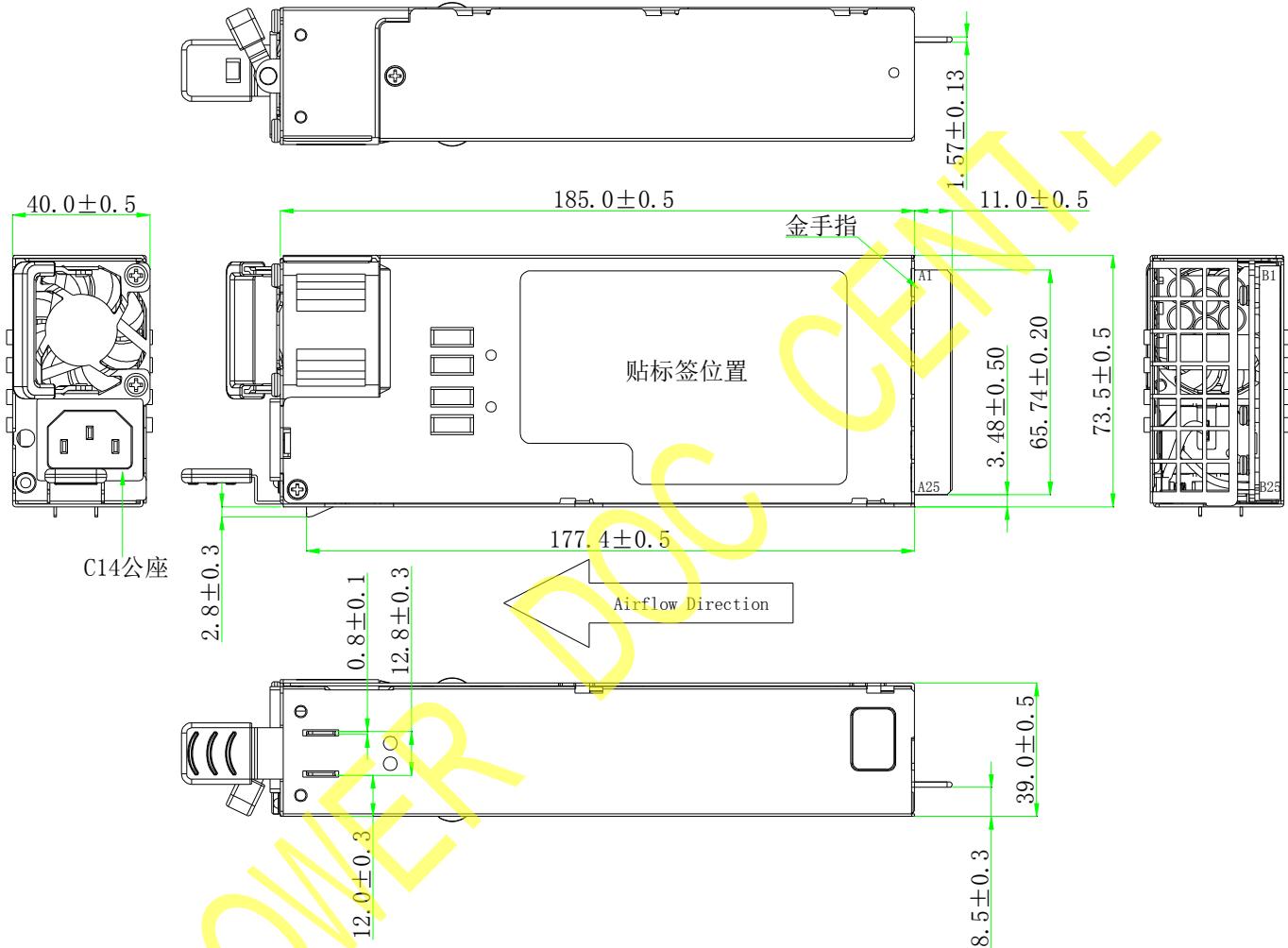
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7.0 OUTLINE STRUCTURE

7.1 Outline Dimension

Outline dimension: 185mm (L)*73.5mm (W)* 39mm (T)



7.3 Output Connector



| Pin | Name | Pin | Name |
|-----|------------|-----|----------|
| A1 | GND | B1 | GND |
| A2 | GND | B2 | GND |
| A3 | GND | B3 | GND |
| A4 | GND | B4 | GND |
| A5 | GND | B5 | GND |
| A6 | GND | B6 | GND |
| A7 | GND | B7 | GND |
| A8 | GND | B8 | GND |
| A9 | GND | B9 | GND |
| A10 | +12V | B10 | +12V |
| A11 | +12V | B11 | +12V |
| A12 | +12V | B12 | +12V |
| A13 | +12V | B13 | +12V |
| A14 | +12V | B14 | +12V |
| A15 | +12V | B15 | +12V |
| A16 | +12V | B16 | +12V |
| A17 | +12V | B17 | +12V |
| A18 | +12V | B18 | +12V |
| A19 | SDA | B19 | A0 |
| A20 | SCL | B20 | A1 |
| A21 | PSON | B21 | +12V SB |
| A22 | Alert | B22 | SM-Bus |
| A23 | GND Sense | B23 | +12Vbus |
| A24 | +12V Sense | B24 | Present |
| A25 | PWOK | B25 | Input OK |

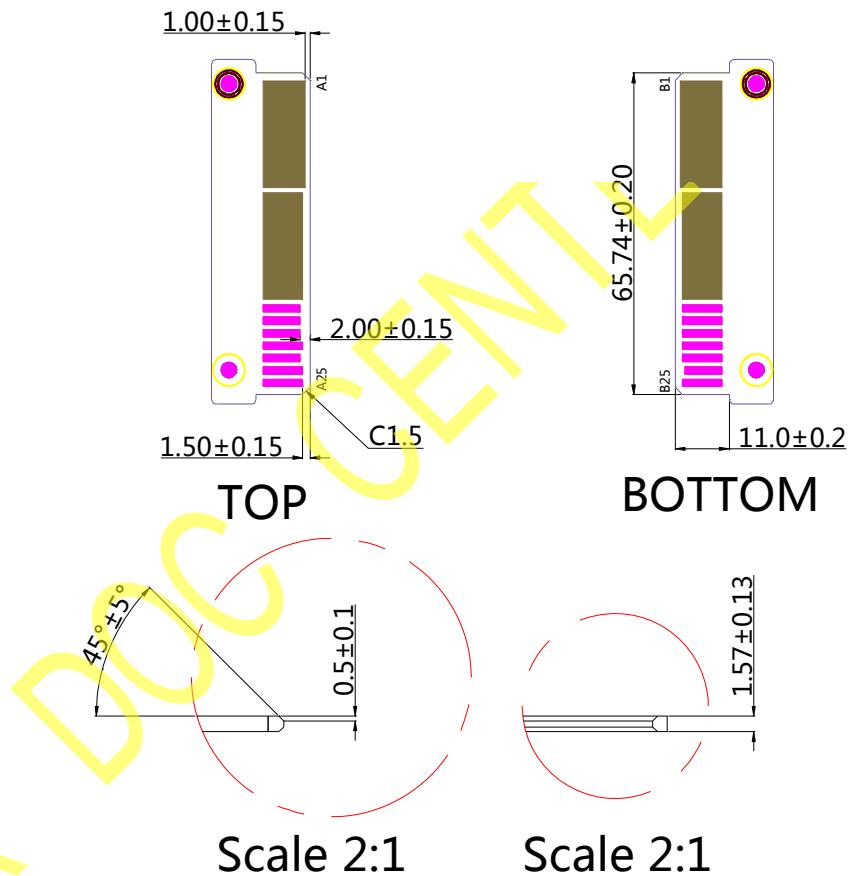


Table25. Output Terminals

| Signal | Description |
|-------------------|---|
| GND | Outputs return and it's also connected with the case. |
| +12V | The main output voltage. |
| PMBus*SDA | I2C Data bus. |
| PMBus*SCL | I2C Clock bus, 100kHz max. |
| A0(SMBus*address) | Address set Pin. |
| A1(SMBus*address) | Address set Pin. |
| PSON | Remote ON/OFF control signal: When the PSON signal is low, the power supply will turn on the +12V main output, and turn off when it's high. |
| +12Vsb | The auxiliary output voltage. |



| | |
|------------|--|
| Alert | Power supply warning signal: When this pin get low signal will notice system the power supply has some fault occurred. |
| SM-Bus | Power supply cold redundancy control signal. |
| GND Sense | +12V output GND return sense for feedback. |
| +12V Sense | +12V output voltage sense for feedback. |
| LS | +12V output load sharing bus. |
| PWOK | Power supply work OK signal. |
| Input OK | The Input voltage is ok signal. |

8.0 ROHS

Power supply must meet be Rohs6 compliant including the component, PCB, soldering material, case, wire, and so on.

9.0 EMI AND EMS REQUIREMENT

警告

此为 A 级产品，在生活环境，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对干扰采取切实可行的措施。

Table26. EMI (Electromagnetic Interference) Requirements Table

| Item | Description and Requirement | Criterion | Notes |
|----------------------------------|-----------------------------|--------------|-----------------|
| Radiated Emissions | Frequency: 30MHz~1GHz | EN 55032 | 230V/50Hz input |
| | Class A with 3dB Margin | FCC Part 15 | 120V/60Hz input |
| Conducted Emissions (Voltage) | Frequency: 150KHz~30MHz | EN 55032 | 230V/50Hz input |
| | Class A with 3dB Margin | FCC Part 15 | 120V/60Hz input |
| Harmonic | EN 61000-3-2 Class A | EN 61000-3-2 | 230V/50Hz input |

**Table27. EMS (Electromagnetic Susceptibility) Requirements Table**

| Item | Description and Requirement | Level | Criterion |
|---------------------------------------|---|-------------|--|
| Surge | Different Mode: ±1KV Common Mode: ±2KV | B | EN61000-4-5 EN 55035 GR-1089-CORE |
| Electrical Fast Transient Group (EFT) | ±1KV | B | EN61000-4-4 EN 55035 YD/T 1082 |
| Electrical Static Discharge (ESD) | Touch: ±6KV Air: ±8KV | B | EN61000-4-2 EN 55035 |
| Radiated Susceptibility (RS) | 80MHz~2.7GHz 3V/m 80% AM | A | EN 61000-4-3 EN 55035 |
| Conducted Susceptibility (CS) | 150KHz~80MHz 3V 80% AM | A | EN 61000-4-6 EN 55035 |
| Voltage Dips and Interruptions | The power supply is required to meet Performance Criterion A with the exception of IEC61000-4-11 Voltage Interruptions (>95% reduction 250 periods) where the power supply is required to meet Performance Criterion C. | B C C | EN 61000-4-11 EN 61000-4-29 EN 55024 GB 19286 EN 60601 |

Note: The loading for Voltage Variations is TBD.

Performance criterion of the voltage fluctuation immunity test:

A: The power supply should have no loss of function or degradation of performance according to its specification during the test.

B: Temporary loss of function or degradation of performance is acceptable, but all the outputs should be in an acceptable range and should recover to normal after the test. The power supply shouldn't loss any of outputs, reset or any abnormal warning when doing the test with system.

C: Temporary loss of function or shut down is acceptable, but the power supply should restart with an operator intervention or auto-restart normally after the test.



10.0 MECHANICAL PERFORMANCE

Non-operating:

Sine sweep: 5~500Hz @0.5gRMS at 0.5 octave/min; dwell 15 min at each of 3 resonant points;

Random profile: 5Hz @0.01g^2/Hz (slope up); 20~500Hz @0.02g^2/Hz (flat);

Input acceleration = 3.13gRMS; 10min.per axis for 3 axis on all samples.

11.0 MTBF

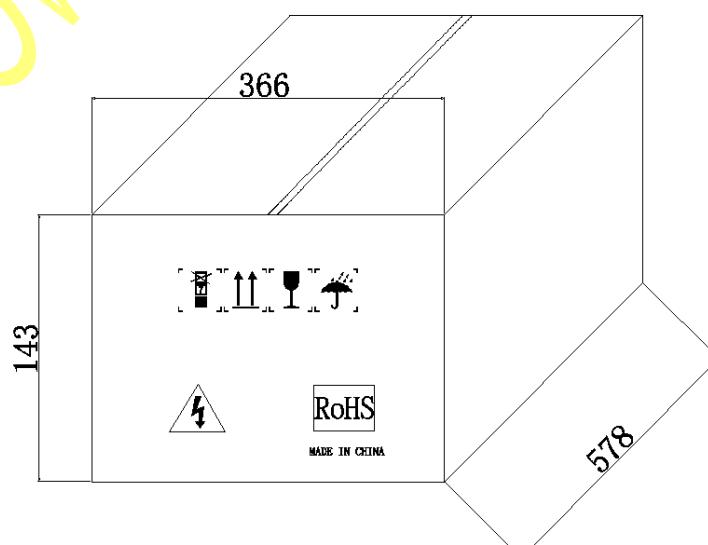
Quantitative reliability (Quantitative) performance requirements: MTBF (MTBF Mean Time between Critical Failure), according to the Bellcore standard: Telcordia Technologies SR-332 (Method I Case 3), the PSU operates continuously under 25degC condition, 230Vac/50Hz and 115Vac/60Hz under 100% load, the testing process should not be interrupted.

Table28.

| Item | Requirement | Notes |
|----------------------------|--|--|
| E-CAP Life Time | ≥ 5 years at 25°C ambient | Should ≥ 3 years at 25°C ambient when mating with the system of customer |
| CMTBF (Calculated MTBF) | ≥ 550,000 hours, at 25°C (≥ 100,000 hours, at 40°C) ambient temperature and full load | By Telcordia SR-332 issue 2 |

12.0 PACKAGE

12.1 Outline Diagram of Carton



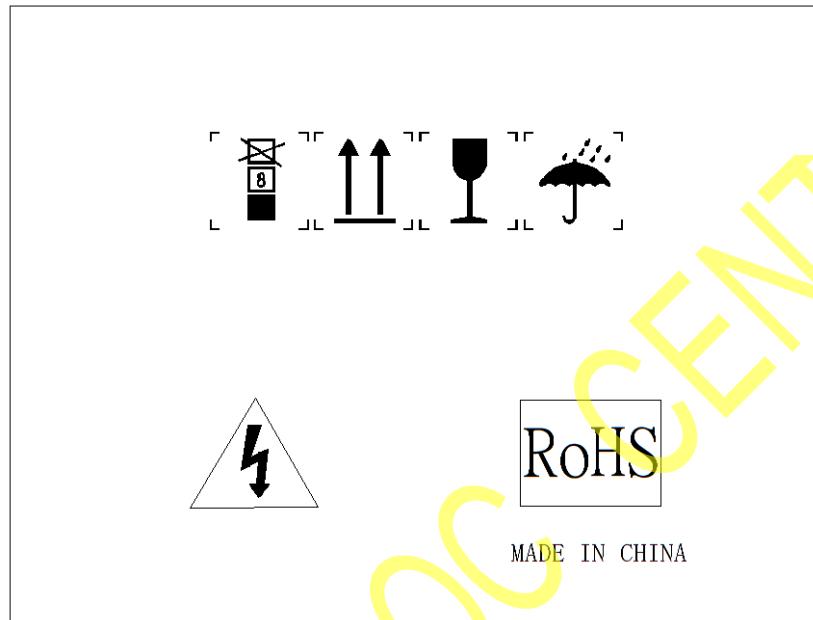


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Note:

Material: K=K, five layers of corrugated paper.

12.2 Side Label



12.3 Front Label



13.0 SOFTWARE

13.1 Data Precision Requirement

Some data read from power supply should have a precision requirement as below table:



Table29. Required Accuracy (100V-240Vac or 160V-340Vdc)

| Output Load Condition | <20% | 20%-50% | >50%-100% |
|--|---------|---------|-----------|
| Read_VIN(88h) | No Spec | ±3% | ±3% |
| Read_Vout(8Bh) | No Spec | ±3% | ±3% |
| Read_Iout(8Ch) | No Spec | ±5% | ±3% |
| Read_Pout(96h) | No Spec | ±5% | ±3% |
| Read_Temperature(8Eh) (Ambient temperature) | ±3°C | ±3°C | ±3°C |

13.2 PMBus Specification

Linear Data Formats

The Linear Data Format is a two byte value with: An 11 bit, two's complement mantissa and A 5 bit, two's complement exponent (scaling factor). The format of the two data bytes is illustrated in below Figure.



The relation between Y, N and the “real world” value is: $X = Y \cdot 2^N$

Where, as described above:

X is the “real world” value being communicated

Y is an 11 bit, two's complement integer;

N is a 5 bit, two's complement integer.

Devices that use the linear format must accept and be able to process any value of N.



13.3 PMBUS Command Supported

Table30. STATUS_WORD Command

| Byte | Bit No. | Status Bit Name | Meaning | Support |
|------|---------|-------------------|--|---------|
| Low | 7 | BUSY | A fault was declared because the device was busy and unable to respond. | No |
| | 6 | OFF | This bit is asserted if the unit is not providing power to the output, regardless of the reason, including simply not being enabled. | Yes |
| | 5 | VOUT_OV | An output over voltage fault has occurred. | Yes |
| | 4 | IOUT_OC | An output over current fault has occurred. | Yes |
| | 3 | VIN_UV | An input under voltage fault has occurred. | Yes |
| | 2 | TEMPERATURE | A temperature fault or warning has occurred. | Yes |
| | 1 | CML | A communications, memory or logic fault has occurred. | No |
| | 0 | NONE OF THE ABOVE | A fault or warning not listed in bits [7:1] of this byte has occurred. | No |
| High | 7 | VOUT | An output voltage fault or warning has occurred. | Yes |
| | 6 | IOUT/POUT | An output current or output power fault or warning has occurred. | Yes |
| | 5 | INPUT | An input voltage, input current, or input power fault or warning has occurred. | Yes |
| | 4 | MFR | A manufacturer specific fault or warning has occurred. | No |
| | 3 | POWER_GOOD# | The POWER_GOOD signal, if present, is negated. | Yes |
| | 2 | FANS | A fan or airflow fault or warning has occurred. | Yes |
| | 1 | OTHER | A bit in STATUS_OTHER is set. | Yes |
| | 0 | UNKNOWN | A fault type not given in bits [15:1] of the STATUS_WORD has been detected. | No |

**Table31. STATUS_VOUT Command**

| Bit | Meaning | Support |
|-----|--|---------|
| 7 | VOUT Over voltage Fault | Yes |
| 6 | VOUT Over voltage Warning | No |
| 5 | VOUT Under voltage Warning | No |
| 4 | VOUT Under voltage Fault | Yes |
| 3 | VOUT_MAX Warning (An attempt has been made to set the output voltage to value higher than allowed by the VOUT_MAX command) | No |
| 2 | TON_MAX_FAULT | No |
| 1 | TOFF_MAX Warning | No |
| 0 | VOUT Tracking Error | No |

Table32. STATUS_IOUT Command

| Bit | Meaning | Support |
|-----|--|---------|
| 7 | IOUT Over current Fault | Yes |
| 6 | IOUT Over current And Low Voltage Shutdown Fault | No |
| 5 | IOUT Over current Warning | Yes |
| 4 | IOUT Undervoltage Fault | No |
| 3 | Current Share Fault | No |
| 2 | Power Limiting | No |
| 1 | POUT Overpower Fault | Yes |
| 0 | POUT Overpower Warning | Yes |

Table33. STATUS_INPUT Command

| Bit | Meaning | Support |
|-----|---|---------|
| 7 | VIN Over voltage Fault | Yes |
| 6 | VIN Over voltage Warning | No |
| 5 | VIN Under voltage Warning | No |
| 4 | VIN Under voltage Fault | Yes |
| 3 | Unit Off For Insufficient Input Voltage | No |
| 2 | IIN Over current Fault | No |
| 1 | IIN Over current Warning | No |



| | | |
|---|-----------------------|----|
| 0 | PIN Overpower Warning | No |
|---|-----------------------|----|

Table34. STATUS_TEMPERATURE Command

| Bit | Meaning | Support |
|-----|----------------------------|---------|
| 7 | Over temperature Fault | Yes |
| 6 | Over temperature Warning | Yes |
| 5 | Under temperature Warnings | No |
| 4 | Under temperature Fault | No |
| 3 | Reserved | No |
| 2 | Reserved | |
| 1 | Reserved | |
| 0 | Reserved | |

Table35. STATUS_FAN_1_2 Command

| Bit | Meaning | Support |
|-----|------------------------|---------|
| 7 | Fan 1 Fault | Yes |
| 6 | Fan 2 Fault | No |
| 5 | Fan 1 Warning | No |
| 4 | Fan 2 Warning | No |
| 3 | Fan 1 Speed Overridden | No |
| 2 | Fan 2 Speed Overridden | No |
| 1 | Airflow Fault | No |
| 0 | Airflow Warning | No |

Table36. STATUS_OTHER Command

| Bit | Meaning | Support |
|-----|--|---------|
| 7 | Transformer primary and secondary communication failures(Mfr. Defined) | Yes |
| 6 | PFC voltage ok check(Mfr. Defined) | Yes |
| 5 | Input A Fuse Or Circuit Breaker Fault | No |
| 4 | Input B Fuse Or Circuit Breaker Fault | No |
| 3 | Input A OR-ing Device Fault | No |
| 2 | Input B OR-ing Device Fault | No |
| 1 | Output OR-ing Device Fault | No |



| | | |
|---|----------|----|
| 0 | Reserved | No |
|---|----------|----|

Table37. Supported Command Summary

| CMD Code | Name | Type | Bytes | Conditions |
|----------|-------------------------------|------------|-------|-----------------------------|
| 03h | CLEAR_FAULTS | Send Byte | 0 | |
| 19h | CAPABILITY | Read Byte | 1 | 0x90 |
| 20h | VOUT_MODE | Read Byte | 1 | 17h(n=-9) |
| 78h | STATUS_BYTE | Read Byte | 1 | |
| 79h | STATUS_WORD | Read Word | 2 | |
| 7Ah | STATUS_VOUT | Read Byte | 1 | |
| 7Bh | STATUS_IOUT | Read Byte | 1 | |
| 7Ch | STATUS_INPUT | Read Byte | 1 | |
| 7Dh | STATUS_TEMPERATURE | Read Byte | 1 | |
| 7Fh | STATUS_OTHER | Read Byte | 1 | |
| 80h | READ_VIN_TYPE | Read Byte | 1 | 00:NO AC; 01:AC; 02:HVDC |
| 81h | STATUS_FANS_1_2 | Read Byte | 1 | |
| 84h | READ_Vsb_OUT(Mfr. Defined) | Read Word | 2 | |
| 88h | READ_VIN | Read Word | 2 | |
| 8Bh | READ_VOUT | Read Word | 2 | |
| 8Ch | READ_IOUT | Read Word | 2 | |
| 8Eh | READ_TEMPERATURE_2 | Read Word | 2 | |
| 90h | READ_FAN_SPEED_1 | Read Word | 2 | Rpm value |
| 96h | READ_POUT | Read Word | 2 | |
| 97h | READ_PIN | Read Word | 2 | |
| 98h | PMBUS_REVISION | Read Byte | 1 | V1.2 |
| 99h | MFR_ID | Read Block | 14 | See MFR Data table |
| 9Ah | MFR_MODEL | Read Block | 16 | See MFR Data table |
| 9Bh | MFR_REVISION | Read Block | 6 | See MFR Data table |
| A0h | MFR_VIN_MIN | Read Word | 2 | See MFR Data table |
| A1h | MFR_VIN_MAX | Read Word | 2 | See MFR Data table |



| | | | | |
|-----|------------------|-------------------------|---|--|
| A4h | MFR_VOUT_MIN | Read Word | 2 | See MFR Data table |
| A5h | MFR_VOUT_MAX | Read Word | 2 | See MFR Data table |
| A6h | MFR_IOUT_MAX | Read Word | 2 | See MFR Data table |
| A7h | MFR_POUT_MAX | Read Word | 2 | See MFR Data table |
| A8h | MFR_TAMBIENT_MAX | Read Word | 2 | See MFR Data table |
| A9h | MFR_TAMBIENT_MIN | Read Word | 2 | See MFR Data table |
| D0h | SMART_ON_CONFIG | Write Byte Read Byte | 1 | 00h Standard Redundancy 01h Smart On Active 02h Smart Standby 03h Smart Standby 04h Smart Standby |

Table38. MFR Data Table

| CMD Code | Name | Conditions |
|----------|------------------|------------------|
| 99h | MFR_ID | ASPOWER##### |
| 9Ah | MFR_MODEL | U1A-D10550-DRB-E |
| 9Bh | MFR_REVISION | E.g.: “1.0SA0” |
| A0h | MFR_VIN_MIN | 90 |
| A1h | MFR_VIN_MAX | 264 |
| A4h | MFR_VOUT_MIN | 11.4 |
| A5h | MFR_VOUT_MAX | 12.6 |
| A6h | MFR_IOUT_MAX | 45 |
| A7h | MFR_POUT_MAX | 550 |
| A8h | MFR_TAMBIENT_MAX | 50 |
| A9h | MFR_TAMBIENT_MIN | 0 |



14.0 FRU Format

14.1 FRU Data

The FRU data format shall be compliant with the IPMI ver.1.0 (per rev.1.1 from Sept.25, 1999) specification. The current version of these specifications is available at <http://developer.intel.com/design/servers/ipmi/spec.htm>. The following is the exact listing of the EEPROM content. During testing this listing shall be followed and verified.

14.1.1 FRU Device Protocol

The FRU device will implement the same protocols as the commonly used 24C02 device, including the Byte Read, Sequential Read, Byte Write, and Page Read protocols.

14.1.2 FRU Format

The information to be contained in the FRU device is shown in the following table.

Table39

| Area Type | Description |
|---------------------------|--|
| Common Header | As defined by the FRU document |
| Internal Use Area | Reserve |
| Chassis Info Area | Not applicable, do not reserve |
| Board Info Area | Not applicable, do not reserve |
| Product Info Area | As defined by the IPMI FRU document. Product information shall be defined as follows: |
| Field Name | Field Description |
| Manufacturer Name | {Formal name of manufacturer} |
| Product Name | {Manufacturer's model number} |
| Product part/model number | Customer part number |
| Product Version | Customer current revision |
| Product Serial Number | {Defined at time of manufacture} |
| Asset Tag | {Not used, code is zero length byte} |
| FRU File ID | {Not required} |
| PAD Bytes | {Added as necessary to allow for 8-byte offset to next area} |
| Multi-Record Area | As defined by the IPMI FRU document. The following record types shall be used on this power supply: Power Supply Information (Record Type 0x00) DC Output (Record Type 0x01) |



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| | |
|--|---|
| | No other record types are required for the power supply. Multi-Record information shall be defined as follows: |
| Field Name (PS Info) | Power Supply Information |
| Overall Capacity (watts) | |
| Peak VA | |
| Inrush current (A) | |
| Inrush interval (ms) | |
| Low end input voltage range 1 | |
| High end input voltage range 1 | |
| Low end input voltage range 2 | |
| High end input voltage range 2 | |
| Low end Input frequency range | |
| High end Input frequency range | |
| Input dropout tolerance | |
| Binary flags | |
| Peak Wattage | |
| Combined wattage | |
| Predictive fail tachometer lower threshold | |
| Field Name (Output) | Power supply's output voltage information |
| Output Information | |
| Nominal voltage | |
| Maximum negative voltage | |
| Maximum positive voltage | |
| Ripple and Noise pk-pk | |
| Minimum current draw | |
| Maximum current draw | |



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| Mfg Date & Time: 2017/12/24 4:14:00 PM | | | | | |
|---|---------|------------------|------------------|---|--------------------------|
| U1A-D10550-DRB FRU MEMORY MAP XXF | | | | | |
| ITEM | ADDRESS | BYTE VALUE (DEC) | BYTE VALUE (hex) | DESCRIPTION | BLOCK TITLE |
| 1 | 0000H | 1 | 01 | FORMAT VERSION NUMBER | COMMON HEADER |
| 2 | 0001H | 1 | 01 | INTERNAL USE AREA OFFSET | |
| 3 | 0002H | 0 | 00 | CHASSIS INFO AREA OFFSET | |
| 4 | 0003H | 0 | 00 | BOARD AREA OFFSET | |
| 5 | 0004H | 3 | 03 | PRODUCT INFO AREA OFFSET | |
| 6 | 0005H | 11 | 0B | MULTI RECORD AREA OFFSET | |
| 7 | 0006H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 8 | 0007H | 240 | F0 | ZERO CHECK SUM (100H-(TOTAL BYTES)) | INTERNAL USE AREA |
| 1 | 0008H | 1 | 01 | PAD (ALWAYS ZERO) | |
| 2 | 0009H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 3 | 000AH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 4 | 000BH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 5 | 000CH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 6 | 000DH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 7 | 000EH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 8 | 000FH | 0 | 00 | PAD (ALWAYS ZERO) | |
| 9 | 0010H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 10 | 0011H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 11 | 0012H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 12 | 0013H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 13 | 0014H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 14 | 0015H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 15 | 0016H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 16 | 0017H | 0 | 00 | PAD (ALWAYS ZERO) | |
| 17 | 0018H | 1 | 01 | PRODUCT AREA FORMAT VERSION | PRODUCT INFORMATION AREA |
| 18 | 0019H | 8 | 08 | PRODUCT AREA LENGTH (#BYTES /8) | |
| 19 | 001AH | 25 | 19 | LANGUAGE (ENGLISH) | |
| 20 | 001BH | 199 | C7 | PRODUCT MANUFACTURER NAME LENGTH / byte | |
| 21 | 001CH | 65 | 41 | A | |
| 22 | 001DH | 83 | 53 | S | |
| 23 | 001EH | 80 | 50 | P | |
| 24 | 001FH | 79 | 4F | O | |
| 25 | 0020H | 87 | 57 | W | |
| 26 | 0021H | 69 | 45 | E | |
| 27 | 0022H | 82 | 52 | R | |
| 28 | 0023H | 207 | CF | PRODUCT NAME LENGTH | |
| 29 | 0024H | 85 | 55 | U | |
| 30 | 0025H | 49 | 31 | I | |
| 31 | 0026H | 65 | 41 | A | |
| 32 | 0027H | 45 | 2D | - | |
| 33 | 0028H | 68 | 44 | D | |
| 34 | 0029H | 49 | 31 | I | |
| 35 | 002AH | 48 | 30 | 0 | |
| 36 | 002BH | 53 | 35 | 5 | |
| 37 | 002CH | 53 | 35 | 5 | |
| 38 | 002DH | 48 | 30 | 0 | |
| 39 | 002EH | 45 | 2D | - | |
| 40 | 002FH | 68 | 44 | D | |
| 41 | 0030H | 82 | 52 | R | |
| 42 | 0031H | 66 | 42 | B | |
| 43 | 0032H | 32 | 20 | | |
| 44 | 0033H | 197 | C5 | CUSTOMER PRODUCT SERIAL NO. LENGTH | Part NO. |
| 45 | 0034H | 32 | 20 | | |
| 46 | 0035H | 32 | 20 | | |
| 47 | 0036H | 32 | 20 | | |
| 48 | 0037H | 32 | 20 | | |
| 49 | 0038H | 32 | 20 | | |
| 50 | 0039H | 195 | C3 | BORAD VERSION type/length | |
| 51 | 003AH | 49 | 31 | 1 | To be updated |
| 52 | 003BH | 46 | 2E | . | To be updated |
| 53 | 003CH | 48 | 30 | 0 | To be updated |
| 54 | 003DH | 214 | D6 | PRODUCT SERIAL NO. LENGTH | |
| 55 | 003EH | 88 | 58 | X | To be updated |
| 56 | 003FH | 88 | 58 | X | To be updated |
| 57 | 0040H | 88 | 58 | X | To be updated |
| 58 | 0041H | 88 | 58 | X | To be updated |
| 59 | 0042H | 88 | 58 | X | To be updated |
| 60 | 0043H | 88 | 58 | X | To be updated |



| | | | | | |
|----|-------|-----|----|--|---------------|
| 61 | 0044H | 88 | 58 | X | To be updated |
| 62 | 0045H | 88 | 58 | X | To be updated |
| 63 | 0046H | 88 | 58 | X | To be updated |
| 64 | 0047H | 88 | 58 | X | To be updated |
| 65 | 0048H | 88 | 58 | X | To be updated |
| 66 | 0049H | 88 | 58 | X | To be updated |
| 67 | 004AH | 88 | 58 | X | To be updated |
| 68 | 004BH | 88 | 58 | X | To be updated |
| 69 | 004CH | 32 | 20 | | To be updated |
| 70 | 004DH | 32 | 20 | | To be updated |
| 71 | 004EH | 32 | 20 | | To be updated |
| 72 | 004FH | 32 | 20 | | To be updated |
| 1 | 0050H | 32 | 20 | | To be updated |
| 2 | 0051H | 32 | 20 | | To be updated |
| 3 | 0052H | 32 | 20 | | To be updated |
| 4 | 0053H | 32 | 20 | | To be updated |
| 5 | 0054H | 192 | C0 | ASSET TAG type/length byte | |
| 6 | 0055H | 192 | C0 | FRU File ID type/length byte | |
| 7 | 0056H | 193 | C1 | NO MORE FIELDS MARKER | |
| 8 | 0057H | 49 | 31 | CHECKSUM (100H -(LOWER_BYTE(SUM_OF_BYTES))) | To be updated |
| 9 | 0058H | 0 | 00 | RECORD TYPE ID 0X00 = POWER SUPPLY INFORMATION | MULTIRECORD |
| 10 | 0059H | 2 | 02 | 7 : END OF LIST , 6 : 4 =000B , 3 : 0 RECORD FORMAT VERSION = 2 | HEADER |
| 11 | 005AH | 24 | 18 | RECORD LENGTH OF MULTIRECORD | |
| 12 | 005BH | 188 | BC | RECORD CHECKSUM | |
| 13 | 005CH | 42 | 2A | HEADER CHECKSUM | |
| 14 | 005DH | 38 | 26 | 15-12 : RESERVED , WRITE AS 0000B | 550W |
| 15 | 005EH | 2 | 02 | 11-0 : OVERALL CAPACITY (WATTS) | 550W |
| 16 | 005FH | 38 | 26 | PEAK VALUE | 550W |
| 17 | 0060H | 2 | 02 | LSB FIRST | 550W |
| 18 | 0061H | 55 | 37 | INRUSH CURRENT FFH IF NOT SPECIFIED | 55A |
| 19 | 0062H | 5 | 05 | SET TO 0 IF NO INRUSH CURRENT SPECIFIED | 5mS |
| 20 | 0063H | 16 | 10 | LOW END INPUT VOLTAGE RANGE 1 100V = 2320H | 100V |
| 21 | 0064H | 39 | 27 | | 100V |
| 22 | 0065H | 156 | 9C | HIGH END INPUT VOLTAGE RANGE 1 140 = 36B0H | 127V |
| 23 | 0066H | 49 | 31 | | 127V |
| 24 | 0067H | 32 | 20 | LOW END INPUT VOLTAGE RANGE 2 180V = 4650H | 200V |
| 25 | 0068H | 78 | 4E | | 200V |
| 26 | 0069H | 192 | C0 | HIGH END INPUT VOLTAGE RANGE 2 264 = 6720H | 240V |
| 27 | 006AH | 93 | 5D | | 240V |
| 28 | 006BH | 47 | 2F | LOW END INPUT FREQUENCY RANGE 47HZ = 2FH | 47Hz |
| 29 | 006CH | 63 | 3F | HIGH END INPUT FREQUENCY RANGE 63HZ = 3FH | 63Hz |
| 1 | 006DH | 12 | 0C | A / C DROPOUT TOLERANCE IN mS 12mS = 0CH | 12mS |
| 2 | 006EH | 26 | 1A | 4 : TACHOMETER PULSES PER ROTATION / PREDICTIVE FALL POLARITY YES = 1 | |
| 3 | 006FH | 38 | 26 | PEAK WATTAGE 15-12 : HOLD UP TIME IN SECONDS 1S = 1H | 550W |
| 4 | 0070H | 194 | C2 | 11-0 : PEAK CAPACITY (WATTS) (LSB FIRST) 575W = 01C2H | 12S |
| 5 | 0071H | 0 | 00 | COMBINED WATTAGE 7-4 : VOLTAGE 1 , 3-0 : VOLTAGE 2 = 00 H | |
| 6 | 0072H | 38 | 26 | BYTE 2 : 3 TOTAL COMBINED WATTAGE (LSB FIRST) W = 0000H | 550W |
| 7 | 0073H | 2 | 02 | | 550W |
| 8 | 0074H | 133 | 85 | PREDICTIVE FAIL TACHOMETER LOWER THRESHOLD (RPM / 60) 2000/60 => 21h | |
| 9 | 0075H | 1 | 01 | RECORD TYPE ID 0X01 = DC OUTPUT Record | MULTIRECORD |
| 10 | 0076H | 2 | 02 | 7 : END OF LIST , 6 : 4 =000B , 3 : 0 RECORD FORMAT VERSION = 2 | HEADER |
| 11 | 0077H | 13 | 0D | RECORD LENGTH OF MULTIRECORD | |
| 12 | 0078H | 255 | FF | RECORD CHECKSUM | |
| 13 | 0079H | 255 | F1 | HEADER CHECKSUM | |
| 14 | 007AH | 1 | 01 | +12V 7 : STANDBY = 0 , 6-4 : RESERVED 000B , 3-0 : OUTPUT NUMBER = 0001B | +12V |
| 15 | 007BH | 176 | B0 | NOMINAL VOLTAGE (10mV) 1200 = 04B0H | 12.0V |
| 16 | 007CH | 4 | 04 | | 12.0V |
| 17 | 007DH | 116 | 74 | MAXIMUM NEGATIVE VOLTAGE DEVIATION (10mV) | 11.4V |
| 18 | 007EH | 4 | 04 | | 11.4V |
| 1 | 007FH | 236 | EC | MAXIMUM POSITIVE VOLTAGE DEVIATION (10mV) | 12.6V |
| 2 | 0080H | 4 | 04 | | 12.6V |
| 3 | 0081H | 120 | 78 | RIPPLE AND NOISE PK-PK 10Hz TO 20MHz (mV) 120mV = 0078H | 120mV |
| 4 | 0082H | 0 | 00 | | 120mV |
| 5 | 0083H | 244 | F4 | MINIMUM CURRENT DRAW(mA) | 0.5A |
| 6 | 0084H | 1 | 01 | | 0.5A |
| 7 | 0085H | 200 | C8 | MAXIMUM CURRENT DRAW(mA) | 45A |
| 8 | 0086H | 175 | AF | | 45A |
| 9 | 0087H | 1 | 01 | RECORD TYPE ID 0X01 = DC OUTPUT Record | MULTIRECORD |
| 10 | 0088H | 130 | 82 | 7 : 7 END OF LIST , 6 : 4 = 000B , 3 : 0 RECORD FORMAT VERSION = 2 | HEADER |
| 11 | 0089H | 13 | 0D | RECORD LENGTH OF MULTIRECORD | |
| 12 | 008AH | 225 | E1 | RECORD CHECKSUM | |
| 13 | 008BH | 143 | 8F | HEADER CHECKSUM | |
| 14 | 008CH | 130 | 82 | +12VSB 7 : STANDBY = 0 , 6-4 : RESERVED 000B , 3-0 : OUTPUT NUMBER = 0010B | +12VSB |
| 15 | 008DH | 176 | B0 | NOMINAL VOLTAGE(10mV) | 12V |



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| | | | | | |
|----|-------|-----|----|---|-------|
| 16 | 008EH | 4 | 04 | | 12V |
| 17 | 008FH | 116 | 74 | MAXIMUM NEGATIVE VOLTAGE DEVIATION(10mV) | 11.4V |
| 18 | 0090H | 4 | 04 | | 11.4V |
| 1 | 0091H | 236 | EC | MAXIMUM POSITIVE VOLTAGE DEVIATION(10mV) | 12.6V |
| 2 | 0092H | 4 | 04 | | 12.6V |
| 3 | 0093H | 120 | 78 | RIPPLE AND NOISE PK - PK 10Hz TO 20MHz(mV) 50mV = 0032H | 120mV |
| 4 | 0094H | 0 | 00 | | 120mV |
| 5 | 0095H | 50 | 32 | MINIMUM CURRENT DRAW(mA) 0mA = 0000H | 0.05A |
| 6 | 0096H | 0 | 00 | | 0.05A |
| 7 | 0097H | 208 | D0 | MAXIMUM CURRENT DRAW(mA) | 2A |
| 8 | 0098H | 07 | 07 | | 2A |
| 9 | 0099H | 0 | 00 | Unused Area | |
| 10 | 009AH | 0 | 00 | Unused Area | |
| 11 | 009BH | 0 | 00 | Unused Area | |
| 12 | 009CH | 0 | 00 | Unused Area | |
| 13 | 009DH | 0 | 00 | Unused Area | |
| 14 | 009EH | 0 | 00 | Unused Area | |
| 15 | 009FH | 0 | 00 | Unused Area | |
| 16 | 00A0H | 0 | 00 | Unused Area | |
| 17 | 00A1H | 0 | 00 | Unused Area | |
| 18 | 00A2H | 0 | 00 | Unused Area | |
| 19 | 00A3H | 0 | 00 | Unused Area | |
| 20 | 00A4H | 0 | 00 | Unused Area | |
| 21 | 00A5H | 0 | 00 | Unused Area | |
| 22 | 00A6H | 0 | 00 | Unused Area | |
| 23 | 00A7H | 0 | 00 | Unused Area | |
| 24 | 00A8H | 0 | 00 | Unused Area | |
| 25 | 00A9H | 0 | 00 | Unused Area | |
| 26 | 00AAH | 0 | 00 | Unused Area | |
| 27 | 00ABH | 0 | 00 | Unused Area | |
| 28 | 00ACH | 0 | 00 | Unused Area | |
| 29 | 00ADH | 0 | 00 | Unused Area | |
| 30 | 00AEH | 0 | 00 | Unused Area | |
| 31 | 00AFH | 0 | 00 | Unused Area | |
| 32 | 00B0H | 0 | 00 | Unused Area | |
| 33 | 00B1H | 0 | 00 | Unused Area | |
| 34 | 00B2H | 0 | 00 | Unused Area | |
| 35 | 00B3H | 0 | 00 | Unused Area | |
| 36 | 00B4H | 0 | 00 | Unused Area | |
| 37 | 00B5H | 0 | 00 | Unused Area | |
| 38 | 00B6H | 0 | 00 | Unused Area | |
| 39 | 00B7H | 0 | 00 | Unused Area | |
| 40 | 00B8H | 0 | 00 | Unused Area | |
| 41 | 00B9H | 0 | 00 | Unused Area | |
| 42 | 00BAH | 0 | 00 | Unused Area | |
| 43 | 00BBH | 0 | 00 | Unused Area | |
| 44 | 00BCH | 0 | 00 | Unused Area | |
| 45 | 00BDH | 0 | 00 | Unused Area | |
| 46 | 00BEH | 0 | 00 | Unused Area | |
| 47 | 00BFH | 0 | 00 | Unused Area | |
| 48 | 00C0H | 0 | 00 | Unused Area | |
| 49 | 00C1H | 0 | 00 | Unused Area | |
| 50 | 00C2H | 0 | 00 | Unused Area | |
| 51 | 00C3H | 0 | 00 | Unused Area | |
| 52 | 00C4H | 0 | 00 | Unused Area | |
| 53 | 00C5H | 0 | 00 | Unused Area | |
| 54 | 00C6H | 0 | 00 | Unused Area | |
| 55 | 00C7H | 0 | 00 | Unused Area | |
| 56 | 00C8H | 0 | 00 | Unused Area | |
| 57 | 00C9H | 0 | 00 | Unused Area | |
| 58 | 00CAH | 0 | 00 | Unused Area | |
| 59 | 00CBH | 0 | 00 | Unused Area | |
| 60 | 00CCH | 0 | 00 | Unused Area | |
| 61 | 00CDH | 0 | 00 | Unused Area | |
| 62 | 00CEH | 0 | 00 | Unused Area | |
| 63 | 00CFH | 0 | 00 | Unused Area | |
| 64 | 00D0H | 0 | 00 | Unused Area | |
| 65 | 00D1H | 0 | 00 | Unused Area | |
| 66 | 00D2H | 0 | 00 | Unused Area | |
| 67 | 00D3H | 0 | 00 | Unused Area | |
| 68 | 00D4H | 0 | 00 | Unused Area | |
| 69 | 00D5H | 0 | 00 | Unused Area | |
| 70 | 00D6H | 0 | 00 | Unused Area | |
| 71 | 00D7H | 0 | 00 | Unused Area | |



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|-----|-------|---|----|-------------|
| 72 | 00D8H | 0 | 00 | Unused Area |
| 73 | 00D9H | 0 | 00 | Unused Area |
| 74 | 00DAH | 0 | 00 | Unused Area |
| 75 | 00DBH | 0 | 00 | Unused Area |
| 76 | 00DCH | 0 | 00 | Unused Area |
| 77 | 00DDH | 0 | 00 | Unused Area |
| 78 | 00DEH | 0 | 00 | Unused Area |
| 79 | 00DFH | 0 | 00 | Unused Area |
| 80 | 00E0H | 0 | 00 | Unused Area |
| 81 | 00E1H | 0 | 00 | Unused Area |
| 82 | 00E2H | 0 | 00 | Unused Area |
| 83 | 00E3H | 0 | 00 | Unused Area |
| 84 | 00E4H | 0 | 00 | Unused Area |
| 85 | 00E5H | 0 | 00 | Unused Area |
| 86 | 00E6H | 0 | 00 | Unused Area |
| 87 | 00E7H | 0 | 00 | Unused Area |
| 88 | 00E8H | 0 | 00 | Unused Area |
| 89 | 00E9H | 0 | 00 | Unused Area |
| 90 | 00EAH | 0 | 00 | Unused Area |
| 91 | 00EBH | 0 | 00 | Unused Area |
| 92 | 00ECH | 0 | 00 | Unused Area |
| 93 | 00EDH | 0 | 00 | Unused Area |
| 94 | 00EEH | 0 | 00 | Unused Area |
| 95 | 00EFH | 0 | 00 | Unused Area |
| 96 | 00F0H | 0 | 00 | Unused Area |
| 97 | 00F1H | 0 | 00 | Unused Area |
| 98 | 00F2H | 0 | 00 | Unused Area |
| 99 | 00F3H | 0 | 00 | Unused Area |
| 100 | 00F4H | 0 | 00 | Unused Area |
| 101 | 00F5H | 0 | 00 | Unused Area |
| 102 | 00F6H | 0 | 00 | Unused Area |
| 103 | 00F7H | 0 | 00 | Unused Area |
| 104 | 00F8H | 0 | 00 | Unused Area |
| 105 | 00F9H | 0 | 00 | Unused Area |
| 106 | 00FAH | 0 | 00 | Unused Area |
| 107 | 00FBH | 0 | 00 | Unused Area |
| 108 | 00FCH | 0 | 00 | Unused Area |
| 109 | 00FDH | 0 | 00 | Unused Area |
| 110 | 00FEH | 0 | 00 | Unused Area |
| 111 | 00FFH | 0 | 00 | Unused Area |



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FRU DATA FOLLOW WITH SPEC LABEL, SPEC LABEL SHOULD BE CONFIRMED BY M.E.

Table showing HEX Information:

Rev: XXF

| Addr | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 0000 | 01 | 01 | 00 | 00 | 03 | 0B | 00 | F0 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 0010 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 08 | 19 | C7 | 41 | 53 | 50 | 4F |
| 0020 | 57 | 45 | 52 | CF | 55 | 31 | 41 | 2D | 44 | 31 | 30 | 35 | 35 | 30 | 2D | 44 |
| 0030 | 52 | 42 | 20 | C5 | 20 | 20 | 20 | 20 | 20 | C3 | 31 | 2E | 30 | D6 | 58 | 58 |
| 0040 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 20 | 20 | 20 | 20 | 20 |
| 0050 | 20 | 20 | 20 | 20 | C0 | C0 | C1 | 31 | 00 | 02 | 18 | BC | 2A | 26 | 02 | 26 |
| 0060 | 02 | 37 | 05 | 10 | 27 | 9C | 31 | 20 | 4E | C0 | 5D | 2F | 3F | 0C | 1A | 26 |
| 0070 | C2 | 00 | 26 | 02 | 85 | 01 | 02 | 0D | FF | F1 | 01 | B0 | 04 | 74 | 04 | EC |
| 0080 | 04 | 78 | 00 | F4 | 01 | C8 | AF | 01 | 82 | 0D | E1 | 8F | 82 | B0 | 04 | 74 |
| 0090 | 04 | EC | 04 | 78 | 00 | 32 | 00 | D0 | 07 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00A0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00B0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00C0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00D0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00E0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00F0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

CHECK LIST

All data written to EEPROM should be ASCII code in hexadecimal format

Note: All of the Check Sum are Calculated by Zero Check Sum

| NO. | Item | Address | Byte | Description | Value |
|-----|----------------------|---------|------|---|------------------|
| 1 | Checksum1 | 07H | 1 | 100H - (Low Byte Sum(00H~06H)) | F0 |
| 2 | Checksum2 | 57H | 1 | 100H - (Low Byte Sum(18H~56H)) | Updated |
| 3 | Checksum3 | 5BH | 1 | 100H - (Low Byte Sum(5DH~74H)) | BC |
| 4 | Checksum4 | 5CH | 1 | 100H - (Low Byte Sum(58H~5BH)) | 2A |
| 5 | Checksum6 | 78H | 1 | 100H - (Low Byte Sum(7AH~86H)) | FF |
| 6 | Checksum7 | 79H | 1 | 100H - (Low Byte Sum(75H~78H)) | F1 |
| 7 | Checksum8 | 8AH | 1 | 100H - (Low Byte Sum(8CH~98H)) | E1 |
| 8 | Checksum9 | 8BH | 1 | 100H - (Low Byte Sum(87H~8AH)) | 8F |
| 9 | Manufacturer Name | 1CH~22H | 7 | Use the ASCII Code | "ASPOWER" |
| 10 | Product Name | 24H~32H | 15 | Use the ASCII Code | "U1A-D10550-DRB" |
| 11 | CUSTOMER PRODUCT NO. | 34H~38H | 5 | Use the ASCII Code | |
| 12 | Product Version NO | 3AH~3CH | 3 | Use the ASCII Code*(the value must to accord with #2) | Updated |
| 13 | Product Serial No. | 3EH~53H | 22 | Use the ASCII Code*(the value must to accord with #1) | Updated |
| 14 | Unused Area | 99H~FFH | | | 00 |



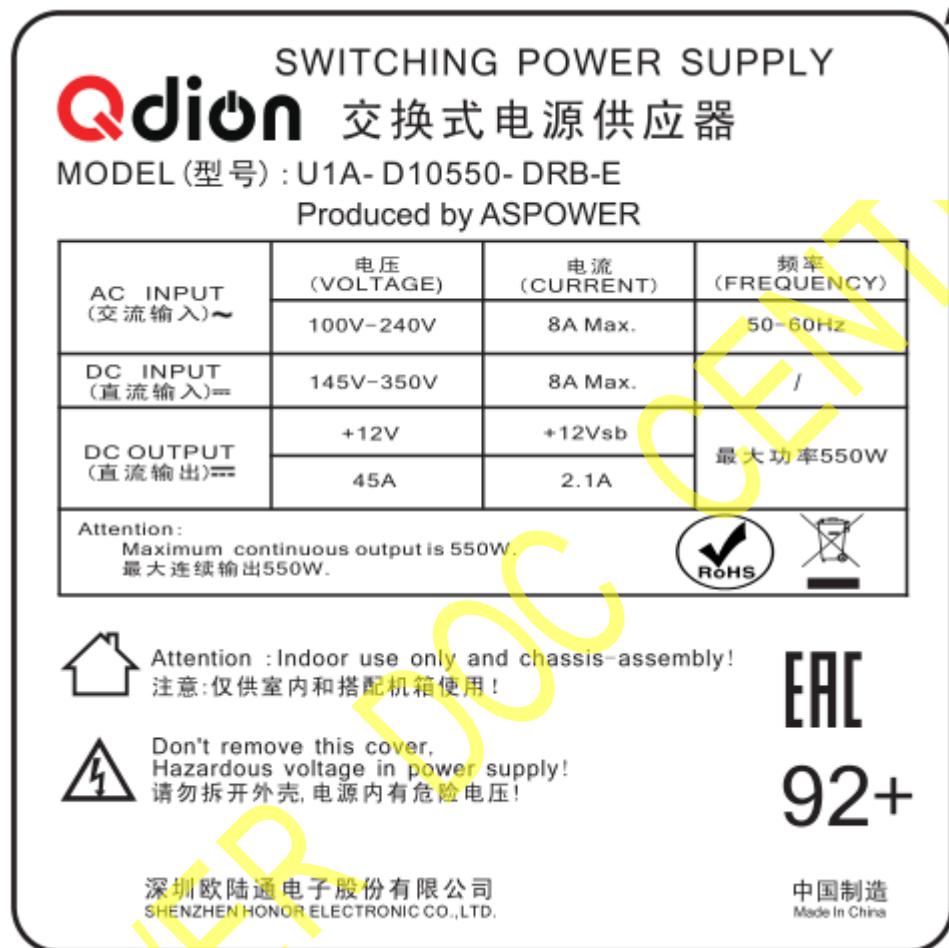
— ASP S/N: 1# XXXXXXHXXXXXX 2# VER X.X



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15.0 LABEL AND BAR CODE

15.1 Label



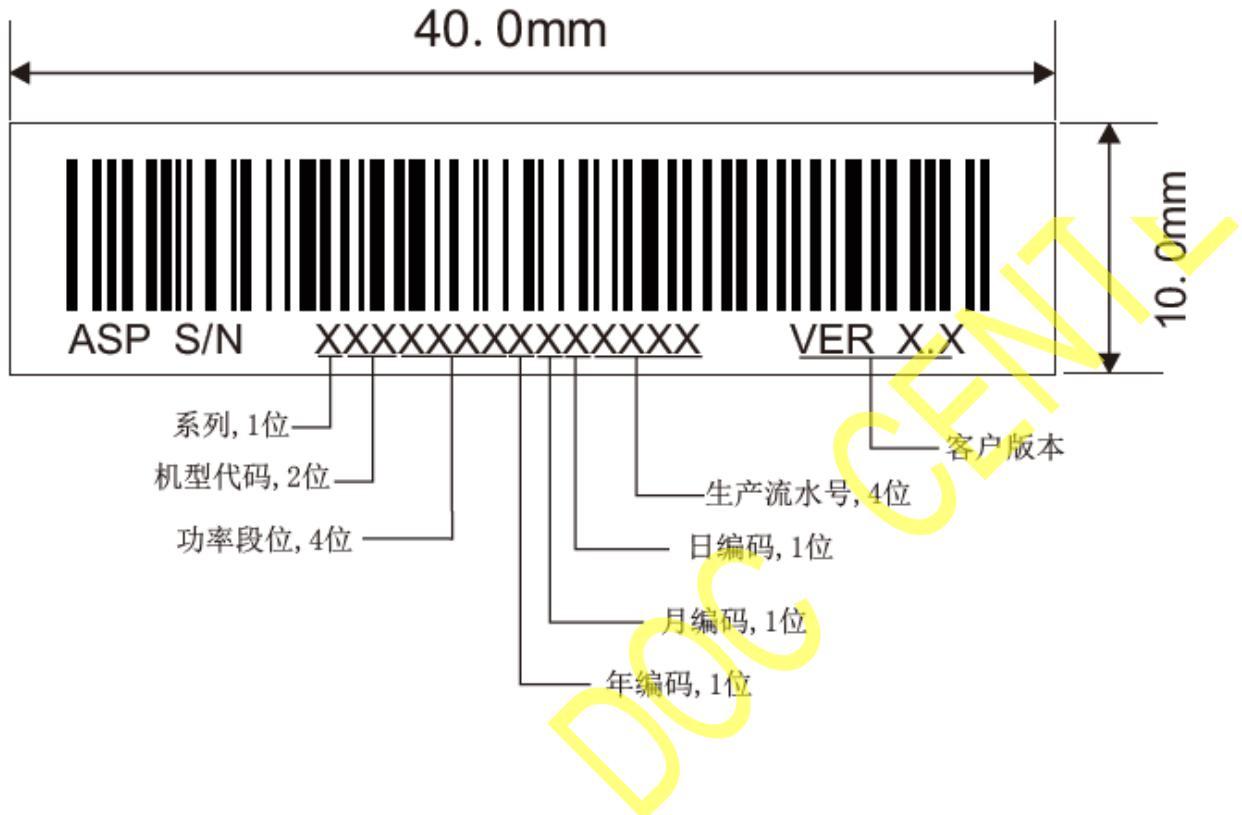


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15.2 Bar Code

Outline dimension: 40mm (L) *10(W)





ASPOWER

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1. 系列类型

机种系列服从欧陆通产品分类原则.

2. 机型代码

从01-ZZ表示同系列同一功率段, 不同分支不同客户的代码.

3. 功率段位

0800=800W, 1200=1200W, 3000=3000W等, 依次类推.

4. 年编码格式

| | | | | | | | | | |
|----|------|------|------|------|------|------|------|------|-------|
| 年份 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | |
| 编号 | A | B | C | D | E | F | G | H | |

5. 月编码规则

| | | | | | | | | | |
|----|----|----|----|----|----|----|-------|-----|-----|
| 月份 | 1月 | 2月 | 3月 | 4月 | 5月 | 6月 | | 11月 | 12月 |
| 编号 | 1 | 2 | 3 | 4 | 5 | 6 | | B | C |

6. 日编码规则

| | | | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 日份 | 1号 | 2号 | 3号 | 4号 | 5号 | 6号 | 7号 | 8号 | 9号 |
| 编号 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 日份 | 10号 | 11号 | 12号 | 13号 | 14号 | 15号 | 16号 | 17号 | 18号 |
| 编号 | A | B | C | D | E | F | G | H | J |
| 日份 | 19号 | 20号 | 21号 | 22号 | 23号 | 24号 | 25号 | 26号 | 27号 |
| 编号 | K | L | M | N | P | Q | R | S | T |
| 日份 | 28号 | 29号 | 30号 | 31号 | | | | | |
| 编号 | U | V | W | X | | | | | |

7. 生产流水号格式

流水号用4位来表示, 计数如0001~9999