SILVERSTONE

CPB Series
CPB01
2400W 1U 1+1 Redundant CRPS
Fully Modular Power Distribution Board with Cage

- Support up to 2400W PDB Design to fit for 2 vertical CRPS power supply to install on the chassis.
- Mylar insulation included that to prevent the PDB board shortcut
- Using an Amphenol-manufactured card edge connector with 3-beam contact design to ensure stable power output.
- Perfectly fit for GM2000C-TFU and GM2400C-TFU CRPS PSU
- Full modular design with all black flat cable included.
- Support up to 6 pcs of 12V-2x6 connector to allow user could connect with latest Nvidia/AMD graphic cards.
- PDB followed Fire Resistant (UL 94V-0) standard
- The PDB is designed with a PMBus connector to enable administrators toconveniently monitor and read power status signals.
- Multiple protection circuitry

SPECIFICATION

SilverStone CPB Series
CPB01
SST-CPB01

1U 1+1 Redundant CRPS Fully Modular Power distribute board with cage

This specification defines the performance characteristics of a 1U redundant power supply back panel. Its operation temperature is at 50 degrees Celsius and the total output reaches to 2400W.

1. Input Requirement

1.1 DC Input Requirements

The Backplane must be capable of operating with the following Conditions

	Minimum	Nominal	Maximum	Unit
Input Voltage Range(Vdc)	11.71	12.2	12.69	Vdc

Table 1.1

1.2 Efficiency

The power supply must have a minimum of 88% efficiency measured at the worst case condition.

2. Output Requirements

2.1 DC voltage regulation

All outputs must maintain their regulation within the below limits when measured at the output connector point or across the remote sense (if applicable) in any load condition defined in section 2.2

Output	Minimum	Nominal	Maximum	Unit
+12V	11.40	12.00	12.60	Vdc
+5V	4.75	5.0	5.25	Vdc
+3.3V	3.14	3.3	3.47	Vdc
-12V	10.80	12.0	13.2	Vdc
+5Vsb	4.75	5.0	5.25	Vdc

Table 2.1

2.2 Output Current Requirements

All outputs must maintain their regulation as per section 2.1 when loaded to the following loading combination:

Output	Minimum	Maximum	Unit
+12V	0.5	200	A
+5V	0.5	22	A
+3.3V	0.5	25	A
-12V	0	0.3	A
+5Vsb	0.1	3.0	A

Table 2.2

1. Maximum continuous combined load on +3.3V and +5V outputs shall not exceed 150W.
2. The total output power can not exceed 2400W continuously. During load changes from minimum to maximum or maximum to minimum the unit must not shut down.

2.3 Output Ripple and Noise

The following output ripple/noise requirements will be met throughout the load ranges specified in Section 2.2 and under all input voltage conditions specified in Section 2.1. Ripple and noise are defined as periodic or random signals over the frequency band of 10Hz to 20MHz. Measurements will be made with an oscilloscope set to 20MHz bandwidth limit. Measurement is done by using 10uF Tantalum in parallel with a 0.1uf ceramic capacitor, measured directly at the output connector side.

Output	Maximum	Unit
+12V	120	mV
+5V	50	mV
+3.3V	50	mV
-12V	120	mV
+5Vsb	50	mV

Table 2.3

2.4 Output Dynamic Loading

The output voltages shall remain within the limits specified in 2.2 for the step loading and within the limits specified
in 2.6 for the capacitive loading. The load transient repetition rate shall be tested between 50Hz and 5kHz at duty
cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The Δ step load may
occur anywhere within the MIN load to the MAX load shown in 2.5.

2.5 Transient Load Requirements

Output	Δ Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	0.5 A/μs	1000μF
+5V	30% of max load	0.5 A/μs	1000μF
+12V	65% of max load	0.5 A/μs	2200μF
+5Vsb	25% of max load	0.5 A/μs	350μF

Table 2.5

2.6 Capacitive Loading

The power supply shall be stable and meet all requirements, except dynamic loading requirements, with the following capacitive loading ranges.

2.6 Capacitve Loading Conditions

Output	MIN	MAX	Units
+3.3V	10	12000	μF
+5V	10	12000	μF
+12V	10	11000	μF
-12V	1	350	μF
+5Vsb	1	350	μF

Table 2.6

3. Controls and Signal

3.1 Timing Requirements

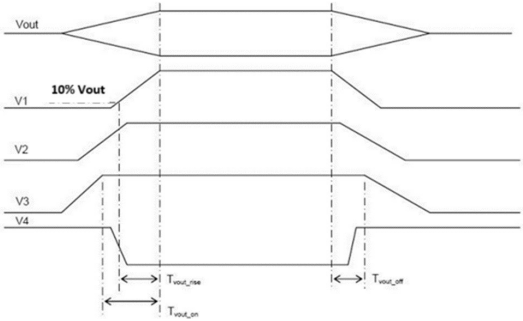
These are the timing requirements for the power supply operation. The output voltages must rise from 10% to within regulation limits (Tvout_rise) within 10 to 70ms. The +3.3V, +5V and +12V output voltages should start to rise at about the same time. All outputs must rise smoothness. The +5V output needs to be greater than the +3.3V output during any point of the voltage rise. The +5 V output must never be greater than the +3.3V output by more than 2.25 V.

Each output voltage shall reach regulation within 50 ms (Tvout_on) of each other during turn on of the power supply.
Each output voltage shall fall out of regulation within 400 ms (Tvout_off) of each other during turn off. Figure 1 andFigure 2 the turn ON and turn OFF timing requirements. In Figure 2, the timing is shown with both AC and PSON# controlling the ON/OFF of the power supply.

PSON# controlling the ON/OFF of the power supply.

Item	Description	MIN	MAX	Units
Tvout_rise	Output voltage rise time from each main output.	10	70	ms
Tvout_on	All main outputs must be within regulation of each other within this time.		50	ms
Tvout_off	All main outputs must leave regulation within this time.		400	ms

Output Voltage Timings Fig 1



Item	Description	MIN	MAX	Units
Tsb_on_delay	Delay from AC being applied to 5 VSB being within regulation.		1500	ms
Tac_on_delay	Delay from AC being applied to all output voltages being within regulation.		**3500**	ms
Tvout_holdup	Time all output voltages stay within regulation after loss of AC.	**10**		ms
Tpwok_holdup	Delay from loss of AC to deassertion of PWOK	**9**		ms
Tpson_on_delay	Delay from PSON# active to output voltages within regulation limits.	5	**500**	ms
T pson_pwok	Delay from PSON# deactive to PWOK being deasserted.		50	ms
Tpwok_on	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	1000	ms
T pwok_off	Delay from PWOK deasserted to output voltages (3.3 V, 5 V, 12 V, -12 V) dropping out of regulation limits.	1		ms
Tpwok_low	Duration of PWOK being in the deasserted state during an off/on cycle using AC or the PSON# signal.	100		ms
Tsb_vout	Delay from 5 VSB being in regulation to O/Ps being in regulation at AC turn on.	50	**3000**	ms
Tsb_holdup	Time 5VSB output voltage stays within regulation after loss of AC.	70		ms

3.2 PS_ON

The PSON# signal is required to remotely turn on/off the power supply. PSON# is an active low signal that turns on the +3.3V, +5V, +12V, and –12V power rails. When this signal is not pulled low by the system,or left open, the outputs (except the +5 VSB and Vbias) turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply.

Table 1: PSON# Signal Characteristic

Signal Type	Accepts an open collector/drain input from the system.Pull-upto VSB located in power supply.	
PSON# = Low	ON	
PSON# = Open or High	OFF	
	MIN	MAX
Logic level low (power supply ON)	0V	1.0V
Logic level high (power supply OFF)	2.0V	5.25V
Source current, Vpson = low	5ms	4mA
Power up delay: Tpson_on_delay		400ms
PWOK delay: Tpson_pwok		50ms

3.3 PWOK(Power OK)

PWOK is a power OK signal and will be pulled HIGH by 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. For a representation of the timing characteristics of PWOK. The start of the PWOK delay time shall be inhibited as long as any power supply output is in current limit.

PWOK Signal Characteristics

Signal Type	+5V TTL Compatible output signal	
PWOK = High	Power OK	
PWOK = Low	Power not OK	
MIN	MIN	MAX
Logic level low, Isink = 4mA		0.4V
Logic level high, Isource = 200μA	2.4V	5.25V
PWOK delay: T pwok_on	100ms	1000ms
PWOK rise and fall time		100μs
Power down delay: T pwok_off	1ms	

Protection Cicuits

Protection circuits inside the power supply shall cause only the power supply's main outputs to shutdown. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 10 seconds and a PSON# cycle HIGH for 1 second shall be able to reset the power supply.

3.4 Over Current Protection

The power supply shall have current limit to prevent the +3.3V, +5V, and +12V outputs from exceeding the values shown in Table 4. If the current limits are exceeded, the power supply shall shutdown and latch off. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply shall not be damaged from repeated power cycling in this condition. –12 V and 5 VSB shall be protected under over current or shorted conditions so that no damage can occur to the power supply. All outputs shall be protected so that no damage occurs to the power supply under a shorted output condition.

Table 4: Over Current Protection

Voltage	Over Current Limit (Iout limit)
+3.3V	110% minimum; 180% maximum
+5V	110% minimum; 180% maximum
+12V	110% minimum; 150% maximum

Note: When the rated output power of the installed module is lower than the backplane output power, the module's OPP/OCP protection settings shall take precedence.

3.5 Over Voltage Protection

The power supply over voltage protection shall be locally sensed. The power supply shall shutdown and latch off after an over voltage condition occurs. This latch shall be cleared by toggling the PSON# signal or by an AC power interruption. Table 5 contains the over voltage limits. The values are measured at the output of the power supply's connectors. The voltage shall never exceed the maximum levels when measured at the power pins of the power
supply connector during any single point of fail. The voltage shall never trip any lower than the minimum levels when measured at the power pins of the

Output Voltage	Table 5: Over MIN (V)	Voltage Limits MAX (V)
+3.3V	3.9	5.0
+5V	5.7	7.0
+12V	13.3	14.5
-12V	-13.3	-16.5
+5Vsb	5.7	7.0

3.6 Buzzer Alarm Definition

When the PS_ON button is pressed, the buzzer on the PDB will emit a short "beep" sound, indicating that the power supply module has started normally. When the backplane and both power modules are operating normally, any input power module failure (SMBAlert low), or Power Good fault (PG low) will trigger the buzzer alarm.

3.7 Mute Switch Definition

After the buzzer alarm is triggered, it helps users quickly locate the faulty module by sound. If the fault is not removed while the system remains powered, the buzzer will stay in alarm state untill the power supply fault is cleared or the system power is turned off, after which the alarm will gradually disappear. It the alarm noise causes disturbance in the working environment, the user can press the mute switch on the back panel to forcibly stop the buzzer alarm.

3.8 Alarm LED Definition

The LED blinks as an alert to help users locate the faulty unit through visual observation.
The LED signal is derived from the PSU (SMBAlert). When either PSU1 or PSU2 has a low-level (SMBAlert) signal,the LED will blink. When both PSUs output a high-level signal, the LED remains steadily on.

4.Environmental Requirements

4.1 Temperature

4.1.1 Normal Operating Ambient(at sea level):

Operation temperature: 0℃ to 50℃
Shipping and Storage : -40℃ to 70℃

4.1.2 HUMIDITY

Operating : 20% to 90% RH
Storage : 5% to 95% RH

4.1.3 ALTITUDE

Operating: to 10,000 feet (3,023 meters)
Non-operating: to 35,000 feet (10,580 meters)

5. MTBF and Quality Data

5.1 MTBF

The life requirement shall be met the following condition. And the environmental temperature is assumed to be 25℃.Normal operation (at the rated input/output): 100,000hr.

5.2 ROHS

This power supply is compliant with ROHS requirements.

6. Mechanical Drawing

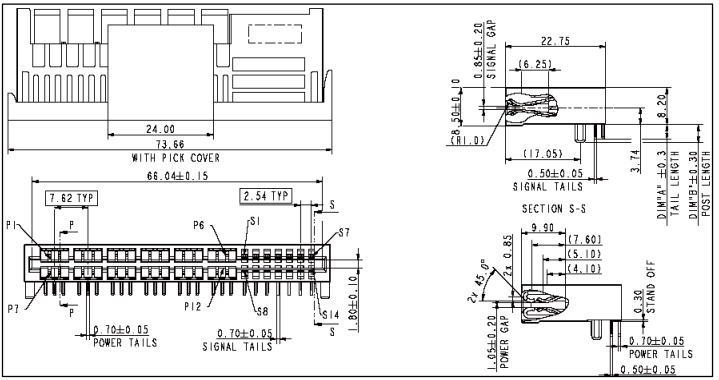
6.1 Intput Connector

The power supply will provide a card edge connector compatible with the backplane. See power supply mechanical drawing for dimensions. The power supply connector is 50pins (25 pair) 90 /180degrees connector.

Power and Signal Connection

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	12VSB
A22	SMB-ALERT	B22	CR_1
A23	RETURN_S	B23	12LS
A24	+12VRS	B24	MUTE
A25	PWOK	B25	C_BUS

Note: The signal pins on the power supply connector will be gold plated to 30 microns.



7. Physical dimension:

1U Dim： L353mm W153.8mm H45.2mm

8. Connectors (INTEL approved equivalent):

M/B 20+4PIN Connector (Molex C4202H02-A20P+A4P or equivalent)

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Black	+3.3V			+3.3V	Black
Black(22AWG)	+3.3Vsense	11	1		
Black	-12V	12	2	+3.3V	Black
Black	GND	13	3	GND	Black
				+5Vsense	Black(22AWG)
Black	PS-ON	14	4	+5V	Black
Black	GND	15	5	GND	Black
Black	GND	16	6	+5V	Black
Black	GND	17	7	GND	Black
Black	NC	18	8	POK	Black
Black	+5V	19	9	+5VSB	Black
Black	+5V	20	10	+12V	Black
Black	+5V	M3	M1	+12V	Black
Black	GND	M4	M2	+3.3V	Black

CPU 4+4PIN Connector (Molex C4202H02-A04P or equivalent)

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Black	+12V	5	1	GND	Black
Black	+12V	6	2	GND	Black
Black	+12V	7	3	GND	Black
Black	+12V	8	4	GND	Black

PCIe (6+2)PIN Connector (Molex P6-I42002K or equivalent)

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Black	+12V	1	4	GND	Black
Black	+12V	2	5	GND	Black
Black	+12V	3	6	GND	Black
Black	GND	1	2	GND	Black

PCIe 12+4PIN：12V-2x6 Auxiliary Power Connector Pin Assignment

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Black	+12V	1	7	GND	Black
Black	+12V	2	8	GND	Black
Black	+12V	3	9	GND	Black
Black	+12V	4	10	GND	Black
Black	+12V	5	11	GND	Black
Black	+12V	6	12	GND	Black
Black(24AWG)	CARD_PWR_STABLE	S1	S3	SENSE0	Black(24AWG
Black(24AWG)	CARD_PWR_STABLE	S2	S4	SENSE1	Black(24AWG

SATA 5PIN Connector (Molex P5-112702T00 or equivalent)

18AWG wire	Signal	Pin
Black	+12V	1
Black	GND	2
Black	+5V	3
Black	GND	4
Black	+3.3V	5

HDD 4PIN (AMP 1-480424-0 or Molex 8981-04P or equivalent)

18AWG wire	Signal	Pin
Black	+12V	1
Black	GND	2
Black	GND	3
Black	+5V	4

Floppy 4PIN (AMP 171822-4 or equivalent)

22AWG wire	Signal	Pin
Black	+12V	4
Black	GND	3
Black	GND	2
Black	+5V	1

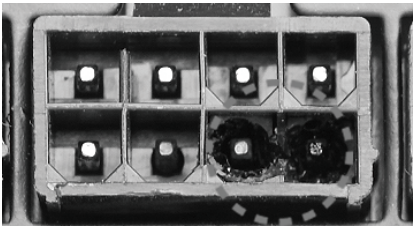
5PIN PMBus Connector

24AWG wire	Signal	PinA	PinB
RED	+3.3V	1	5
Black	GND	2	4
Yellow	ALERT	3	3
Orange	SDA	4	2
White	SCL	5	1

PMBus Definition

Server systems are all equipped with PMBus communication capability.
This power distribution board is designed with an additional connector for PMBus communication, which is used to query FRU data and obtain power supply related information.

9. POWER SUPPLY CONNECTOR OVERUSE DEFINITION



DE **Definition einer Überlastung des Netzanschlusses**

FR **Définition de l'utilisation excessive du connecteur d'alimentation électrique**

ES **Definición de uso excesivo del conector de la Fuente de alimentación**

IT **Definizione di uso eccessivo del connettore di alimentazione**

RU **Определение чрезмерной нагрузки на коннектор блока питания**

TH **ข้อกำหนดการรองรับการใช้งานของขั้วต่อจากพาวเวอร์ซัพพลาย**

KR **전원 공급 커넥터 과용 정의**

JP **電力供給コネクタの使用限度超過に関する説明**

CN 电源供应器接头过度使用定义

TW 電源供應器接頭過度使用定義

Please refer to SilverStone website for latest specifications updates.

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