

## 1.1 INTRODUCTION

First of all, thank you for purchasing MRW/MRP series redundant power supply.

The MRW/MRP series is a 1+1 hot-swappable / hot-pluggable redundant power supply. It consists of,

- 1) complete metal frame
- 2) compact size power module
- 3) backplane

The MRW/MRP series hot swappable redundant power supply offer maximum 350/400/420 watts, and provide Active Power Factor correction (PFC) at full range AC input that complaints to EN 61000-3-2 for CE norms. The power module is in compact size, and built-in a 40mm ball bearing DC fan for better ventilation. Each power module is designed with 6 outputs (+3.3V, +5V, +12V, -5V, -12V, and +5Vsb) circuits. All you can see on the backplane is just passive components and this is the key point for longer MTBF.

The units also offer a warning sub-system, including LED display, buzzer alarm, TTL signal. It guides user the fast way to find out the power supply status.

When all the power modules operate normally, it balances the load share through its parallel design, which increases the reliability of power system.

To really discover the power system and ease in using it, we recommend you to read through this manual carefully.

## 1.2 PACKING

Your MRW/MRP series should consist of the following,

- a) MRW series x 1
- b) Accessory pack x 1
- c) Product Manual x 1

## 1.3 MODEL DESIGNATION

Model number identification

MRW /MRP -Xzzzy

MR --- mini redundant

x --- 6 output channel (+3.3V, +5V, +12V, -5V, -12V & +5Vsb)

--- 5 output channel (+3.3V, +5V, +12V, -12V & +5Vsb)

zzz --- total output power, zzz – 350 / 400 / 420 (unit: watts)

y --- P: built-in PFC (full range)

v: HIGH EFFICIENCY

## 1.4 FEATURES

MRW / MRP series, 350W / 400W / 420W/450W/500W, 1+1 mini redundant power supply with active PFC.

- True redundant design (passive backplane)
- All circuit designed into the power module
- Hot-swap and hot-plug ability
- Full range (90VAC – 264VAC) operation
- Active Power Factor Correction (PFC) built-in
- Balance load sharing design
- Remote sensing design
- Meet FCC, CISPR EMI regulation
- Faulty free- slide rail design
- Isolated fence design to meet safety regulation
- Compact size (PS2 form factor)

## 1.5 DRAWING

## 1.6 SPECIFICATION

### **INPUT CHARACTERISTICS:**

**MRW-5450V4V /5500V4V**

- VOLTAGE: 90 ~ 264 VAC FULL RANGE.
- FREQUENCY: 47 ~ 63 Hz.
- STEADY-STATE CURRENT:
- 7/8A AT ANY HIGH RANGE INPUT VOLTAGE, 3/4A AT ANY LOW RANGE INPUT VOLTAGE
- INRUSH CURRENT: 25A MAX. FOR 110 VAC , 50A MAX. FOR 220 VAC (AT 25 DEGREE C AMBIENT COLD START)
- PFC: UP TO THE TARGET OF 95% @110V, FULL LOAD

### **OUTPUT CHARACTERISTICS:**

OUTPUT VOLTAGE	OUTPUT CURRENT (A)		REGULATION		OUTPUT RIPPLE & NOISE MAX. [P-P]
	MIN.	MAX.	LOAD	LINE	
+5V	1	25	± 250mV	±1%	50mV
+12V	1	37/41	± 600mV	±1%	120mV
-12V	0	0.8	± 600mV	±1%	120mV
+3.3V	1	25	± 165mV	±1%	50mV
+5VSB	0.1	3.5	± 250mV	±1%	50mV

#### REMARKS:

1. +5V AND +3.3V TOTAL MAX. POWER: 170W
2. TOTAL MAX. POWER: 450W / 500W

### **SPECIFICATION:**

- TEMPERATURE RANGE: OPERATING 0°C -- 40°C; STORAGE TEMPERATURE: -20°C – 80°C
- HOLD UP TIME: 16mS MINIMUM AT NOMINAL INPUT VOLTAGE
- EFFICIENCY: TYPICAL >80% AT 115V, 25%~100% MAX LOAD
- LEAKAGE CURRENT: 3.5 mA. MAX. AT NOMINAL VOLTAGE 250VAC
- POWER GOOD SIGNAL: ON DELAY 100 ms TO 500 ms, OFF DELAY 1 ms
- OVER POWER PROTECTION: 110%~160%
- OVER VOLTAGE PROTECTION: +3.3V→3.6~4.3V, +5V→5.5~6.5V, +12V→13.2~15.6V
- OVER CURRENT PROTECTION: +3.3V→27.5~37.5A, +5V→ 27.5~37.5A, +12V→45.1~65.6A
- SHORT CIRCUIT PROTECTION: +12V, -12V, +5VSB
- SAFETY: TO MEET UL, TUV, CB, CCC, RFI/EMI STANDARDS
- EMI NOISE FILTER: FCC CLASS B, CISPR22 CLASS B
- COOLING: 8 0mm DC FANS
- I2C FEATURES (OPTIONAL)
- DIMENSION: 185 (D) x 150 (W) x 86 (H) mm

## 1.7 INSTALLATION & TESTING

Mount the power supply into the system chassis by using proper mounting tool. The mounting holes of the power supply should match up with those in the chassis.

Connect the power connectors to the M/B by following the M/B instruction. There is various on connectors / pinouts in both power supply and M/B. Please ensure to connect the matched one; otherwise, it will cause unexpected harms.

Connect the remaining power connectors to the various peripherals as needed. These connectors are “keyed”, so there will be only one possible way to connect them.

Before applying power source to the system, make sure there is no loose or incorrect connectors. Double check if all connection to the M/B is matched properly. Maybe you would like to test the redundancy function before you put back the cover of your system chassis, then, please power it on. If the power system operates normally, the individual LEDs on power module and the external warning LED light in GREEN. Now, remove one power module from the power system, the warning buzzer in the power system will sound, the external warning LED, which displays the status of the total power system, will change to be RED, the individual LED indicating the power module's status will distinguish. Meanwhile, the power system will continue to backup the power output without affecting the operation of your computing system.

The warning buzzer will sound continuously. You can reset warning buzzer by pressing the buzzer reset switch. Insert the power module which is removed for test earlier. The sound of the warning buzzer will stop; the external warning LED will turn to be GREEN again; the LED indicating the status of power module will light in GREEN. Test another power supply by performing the same procedure.

If everything works out fine, then turn off the power system. Now put back the cover of the chassis and tighten with the screws which you have retained earlier. Now you have completed the installation of MRW / MRP series redundant power supply.

## 1.8 Hot-swap procedures

Please refer to the following when either power module is defective.

1) Locate the defective power module by examining the individual LED (if LED is distinguished, it indicates the power module is defective).

\*\*\* WARNING:

*Please perform the following step carefully; otherwise, it may cause the whole system shutdown.*

\*\*\* WARNING:

*Please do not remove the defective power module until you have worn gloves to keep from being burned. This is due to the cover of the power module is used as heat sink for cooling. Usually, its temperature is around 50-60 degree Celsius under full load condition.*

2) Loose the screws of power module bracket.

3) Plug out the defective power module.

\*\*\* WARNING:

*Please put aside the power module to wait for cooling down. Keep other people from touching it until it is cooled.*

4) Replace a new / GOOD power module. Insert the power module into the power system till to the end.

5) Check the LED of the power module, which should be in GREEN.

6) Check the warning LED indicating the status of total power system, which should be in GREEN.

7) Tighten the screws of the power module.

8) If you want to test this new power module and simulate the defective situation, please refer to Section 1.7 Installation & Testing.

*Remarks: If the DC fan of the power module fails, you have to replace the power module. Please follow the Hot-Swap Procedures for replacement.*

## 1.9 PINOUTS AND FUNCTION OF THE CONNECTORS

### THE LED CONNECTOR OF TOTAL POWER SYSTEM

PIN#	COLOR
1	RED
2	BLACK
3	GREEN

### THE BUZZER RESET SWITCH CONNECTOR

PIN#	COLOR
1	BLACK
2	YELLOW

### THE SIGNAL CONNECTOR OF POWER RESET

PIN#	COLOR	COLOR
1	RED	TTL SIGNAL
2	BLACK	GND

TTL signal:

Sink current max. 5mA

Source current max. 50uA

Low Active ---Defective

High ---Normal

## 1.10 TROUBLE SHOOTING

If you have followed these instructions correctly, it should function normally.

Some common symptoms are, the system doesn't work, buzzer alarms, shutdown after running a very short period,...etc. If so, please check the following steps to verify and correct it.

- 1) Check all connection (if pinouts is correct, if any connection loosed, if the direction is incorrect,...etc.).
- 2) Check if any short-circuit or defective peripherals by plugging out the power connector from each peripheral, one at a time. Shall the system functions again, you have solved the problem.

3) Once you hear the buzzer sound or see the warning LED in RED, please check,

- a) If the loading is under the minimum or over the maximum load of each channel.
- b) If the power source is well connected and supplied.

Shall the above condition is happened, please disconnect the power source and wait for 2-3 minutes to release the protection status; then test it again.

- c) If buzzer keeps alarming or LED indicates the power module failure, please locate which power module is defective. Perform hot-swap procedures (ref. to Sec. 1.8 Hot-Swap Procedures). Return the defective power module back to your vendor for RMA procedure.
- d) If you can not fix the problem, please contact your vendor for supporting.

Note:

\* The description stated herein is subject to change without prior notice.

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