Market Central ®

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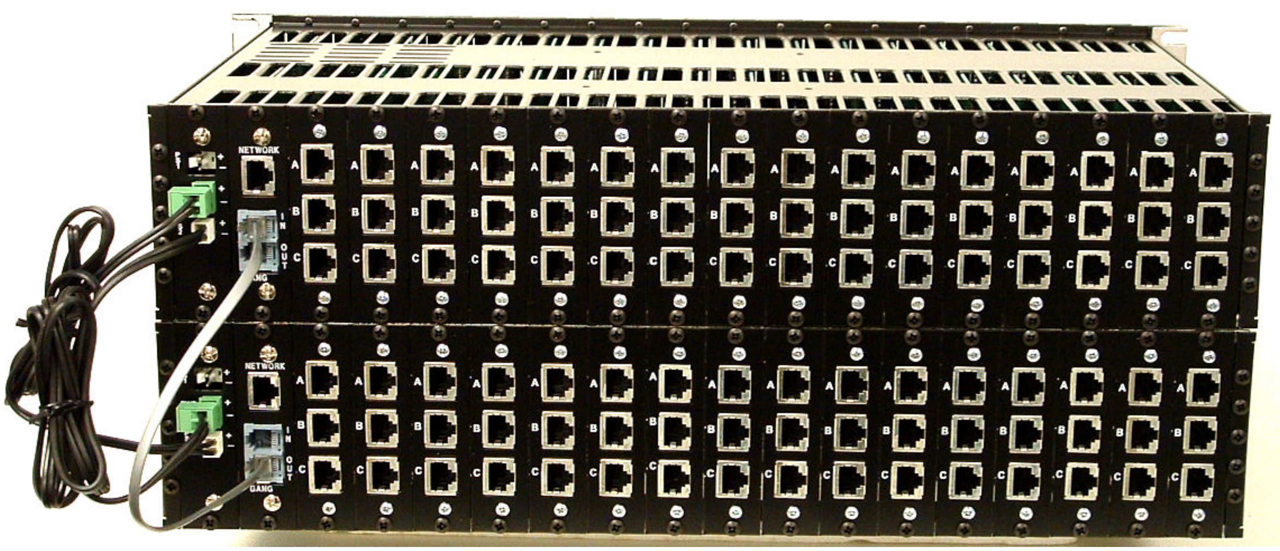
SwitchMaster® R5000 Series
Ultra-Compact Ganged A/B Switching System

July, 2014

COMPLETE 2 CHASSIS SWITCHING SYSTEM INCLUDING (32) RJ45 A/B SWITCH CARDS (SWITCH 8 LEADS), (2) CONTROLLER CARDS, (2) POWER SUPPLY ADAPTER CARDS, AND (2) POWER SUPPLY MODULES	5000877
COMPLETE SINGLE CHASSIS SWITCHING SYSTEM INCLUDING (16) RJ45 A/B SWITCH CARDS (SWITCH 8 LEADS), (1) CONTROLLER CARD, (1) POWER SUPPLY ADAPTER CARD, AND (2) POWER SUPPLY MODULES	5000877-1
COMPLETE 2 CHASSIS SWITCHING SYSTEM INCLUDING (32) RJ45/10 A/B SWITCH CARDS (SWITCH 10 LEADS), (2) CONTROLLER CARDS, (2) POWER SUPPLY ADAPTER CARDS, AND (2) POWER SUPPLY MODULES	5000877-2
CONTROLLER CARD – MANUAL CONTROL ONLY (FRONT & REAR CARD SET)	5000764-SP
RJ45 A/B SWITCH CARD, 8 LEADS	5000725-SP
RJ45/10 A/B SWITCH CARD, 10 LEADS	5000807
EXTERNAL P/S ADAPTER CARD PLUS REDUNDANT CHASSIS POWER CABLE	5000752-SP
EXTERNAL AC/DC POWER SUPPLY MODULE	5000761
2U HIGH, 19” RACK MOUNT CHASSIS	5000722-BLK
RJ11 CROSSOVER CABLE	803078



(rear view of ganged system)

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1. Specifications

Connectors:
RJ45 A/B SWITCH CARDS – (3) RJ45 connectors (either 8/8 or 10/10 depending on switch card part number)
CONTROLLER CARD – (1) RJ45, (2) RJ11
EXT POWER SUPPLY ADAPTER CARD – (2) two pin molex male connectors, (1) two pin terminal block

Indicators:
RJ45 A/B SWITCH CARDS – (2) LED, one for port A connected, one for port B connected
CONTROLLER CARD – (2) LED, one for power, one for status
EXT POWER SUPPLY ADAPTER CARD – (2) LED, PS1 & PS2 POWER STATUS

Switches:
A/B SWITCH CARDS – (1) momentary toggle switch
CONTROLLER CARD – (1) momentary toggle switch, (1) momentary push-button switch

Power:
RJ45 A/B SWITCH CARDS – 12 VDC, 40 mA normal, additional 92 mA max while switching
CONTROLLER CARD – 12 VDC, 100 mA normal
The rack may be powered with one or two (for redundancy) 100-240 VAC, 50-60 Hz input 12 VDC output external power supply modules connected to a single slot power supply adapter card.

Rack Size:
RACK – 3.5” H x 19” W x 12.5” D including handles and connectors – the rack has 18 slots
RJ45 A/B SWITCH CARDS – one slot wide
CONTROLLER CARD – one slot wide
EXT PWR SUPPLY ADPTR CARD – one slot wide

Environment:

TEMPERATURE	0° to 50° C operating, -40° to 70° C non-operating
HUMIDITY	0 to 95% non-condensing
ALTITUDE	40,000 ft maximum

2. Introduction

The R5000 SwitchMaster® Switching System is a 2U 19" rack style chassis containing multiple A/B Switch Cards. Each switch card connects port A or port B to port C, through latching telecommunication relays. Latching switch cards retain their selected connections and continue to pass data even when power is lost or removed. The R5000 rack has 18 slots and can accept any mix of switch cards, power supply cards, and one Controller Card (one required per chassis). Any type of card can be installed in any slot in the R5000 rack, allowing for maximum flexibility of cable routing etc. If a single slot power supply card is used, the rack can hold up to 16 A/B Switch Cards, and a Controller Card. The Controller Card has two RJ11 ports which allow multiple racks to be daisy-chained together to create a single system. Each A/B Switch Card can be individually switched, or an entire rack can be switched, or an entire system of daisy chained racks can be switched. See section 5 Operation for additional details.

3. Configuration

3.1 Controller Card Rear PC Board Configuration

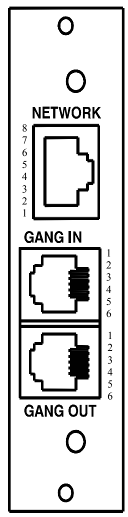

Figure 3.1.1 – Controller Card Rear Panel Outline

The Controller Card rear pc board assembly has two 3-pin headers for shielding and grounding options. These headers are positioned such that pin 1 is toward the card edge connector, and pin 3 is toward the RJ11 connectors. Each header has a 2-position jumper, used to connect two of the three pins together. It should not be necessary to change these jumpers from their factory default positions. The available options are shown in the table below for reference.

Table 3.1.1 – Controller Card Rear PC Board Jumper Settings

Jumper	W1	W2
RJ45 Shield Connected to Frame Ground * Open	 Pin 1 to Pin 2 Pin 2 to Pin 3	
Power Supply Ground 100 Ohm Connection to Frame Ground * Direct Connection to Frame Ground		 Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Positions

Table 3.1.2 – RJ11 GANG-IN Port Pin Assignment

Pin	Signal Name	Signal Direction
5	Signal Ground	Not Applicable
4	Transmit Data	Output
3	Receive Data	Inputt
2	System Control (OPEN,+12,-12)	Input and Output

Table 3.1.3 – RJ11 GANG-OUT Port Pin Assignment

Pin	Signal Name	Signal Direction
5	No Connection	Not Applicable
4	Transmit Data	Output
3	Receive Data	Input
2	Signal Ground	Not Applicable

Note: To daisy chain multiple racks together to create a ganged switching system, use the provided RJ11 male/male crossover cable to connect from the gang-out port on one rack to the gang-in port on the next rack.

3.2 Controller Card Front PC Board Configuration

The Controller Card front pc board has an 8-position dipswitch and four 3-pin headers for user configurable options. All 8 positions on the DIP switch are set to the OFF position as the factory default, and should not be changed. The four 3-pin headers are positioned such that pin 1 is toward the front panel, and pin 3 is toward the rear of the card. Each 3-pin header has a 2-position jumper, used to connect two of the three pins together.

Table 3.2.1 – Controller Card Front PC Board Jumper W1 and W2 Settings

Jumper	**W1**	**W2**
Gang-In Pin 3 Connected to TXD *	Pin 1 to Pin 2	
Gang-In Pin 4 Connected to RXD *		Pin 1 to Pin 2

* Factory Default Setting

Jumpers W1 and W2 function as a pair to configure the gang-in port. These jumpers should not be changed from their factory set default positions. Both jumpers should be set to connect pins 1 and 2.

Table 3.2.2 – Controller Card Front PC Board Jumper W4 and W5 Settings

Jumper	**W4**	**W5**
Internal Comm Port Source Standard mode *	Pin 1 to Pin 2	
Internal Comm Port Source Standard mode *		Pin 1 to Pin 2

* Factory Default Setting

Jumpers W4 and W5 function as a pair to select the source for the controller card's internal communications port. These jumpers should not be changed from their factory set default positions. Both jumpers should be set to connect pins 1 and 2.

4. Installation

4.1 Controller Card Front & Rear PC Board Installation

4.1.1 Align the rear card with the card guides, then carefully slide the rear card into the rack until it makes connection to the 8-position socket on the rack backplane.
4.1.2 Secure the rear card to the rack at the top and bottom of the card using the screws provided.
4.1.3 Align the front card with the card guides, then carefully slide the front card into the rack until it makes connection to the 36-position card edge connector on the rear controller card pcbd.
4.1.4 Secure the front card to the rack at the top and bottom of the card using the screws provided.

4.2 A/B Switch Card Installation

4.2.1 From the rear of the rack, align the switch card with the card guides, then carefully slide the card into the rack until it makes connection to the 8-position socket on the rack backplane.
4.2.2 Secure the card to the rear of the rack at the top and bottom of the card using the screws provided.
4.2.3 If not already in place, secure the front panel to the rack using the screws provided.

4.3 External Power Supply Adapter Card Installation

4.3.1 From the rear of the rack, align the power supply adapter card with the card guides, then carefully slide the card into the rack until it makes connection to the 8-position socket on the rack backplane.
4.3.2 Secure the card to the rear of the rack at the top and bottom of the card using the screws provided.
4.3.3 If not already in place, secure the front panel to the rack using the screws provided.

4.4 Connecting External Power Supply Modules & Redundant Chassis Power Cables

4.4.1 To provide redundant power to a ganged system of two chassis, connect one external power supply module to the PS1 input connector on the power supply adapter card in the first chassis, and connect the second external power supply module to the PS1 input connector on the power supply adapter card in the second chassis. Then using one of the provided Redundant Chassis Power Cables, connect from the PWR OUT connector on the first chassis to the PS2 input connector on the second chassis. Use the other Redundant Chassis Power Cable to connect from the PWR OUT connector on the second chassis to the PS2 input connector on the first chassis. Apply AC power to the external power supply module for the first chassis and verify that the PS1 LED on the first chassis and the PS2 LED on the second chassis are lit. Then apply power to the second external power supply module and verify that the PS1 LED on the second chassis and the PS2 LED on the first chassis are also now lit. This indicates that each chassis is being powered from two sources. If both LEDs on both chassis do not illuminate, verify that AC power is being provided to both external supplies, and that the DC output cords are plugged into the PS1 inputs correctly. Also check the polarity of both Redundant Chassis Power Cables to make sure that the "+" and "-" from the PWR OUT connector on one chassis is connected to the "+" and "-" on the PS2 input connector on the other chassis. When properly configured, if either external power supply module should loose power, the associated front panel LEDs on each chassis will go out but each chassis will continue to operate using power from the remaining supply.
4.4.2 If using a single external power supply module to power a single 2U chassis, you can connect the external power supply DC output cord to either the PS1 or the PS2 input connector on the power supply adapter card. Then connect the external power supply AC input cord to a 100-240 VAC 50-60 Hz source of power. With this configuration only the PS1 or PS2 LED will illuminate on the front of the power supply adapter card to indicate that the chassis is being powered from a single source.
4.4.3 If using two external power supply modules to provide redundant power to a single 2U chassis, connect one external power supply DC output cord to the PS1 input connector on the power supply adapter card, and connect the second external power supply DC output cord to the PS2 input connector on the power supply adapter card . Then connect the external power supply AC input cords to separate 100-240 VAC 50-60 Hz sources of power. With this configuration both the PS1 and PS2 LEDs will illuminate on the front of the power supply adapter card to indicate that the chassis is being powered from two sources. If either external power supply module should loose power, the associated front panel LED will go out but the 2U chassis will continue to operate using power from the remaining supply.

4.5 Daisy Chain Connecting Multiple Racks Together

4.5.1 If multiple racks are to be daisy-chained together so that all the cards in the system can be simultaneously switched, use an RJ11 male/male crossover cable to connect the gang out from one rack to the gang in connector on the next rack. Repeat this step until all racks have been connected.

5. Operation

When power is applied to the chassis, the appropriate PWR LED(s) should illuminate on the power supply card, and either the "A" LED or the "B" LED should illuminate on each A/B switch card to indicate the port connection status of each switch card.

The toggle switches on the A/B Switch Cards are used to switch only that card. Hold the switch in the “A” position to connect Port A to Port C. The “A” LED will illuminate when the switch operation has been completed. Release the toggle switch when switching has finished. Hold the switch in the “B” position to connect Port B to Port C. The “B” LED will illuminate when the switch operation has been completed. Release the toggle switch when switching has finished.

The toggle switch on the Controller Card is used to simultaneously switch all cards in the rack, and is operated in the same fashion as the individual toggle switches on the A/B Switch Cards. Hold the toggle switch on the Controller Card in the “A” position to connect Port A to Port C on every switch card in the chassis. The “A” LED will illuminate on each switch card when the switch operation has been completed. Release the toggle switch when switching has finished. Hold the toggle switch on the Controller Card in the “B” position to connect Port B to Port C on every switch card in the chassis. The “B” LED will illuminate on each switch card when the switch operation has been completed. Release the toggle switch when switching has finished.

To switch an entire system of daisy-chained racks, press the “system” push-button while operating the toggle switch on the Controller Card. Press the “system” push-button and hold the toggle switch on the Controller Card in the “A” position to connect Port A to Port C on every switch card in entire system of racks. The “A” LED will illuminate on each switch card when the switch operation has been completed. Release the toggle switch and pushbutton switch when switching has finished. Press the “system” push-button and hold the toggle switch on the Controller Card in the “B” position to connect Port B to Port C on every switch card in entire system of racks. The “B” LED will illuminate on each switch card when the switch operation has been completed. Release the toggle switch and pushbutton switch when switching has finished.

Note: The Controller Card STAT LED will blink when the toggle switch on the Controller Card is used to initiate a “rack” or “system” level switching operation.

Market Central, Inc.

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