Market Central®

www.secureswitch.com

19 North Main Street, Houston, PA 15342 USA
412.494.2800 **CAGE 1BGJ7**

SwitchMaster® R7400 Series
Multiport Ganged Switching System

April 2025

Rack Mount Chassis	6001065	4U 19" Chassis
Universal Controller Card	6001053	Includes MIB file, can be used in place of 6001058 or a 6001066 controller card
SNMP Controller Card	6001058	Includes MIB file
RS232 Controller Card	6001066	
Logic-only Controller Card	6001060	
RJ45 A/B (2 to 1) Switch Card	6001068	Switches All 8 Leads
RJ45 Dual Channel A/B (2 to 1) Switch Card	6001061	"
RJ45 ABC (3 to 1) Switch Card	6001069	"
RJ45 ABCD (4 to 1) Switch Card	6001070	"
RJ45 CAT-6 A/B (2 to 1) Switch Card	6001062	Supports 10 GbE
RJ45 CAT-6 Dual Channel A/B (2 to 1) Switch Card	6001063	"
RJ45 CAT-6 ABC (3 to 1) Switch Card	6001064	"
RJ45 CAT-6 ABCD (4 to 1) Switch Card	6001072	"
Multimode Fiber Optic A/B (2 to 1) Switch Card - SC	6001073	Full Duplex, Multimode Fiber
Multimode Fiber Optic Dual Channel A/B (2 to 1) Switch Card - SC	6001074	"
Multimode Fiber Optic ABC (3 to 1) Switch Card - SC	6001067	"
Multimode Fiber Optic ABCD (4 to 1) Switch Card - SC	6001075	"
Singlemode Fiber Optic A/B (2 to 1) Switch Card - SC	6001076	Full Duplex, Singlemode Fiber
Singlemode Fiber Optic Dual Channel A/B (2 to 1) Switch Card - SC	6001077	"
Singlemode Fiber Optic ABC (3 to 1) Switch Card - SC	6001078	"
Singlemode Fiber Optic ABCD (4 to 1) Switch Card - SC	6001079	"
Blank Rear Panel	6000762-BLK	Covers 1 empty slot in Chassis
External Power Supply Module	6000761	1 per chassis, or 2 for redundant power
48 VDC Power Supply Card	6001404	Single input
48 VDC Power Supply Card Dual Input	6001403	Dual input for redundant power

NOTE: The part numbers provided above are for Latching Switch Cards, Non-Latching versions are also available. Fiber Optic Switch Cards are also available with LC or ST connectors.

Market Central Inc., 19 North Main Street, Houston, PA 15342
Phone: (412) 494-2800, Fax: (412) 494-5550, www.secureswitch.com CAGE Code 1BGJ7
Copyright© 2019. Market Central, Inc. All rights Reserved.
Market Central® and SwitchMaster® are registered trademarks of Market Central, Inc.

Market Central, Inc.

Federal Communications Commission (FCC) Statement

Contents

Market Central, Inc.

1. Specifications

Connectors:
RJ45 A/B (2 to 1) SWITCH CARDS – (3) RJ45 connectors
RJ45 DUAL CHANNEL A/B (2 to 1) SWITCH CARDS – (6) RJ45 connectors
RJ45 ABC (3 to 1) SWITCH CARDS – (4) RJ45 connectors
RJ45 ABCD (4 to 1) SWITCH CARDS – (5) RJ45 connectors
FIBER OPTIC A/B (2 to 1) SWITCH CARD – (3) duplex SC or ST
FIBER OPTIC DUAL CHANNEL A/B (2 to 1) SWITCH CARD – (6) duplex SC or ST
FIBER OPTIC ABC (3 to 1) SWITCH CARD – (4) duplex SC or ST
FIBER OPTIC ABCD (4 to 1) SWITCH CARD – (5) duplex SC or ST
CONTROLLER CARD – (2) RJ12 (6 wire), (2) Two-Position DC Power Entry, (2) Two-Position Alarm Contact
                 Terminal Block, (1) RJ45 Ethernet Interface (not active on some models)

Indicators:
A/B (2 to 1) SWITCH CARDS – (2) LED, one for A, one for B
DUAL CHANNEL A/B (2 to 1) SWITCH CARDS – (4) LED, one each for A, B, C, and D
ABC (3 to 1) SWITCH CARDS – (3) LED, one each for A, B, and C
ABCD (4 to 1) SWITCH CARDS – (4) LED, one each for A, B, C, and D
CONTROLLER CARD – (3) LED, two for power, one for status, (2) Alarm Relay Contacts

Switches:
A/B (2 to 1) SWITCH CARDS – (2) momentary push-button switches, one for A, one for B
DUAL CHANNEL A/B (2 to 1) SWITCH CARDS – (4) momentary push-button switches, one for A, B, C, & D
ABC (3 to 1) SWITCH CARDS – (3) momentary push-button switches, one each for A, B, and C
ABCD (4 to 1) SWITCH CARDS – (4) momentary push-button switches, one each for A, B, C, and D
CONTROLLER CARD – (5) momentary push-button switches, one each for A, B, C, and D and one for SYSTEM,
(1) 8-position dipswitch
4U RACK – (1) key-lock switch

Ethernet Interface (SNMP Controller Card and Universal Controller Card only):
10BASE-T/100BASE-TX, Full-Duplex and Half-Duplex supported, Auto MDI/MDI-X supported

Power:

CARD TYPE	Steady-State Load at 12 VDC	Momentary Maximum Load While Switching	Steady-State Load For Non-Latching Switch Cards
RJ45 A/B SWITCH CARD	20 mA	85 mA	85 mA
RJ45 DUAL CHANNEL A/B SWITCH CARD - INDIVIDUAL	20 mA	85 mA	150 mA
RJ45 DUAL CHANNEL A/B SWITCH CARD - GANGED	20 mA	150 mA	150 mA
RJ45 ABC SWITCH CARD	20 mA	85 mA	85 mA
RJ45 ABCD SWITCH CARD	20 mA	85 mA	150 mA
MULTIMODE FIBER OPTIC A/B SWITCH CARD	20 mA	115 mA	115 mA
MULTIMODE FIBER OPTIC DUAL CHANNEL A/B SWITCH CARD - INDIVIDUAL	20 mA	115 mA	210 mA
MULTIMODE FIBER OPTIC DUAL CHANNEL A/B SWITCH CARD - GANGED	20 mA	210 mA	210 mA
MULTIMODE FIBER OPTIC ABC SWITCH CARD	20 mA	115 mA	210 mA
MULTIMODE FIBER OPTIC ABCD SWITCH CARD	20 mA	115 mA	210 mA
SINGLEMODE FIBER OPTIC A/B SWITCH CARD	25 mA	100 mA	100 mA
SINGLEMODE FIBER OPTIC DUAL CHANNEL A/B SWITCH CARD - INDIVIDUAL	25 mA	100 mA	175 mA

Market Central, Inc.

CARD TYPE	Steady-State Load at 12 VDC	Momentary Maximum Load While Switching	Steady-State Load For Non-Latching Switch Cards
SINGLEMODE FIBER OPTIC DUAL CHANNEL A/B SWITCH CARD - GANGED	25 mA	175 mA	175 mA
SINGLEMODE FIBER OPTIC ABC SWITCH CARD	25 mA	100 mA	175 mA
SINGLEMODE FIBER OPTIC ABCD SWITCH CARD	25 mA	100 mA	175 mA
CONTROLLER CARD	50 mA	80 mA	N/A
CONTROLLER CARD WITH ETHERNET MODULE	300 mA	330 mA	N/A

The 4U rack may be powered with one or two external 12 VDC, 5 A, regulated supplies.
The external power supply has an IEC input socket, for 100 – 240 VAC, 47 – 63 Hz INPUT, with a 12 VDC, 5 A, regulated OUTPUT.

Fiber Optic Switch Operating Wavelength

Switch Type	Operating Wavelength
Latching – Multimode	800 to 1600 nm
Non-Latching – Multimode	850 & 1310 nm *
Latching – Singlemode	1310 (1260 – 1360) nm & 1550 (1510 – 1610) nm *
Non-Latching - Singlemode	1310 (1260 – 1360) nm & 1550 (1510 – 1610) nm *

* other wavelengths available as a custom

Fiber Optic Switch Insertion Loss and Isolation

Switch Type	Insertion Loss (Max)	Isolation dB (Min)
A/B and DUAL A/B		
Multimode	2.0 dB	35 dB
Singlemode	1.5 dB	55 dB
ABC (3:1) and ABCD (4:1)		
Multimode	3.0 dB	35 dB
Singlemode	2.5 dB	55 dB

Environment:
TEMPERATURE   0° to 50° C operating, -10° to 60° C non-operating
HUMIDITY   up to 80%, non-condensing

Rack Size:
RACK – 7.0" H x 19" W x 6.5" D (not including handles and connectors)
RJ45 A/B (2 to 1) SWITCH CARDS – one slot (0.937 inches wide)
RJ45 DUAL CHANNEL A/B (2 to 1) SWITCH CARDS – one slot (0.937 inches wide)
RJ45 ABC (3 to 1) SWITCH CARDS – one slot (0.937 inches wide)
RJ45 ABCD (4 to 1) SWITCH CARDS – one slot (0.937 inches wide)
FIBER OPTIC A/B (2 to 1) SWITCH CARDS – one slot (0.937 inches wide)
FIBER OPTIC DUAL CHANNEL A/B (2 to 1) SWITCH CARDS – one slot (0.937 inches wide)
FIBER OPTIC ABC (3 to 1) SWITCH CARDS – one slot (0.937 inches wide)
FIBER OPTIC ABCD (4 to 1) SWITCH CARDS – one slot (0.937 inches wide)
CONTROLLER CARDS – one slot (0.937 inches wide)

The R7400 Multiport Ganged Switching System rack has 18 slots. Slot 18 is reserved for special applications and is covered by a blank panel to prevent accidental mis-use.

Market Central, Inc.

2. Introduction

The R7400 Multi-port Ganged Switching System is a 4U high 19 inch rack style gang switch that supports multiple R7400 switch cards. Its rack mount chassis has 18 slots, with slot 18 reserved for special applications. A Controller Card must be installed in slot 17, leaving 16 slots for any mix of R7400 switch cards. Each switch card can be individually switched, or the entire rack can be switched from the Controller Card. Two RJ12 ports are provided that can be used to daisy chain up to 255 racks, thus allowing a single point of control for all the racks in a daisy chain system of racks. The R7400 also supports switching control via a +12 VDC signal, or via remote external momentary contact switches. When controlled via external momentary contact switches, the maximum number of racks that can be daisy chained together is limited to 64 racks.

The R7400 switch cards are available in five basic types.
Type 1: A/B (2 to 1) switch cards connect the COMMON port to the A port or the B port.
Type 2: Dual (INDIVIDUAL) Channel A/B (2 to 1) switch cards connect COMMON 1 port to the A port or the B port, and COMMON 2 port to the C port or the D port. When configured for Individual control, Channel 1 and Channel 2 operate independently.
Type 3: Dual (GANGED) Channel A/B (2 to 1) switch cards connect COMMON 1 port to the A port or the B port, and COMMON 2 port to the C port or the D port. When configured for Ganged control, Channel 1 and Channel 2 operate together. When COMMON 1 port is connected to the A port, COMMON 2 port is connected to the C port. When COMMON 1 port is connected to the B port, COMMON 2 is connected to the D port.
Type 4: ABC (3 to 1) switch cards connect the COMMON port to the A port, or the B port, or the C port.
Type 5: ABCD (4 to 1) switch cards connect the COMMON port to the A port, or the B port, or the C port, or the D port.

The DUAL CHANNEL A/B (2 to 1) switch cards are user configurable as INDIVIDUAL channel control or GANGED channel control.

The standard R7400 switch cards make the connections using latching telecommunication relays or latching fiber optic switching mechanisms. Latching circuitry allows the switch cards to retain their selected connections and maintain data flow even when power is lost or is removed.

R7400 switch cards are also available with non-latching relays or non-latching fiber optic switching mechanisms (please call for details). Non-latching switch cards will power up with the COMMON port connected to the A port, and when power is lost, these cards will automatically "fall-back" to the "COMMON port connected to the A port" connection state.

The Controller Card is available in four options: (Logic Only, RS-232, SNMP, and Universal). The Logic Only version supports individual card switching, Rack switching, and System Gang Switching using the front panel push-button switches, as well as Gang Switching using an external +12 VDC signal or external remote contact switches. A key lock switch on the rack allows the user to enable or disable manual switching (disables the front panel push-button switches). The RS-232 version supports the manual switching capabilities of the Logic Only version , as well as RS-232 communications on the Gang-In and Gang-Out connectors. The Gang-In connector can be configured to use RS-232 communications or external signal / contact. The RS-232 version allows racks to be addressed, and individual Switch Cards within the rack to be switched with serial commands.

The SNMP version controller card supports all of the features of the RS-232 version, and adds an Ethernet module for SNMP, telnet, or web browser remote access. Note that there can only be one SNMP style Controller Card in a daisy chained system of racks, and it must be installed in the first rack in the system. The SNMP Controller Card also supports SNMP traps or syslog messages (user configurable) for various events notifications, and can send these notifications to as many as 16 different remote monitoring locations.

The Universal version controller card can operate either as an SNMP controller card or as an RS-232 controller card. This versatility makes it well suited for use as a spare, or when maximum flexibility is an important consideration. The address DIP switch on the Universal controller card is used to configure its operating mode. When this address is set to 01, the Universal controller card operates as an SNMP version controller card with the Ethernet interface enabled. When this address is set to 02 or higher, the RJ45 Ethernet remote interface on the Universal controller card is disabled and it operates as an RS-232 version controller card.

Market Central, Inc.

3. Configuration

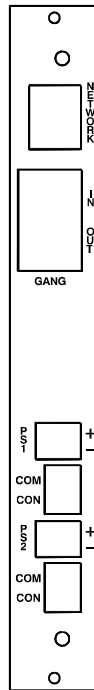### 3.1 Controller Card Configuration

Figure 3.1.1 – Controller Card Outline

The following discussion will describe all user configurable settings on the R7400 Controller Card. Some of these settings are not applicable to all versions of the controller card and this is noted below where appropriate.

DIP Switch SW6 is used to set the Controller Card's address. The Controller Card address is used to identify the rack number when remotely accessing the switch through the serial port or Ethernet port. The Controller Card address can be set from 0x01 to 0xFF hex, with position 1 being the least significant bit and position 8 being the most significant bit. A switch in the ON position is a low or 0 bit, while a switch in the OFF position is a high or 1 bit. Address 0x00 is invalid and must not be used (it is used for factory test only). Each Controller Card within a multi-rack system must have a unique address. The first rack in the system should be assigned address 0x01, the next rack address 0x02, and so on through 0xFF. If an Ethernet enabled Controller Card is being used in a multi-rack system, it must be located in the first rack in the daisy-chained system of racks, and that card must be set to address 0x01. Only one Ethernet enabled Controller Card is permitted per multi-rack system. Note that when using a Universal controller card, setting the card's rack address to 0x01 enables the Ethernet remote control interface, while setting the card's rack address to 0x02 or higher disables the Ethernet remote control interface. You can use a Universal controller card in each rack in a daisy-chained system of racks as long as the first rack is configured with address 0x01, and the second rack is configured with address 0x02, and so on.

The Controller Card also has user configurable jumpers. The 3-pin jumpers are positioned such that pin 1 is located toward the front or top of the card. For reference, the LED indicators and push-button switches are located at the front toward the top of the card. Each 3-pin jumper has a 2-position shunt, used to connect two of the three pins together.

Table 3.1.2 – Controller Card Shield and Ground Jumper Settings (* indicates factory default positions)

Jumper	W1	W20
RJ45 Shield		
Connected to Frame Ground *	Pin 1 to Pin 2	
Open	Pin 2 to Pin 3	
Power Supply Ground		
100 Ohm Connection to Frame Ground*		Pin 1 to Pin 2
Direct Connection to Frame Ground		Pin 2 to Pin 3

Figure 3.1.2 – RJ45 and RJ12 Pin Number Diagram
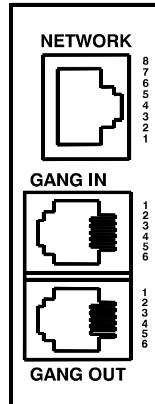
Table 3.1.3 – RJ45 (Optional Ethernet Port) Pin Assignment

Pin	Signal Name	Signal Direction
1	Transmit Pair	Output
2	Transmit Pair	Output
3	Receive Pair	Input
6	Receive Pair	Input

Note: Although the RJ45 port is present on all versions of the Controller Card, this port is only used on the SNMP and Universal version of the Controller Card.

Table 3.1.4 – RJ12 GANG-IN Port Pin Assignment

Pin	Signal Name	Signal Direction	Jumper
6	V+ (Approximately 11 VDC)	Output (current limited)	None
5	Signal Ground	Not Applicable	None
4	Transmit Data / SYS_A (I/O)	Output / (Input and Output)	W10 (not on logic only controller card)
3	Receive Data / SYS_B (I/O)	Input / (Input and Output)	W9 (not on logic only controller card)
2	Open / SYS_C (I/O)	None / (Input and Output)	W7 (not on logic only controller card)
1	Open / SYS_D (I/O)	None / (Input and Output)	W8 (not on logic only controller card)

Note: Jumpers W7, W8, W9, and W10 select the function of pins 1 through 4 on the GANG-IN port. The logic only model of the controller card does not have these jumpers installed. Pins 1 through 4 are factory configured as SYS I/O pins and are not user configurable.

Market Central, Inc.

Table 3.1.5 – RJ12 GANG-OUT Port Pin Assignment

Pin	Signal Name	Signal Direction	Jumper
6	Open / SYS_D (I/O)	None / (Input and Output)	W14 (not on logic only controller card)
5	Open / SYS_C (I/O)	None / (Input and Output)	W13 (not on logic only controller card)
4	Transmit Data / SYS_B (I/O)	Output / (Input and Output)	W15 (not on logic only controller card)
3	Receive Data / SYS_A (I/O)	Input / (Input and Output)	W11 (not on logic only controller card)
2	Signal Ground	Not Applicable	
1	V+ (Approximately 11 VDC)	Output (current limited)	None

Note: Jumpers W11, W13, W14, and W15 select the function of pins 3 through 6 on the GANG-OUT port. The logic only model of the controller card does not have these jumpers installed. Pins 3 through 6 are factory configured as SYS I/O pins and are not user configurable.

Note: The PC board GANG-IN / GANG-OUT connectors are RJ12 6P6C jacks. When daisy-chain connecting multiple racks, a standard RJ11 6P4C male/male crossover cable is sufficient to daisy chain connect from the gang-out port on one rack to the gang-in port on the next if the controller cards in the racks support serial communications. For logic only controller cards, or when using the SYS_I/O signals a 6P6C cable is required.

Table 3.1.6 – Controller Card **GANG-IN** Port Configuration Jumper Settings (not applicable to logic only controller cards)

Jumper	W10	W9	W7	W8
Gang-In Pin 4 Connected to TXD * Connected to SYS_A (I/O)	Pin 1 to Pin 2 Pin 2 to Pin 3			
Gang-In Pin 3 Connected to RXD * Connected to SYS_B (I/O)		Pin 1 to Pin 2 Pin 2 to Pin 3		
Gang-In Pin 2 Not Connected * Connected to SYS_C (I/O)			Pin 1 to Pin 2 Pin 2 to Pin 3	
Gang-In Pin 1 Not Connected * Connected to SYS_D (I/O)				Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting

Jumpers W7, W8, W9, and W10 function as a group to configure the GANG-IN port. Refer to table 3.1.4 for the GANG-IN port pin assignment. Connect to TXD and RXD to support RS-232 serial communications, or connect to SYS I/O signals to control the system with a remote 12 volt source or remote contact switches.

NOTE: RS-232 serial communication is not supported on the logic only version. A logic only Controller Card will be factory configured with connections to the SYS I/O signals, and jumpers W7 – W11 and W13 – W15 will not be present.

The connections to V+ on pin 6 of the GANG-IN connector and to pin 1 of the GANG-OUT connector are through a diode and through 1 K ohm resistors. When configured, the System Control signals on pins 1 through 4 of the GANG-IN connector and pins 3 through 6 on the GANG-OUT connector can function as inputs and outputs. When used as inputs these System Control signals can be driven to +12 VDC to switch the installed switch cards to the desired connection state. For example SYS_A is driven to +12 VDC to switch the system to A. SYS_B is driven to +12 VDC to switch the system to B and so on. As an output, the signals are driven to +10 VDC when the user initiates a system switch. When the user initiates a SYSTEM switch to A, SYS_A and is driven to +10 VDC. When

the user initiates a SYSTEM switch to B, SYS_B and is driven to +10 VDC and so on.

Table 3.1.7 – Controller Card **GANG-OUT** Port Configuration Jumper Settings (not applicable to logic only controller cards)

Jumper	W11	W15	W13	W14
Gang-Out Pin 3 Connected to RXD * Connected to SYS_A (I/O)	Pin 1 to Pin 2 Pin 2 to Pin 3			
Gang-Out Pin 4 Connected to TXD * Connected to SYS_B (I/O)		Pin 1 to Pin 2 Pin 2 to Pin 3		
Gang-Out Pin 5 Not Connected * Connected to SYS_C (I/O)			Pin 1 to Pin 2 Pin 2 to Pin 3	
Gang-Out Pin 6 Not Connected * Connected to SYS_D (I/O)				Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting

Jumpers W11, W13, W14, and W15 function as a group to configure the GANG-OUT port. Refer to table 3.1.5 for the GANG-OUT port pin assignment. Connect to TXD and RXD to support RS-232 serial communications, or connect to SYS I/O signals to control the system with a remote 12 volt source or remote contact switches.

Table 3.1.8 – Controller Card Ethernet Module Configuration Jumper Settings

Jumper	W16	W17
Ethernet Module Jumper Settings No Ethernet Module installed Ethernet Module installed	Pin 1 to Pin 2 Pin 2 to Pin 3	Pin 1 to Pin 2 Pin 2 to Pin 3

Jumpers W16 & W17 should be set as follows:
- Both to position 1-2 if there is no Ethernet module installed.
- Both to position 2-3 if there is an Ethernet module installed.

    WARNING: Damage may occur to the Ethernet module and/or Controller Card if these jumpers are set to position 1-2 with an Ethernet module installed.

The Controller Card has two independent power supply entry connectors. Each power supply has a set of alarm relay contacts. The alarm relay contacts are labeled COM for common and CON for contact. The user may select the normally open or normally closed contact.

Table 3.1.8 – Controller Card Alarm Contact Configuration Jumper Settings

Jumper	W18	W19
Power Supply 1 Alarm Contact Normally Closed Contact * Normally Open Contact	Pin 1 to Pin 2 Pin 2 to Pin 3	
Power Supply 2 Alarm Contact Normally Closed Contact * Normally Open Contact		Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting

Dip Switch SW7 function is reserved for future development, and should be left in the OFF position. Note: Dip Switch SW7 may not be installed.

Market Central, Inc.

3.2 Configuring R7400 Switch Cards

There are no jumpers or switch settings that need to be configured on most of the R7400 Switch Cards. The R7400 DUAL CHANNEL A/B SWITCH CARD has a jumper that allows the user to configure the channels for INDIVIDUAL control or GANGED control.

Table 3.2.1 – DUAL CHANNEL A/B SWITCH CARD Control Configuration Jumper Settings

Jumper	W2
Dual Channel Control	
Individual Control *	Pin 1 to Pin 2
Ganged Control	Pin 2 to Pin 3

* Factory Default Setting (Contact the Factory if you would like to order the Dual Channel A/B Switch Cards pre-configured for Ganged Control.)

Jumper W2 will ONLY be installed on DUAL CHANNEL A/B SWITCH CARDS, and will not be installed on other R7400 Switch Cards. Pin 1 on W2 is marked on the PC board silkscreen.

4. Installation

The R7400 Switch Cards and the Controller Card are installed from the rear of the rack.

4.1. Initial Installation

4.1.1 For each rack that contains a Controller Card (except the Logic-only Controller Card), you must first set the Controller Card's address using the address DIP switch on the Controller Card.

4.1.2 Using the card guides, carefully slide each card into the rack. Use caution to guide the switches and LED indicators as they go through the holes in the front panel. Fully insert the card until it makes connection to the card edge connector on the rack backplane.

4.1.3 Secure the card to the rack at the top and bottom of the card, using the screws provided.

4.1.4 The PC board GANG-IN / GANG-OUT connectors are RJ12 6P6C jacks. If daisy-chain connecting multiple racks, a standard RJ11 6P4C male/male crossover cable is sufficient to daisy chain connect from the gang-out port on one rack to the gang-in port on the next if the controller cards in the racks support serial communications. For logic only controller cards, or when using the SYS_I/O signals a 6P6C cable is required.

4.1.5 If you are going to remotely manage the system over an Ethernet network, you must first set the IP address, subnet mask and gateway address parameters on the Controller Card using the serial port connection. You should set these parameters before attaching a cable to the NETWORK port, as the default parameters may not work or could interfere with the operation of your Ethernet network. See section 6 for more information regarding IP setup.

4.1.6 Apply power to each rack, using the 12 VDC regulated power supply provided with your system. The ramp on the power supply connector should face the tab on the power supply entry header. When first installed, each switch should be cycled from A to B and back. On switches that have C and/or D positions, cycle the switch through all positions. It is possible for the latching relays to have changed state during shipping. Cycling the switch will assure that all latching relays and/or latching optical switching mechanisms are in a known state.

4.1.7 Connect cables between the A, B, C, D, and COMMON ports on the switch cards and your devices. The R7400 Switch cards provide straight thru connections and are bidirectional, i.e. they have no preference to signal direction. If your application requires a cross-over cable, use only 1 cross-over cable in that path. Use a straight through cable on the other side of the switch card.

4.2. Adding a rack to an installed multi-rack system

The following procedure was developed to prevent inadvertent system switching when adding a rack to an installed system of daisy-chained racks.

4.2.1 If the new rack contains a Controller Card (except the Logic-only Controller Card), you must first set the Controller Card's address. The address for the new rack should be unique – see .Section 3.1 for setting the Controller Card's address DIP switch.

4.2.2 Remove power from the last rack in the existing multi-rack system. The standard R7400 Switch Cards use

latching relays or latching optical switching mechanisms, so the equipment connected thru the rack that is powered down will continue to operate normally. If the R7400 contains non-latching switch cards, the connections thru these cards will "fall-back" to the "COMMON port connected to the A port" connection state when power is lost or removed. On non-latching DUAL Channel Switch Cards, COMMON 1 port will connect to the A port, and COMMON 2 port will connect to the C port when power is lost or removed.

4.2.3 Connect from the GANG-OUT port on the last rack in the system to the GANG-IN port on the new rack. The PC board GANG-IN / GANG-OUT connectors are RJ12 6P6C jacks. When daisy-chain connecting racks, a standard RJ11 6P4C male/male crossover cable is sufficient to daisy chain connect from the gang-out port on one rack to the gang-in port on the next if the controller cards in the racks support serial communications. For logic only controller cards, a 6P6C cable is required.

4.2.4 Apply power to both racks, using the 12 VDC regulated power supply provided with each unit. The ramp on the power supply connector should face the tab on the power supply entry header.

4.2.5 After the new rack has been powered up the first time, it is recommended that all of the Switch Cards in the rack be cycled from A to B and back. On switches that have C and/or D positions, cycle the switch through all positions. It is possible for the latching relays to have changed state during shipping. Cycling the switch will assure that all latching relays and/or latching optical switching mechanisms are in a known state. Once this has been done the system will be ready for use.

5. Operation

When power is applied to the Controller Card, the appropriate Power Supply LED should illuminate. Also, the alarm relay associated with the power supply should be energized, changing the state of the alarm relay contacts. On each R7400 Switch Card, either the "A", "B", "C", or the "D" LED should illuminate to indicate the currently connected port. On Dual Channel A/B Switch Cards, either the "A" or "B", AND either the "C" or "D" LED should illuminate to indicate the currently connected ports.

When the Key-Lock switch is OFF, the push-button switches in the rack will be disabled. Note that the rack will still switch in response to switch commands sent to the Gang In RS232 port, or to the E/N network port, or via an external dry contact closure if using this option. When the Key-Lock switch is ON, the push-button switches in the rack function normally.

The push-button switches on each R7400 Switch Card are used to switch only that card. Press and hold the "A" switch to connect the COMMON Port to the A Port. The "A" LED will illuminate when the switch operation has been completed. Release the switch when switching has finished. Press and hold the "B" switch to connect the COMMON Port to the B Port. The "B" LED will illuminate when the switch operation has been completed. Release the switch when switching has finished. Use the same process for positions "C" and "D". On Dual Channel Switch Cards, the A and B switches control the connections to COMMON port 1, and the C and D switches control the connections to COMMON port 2. If the Dual Channel Switch Card is configured for GANGED control, switches A and C operate as one, and switches B and D operate as one.

The push-button switches on the Controller Card are used to switch all cards in the rack, and are operated in the same fashion as the push-button switches on the individual Switch Cards. To switch the entire system (multiple racks ganged together), hold the "system" push-button while operating one of the A, B, C, or D push-button switches on the Controller Card. Operating the C or D push-buttons will have no affect on cards which do not have C or D ports.

The Controller Card STAT LED should blink under the following conditions:
The Controller Card push-button switches are used to initiate a "rack", or "system" level switching operation.
The Controller Card receives a switch command from the gang-in port or the E/N network port.

5. 1 "SYSTEM" Switching Using the Gang-In System Control Signals

The System Control signals on the Gang In connector can be used as input control signals or as an output control signals. When used as an input control signals, the SYS_A, SYS_B, SYS_C, or SYS_D pin should be driven to +12 VDC to switch the system to A, B, C, or D respectively. The input circuit requires approximately 1 mA to operate.

As an output, these signals are driven to +10 VDC when the user initiates a system switch to A, B, C, or D. To protect the output circuits, each output goes through a 1 K ohm resistor. Therefore, the output should not be used to

drive large loads.

In order to allow remote switching of the system using external dry contact closures the GANG-IN and GANG-OUT connectors supply V+ (approximately 11 VDC) on pin 6 and pin 1 respectively. These V+ outputs are provided through a diode and through 1 K ohm resistors as shown in Figure 5.1.1. To use this remote control feature, momentary push-button switches or other dry contact closures need to be connected to either the GANG-IN connector or to the GANG-OUT connector as shown in Figure 5.1.1. Figure 5.1.1 shows both the GANG-IN and GANG-OUT pins for reference – connect the external dry contact closures shown on the right side of the diagram to only the GANG-IN pins shown or only to the GANG-OUT pins shown, not to both the GANG-IN and GANG-OUT pins. The external switches / contacts shown in Figure 5.1.1 are EXTERNAL to the R7400 system. Refer to Table 3.1.6 for GANG-IN Port Configuration Jumper Settings, or Table 3.1.7 for GANG-OUT Port Configuration Jumper Settings.
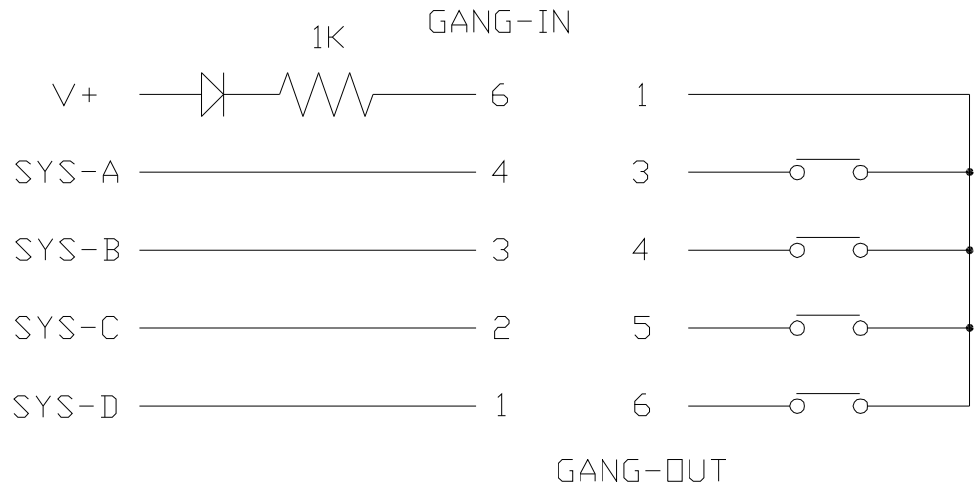
Figure 5.1.1 – SYSTEM Switching using External Dry Contact Closures

5.2 RS232 Terminal Commands (Not applicable to SNMP Controller Cards or Universal Controller Cards set for rack address 0x01)

This section describes the RS232 commands that are available when using an RS232 Controller Card. SNMP Controller Cards and Universal Controller Cards set to rack address 0x01 respond to an enhanced set of RS232 commands – see Section 5.3 and Section 7 for more details on command syntax and responses for terminal commands supported by Ethernet enabled Controller Cards.

IMPORTANT: To start the "terminal" interface on an RS232 Controller Card so that it is ready to accept and respond to commands, set your terminal to 1200 Baud, No Parity, 8 Data Bits, 1 Stop Bit, then connect your terminal to the GANG-IN port (refer to Table 3.1.4), and press the SPACE KEY.

When the GANG-IN port on an RS232 Controller Card detects a 1200 Baud SPACE character, it starts the "terminal" interface and responds with the ">" prompt character. If you then type "help" and then press the ENTER KEY, the RS232 Controller Card will respond with the rack address, software version, and a list of the available commands – see Table 5.2.1 below.

Table 5.2.1 – RS232 Controller Card response to "help" command (1200, N, 8, 1)

```
Rack 1
Rev. 74C.D
Commands:
get system
get rack n (n = rack addr, 1 to 255)
get card y (y = card addr, 1 to 4080)
get power n (n = rack addr, 1 to 255)
```

```
get version n (n = rack addr, 1 to 255)
get types n (n = rack addr, 1 to 255)
get groups n (n = rack addr, 1 to 255)
set system X (X = A, B, C, or D)
set rack n X (n = rack addr, 1 to 255, X = A, B, C, or D)
set card y X (y = card addr, 1 to 4080, X = A, B, C, or D)
set groups n string (n = rack addr, 1 to 255, string up to 16 chars)
help (displays current commands)
SPACE (space character starts terminal mode)
exit (exit terminal mode)
>
```

NOTE: For commands that use a rack address "n", refer to Section 3.1 on how to set the rack address DIP switch on the controller card. For commands that use a card address "y", use the following formula to determine the card address of any card in any rack: $y = 16*(\text{rack address} - 1) + \text{slot\#}$ Example: the card in slot 12 in rack 3 is card address 44.

Commands are not case sensitive and can be entered as either upper or lower case, except for the group string which treats group a and group A as two different groups. The RS232 Controller Card echoes each character it receives back to your terminal, allowing the user to backspace to correct typing errors. Each word on a command line must be separated by a single SPACE character. The command is processed when you press the ENTER KEY. All of the above commands except "help" and "exit" may be abbreviated by using only the first character of each word on the command line. For example:

"g s<CR>" is the same as "get system<CR>".
"s r 2 A<CR>" is the same as "set rack 2 A<CR>".

The following table shows an example of each command along with the expected Response and Action. Please note that each command must be followed by a carriage return (ASCII HEX 0x0D).

Command	Response	Action
"SPACE" char	>	starts terminal mode if not started (1200,N,8,1), otherwise system will echo back a "SPACE" char if already in terminal mode
get system	System Status (A, B, C, D, M or X)	None. M for Mixed, X for empty.
set system B	System Set To B	All switch cards in system will switch to B For Dual Channel Switch Cards: Set values A and B connect COM1 to A or B respectfully. Set values C and D connect COM2 to C or D respectfully.
get rack 1	Rack 1 Status ABCDAABBXCCXDDXX	None. In the response shown, switch cards 1, 5, & 6 are in A, 2, 7, & 8 are in B, 3, 10, & 11 are in C, 4, 13, & 14 are in D, and the rest are not present. If the selected rack doesn't respond within 3 seconds, the RS232 Controller Card in rack 1 will reply with "No Response".
get rack 1	Rack 1 Status ABCDAABBXCCXDDXX XXXXCDCDXXXXXXXX	None. In the response shown, rack 1 contains four dual channel switch cards in slots 5 through 8. The dual channel switch cards show a connection state for common port 1 in the first 16 characters, and a connection state for common port 2 in the second 16 characters. The dual channel switch card in slot 5 shows common port 1 is connected to port A, while common port 2 is connected to port C.
set rack 1 A	Rack 1 Set To A	All switch cards in rack 1 will switch to A For Dual Channel Switch Cards: Set values A and B connect COM1 to A or B respectfully. Set values C and D connect COM2 to C or D respectfully.

get card 8	Card 8 Status (A, B, C, D, or Empty)	None
		For Dual Channel Switch Cards, the status will be two characters, one for each channel. For example status AC means that COM1 is connected to A and COM2 is connected to C.
set card 8 B	Card 8 Set To B	Switch card 8 will switch to B
		For Dual Channel Switch Cards: Set values A and B connect COM1 to A or B respectfully. Set values C and D connect COM2 to C or D respectfully.
get power 1	Rack 1 Power: Two Supplies	None. In the response shown, the rack is powered with two energized power supplies. If one power supply is down, the status would be One Supply Down.
get version 1	Rack 1 Version Rev. 74C.D	None
get types 1	Rack 1 Types 1110223344440555	None. This response displays one character for each card slot. Type 0 = Empty, or Not Available, Type 1 = A/B Switch, Type 2 = Dual Channel Independent A/B Switch, Type 3 = Dual Channel Ganged A/B Switch, Type 4 = ABC Switch, Type 5 = ABCD Switch.
get groups 1	Rack 1 Groups 1234567812345678	None. This response displays one character for each card slot, indicating which group each switch cards belongs to.
set groups 1 1111222233334444	Rack 1 Groups Set To 1111222233334444	Set card slots 1 – 4 to group 1, card slots 5 – 8 to group 2, card slots 9 – 12 to group 3, and card slots 13 – 16 to group 4. Any character can be used to label a group, except "0" which indicates independent and upper case "X" which skips a position (retains the previously assigned group character). All cards in a group follow any switching command to any card in the group.
help	(see Table 5.2.1 above)	None
exit	Good Bye	Exits terminal mode

5.2.1 Programming Tips for Using the RS232 Terminal Commands

This section is applicable to RS232 Controller Cards **WITHOUT** an Ethernet module installed, and is intended for programmers who want to control the R7400 Multiport Ganged Switching System in an automated environment using a computer.

BACKGROUND:

When first energized, the R7400 RS232 Controller Card provides a special rack-to-rack interface at the Gang In connector, operating at 2400, N, 8, 1. When the Controller Card receives a 1200 baud SPACE character, it detects a framing error with null data. This causes it to enter "Terminal" mode and to automatically change its data rate to 1200 bps. The controller indicates that is has entered terminal mode by displaying a prompt character (">", ASCII HEX 0x3E). It then stays in terminal mode, until it receives the "exit" command, or detects 2400 baud characters.

While in terminal mode, the controller echoes the received characters and collects them into a buffer until it receives a carriage return character. The carriage return is echoed and then the controller begins to process the received command. Any characters received while the controller is processing the command are ignored. When the command is processed, the controller responds, followed by a prompt character, indicating that it is ready to receive another command. If the controller gets a command that is intended for another controller, it passes that command out the Gang Out port, and waits up to three seconds for a response. If it does not get a response, it responds "No Response", followed by a prompt.

Market Central, Inc.

<u>PROGRAMMING:</u>
First your program must set its RS232 COM port to 1200, N, 8, 1.

Since the R7400 RS232 Controller Card may be in rack-to-rack interface mode, your program should then force the controller into terminal mode. This can be done by sending a SPACE character, followed by a carriage return character. If the Controller Card is in rack-to-rack interface mode, the SPACE character will cause the controller to go into Terminal mode, and will then respond with a prompt character. The carriage return will then cause it to respond with "Invalid Command", followed by another prompt character. If the controller was already in terminal mode, the controller will simply respond "Invalid Command", followed by a prompt character.

Now that the Controller Card is in terminal mode, your program can issue other commands, but must wait for the controller to issue the prompt character (">", ASCII HEX 0x3E) before sending each new command.

If the Controller Card looses power, it will reset itself when power is restored and come back up in the rack-to-rack interface mode. As such, you may want to include an error recovery routine in your program that tries to force terminal mode if your program does not receive a response from the Controller Card. In applications where your program will issue commands very infrequently, you may find it useful to force terminal mode before every command in case the controller has lost power since your last command.

5.3 Enhanced RS232 Terminal Commands for SNMP Controller Cards and Universal Controller Cards set for rack address 0x01

This section is applicable to controller cards **WITH** an Ethernet module installed and enabled. The RS232 Gang In interface on an Ethernet enabled Controller Card operates at 9600 bps (rather than at 1200 bps as is the case for an RS232 Controller Card). The Gang Out interface on an Ethernet enabled Controller Card remains unchanged, and may still be used to connect to an RS232 Controller Card when daisy chaining multiple racks together. When daisy chaining multiple racks, only the first rack in the chain may have an Ethernet enabled Controller Card installed.

The Ethernet enabled Controller Card supports an enhanced set of serial commands that are listed below and described in more detail in section 7. To communicate with an Ethernet enabled Controller Card, set your RS232 terminal to 9600 baud, no parity, 8 data bits, and 1 stop bit. Connect this terminal to the GANG-IN port.

When you apply power to the system, the Controller Card and Ethernet module run a series of internal self tests and configuration steps. This takes approximately 5 seconds. After this process is complete you will see a sign-on message displayed on your serial console, similar to the following:

```
Network Agent Version 4_01G DEC 2018
Copyright (c) 2018
All rights reserved
System starting ...
Rack position A
Console ready


>
```

At this point the Ethernet enabled Controller Card is now ready to receive RS232 serial commands via the Gang In connector. If you type "help" followed by the ENTER KEY, the list of available commands will be displayed as shown below. See Section 7 for a detailed description of each command.

```
CONSOLE COMMANDS:
GET        ALL (display all parameters)
GET        VERSION (display rack 1 software versions)
GET        VERSION N (display rack N software versions)
GET[SET]   SYSTEM [A/B/C/D] (control all system ports)
GET[SET]   RACK N [A/B/C/D] (control single rack ports)
GET[SET]   PORT N [A/B/C/D] (control single port)
GET        EVERYRACK (display status for all racks)
GET        EVERYRACK N (display status for racks 1 thru N)
GET        POWER N (display power status)
GET[SET]   GROUPS N [string] (control single rack groups)
```

```
GET        TYPES N (display single rack types)
GET[SET]   IPADDRESS [X.X.X.X]
GET[SET]   SUBNETMASK [X.X.X.X]
GET[SET]   GATEWAY [X.X.X.X]
GET[SET]   PINGREPLY [ON/OFF]
GET[SET]   SNMPENABLE [ON/OFF]
GET[SET]   READCOMMUNITYNAME [string]
GET[SET]   WRITECOMMUNITYNAME [string]
GET[SET]   WEBENABLE [ON/OFF]
GET[SET]   WEBPASSWORD [string]
GET[SET]   WEBTIMEOUT [N] (seconds)
GET[SET]   WEBPORT [N]
GET[SET]   TELNETENABLE [ON/OFF]
GET[SET]   TELNETPASSWORD [string]
GET[SET]   TELNETTIMEOUT [N] (seconds)
GET[SET]   TELNETPORT [N]
GET[SET]   MONITORIP N [X.X.X.X] (0.0.0.0 to disable)
GET        MONITORIP (display all monitor IP addresses)
SET        MONITORIPRANGE N [X.X.X.S E] (N=Index,S=Start,E=End)
GET[SET]   MONITORMODE [FAILOVER/TOGGLE]
GET[SET]   MONITORDELAYCOUNT [N]
GET[SET]   MONITORINTERVAL [N] (1/10 seconds, 0 to disable)
GET[SET]   MONITORFAILCOUNT [N] (0 = no auto bypass)
GET[SET]   MONITOROKCOUNT [N] (0 = no auto recover)
GET[SET]   MONITORTIMES N HH:MM HH:MM (0:0 0:0 Always ON)
GET        MONITORTIMES (display all monitor times)
GET[SET]   AUTHENTICATIONTRAP [ON/OFF]
GET[SET]   ALERTTYPE [TRAP/SYSLOG]
GET[SET]   ALERTINTERVAL [N] (1 – 255 minutes, 0 for single)
GET[SET]   AUTOSWITCH [NORMAL/BYPASS]
GET[SET]   AUTOSWITCHTRIP [N] (0 – 255, Auto-Switch Trip Point)
GET[SET]   DAY [MONDAY/TUESDAY/…]
GET[SET]   TIME [HH:MM] (HOUR 0 – 23, MINUTE 0 – 59)
GET[SET]   DATE [MM/DD/YYYY] (two digit month and day, four digit year)
GET[SET]   ADMINIP N [X.X.X.X] (0.0.0.0 to disable an entry)
GET        ADMINIP (display all administrator IP addresses)
GET[SET]   MANAGER N [X.X.X.X] (0.0.0.0 to disable an entry)
GET        MANAGER (display all SNMP managers)
PING       X.X.X.X (ICMP ECHO to remote host)
GET[SET]   EVENTLOG (GET to display event log, SET to clear event log)
SAVE       save settings for next startup
RESET      restart (use after SAVE)
SET        DEFAULTS (restore default user settings, save required)
```

5.4 Automatic Switching (for SNMP Controller Cards and Universal Controller Cards set for rack address 0x01)

The Ethernet Controller Card can be configured to automatically switch the connection state (all COMMON ports are connected to their respective A ports) or (all COMMON ports are connected to their respective B ports). In order to be able to perform the auto-switching functions, the internal Ethernet module issues ICMP echo request (PING) packets to a user configurable IP address on the network.

The auto-switching function can be configured to operate in one of two modes. In FAILOVER mode (the default mode), the auto-switching function switches to the "failover" or "bypass" connection state (all COMMON ports are connected to their respective A ports) when PING responses are not received, and if configured to "auto recover" it switches to the "normal" connection state (all COMMON ports are connected to their respective B ports) when PING responses are received. In TOGGLE mode, the auto-switching function toggles the connection state from A to B or from B to A when PING responses are not received, and maintains the connection state all COMMON ports are connected to their respective A ports or B ports when PING responses are received. User configurable parameters control the auto-switching functions to allow the switch to be used in a variety of applications.

In FAILOVER mode, if the "normal" network path connections between the Ethernet module and the device being monitored go down for any reason, the Ethernet module will no longer be able to PING the specified IP address, and

will then automatically switch from the "normal" connection state (all COMMON ports are connected to their respective B ports) to the "bypass" or "failover" connection state (all COMMON ports are connected to their respective A ports). Once the problems on the primary path have been identified and corrected, the user can issue a command to cause the R7400 Switching System to switch from the failover connection state back to the normal connection state. If auto recovery is enabled, the Ethernet module will automatically re-connect the normal path connections when it is again able to PING the user specified IP address. When using the auto recovery feature, it is important that the Ethernet network port on the R7400 Switching System be connected to the user's network such that the normal path is continuously being monitored even when the backup path has been selected, otherwise the R7400 Switching System could repeatedly switch (flap) back and forth between the failed primary path and the functioning backup path.

In TOGGLE mode, if the "current" network path connections between the Ethernet module and the device being monitored go down for any reason, the Ethernet module will no longer be able to PING the specified IP address, and will then automatically switch to the "alternate" connection state, trying to restore successful PING responses. In this mode, the auto-switching function will toggle between (all COMMON ports are connected to their respective A ports) and (all COMMON ports are connected to their respective B ports), until it receives responses to its PING requests. The R7400 Switching System will then remain in the current connection state (all COMMON ports are connected to their respective A ports or B ports), until the user issues a command to cause the R7400 Switching System to switch connections, or should the Ethernet module fail to receive PING responses. When in TOGGLE mode, it is important that the R7400 Switching System Ethernet network port be connected to the user's network such that the current path is being monitored.

See the diagrams below for examples of auto switching configurations.

When the auto switching feature is enabled, manual and remote switching can still be performed using the front panel toggle switch or by issuing serial or Ethernet commands, but this can affect the operation of the automatic switching feature. This is because the automatic switching feature is only aware of "system level" commands, i.e. "SET SYSTEM A", "SET SYSTEM B", and manual switching using the controller card front panel push-button switches. If the user initiates any of these "system level" commands, the switching system will execute the command and the automatic switching feature will record the new connection state. The automatic switching feature will then continue to monitor the connection path to the selected IP address and will automatically switch connections as it normally would.

However, if the switching system receives a "SET RACK" command, these commands will not be recorded by the automatic switching feature - it will be unaware that the switching system has changed connection states. Under certain conditions when in this state, the automatic switching feature will not automatically switch connection states as expected, because it "thinks" that it is already in the correct connection state. To recover from this condition the user can either power cycle the Ethernet Controller Card, issue a "RESET" command, or execute a "system level" command. Any of these actions will cause the automatic switching feature to record the current connection state of the switch, which then allows it to again operate normally.

Connection changes made using the "SET PORT" command also are not recorded by the automatic switching feature. Thus under certain conditions, the automatic switching feature will not automatically switch connection states as described above when "rack level" commands are issued.

Network Connections for Auto Failover & Manual Recovery (FAILOVER mode) OR TOGGLE mode

Note: The Ethernet Module monitors the WAN connections by PINGing the far side router thru the primary WAN link. In FAILOVER mode, if the primary WAN link fails, the Ethernet Module auto switches to the backup WAN link. Auto recovery is disabled in this configuration to prevent flapping. In TOGGLE mode, if the selected WAN link fails, the Ethernet Module will toggle between the primary and backup WAN until a working link is established.
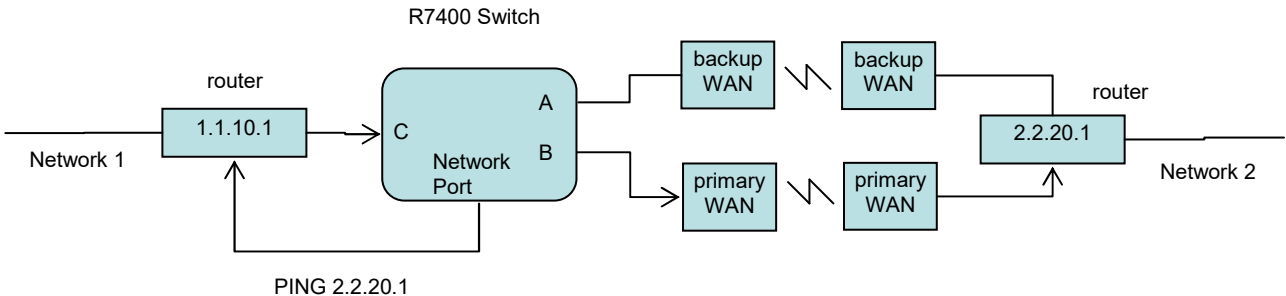
Network Connections for Auto Failover & Auto Recovery (FAILOVER mode)

Note: The Ethernet Module monitors the WAN connections by PINGing the far side router thru the primary WAN link. If the primary WAN link fails, the Ethernet Module auto switches to the backup WAN link. When the primary WAN link is available again, the Ethernet Module auto switches back to the primary WAN path. This configuration will not function properly in TOGGLE mode, since the connection between the Ethernet Module Network Port and the far side router is not affected by switching the C port connection state.
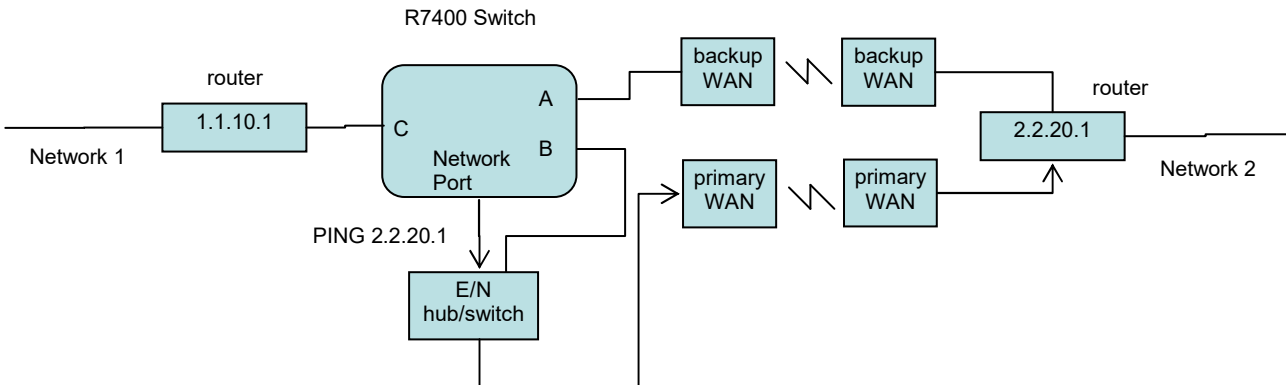
6. SNMP/Web Setup

To perform the initial setup of an Ethernet enabled Controller Card so that it can be remotely accessed over an Ethernet network, you will need a serial terminal capable of 9600 baud, no parity, 8 data bits, and 1 stop bit in order to configure the required networking parameters. Connect this terminal to the Gang In port. The necessary connections to a standard IBM compatible PC serial port DB9 connector are as follows:

Table 6.1.1 – GANG-IN to DB9 Pin Assignment

GANG-IN RJ11	SIGNAL	DIRECTION	HOST DB9
4	RECEIVED DATA	TO HOST	2
3	TRANSMITTED DATA	FROM HOST	3
5	GROUND		5

Apply power to the R7400 Multiport Ganged Switching System. The Ethernet enabled Controller Card requires approx 5 seconds to boot up, while it performs several internal self tests and initialization tasks. After this process is

complete you will see a sign-on message similar to the following on your serial console:

```
Network Agent Version 4_01G DEC 2018
Copyright (c) 2018
All rights reserved
System starting ...
Rack Position A
Console ready

>
```

At this point the Ethernet enabled Controller Card is ready to accept the networking related configuration commands necessary before you will be able to communicate with it over an Ethernet network. You will need to enter an IP address, subnet mask, and gateway address as well as read and write SNMP community names, a telnet password, and/or a web password depending on which of these options you want to use. These parameters must be saved into non-volatile memory, and the system then needs to be reset to allow it to reconfigure with the new settings. Any time one or more of these parameters is changed, they must be saved followed by a system reset. The following shows a typical setup session. Change the entered parameters shown below to suit your application requirements. These networking configuration commands are described in more detail in Section 7.

```
>set ipaddress 192.168.1.200
IP Address: 192.168.1.200

>set subnetmask 255.255.255.0
Subnet Mask: 255.255.255.0

>set gateway 192.168.1.1
Gateway IP Address: 192.168.1.1

>set readcommunityname public
Read Community Name: public

>set writecommunityname private
Write Community Name: private

>save
saving...
Save complete.

>reset
resetting, please wait...
```

After the system reinitializes, you will again be greeted by the sign-on message as before. You can now attach a 10base-T CAT5 cable between the Network port on the Ethernet enabled Controller Card and an available port on your Ethernet hub or switch/router. The Ethernet enabled Controller Card will now respond to telnet, SNMP and/or HTTP messages at the assigned IP address depending on which options you enabled on the Controller Card. Section 7 describes the commands that are available via the console prompt (telnet, web, or RS-232 interface). Section 8 describes the operation of the web browser interface, and Section 9 provides a MIB Path Summary that lists the supported SNMP variables and their functions.

7. Console Commands

The following list of commands are available from the console prompt (telnet, web, or RS232 interface) of the Ethernet enabled Controller Card. All commands can entered in any mix of upper or lower case (commands are not case sensitive), although several variable parameters are case sensitive (read/write community names, plus telnet and web passwords). All commands must be terminated with a carriage return (ASCII 13 or hex 0x0D) before they will be processed. GET, SET, SYSTEM, RACK, and PORT can all be abbreviated by the first letter of the command, allowing shorthand entry of switching commands.

Market Central, Inc.

GET ALL

Displays all parameters and settings. An example output is shown here.

```
System Status: A
IP Address: 192.168.1.30
MAC Address: 00 06 57 00 01 02
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.1
PING Reply: Enabled
SNMP Enable: Enabled
Read Community Name: public
Write Community Name: private
Web Enable: Enabled
Web Password: mctech
Web Timeout: 300
Web Port: 80
Telnet Enable: Enabled
Telnet Password: dataman
Telnet Timeout: 80
Telnet Port: 23
Monitor Interval: 10
Monitor Fail Count: 5
Monitor Ok Count: 5
Monitor Delay Count: 10
Monitor Mode: FAILOVER
AutoSwitch Mode: NORMAL
AutoSwitch Trip Point: 0
Monitor IP Status: 0 UP, 0 DOWN, 0 ASSIGNED, 256 AVAILABLE
Monitor Times: ALWAYS ON, Current Day: 1 MONDAY
Date: 01/16/2012 Time: 09:25:54
Authentication Trap: Disabled
Alert Type: TRAP
Alert Interval: 0 – Single
Event Log Count: 1
ADMIN IP Addresses: 0 ASSIGNED, 8 AVAILABLE
SNMP Managers: 1 ASSIGNED, 15 AVAILABLE
Model 4: 4_01G DEC 2018, Rev. 74C.D
```

GET VERSION

Displays the software revisions of the network module and firmware on the SNMP enabled Controller Card.

```
Model 4: 4_01G DEC 2018, Rev. 74C.D
```

GET VERSION N

Displays the software revisions of the network module and firmware on the Controller Card in Rack N. If Rack N is not present, the Controller Card firmware will be shown as "no response".

```
Model 4: 4_01G DEC 2018, Rev. 74C.D
```

GET SYSTEM

Displays the system status. This is the same as the status returned by the SNMP variable mpSystemGangPort. The GET SYSTEM command is meaningful only if you exclusively use the SET SYSTEM command to control the state of all of the R7400 switch cards simultaneously. The GET SYSTEM command queries rack 1 for status and assumes that all other racks in the system are in the same connection state. The status will be A, B, C, or D if all cards in the first rack have the same status. The status will be X for empty "not present" if there are no cards installed in the first rack. The status will be "M" for mixed status if the cards in the first rack do not all have the same status.

```
System Status: A
```

For Dual Channel Switch cards:
Status value A means that COM1 is connected to A, and COM2 is connected to C.
Status value B means that COM1 is connected to B, and COM2 is connected to C.
Status value C means that COM1 is connected to A, and COM2 is connected to D.

Status value D means that COM1 is connected to B, and COM2 is connected to D.

SET SYSTEM A[B/C/D]
Sets the entire system (all connected racks) to position A, B, C, or D. Not all values have meaning for all switch types. For example Set System D will not cause a switching action on ABC switches.

For Dual Channel Switch Cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.

GET RACK N
Displays status of rack N (1-255). This is the same as the status returned by the SNMP variable mpRackCards. It displays a 16 character string showing the status of each card slot. If the rack contains any dual channel switches, the response will be 32 characters, 16 characters for the status of channel 1, followed by 16 characters for the status of channel 2.

```
Rack Status: XXXBXXBXXXXBXAXX
```

For a Rack with Dual Channel Cards in slots 5 – 8, and 11 - 16:

```
Rack Status:
ABCDAABBXXAABBBB
XXXXCCCCXXDDCCDD
```

SET RACK N A[B/C/D]
Sets the entire addressed rack N (1-255) to position A, B, C, or D. Not all values have meaning for all switch types.

For Dual Channel Switch Cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.

GET PORT N
Displays the status of A/B switch card N (1-4080). Switch card addresses are assigned using the formula N = 16*(rack address – 1) + slot#   The response will be "A", "B", "C", "D", or "X" (if not present). Dual Channel switch cards will respond with two character status, one character for the channel 1 status followed by one character for the channel 2 status.

```
Port Status: B
Port Status: X
```

For Dual Channel Cards:

```
Port Status: AC
```

SET PORT N A[B/C/D]
Sets the addressed switch card N (1-4080) to position A, B, C, or D. Switch card addresses are assigned using the formula N = 16*(rack address – 1) + slot#

For Dual Channel Switch Cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.

GET EVERYRACK
Displays status of all racks (1 thru 255). This command displays the "Rack Status" for racks 1 thru 255, stopping when it reaches rack 255 or encounters a "no response" from the requested rack. This is the same as the status returned by the SNMP variable mpRackCards. It displays a 16 character string showing the status of each card slot. The status may be 32 characters if the rack contains any Dual Channel Switch Cards.

```
Rack 1 Status: AAAABBAABBBBAABB
Rack 2 Status: AAAABBBBXXXXXXXX
```

```
       Rack 3 Status: no response
```

GET EVERYRACK N

Displays status of rack (1 thru N). This command displays the "Rack Status" for racks 1 thru N, stopping when it reaches rack N or encounters a "no response" from the requested rack. This is the same as the status returned by the SNMP variable mpRackCards. It displays a 16 character string showing the status of each card slot. The status may be 32 characters if the rack contains any Dual Channel Switch Cards.

```
       Rack 1 Status: AAAABBAABBBBAABB
       Rack 2 Status: AAAABBBBXXXXXXXX
       Rack 3 Status: no response
```

GET POWER N

Displays the status of the power supplies for rack N. If only one power supply is being used to power the rack or if one of the supplies in a dual powered rack is down, the response will be "One Supply Down". If two supplies are used and both are operational, the response will be "Two Supplies".

```
       Power Status: One Supply Down
       Power Status: Two Supplies
```

GET GROUPS N

Displays the group settings for rack N. One character for each of the sixteen cards in the rack. Any character can be used to label a group, except "0" which indicates independent and upper case "X" which skips a position (retains the previously assigned group character). All cards in a group follow any switching command to any card in the group.

```
       Rack Groups: 1111222233334444
```

SET GROUPS N [string]

Set the group settings for rack N. One character for each of the sixteen cards in the rack. Any character can be used to label a group, except "0" which indicates independent and upper case "X" which skips a position (retains the previously assigned group character). All cards in a group follow any switching command to any card in the group.

GET TYPES N

Displays the switch card types for rack N. One character for each of the sixteen cards in the rack.

Type 0 = Empty, or Not Available

Type 1 = A/B Switch

Type 2 = Dual Channel A/B Switch, Independent Control

Type 3 = Dual Channel A/B Switch, Ganged Control

Type 4 = ABC Switch

Type 5 = ABCD Switch

```
       Rack Types: 1110223344440555
```

SET IPADDRESS X.X.X.X

GET IPADDRESS

Set or display the current IP address of the Ethernet module on the Controller Card. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET SUBNETMASK X.X.X.X

GET SUBNETMASK

Set or display the current subnet mask of the Ethernet module. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET GATEWAY X.X.X.X

GET GATEWAY

Set or display the gateway router's IP address. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET PINGREPLY ON[OFF]
GET PINGREPLY
Set or display whether or not the Ethernet module will respond to incoming PINGs (ICMP echo requests). Any change will not become permanent until a SAVE operation is performed.

SET SNMPENABLE ON[OFF]
GET SNMPENABLE
Set or display whether or not the SNMP interface on the Ethernet module is enabled. Any change will not become permanent until a SAVE operation is performed.

SET READCOMMUNITYNAME string
GET READCOMMUNITYNAME
SET WRITECOMMUNITYNAME string
GET WRITECOMMUNITYNAME
Set or display the current read or write community name as specified. Any mix of upper/lower case letters (passwords are case sensitive), numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 23 chars in length. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET WEBENABLE ON[OFF]
GET WEBENABLE
Set or display the current state of web based access. The Ethernet module will not accept any HTTP requests when web enable is off. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET WEBPASSWORD string
GET WEBPASSWORD
Set or display the current web password. Any mix of upper/lower case letters (passwords are case sensitive), numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 23 chars in length. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET WEBTIMEOUT seconds
GET WEBTIMEOUT
Set or display the current web timeout in seconds. After a period of inactivity of this many seconds, the Ethernet module will request a login. Note that the web timeout cannot be disabled, for security reasons, it can however, be set arbitrarily large.

SET WEBPORT N
GET WEBPORT
Set or display the current web port number. Changing the web port number from the default can be used to provide an additional level of security. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET TELNETENABLE ON[OFF]
GET TELNETENABLE
Set or display the current state of telnet based access. The Ethernet module will not accept any telnet requests when telnet enable is off. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET TELNETPASSWORD string
GET TELNETPASSWORD
Set or display the current telnet password. Any mix of upper/lower case letters (passwords are case sensitive), numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 23 chars in length. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET TELNETTIMEOUT seconds
GET TELNETTIMEOUT
Set or display the current telnet timeout in seconds. After a period of inactivity of this many seconds, the Ethernet module will disconnect any current telnet session. Note that the telnet timeout cannot be disabled, it can however, be set arbitrarily large.

SET TELNETPORT N
GET TELNETPORT
Set or display the current telnet port number. Changing the telnet port number from the default can be used to provide an additional level of security. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET MONITORIP N [X.X.X.X]
GET MONITORIP N
GET MONITORIP
Set or display the IP address(es) of the device(s) that the Ethernet module is to PING to determine the Link State (UP) or (DOWN). The Ethernet module can monitor several IP addresses. Setting a Monitor IP address to 0.0.0.0 will remove it from the monitored list. If all Monitor IP addresses are set to 0.0.0.0, the auto switch/recovery function and the LINK UP/DOWN alert function are disabled. Any change will not become permanent until a SAVE operation is performed. The Ethernet module will send TRAP or SYSLOG messages when a Monitored Port Link State changes. The Monitor IP addresses can also be used to control an optional auto switch/recovery function. If enabled, the auto switch/recovery function will cause the R7400 Switching System to auto-switch to the normal path (B), connecting port B to the common port when all monitored port links are UP. When any of the monitored port links are DOWN, the auto switch/recovery function will cause the R7400 Switching System to auto-switch to the bypass path (A), connecting port A to the common port. See the AUTOSWITCHTRIP description for an explanation of the auto-switch trip point.

SET MONITORIPRANGE N [X.X.X.S E]
Set a range of Monitor IP addresses with a single command. N is the index of the starting entry in the Monitor IP address table. Valid index is 1 to 256. S is the last octet value of the Starting Monitor IP address, while E is the last octet value of the Ending Monitor IP address. For example to monitor all IP addresses 192.168.1.1 through 192.168.1.150, use the following command SET MONITORIPRANGE 1 192.168.1.1 150. This command will place 150 addresses in the Monitor IP address table. Any change will not become permanent until a SAVE operation is performed.

SET MONITORINTERVAL [N]
GET MONITORINTERVAL
Set or display the time interval between PINGs issued by the internal Ethernet module, measured in 100 msec increments. To issue PINGs every 1.5 seconds, set this value to 15. The valid range is 1 to 255 (0.1 seconds to 25.5 seconds). A value of 0 disables the automatic switch/recovery function. Any change will not become permanent until a SAVE operation is performed.

SET MONITORFAILCOUNT [N]
GET MONITORFAILCOUNT
Set or display the number of successive PING attempts that must fail before the Ethernet module automatically switches to the alternate paths and removes the normal path connection paths. The valid range is 1 to 255. In FAILOVER MODE, a value of 0 disables the automatic bypass function, however automatic recovery will still operate if enabled. The LINK UP/DOWN alert function will still operate, and will report a monitored port Link State as DOWN each time a PING fails if the Link State was previously UP. When automatic bypass is enabled and any monitored port Link State is DOWN, the R7400 will perform an auto-switch to the bypass path (A), connecting port A to the common port. Any change will not become permanent until a SAVE operation is performed.

SET MONITOROKCOUNT [N]
GET MONITOROKCOUNT
Set or display the number of successive PING attempts that must succeed before the Ethernet module automatically switches back to the normal paths and removes the alternate connection paths. The valid range is 1 to 255. In FAILOVER MODE, a value of 0 disables only the automatic recovery function, however automatic bypass will still operate if enabled. The LINK UP/DOWN alert function will still operate, and will report a monitored port Link

State as UP each time a PING succeeds if the Link State was previously DOWN. If auto recovery is disabled the user must manually switch back to the normal path via the front panel toggle switch or by issuing a "set system B" command. When automatic recovery is enabled and ALL monitored ports Link State is UP, the R7400 will perform an auto-switch to the normal path (B), connecting port B to the common port. Any change will not become permanent until a SAVE operation is performed.

SET MONITORDELAYCOUNT [N]
GET MONITORDELAYCOUNT
Set or display the Monitor Delay Count. This parameter is the number of PING attempts to delay auto-switching action following a "system" switching event or "auto-switching" event. The auto-switch logic uses MONITORFAILCOUNT and MONITOROKCOUNT to determine if a non-zero monitor IP address LINK is UP or DOWN. If the number of non-zero monitor IP LINKs DOWN is greater than the auto-switch trip point or ALL non-zero monitor IP LINKs are DOWN, the auto-switch feature will FAILOVER to the "failover" connection state, or TOGGLE the connection state, depending on the MONITORMODE setting. The MONITORDELAYCOUNT provides a delay after "system" or "auto" switching to allow the monitored LINK(s) state to change from DOWN to UP or vice versa. The MONITORDELAYCOUNT should be set to a value larger than MONITOROKCOUNT or MONITORFAILCOUNT to allow time for the monitored IP addresses to respond. If monitoring more than one MONITORIP address, the MONITORDELAYCOUNT will need to be adjusted to allow time for ALL monitored IP addresses to respond. The valid range is 0 to 255. Any change will not become permanent until a SAVE operation is performed.

SET MONITORMODE [FAILOVER/TOGGLE]
GET MONITORMODE
Set or display the Monitor Mode. In FAILOVER mode, the auto-switching function switches to the "failover" connection state (all COMMON ports are connected to their respective A ports) when PING attempts fail, and if configured to auto-recover, switches to the "normal" connection state (all COMMON ports are connected to their respective B ports) when PING attempts succeed. In TOGGLE mode, the auto-switching function toggles the connection state (A to B, or B to A) when PING attempts fail, and maintains the connection state when PING attempts succeed. TOGGLE mode is not allowed when AutoSwitch mode is BYPASS. Any change will not become permanent until a SAVE operation is performed.

SET MONITORTIMES N [X.X.X.X]
GET MONITORTIMES N
GET MONITORTIMES
Set or display the Monitor Start and End Times for each day of the week. For N (1 = MONDAY, 2 = TUESDAY, 3 = WEDNESDAY, 4 = THURSDAY, 5 = FRIDAY, 6 = SATURDAY, 7 = SUNDAY). A GET without specifying the N (day) will return the start and end monitoring times for all days. A GET will return a string similar to the following: (Day 3 WEDNESDAY S: 06:30 E: 18:45) which represents WEDNESDAY Start Monitor Time 6:30 AM, End Monitor Time 6:45 PM. To SET the Monitor Times for TUESDAY to Start at 5:00 AM and End at 7:50 PM, enter the following command: "SET MONITORTIMES 2 5:00 19:50". When the MONITORINTERVAL is not zero and there is at least one non-zero MONITORIP, the Network Monitor will monitor the non-zero ports, and maintain the Link State (UP or DOWN) for each non-zero port. The purpose of the Monitor Times is to set a window for reporting (sending TRAP or SYSLOG messages) and for auto-bypass/recovery switching. If the current Time is outside the Monitor Times for the current Day, the Network Monitor will not report on the status of the monitored ports and will not auto-switch. Setting the Monitor Times to 00:00 00:00 will cause the Network Monitor to report status on the monitored ports and auto-switch if enabled, independent of the current Day and Time.

SET AUTHENTICATIONTRAP ON[OFF]
GET AUTHENTICATIONTRAP
Set or display the current state of authentication error traps. Authentication traps will be generated when this parameter is set to ON, and not when OFF. Note that this setting only affects the trap generation, and not how the Ethernet module handles an authentication failure. An authentication failure generally means that an SNMP access was attempted with an incorrect community name. Any change will not become permanent until a SAVE and RESET operation sequence is performed.

SET ALERTTYPE [TRAP/SYSLOG]
GET ALERTTYPE
Set or display the type of alert messages sent by the Ethernet module when certain events such as a change in switch state occur. The Ethernet module can be configured to issue either syslog messages, or SNMP traps. Note that at least one IP address must be entered using the "SET MANAGER N X.X.X.X" command before either syslog messages or traps will be issued. See section 9 for a list of the traps supported by the R7400, and see section 10 for a list of the supported syslog messages.

SET ALERTINTERVAL [N]
GET ALERTINTERVAL
Set or display the time interval between Monitored Port status update TRAP or SYSLOG messages, measured in minute increments. The Network Monitor will issue a TRAP or SYSLOG message each time a monitored port Link State changes. Additionally, at the Alert Interval in minutes, it will send a TRAP or SYSLOG message for each monitored port with Link State DOWN. The valid range is 1 to 255 (minutes). A value of 0 sets it to "Single" mode. In "Single" mode, a single TRAP or SYSLOG message is sent for each monitored port Link State change. Any change will not become permanent until a SAVE operation is performed.

SET AUTOSWITCH [NORMAL/BYPASS]
GET AUTOSWITCH
Set or display the Auto-Switch Mode. If Auto-Bypass is enabled, the R7400 will Auto-Switch to the bypass path (A), connecting port A to the common port when any monitored port Link State is DOWN. If Auto-Recovery is enabled, the R7400 will Auto-Switch to the normal path (B), connecting port B to the common port when ALL monitored port Link States are UP. In NORMAL Auto-Switch Mode, the Auto-Switch function will continue to Auto-Switch to the appropriate bypass/normal path depending on the Link State of the monitored ports, overriding any user selection. In BYPASS Auto-Switch Mode, the Auto-Switch function will Auto-Switch on changes to monitored port Link State. When in BYPASS mode, if a monitored port Link State changes from UP to DOWN, or if the status changes from one monitored port DOWN to all monitored ports UP, the Auto-Switch function will Auto-Switch as appropriate. However, the user may bypass this Auto-Switch feature and manually force a change in the connection path until another monitored port Link State changes. BYPASS mode is not allowed when Monitor Mode is TOGGLE. Any change will not become permanent until a SAVE operation is performed.

SET AUTOSWITCHTRIP [N]
GET AUTOSWITCHTRIP
Set or display the auto-switch trip point. When auto switch/recover function is enabled, the auto-switch trip point sets the number of monitored ports which can have a Link State of DOWN before auto-switching to the bypass path (A), connecting port A to the common port. If the number of monitored ports which have a Link State of DOWN is greater than the auto-switch trip point, the R7400 will auto-switch to the bypass path. The valid range is 0 to 255. Any change will not become permanent until a SAVE operation is performed.

SET DAY
GET DAY
Set or display the day of the week. The DAY and TIME are used in conjunction with the Monitor Times for reporting and auto-switching functions. For a SET, enter the text for the desired DAY (MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, or SUNDAY). When a GET DAY is received, it will display a number associated with the DAY string, which corresponds to the number in the Monitor Times list. The DAY is not preserved through a loss of power. If this feature is required for your application, the SNMP enabled Controller card is available with a battery backed Real-Time-Clock.

SET TIME
GET TIME
Set or display the time of day, using a 24 hour clock from 00:00 to 23:59. To set the time, enter the time in hours and minutes as follows: To set the time for 6:30AM "SET TIME 06:30" and for 5:45PM "SET TIME 17:45". The TIME is not preserved through a loss of power. If this feature is required for your application, the SNMP enabled Controller card is available with a battery backed Real-Time-Clock.

SET DATE [MM/DD/YYYY]
GET DATE
Set or display the date, using a two digits for month (1 through 12), two digits for day (1 through 31), and four digits for the year up to 9999. The DATE is not preserved through a loss of power. If this feature is required for your application, the Ethernet module on the Controller card is available with a battery backed Real-Time-Clock. To allow the user to enter the year with only two digits, the "Base Year" is maintained if a SAVE is performed. The term "Base Year" as used here means the year with the last two digits set to zero. For the Year 2012, the "Base Year" is 2000.

SET ADMINIP N X.X.X.X
Set administrator N (1-8) IP address. Up to 8 different administrator IP addresses can be entered. To remove an entry from the list, set the IP address to 0.0.0.0. If all 8 ADMIN IP addresses are 0.0.0.0 (no ADMIN IP addresses are configured) the Ethernet module will allow access via the Ethernet interface from any IP address, subject to the existing password and enable flags for each interface. If one or more ADMIN IP addresses are non-zero, the Ethernet module will only process messages received from the configured (non-zero) ADMIN IP addresses. All other messages will be ignored. This ADMIN IP address filtering feature applies to the telnet, web browser and SNMP Ethernet interfaces and to the PING reply functions. The ADMIN IP address filtering does not affect outgoing PING and ARP messages so the Ethernet module is still able to monitor any IP address for the "auto-switch" features. The administrator IP addresses can be different than the manager IP addresses. Any change will not become permanent until a SAVE operation is performed.

GET ADMINIP N
Display the IP address of administrator N (1-8). If no value is entered for "N", then all administrator IP addresses will be displayed.

```
ADMIN IP Addresses:
1: 192.168.1.113
2: 192.168.1.115
3: 192.168.1.149
4: 192.168.1.100
```

GET ADMINIP
Display all administrator IP addresses.

SET MANAGER N X.X.X.X
Set SNMP manager N (1-16) IP address. Up to 16 SNMP MANAGER IP addresses can be entered for destinations of trap messages. Trap messages will be sent to all enabled MANAGER IP addresses. To remove an entry from the list, set the IP address to 0.0.0.0.

GET MANAGER N
Display SNMP manager N (1-16) IP address. If no value is entered for "N", then all SNMP manager IP addresses will be displayed.

```
SNMP Managers:
1: 192.168.1.113
2: 192.168.1.115
3: 192.168.1.149
4: 192.168.1.100
```

GET MANAGER
Display all SNMP manager IP addresses.

PING X.X.X.X
Causes the Ethernet module to issue a single ICMP echo request packet to the designated IP address. If a response is received, the Ethernet module will display the message "Reply from X.X.X.X". If no response is received within 5 seconds, the Ethernet module will display the message "Request timed out".

GET EVENTLOG
SET EVENTLOG
The Event Log stores the most recent 32 traps. The Event Log is reset if power is lost, or the Ethernet module is reset. The GET EVENTLOG command displays the Event Log in a format similar to SYSLOG messages. The SET EVENTLOG command clears the Event Log.

SAVE
Save settings for next startup. All settings are stored in NV memory and restored upon power on. Changes to parameters will not become permanent unless a SAVE operation is performed.

RESET
Causes the Ethernet module to reboot and reloads all parameters from stored settings. About 10 seconds after receiving the RESET command, the Ethernet module reboots, which then takes approx 5 additional seconds to reboot completely.

SET DEFAULTS
Restore user default settings. A SAVE operation is required to make the changes permanent.

?
HELP
Displays a list of commands.

```
CONSOLE COMMANDS:
GET         ALL (display all parameters)
GET         VERSION (display rack 1 software versions)
GET         VERSION N (display rack N software versions)
GET[SET]    SYSTEM [A/B/C/D] (control all system ports)
GET[SET]    RACK N [A/B/C/D] (control single rack ports)
GET[SET]    PORT N [A/B/C/D] (control single port)
GET         EVERYRACK (display status for all racks)
GET         EVERYRACK N (display status for racks 1 thru N)
GET         POWER N (display power status)
GET[SET]    GROUPS N [string] (control single rack groups)
GET         TYPES N (display single rack types)
GET[SET]    IPADDRESS [X.X.X.X]
GET[SET]    SUBNETMASK [X.X.X.X]
GET[SET]    GATEWAY [X.X.X.X]
GET[SET]    PINGREPLY [ON/OFF]
GET[SET]    SNMPENABLE [ON/OFF]
GET[SET]    READCOMMUNITYNAME [string]
GET[SET]    WRITECOMMUNITYNAME [string]
GET[SET]    WEBENABLE [ON/OFF]
GET[SET]    WEBPASSWORD [string]
GET[SET]    WEBTIMEOUT [N] (seconds)
GET[SET]    WEBPORT [N]
GET[SET]    TELNETENABLE [ON/OFF]
GET[SET]    TELNETPASSWORD [string]
GET[SET]    TELNETTIMEOUT [N] (seconds)
GET[SET]    TELNETPORT [N]
GET[SET]    MONITORIP N [X.X.X.X] (0.0.0.0 to disable)
GET         MONITORIP (display all monitor IP addresses)
SET         MONITORIPRANGE N [X.X.X.S E] (N=Index,S=Start,E=End)
GET[SET]    MONITORMODE [FAILOVER/TOGGLE]
GET[SET]    MONITORDELAYCOUNT [N]
GET[SET]    MONITORINTERVAL [N] (1/10 seconds, 0 to disable)
GET[SET]    MONITORFAILCOUNT [N] (0 = no auto bypass)
GET[SET]    MONITOROKCOUNT [N] (0 = no auto recover)
GET[SET]    MONITORTIMES N HH:MM HH:MM (0:0 0:0 Always ON)
GET         MONITORTIMES (display all monitor times)
GET[SET]    AUTHENTICATIONTRAP [ON/OFF]
GET[SET]    ALERTTYPE [TRAP/SYSLOG]
GET[SET]    ALERTINTERVAL [N] (1 - 255 minuttes, 0 for single)
```

```
GET[SET]    AUTOSWITCH [NORMAL/BYPASS]
GET[SET]    AUTOSWITCHTRIP [N] (0 - 255, Auto-Switch Trip Point)
GET[SET]    DAY [MONDAY/TUESDAY/...]
GET[SET]    TIME [HH:MM] (HOUR 0 - 23, MINUTE 0 - 59)
GET[SET]    DATE [MM/DD/YYYY] (two digit month and day, four digit year)
GET[SET]    ADMINIP N [X.X.X.X] (0.0.0.0 to disable an entry)
GET         ADMINIP (display all administrator IP addresses)
GET[SET]    MANAGER N [X.X.X.X] (0.0.0.0 to disable an entry)
GET         MANAGER (display all SNMP managers)
PING        X.X.X.X (ICMP ECHO to remote host)
GET[SET]    EVENTLOG (GET to display event log, SET to clear event log)
SAVE        save settings for next startup
RESET       restart (use after SAVE)
SET         DEFAULTS (restore default user settings, save required)
```

8. Web Interface

The Ethernet enabled Controller Card also provides access to the console commands listed in Section 7 through a web browser interface. When enabled (see SET WEBENABLE command) accessing the default page on the Ethernet enabled Controller Card (by entering the Ethernet module's IP address in the address bar of your web browser application e.g. Internet Explorer, Netscape, etc) will present the following page:

Web Interface Version 1.0
Copyright (c) 2018.
All rights reserved.

Please logon:

Password: [   ]

[Submit]

Figure 8.1 Logon Screen

Note: If using a pop up blocker on your web browser, be sure to allow pop ups from the IP address of the R7400 Multiport Ganged Switching System, otherwise you could experience trouble receiving a response through the web interface.

After successfully entering the correct web password (see SET WEBPASSWORD command) you will get the command console page shown in Figure 8.2.

IMPORTANT: Do **NOT** click on the "submit" button or press the "enter" key on your keyboard multiple times. The web browser interface on the Ethernet enabled Controller Card can take up to 5 to 10 seconds to process a command and return a response. Clicking on "submit" or hitting "enter" multiple times while the Ethernet enabled Controller Card is processing a command can cause it to decide that the interface is not functioning properly. If this happens, the Ethernet enabled Controller Card will become non-responsive until it receives a valid login request i.e. you must re-enter the Ethernet enabled Controller Card's IP address in the address bar of your web browser, and then re-logon when the logon screen appears.

Market Central, Inc.

Web Interface Version 1.0
Copyright (c) 2018.
All rights reserved.

Command console:

Enter new command: [   ]

[Send Command]   [Logoff]

Figure 8.2 Initial Command Screen

At this point you may enter any valid command into the text box and click "Send Command" to execute (see Section 7 for a complete description of the console commands). The following is an example result of the GET SYSTEM command.

Web Interface Version 1.0
Copyright (c) 2018.
All rights reserved.

Command console:

Output from last command...

System Status: A

Enter new command: [   ]

[Send Command]   [Logoff]

Figure 8.3 Example Command Results Screen for GET SYSTEM command

The Ethernet enabled Controller Card will allow only 1 telnet or web access session at a time. For this reason, the web timeout and telnet timeout parameters should be set to reasonable timeout values. To free up a session without waiting for the web timeout, click "Logoff". Typing "quit" at the telnet prompt will similarly close a telnet session. Resetting the Ethernet module will also clear any existing web or telnet sessions.

9. MIB Path Summary
* NOTE: The MIB contains definitions that do not apply to every product in the R7000 family.

[internet] – 1.3.6.1
  [private] – 1.3.6.1.4
    [enterprises] – 1.3.6.1.4.1
      [mctech] – 1.3.6.1.4.1.9477

[mctech] – 1.3.6.1.4.1.9477
        private enterprise number

[mcAgent] – 1.3.6.1.4.1.9477.1
        SNMP Agent

[mpSwitchSystem] – 1.3.6.1.4.1.9477.1.8
        Multiport Switch System

        [mpSystemGangPort] – 1.3.6.1.4.1.9477.1.8.1

        [mpRackTable] – 1.3.6.1.4.1.9477.1.8.2
                [mpRackIndex] – 1.3.6.1.4.1.9477.1.8.2.1.1.RackIndex
                [mpRackGangPort] – 1.3.6.1.4.1.9477.1.8.2.1.2.RackIndex
                [mpRackKeyStat] – 1.3.6.1.4.1.9477.1.8.2.1.3.RackIndex
                [mpRackPowerStat] – 1.3.6.1.4.1.9477.1.8.2.1.4.RackIndex
                [mpRackSoftwareVersion] – 1.3.6.1.4.1.9477.1.8.2.1.5.RackIndex
                [mpRackName] – 1.3.6.1.4.1.9477.1.8.2.1.6.RackIndex
                [mpRackCards] – 1.3.6.1.4.1.9477.1.8.2.1.7.RackIndex
                [mpRackGroups] – 1.3.6.1.4.1.9477.1.8.2.1.8.RackIndex
                [mpRackHealth] – 1.3.6.1.4.1.9477.1.8.2.1.9.RackIndex
                [mpRackTypes] – 1.3.6.1.4.1.9477.1.8.2.1.10.RackIndex

        [mpSwitchTable] – 1.3.6.1.4.1.9477.1.8.3
                [mpSwitchIndex] – 1.3.6.1.4.1.9477.1.8.3.1.1.SwitchIndex
                [mpSwitchPort] – 1.3.6.1.4.1.9477.1.8.3.1.2.SwitchIndex
                [mpSwitchSoftwareVersion] – 1.3.6.1.4.1.9477.1.8.3.1.3.SwitchIndex
                [mpSwitchName] – 1.3.6.1.4.1.9477.1.8.3.1.4.SwitchIndex
                [mpSwitchType] – 1.3.6.1.4.1.9477.1.8.3.1.5.SwitchIndex

[mcIpRequester] – 1.3.6.1.4.1.9477.2
[mcTrapInfo] – 1.3.6.1.4.1.9477.3
        [mcGenericTrap] – 1.3.6.1.4.1.9477.3.1
        [mcSpecificTrap] – 1.3.6.1.4.1.9477.3.2
[mcManagerTable] – 1.3.6.1.4.1.9477.4
        [mcManagerIndex] – 1.3.6.1.4.1.9477.4.1.1.ManagerIndex
        [mcManagerIp] – 1.3.6.1.4.1.9477.4.1.2.ManagerIndex
[mcNetworkMonitorObjects] – 1.3.6.1.4.1.9477.6
        [mcDay] – 1.3.6.1.4.1.9477.6.1
        [mcTime] – 1.3.6.1.4.1.9477.6.2
        [mcDate] – 1.3.6.1.4.1.9477.6.3
        [mcMonitorInterval] – 1.3.6.1.4.1.9477.6.4
        [mcMonitorFailCount] – 1.3.6.1.4.1.9477.6.5
        [mcMonitorOkCount] – 1.3.6.1.4.1.9477.6.6
        [mcAutoSwitchMode] – 1.3.6.1.4.1.9477.6.7

[mcAutoSwitchTripPoint] – 1.3.6.1.4.1.9477.6.8
[mcAlertType] – 1.3.6.1.4.1.9477.6.9
[mcAlertInterval] – 1.3.6.1.4.1.9477.6.10
[mcAuthTrapEnable] – 1.3.6.1.4.1.9477.6.11
[mcMonitorAlarm] – 1.3.6.1.4.1.9477.6.12
[mcMonitorPortTable] – 1.3.6.1.4.1.9477.6.13
    [mcMonitorPortIndex] – 1.3.6.1.4.1.9477.6.13.1.1.MonitorPortIndex
    [mcMonitorPortIp] – 1.3.6.1.4.1.9477.6.13.1.2.MonitorPortIndex
    [mcMonitorPortLinkState] – 1.3.6.1.4.1.9477.6.13.1.3.MonitorPortIndex
[mcMonitorTimeTable] – 1.3.6.1.4.1.9477.6.14
    [mcMonitorTimeIndex] – 1.3.6.1.4.1.9477.6.14.1.1.MonitorTimeIndex
    [mcMonitorTimePeriod] – 1.3.6.1.4.1.9477.6.14.1.2.MonitorTimeIndex

Traps generated by the system

coldStart	generic trap 0
authenticationFailure	generic trap 4
mpRackKeyLockChange	specific trap 1
mpRackGangSwitchChange	specific trap 2
mpSwitchCardChange	specific trap 3
mpSwitchPortChange	specific trap 4
mpSystemGangSwitchChange	specific trap 6
mpRackPowerStatChange	specific trap 7
mpSystemAutoSwitchChange	specific trap 8
linkStateChangeUP	specific trap 9
linkStateChangeDOWN	specific trap 10

Multiport Switch System SNMP Variable Definitions:

[mpSystemGangPort] – 1.3.6.1.4.1.9477.1.8.1
Multiport Switch System gang port. This variable is used to control all switch cards in the system. A system may consist of up to 255 racks, each rack containing up to 16 switch cards. This variable may be set with a single character to A, B, C, or D. Not all values have meaning for all switch types.
On a "GET" of this variable, only rack with address 0x01 will respond.
The rack status will be A, B, C, or D if all of the switch cards have the same status.
The rack status will be X for empty if there are no switch cards installed in the rack.
The rack status will be M for mixed if the switch cards do not have the same status.

For DUAL channel A/B Switch cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.
Status value A means that COM1 is connected to A, and COM2 is connected to C.
Status value B means that COM1 is connected to B, and COM2 is connected to C.
Status value C means that COM1 is connected to A, and COM2 is connected to D.
Status value D means that COM1 is connected to B, and COM2 is connected to D.

[mpRackTable] – 1.3.6.1.4.1.9477.1.8.2
Multiport Switch Rack variable table. This variable is not directly accessible.

[mpRackIndex] – 1.3.6.1.4.1.9477.1.8.2.1.1.RackIndex
Controller Card "Rack" address. The Controller Card address is set via an eight position dip switch on the card. Each Controller Card in the system MUST have a unique address, in the

range of 0x01 to 0xFF hex. Address 0x00 is invalid, and must not be used. This is a read only variable.

[mpRackGangPort] – 1.3.6.1.4.1.9477.1.8.2.1.2.RackIndex
Multiport Switch Rack gang port. This variable is used to control all switch cards in a rack. A rack may contain up to 16 switch cards.

This variable may be set with a single character to A, B, C, or D. Not all values have meaning for all switch types.
On a "GET" of this variable, only rack with address 0x01 will respond.
The rack status will be A, B, C, or D if all of the switch cards have the same status.
The rack status will be X for empty if there are no switch cards installed in the rack.
The rack status will be M for mixed if the switch cards do not have the same status.

For DUAL channel A/B Switch cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.
Status value A means that COM1 is connected to A, and COM2 is connected to C.
Status value B means that COM1 is connected to B, and COM2 is connected to C.
Status value C means that COM1 is connected to A, and COM2 is connected to D.
Status value D means that COM1 is connected to B, and COM2 is connected to D.

[mpRackKeyStat] – 1.3.6.1.4.1.9477.1.8.2.1.3.RackIndex
Multiport Switch Rack Key-Lock Switch Status. This is a read only variable. This variable can be used to determine if the Key-Lock Switch is in the OFF or ON position. The front panel switches in the rack are disabled when the Key-Lock Switch is in the OFF position. The R7400 Switches will still respond to switch control signals and commands from the GANG-IN and GANG-OUT ports.

[mpRackPowerStat] – 1.3.6.1.4.1.9477.1.8.2.1.4.RackIndex
Multiport Switch Rack Power Status. This is a read only variable.
On the Controller Card, there are two DC power entry connectors. If power is applied to both power entry connectors, the Power Status will report "TwoSupplies". If power is applied to only one of the power entry connectors, the Power Status will report "One Supply Down".

[mpRackSoftwareVersion] – 1.3.6.1.4.1.9477.1.8.2.1.5.RackIndex
Controller Card Software Version. This is a read only variable, and is limited to a maximum of 14 characters.

[mpRackName] – 1.3.6.1.4.1.9477.1.8.2.1.6.RackIndex
Controller Card Identification String. The string is limited to a maximum of 14 characters.

[mpRackCards] – 1.3.6.1.4.1.9477.1.8.2.1.7.RackIndex
Multiport Switch Rack Card Status / Control, One character for each of the sixteen cards in the rack. Card slots which are not populated will be represented by an X character. Characters represent Card slots 1 through 16, from left to right. This variable may be used to set any or all cards in a rack with a single command. When setting, enter one character for each card in the rack, up to 16 characters. Valid Set commands may contain A, B, C, or D, and X to leave a card unchanged. Valid Set commands may NOT mix A, B, C, and D characters in a single command.
For example: string AXAXAAXX is valid, but string AXBXAAXX in NOT valid.

When set with a single character, this command functions the same as a set mpSwitchPort

command. When set with more than one character, this command overrides any group settings in place (see mpRackGroups for more information on group settings).

For DUAL channel A/B Switch cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.
If the rack contains any Dual Channel Switch Cards, the status will contain 16 characters for status 1, followed by 16 characters for status 2.
The following is an example of a status response for a rack with two Dual Channel Switch Cards in slots 1 and slot 3. The status for card 1 is COM1 connected to A, and COM2 connected to C. The status for card 3 is COM1 connected to B, and COM2 connected to D.

mpRackCards status string: AXBXXXXXXXXXXXXXCXDXXXXXXXXXXXXX

[mpRackGroups] – 1.3.6.1.4.1.9477.1.8.2.1.8.RackIndex
Multiport Switch Rack Group Status / Control, One character for each of the sixteen cards in the rack. Any character can be used to label a group, except "0" which indicates independent and upper case "X" which skips a position (retains the previously assigned group character). All cards in a group follow any switching command to any card in the group.

[mpRackHealth] – 1.3.6.1.4.1.9477.1.8.2.1.9.RackIndex
Multiport Switch Rack Configuration Status, One character for each of the sixteen cards in the rack.
This is a read only variable is a string of 16 characters. A "1" will be displayed for card slots which are populated, and a "0" will be displayed for card slots which are not populated.

[mpRackTypes] – 1.3.6.1.4.1.9477.1.8.2.1.10.RackIndex
Multiport Switch Rack Card Type, One character for each of the sixteen cards in the rack.
This is a read only variable is a string of "Card Type" 16 characters.
Type 0 = Empty, or Not Available
Type 1 = A/B Switch
Type 2 = Dual Channel A/B Switch, Independent Control
Type 3 = Dual Channel A/B Switch, Ganged Control
Type 4 = ABC Switch
Type 5 = ABCD Switch

[mpSwitchTable] – 1.3.6.1.4.1.9477.1.8.3
Multiport Switch Card variable table. This variable is not directly accessible.

[mpSwitchIndex] – 1.3.6.1.4.1.9477.1.8.3.1.1.SwitchIndex
Multiport Switch "Card" address. Each switch card address is determined by the position it is installed in the rack and the address of the rack. The formula used to determine the switch card's address is:
card address = 16 * (rack address – 1) + slot #
For example Switch cards 1 through 16 are in rack 1, and Switch cards 17 through 32 are installed in rack 2, and so on up to Switch cards 4065 through 4080 are installed in rack 255.

[mpSwitchPort] – 1.3.6.1.4.1.9477.1.8.3.1.2.SwitchIndex
Multiport Switch Card connected port. This variable is used to control which port on the switch card is connected to the common port on the switch card. When set to A, the switch card will connect the common port to the A port. When set to B, the switch card will connect the common port to the B port, and so on for C and D. When queried, the status of the switch card

will be reported as A, B, C, or D if the addressed card slot is populated, or the status will be X for Empty if the addressed card slot is empty.

For DUAL channel A/B Switch cards:
Set values A and B connect COM1 to A or B respectfully.
Set values C and D connect COM2 to C or D respectfully.
Dual Channel Switch Cards provide two character status, one for each channel.
Dual Channel example: AC for COM1 connected to A, and COM2 connected to C.

[mpSwitchSoftwareVersion] – 1.3.6.1.4.1.9477.1.8.3.1.3.SwitchIndex
Multiport Switch Card Software Version. This is a read only variable, and is limited to a maximum of 14 characters. On the R7400 Multiport Ganged Switching System, the Controller Card provides this response for each switch in the rack.

[mpSwitchName] – 1.3.6.1.4.1.9477.1.8.3.1.4.SwitchIndex
Multiport Switch Card Identification String. The string is limited to a maximum of 14 characters.

[mpSwitchType] – 1.3.6.1.4.1.9477.1.8.3.1.5.RackIndex
Multiport Switch Card Type, read only character variable.
Type 0 = Empty, or Not Available
Type 1 = A/B Switch
Type 2 = Dual Channel A/B Switch, Independent Control
Type 3 = Dual Channel A/B Switch, Ganged Control
Type 4 = ABC Switch
Type 5 = ABCD Switch

[mcIpRequester] – 1.3.6.1.4.1.9477.2
The IP address of the remote entity that last accessed branch 1.3.6.1.4.1.9477.1. This variable can be used to identify the last IP address to access any mcAgent variable. It is returned in the authenticationFailure message.

[mpTrapInfo] – 1.3.6.1.4.1.9477.3
Group of trap information variables. This variable is not directly accessible.

[mcGenericTrap] – 1.3.6.1.4.1.9477.3.1
Indication of generic trap events. This variable is bit mapped such that bit 0 is trap 0, bit 1 is trap 1, etc. Write an integer with 1 in bit positions to clear particular trap indications. For example write 17 to clear traps 0 & 4.

[mcSpecificTrap] – 1.3.6.1.4.1.9477.3.2
Indication of specific trap events. This variable is bit mapped such that bit 1 is trap 1, bit 2 is trap 2, etc. Write an integer with 1 in bit positions to clear particular trap indications. For example write 18 to clear traps 1 & 4.

[mcManagerTable] – 1.3.6.1.4.1.9477.4
Table for SNMP Manager IP addresses. This variable is not directly accessible.

[mcManagerIndex] – 1.3.6.1.4.1.9477.4.1.1.ManagerIndex
Index used to identify unique entries in the Manager IP address table.

[mcManagerIp] – 1.3.6.1.4.1.9477.4.1.2.ManagerIndex
SNMP Manager IP address. Destination IP address for TRAP or SYSLOG messages.

[mcNetworkMonitorObjects] – 1.3.6.1.4.1.9477.6
Group of Network Monitor Object variables. This variable is not directly accessible.

[mcDay] – 1.3.6.1.4.1.9477.6.1
Current day identification number, used to identify which monitor times should be used.

[mcTime] – 1.3.6.1.4.1.9477.6.2
Current time. Used with monitor start and end times to determine if action should be taken.
Also used to timestamp TRAP or SYSLOG messages.

[mcDate] – 1.3.6.1.4.1.9477.6.3
Current Date. Used to timestamp TRAP or SYSLOG messages.

[mcMonitorInterval] – 1.3.6.1.4.1.9477.6.4
Monitor Interval in 1/10 seconds, 0 to disable network monitor function. Used to specify the time
between PING attempts.

[mcMonitorFailCount] – 1.3.6.1.4.1.9477.6.5
Monitor Fail Count, 0 to disable auto-fail switch to A. Also used as successive PING failure
count to declare Link State DOWN.

[mcMonitorOkCount] – 1.3.6.1.4.1.9477.6.6
Monitor OK Count, 0 to disable auto-recover switch to B. Also used as successive PING
success count to declare Link State UP.

[mcAutoSwitchMode] – 1.3.6.1.4.1.9477.6.7
Auto-Switch Mode, NORMAL will switch to A when ANY monitored Link is DOWN, and will
switch to B when ALL monitored Links are UP. NORMAL mode switches continuously.
BYPASS will switch to A when a new monitored Link goes DOWN and will switch to B when
ALL monitored Links go UP. BYPASS mode switches on Link state changes, allowing the user
to BYPASS the Auto-Switch state until a new Link goes DOWN or all Links go UP. BYPASS
mode is not allowed when Monitor Mode is TOGGLE.

[mcAutoSwitchTripPoint] – 1.3.6.1.4.1.9477.6.8
Auto-Switch Trip Point, 0 - Auto-Switch when ANY monitored Link is DOWN. For values from 1
- 255, Auto-Switch when the number of monitored Links DOWN is greater than the Auto-Switch
Trip Point. Note: when ALL monitored Links are DOWN, Auto-Switching will occur if enabled.

[mcAlertType] – 1.3.6.1.4.1.9477.6.9
Alert Type, TRAP or SYSLOG message.

[mcAlertInterval] – 1.3.6.1.4.1.9477.6.10
Alert Interval, in minutes (1 - 255), 0 = single alert. Reports all Monitored Links that are DOWN.

[mcAuthTrapEnable] – 1.3.6.1.4.1.9477.6.11
Authentication TRAP Enable/Disable. When enabled, an Authentication error trap is sent to the
SNMP manager(s) when an SNMP access is attempted with an incorrect community name.

[mcMonitorAlarm] – 1.3.6.1.4.1.9477.6.12
Monitor Alarm state follows auto-switch logic. The Alarm state may drive a LED and/or a set of
relay contacts. The user may set the alarm state to test the alarm output or to clear or quiet an
alarm while corrective action is taken. Setting the alarm state while auto-switching is enabled in
normal mode will cause an auto-switch action.

[mcMonitorPortTable] – 1.3.6.1.4.1.9477.6.13
Table for Monitored Port IP and Link State variables. This variable is not directly accessible.

[mcMonitorPortIndex] – 1.3.6.1.4.1.9477.6.13.1.1.MonitorPortIndex
Index used to uniquely identify a Monitor Port IP and Link State.

[mcMonitorPortIp] – 1.3.6.1.4.1.9477.6.13.1.2.MonitorPortIndex
Monitored Port IP address. Non-zero monitor IP addresses will be monitored using PING requests.

[mcMonitorPortLinkState] – 1.3.6.1.4.1.9477.6.13.1.3.MonitorPortIndex
Monitored Port Link State. When a new monitor port IP address is assigned, its Link state is unknown. After MonitorFailCount successive failed PING requests, the Link state is changed to DOWN. After MonitorOkCount successive successful PING requests, the Link state is changed to UP.

[mcMonitorTimeTable] – 1.3.6.1.4.1.9477.6.14
Table for Monitor Time variables. This variable is not directly accessible.

[mcMonitorTimeIndex] – 1.3.6.1.4.1.9477.6.14.1.1.MonitorTimeIndex
Index used to uniquely identify monitor time period by day.

[mcMonitorTimePeriod] – 1.3.6.1.4.1.9477.6.14.1.2.MonitorTimeIndex
Monitor Time Period Identification String (Enter Start and End Times as follows HH:MM HH:MM to set). The current day selects the monitor period, and the current time is compared to the start and end times to determine if action should be taken.

Multiport Switch System SNMP Trap Definitions:

All traps carry the sysObjectId (1.3.6.1.2.1.1.2) variable, whose value is 1.3.6.1.4.1.9477.1.

coldStart – generic trap 0
This trap is sent during a power on initialization and reboot of the Ethernet module. It carries the sysDescr variable (1.3.6.1.2.1.1.1).

authenticationFailure – generic trap 4
This trap is sent as a result of an authentication failure in processing an SNMP request. Generally an authentication failure occurs as a result of an SNMP request with an invalid community name. It carries the IpRequester variable.

mpRackKeyLockChange – specific trap 1
This trap is sent when the key switch is changed on a rack. It carries the mpRackKeyStat variable.

mpRackGangSwitchChange – specific trap 2
This trap is sent when a rack gang switch occurs. It carries the mpRackGangPort variable.

mpSwitchCardChange – specific trap 3
This trap is sent when a card is removed from or inserted into a rack. It carries the mpSwitchPort variable.

mpSwitchPortChange – specific trap 4
This trap is sent when an individual card is switched. It carries the mpSwitchPort variable.

mpSystemGangSwitchChange – specific trap 6
This trap is sent when a system gang switch occurs. It carries the mpSystemGangPort variable.

mpRackPowerStatChange – specific trap 7
This trap is sent when the rack power supply status changes. It carries the mpRackPowerStat variable.

mpSystemAutoSwitchChange – specific trap 8
This trap is sent when a system auto switch occurs. It carries the mpSystemGangPort variable.

linkStateChangeUP – specific trap 9
This trap is sent when a Monitored Link State changes from DOWN to UP. It carries the mpMonitorPortIp of the Monitored Port that changed state.

linkStateChangeDOWN – specific trap 10
This trap is sent when a Monitored Link State changes from UP to DOWN. It carries the mpMonitorPortIp of the Monitored Port that changed state.

10. Syslog Messages

The internal Ethernet module can be configured to issue a syslog message rather than an SNMP trap when certain events occur. To configure the Ethernet module to issue syslog messages, you must use the "SET ALERTTYPE" command to select SYSLOG messages, and you need to specify the IP address(es) of the device(s) that will be receiving the syslog messages by using the "SET MANAGER N X.X.X.X" command (see section 7 for details regarding these commands). Once these configuration parameters have been set, the Ethernet module will issue syslog messages for the following types of events:

- power up cold start, or Ethernet module restart using the RESET command
- SNMP authentication failure (access attempted using incorrect read or write community name)
- change in the state of the front panel keylock switch
- change in the state of the rack switch ports caused by a user initiated "rack" command or the front panel push-button switch
- change in the state of an individual switch port caused by a user removing a switch card from the rack or installing a switch card into the rack
- change in the state of an individual switch port caused by a user initiated "port" command or the front panel individual push-button switches
- change in the state of the system switch ports caused by a user initiated "system" command or the front panel push-button switch
- change in the power ON/OFF state of either power input
- change in the state of the system switch ports due to the auto-switch function
- change in the state of a Monitored Link from DOWN to UP
- change in the state of a Monitored Link from UP to DOWN

The syslog messages issued by the Ethernet module conform where possible to the general recommendations as described in RFC 3164. The standard Ethernet module does not have a real-time clock. The Ethernet module uses its internal DATE and TIME to generate a timestamp for the syslog message. Please note that the DATE and TIME are reset to 01/01/2010 and 00:00:00 when the Ethernet module is powered on or reset, which generates a timestamp of Jan 1 00:00:00. Use the SET DATE and SET TIME commands to adjust the date and time as needed. Contact your supplier if your application requires a battery backed real-time clock. Alternatively, the device receiving the syslog messages can apply a timestamp or other identifier if the generated timestamp is not sufficient. The general format for each syslog message from the Ethernet module is as follows:

Jan 1 00:00:00 [Ethernet module IP address] Switching System: [specific message based on the event that occurred]

Listed below is an example for each type of syslog message that the Ethernet module can issue, followed by the actual syslog message that the Ethernet module will send. This is not an exhaustive list of all possible syslog messages.

power up cold start (or RESET command)
Jan 1 00:00:00 192.168.1.151 Switching System: Switch has been reset.

SNMP authentication failure
Jan 1 00:00:00 192.168.1.151 Switching System: SNMP authentication failure.

keylock switch change disabled to enabled
Jan 1 00:00:00 192.168.1.151 Switching System: Keyswitch change to ON position.

rack gang switch to A via SET RACK 1 A command (or push-button switch)
Jan 1 00:00:00 192.168.1.151 Switching System: Rack switch to A position.

individual switch card removed from the rack
Jan 1 00:00:00 192.168.1.151 Switching System: Port card removed.

individual switch card set to B via SET PORT 1 B command (or push-button switch)
Jan 1 00:00:00 192.168.1.151 Switching System: Port switch to B position.

system gang switch to B via SET SYSTEM B command (or push-button switch)
Jan 1 00:00:00 192.168.1.151 Switching System: System switch to B position.

power supply status change from one supply to two supplies.
Jan 1 00:00:00 192.168.1.151 Switching System: Power supply status changed to two supplies.

system gang switch to A due to the auto-switch function
Jan 1 00:00:00 192.168.1.151 Switching System: Automatic switch to A position.

monitored Link state changed from down to up
Jan 1 00:00:00 192.168.1.151 Switching System: Monitored Link State changed from DOWN to UP. IP: 192.168.1.153

monitored Link state changed from up to down
Jan 1 00:00:00 192.168.1.151 Switching System: Monitored Link State changed from UP to DOWN. IP: 192.168.1.153

Market Central, Inc.

<u>WARRANTY/LIMITATION OF REMEDIES AND LIABILITY</u>

  <u>WARRANTY </u>Market Central warrants to the original purchaser only that the products which are the subject of this Contract will be free of defects in workmanship and materials, under normal service and use, for a period of one (1) year from date of sale. Products which have been changed or altered in any manner from their original design, or which are improperly or defectively installed, tested, serviced or used, are not covered by this warranty. If any alleged failure to conform to this warranty shall arise during a period of one (1) year from date of sale, Market Central shall, upon prompt, written notice and compliance by Customer with such instructions as Market Central shall provide with respect to the return of allegedly defective products or parts, correct such non-conformity by repair or replacement, or by the refund of the purchase price or applicable portion thereof, at Market Central's sole discretion. Correction in the foregoing manner shall constitute a complete fulfillment of all obligations and liabilities of Market Central with respect to said products. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES , WHETHER WRITTEN, ORAL , IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; AND MARKET CENTRAL EXPRESSLY DISCLAIMS ANY SUCH WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

  <u>LIMITATION OF REMEDY</u>. If any claim shall arise with respect to any alleged non-conforming product, Market Central's sole obligation and Customer's sole and exclusive remedy shall be the repair or replacement of said allegedly defective product or component or the refund of the applicable portion of the purchase price, at Market Central's sole discretion and at no cost to Customer, in accordance with the warranty provisions of the preceding paragraph. SAID REMEDY SHALL BE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY WITH RESPECT TO ANY ALLEGED NON-CONFORMING PRODUCT OR OTHER CLAIM AS TO THE CONDITION OF ANY PRODUCT OR COMPONENT, WHETHER IN THE NATURE OF A CLAIM FOR BREACH OF WARRANTY, NEGLIGENCE, TORT, STRICT LIABILITY, PRODUCT LIABILITY WITH RESPECT TO DESIGN AND/OR MANUFACTURE, OR OTHERWISE.

  <u>LIMITATIONS OF LIABILITY</u>. In no event will Market Central be liable for any incidental, consequential, special or indirect losses or damages arising out of or in connection with the Contract, its performance or breach thereof, including without limitation any and all losses and damages arising out of or related to costs of removal and reinstallation of any item, loss of goodwill, loss of profits, delay and loss of use. MARKET CENTRAL'S LIABILITY WITH RESPECT TO ANY CLAIM OF ANY KIND FOR ANY LOSS OR DAMAGE SHALL NOT IN ANY EVENT EXCEED THE PRICE ALLOCABLE TO THE PRODUCT OR UNIT THEREOF WHICH GIVES RISE TO THE CLAIM; AND MARKET CENTRAL SHALL NOT BE LIABLE FOR ANY PENALTIES, PUNITIVE DAMAGES OR EXEMPLARY DAMAGES OF ANY KIND OR DESCRIPTION.