



Market Central®
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SwitchMaster® XK5000 Series Ultra-Compact Kill Switch System

OCT 2012
 Part Numbers

COMPLETE SYSTEMS	
COMPLETE XK5000 SYSTEM WITH 32 CAT6 AB SWITCH CARDS, ETHERNET CONTROL & DUAL SUPPLIES	6101100
COMPLETE XK5000 SYSTEM WITH 32 CAT5 AB SWITCH CARDS, ETHERNET CONTROL & DUAL SUPPLIES	6101101
COMPLETE XK5000 SYSTEM WITH 32 MM F.O. AB SWITCH CARDS, ST CONNECTORS, ETHERNET CONTROL & DUAL SUPPLIES	6101102
COMPLETE XK5000 SYSTEM WITH 32 MM F.O. AB SWITCH CARDS, SC CONNECTORS, ETHERNET CONTROL & DUAL SUPPLIES	6101103
INDIVIDUAL COMPONENTS	
CONTROLLER CARD – LOGIC ONLY	6001082
CONTROLLER CARD – PROCESSOR	6001088
NETWORK CARD – BASE (SUPPORTS LOGIC ONLY AND PROCESSOR CONTROLLER)	6001083
NETWORK CARD – ETHERNET (FOR USE WITH PROCESSOR CONTROLLER)	6001089
NETWORK CARD – ETHERNET+POE (FOR USE WITH PROCESSOR CONTROLLER)	6001090
LATCHING CAT6 RJ45 A/B SWITCH CARD	6001080
NON-LATCHING CAT6 RJ45 A/B SWITCH CARD	6001087
LATCHING FIBER OPTIC A/B SWITCH CARD, SC CONNECTORS	6001091
LATCHING FIBER OPTIC A/B SWITCH CARD, ST CONNECTORS	6001092
NON-LATCHING FIBER OPTIC A/B SWITCH CARD, SC CONNECTORS	6001093
NON-LATCHING FIBER OPTIC A/B SWITCH CARD, ST CONNECTORS	6001094
DUAL DC INPUT CARD (SINGLE SLOT)	6001084
EXTERNAL AC/DC POWER SUPPLY MODULE	5000761
DC POWER SUPPLY CARDS (-48 VOLT) – REQUIRES TWO SLOTS	6001095
AC POWER SUPPLY CARD - REQUIRES TWO SLOTS	6001085
2U HIGH, 19" RACK MOUNT CHASSIS	6001086
BLANK FRONT/REAR PANEL (TO COVER EMPTY SLOTS)	6001096



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1. Specifications

Connectors:

CAT6 RJ45 A/B SWITCH CARD – (3) CAT6 RJ45 connectors

FIBER OPTIC A/B SWITCH CARDS – (3) Duplex fiber optic SC or ST receptacles

NETWORK CARD – (1) RJ45, (2) RJ11

DUAL DC INPUT CARD – (2) DC INPUT 2-pin headers, (2) Power Status 2-position Terminal Blocks

Indicators:

A/B SWITCH CARDS – (2) LED, one for A, one for B

CONTROLLER CARD – (1) LED, power / status

NETWORK CARD – (2) LED, one for POE power, one for status

DUAL DC INPUT CARD – (2) LED for power supply status

Switches:

A/B SWITCH CARDS – (1) momentary toggle switch

CONTROLLER CARD – (2) momentary toggle switch, (1) 8-position dipswitch, (1) momentary push-button switch, and (1) key-lock switch.

Power Consumption per Card:

The rack must be powered with a regulated 12 VDC supply. The load depends on the rack configuration.

LATCHING CAT6 RJ45 A/B SWITCH CARD – 12 VDC, 1 mA normal, additional 65 mA max while switching.

NON-LATCHING CAT6 RJ45 A/B SWITCH CARD – 12 VDC, 1 mA in A position, 66 mA max in B position.

LATCHING FIBER OPTIC A/B SWITCH CARD – 12 VDC, TBD mA normal, additional 80 mA max while switching.

NON-LATCHING FIBER OPTIC A/B SWITCH CARD – 12 VDC, TBD mA in A position, additional 93 mA max at 12 VDC in B position.

LOGIC ONLY CONTROLLER CARD – 12 VDC, 8 mA.

PROCESSOR CONTROLLER CARD – 12 VDC, TBD mA.

BASE NETWORK CARD – 12 VDC, 10 mA.

ETHERNET NETWORK CARD – 12 VDC, 45 mA.

ETHERNET + POE NETWORK CARD – 12 VDC, 45 mA, POE output 12 VDC 1 Amp maximum.

Power Supply Options:

One or Two External AC/DC Power Supply (12 VDC, 5 A) modules with the Dual DC Input Card.

Internal AC (90 – 264 VAC, 47 – 63 Hz, 12 VDC, 50W) Power Supply Card.

Internal DC (36 – 76 VDC, 12 VDC, 50W) Supply Card.

Network Card with Power-Over-Ethernet, 12 VDC, 1 Amp Maximum. The POE supply can be used for a rack fully populated with up to 32 LATCHING A/B switch cards. To support NON-LATCHING switch cards, use one of the other power supply options.

Two power supplies may be used in single rack for redundancy.

Rack Size:

RACK – 3.5” H x 19” W x 18.75” D (including handles and connectors)

CAT6 RJ45 A/B SWITCH CARD – one slot (0.937 inches wide)

FIBER OPTIC A/B SWITCH CARDS – one slot (0.937 inches wide)

CONTROLLER CARD – one slot (0.937 inches wide)

NETWORK CARD – one slot (0.937 inches wide)

DUAL DC INPUT CARD – one slot (0.937 inches wide)

AC POWER SUPPLY CARD – two slots (1.875 inches wide)

DC POWER SUPPLY CARD – two slots (1.875 inches wide)

The rack has 18 slots on each side, to hold up to 16 A/B switch cards on each side, with a special slot for the controller and network card on the front, and two slot width for a power supply on the rear.

Environment:

TEMPERATURE 0° to 50° C operating, -40° to 70° C non-operating

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HUMIDITY	0 to 95% non-condensing
ALTITUDE	10,000 ft maximum operating, 40,000 ft maximum non-operating

2. Introduction

The XK5000 SwitchMaster[®] Switching System is a 2U 19" rack style chassis containing up to 32 A/B Switch Cards. Each switch card connects port A or port B to port C, through latching or non-latching telecommunication relays or fiber optic switching mechanisms. The XK5000 rack has 18 slots on each side and can accept any mix of up to 16 A/B switch cards on each side. The XK5000 rack has special slots for the Controller and Network cards on the front, and two slots reserved for Power Supply cards on the rear. Starting in the front next to the Controller Card, the Switch Card slots are numbered 1 to 16 from left to right, continuing in the rear Switch Card slots are numbered 17 to 32 from left to right, with Switch Card slot 32 next to the Power Supply slots. The Controller Card has two toggle switches to control the front switch cards (1 – 16) independently from the rear switch cards (17 – 32). Only one Controller Card or Network Card may be used in each rack, but more than one power supply could be used for redundancy. The Dual DC Input Card allows for two external redundant power supplies. The internal AC and DC Power Supply cards each require two slots, but more than one can be used in the rack for redundancy at the expense of two switch card slots. Each A/B Switch Card can be individually switched, or the front rack (up to 16 switch cards), or the rear rack (up to 16 switch cards), or the entire system (front and rear and any interconnected racks) can be switched from the Controller Card. The Controller Card has a keyed switch to enable and disable manual switching (disables the front panel toggle switches on the Controller Card and on each switch card). This keyed switch can also control the switch card LED indicators, turning them OFF to conserve power while manual switching is disabled. The Network Card has two RJ11 ports which provide for serial communications to the rack, and also to allow up to 255 racks to be daisy-chained together to create a single system that can be controlled by the first rack in the daisy chain. The XK5000 can be controlled with the manual toggle switches located on the front of each switch card, the manual toggle switches on the Controller Card, or remotely using a +/- 12 VDC signal from a remote toggle switch. The +/- 12 VDC hardware control signal can be used to "system" switch a system with up to 64 racks. Additional remote interface options include RS232 serial control, and Ethernet (SNMP, telnet, or web browser).

The Controller Card is available in two different versions (Logic Only, and Processor). The Logic Only version supports Front Rack, Rear Rack, and System Gang Switching using the manual toggle switches on the Controller Card as well as System Gang Switching using an external +/- 12 VDC signal or external remote toggle switch. The Processor version allows all features of the Logic Only version, with the addition of RS-232 communication on the Network Card Gang-In and Gang-Out connectors. This allows racks to be addressed, and individual A/B Switch Cards within the rack to be switched with serial commands.

The Network Card is available in three different versions (Base, Ethernet, and Ethernet + POE). The Base version supports all Gang-In and Gang-Out connections to allow the racks to be daisy-chained into a system of interconnected racks. The Base version supports RS-232 "terminal" commands if used with a Processor version of the Controller Card. The Ethernet version supports enhanced RS-232 serial commands, with the addition of an Ethernet port for SNMP, telnet, or web commands. There can only be one Ethernet Network Card in a system of daisy-chained racks, and it must be installed in the first rack in the system. The optional POE version allows the XK5000 chassis to receive Power-Over-Ethernet, for use in areas where AC power is not available. The POE power option provides enough power for a XK5000 rack with up to 32 Latching A/B Switch Cards. If using Non-Latching A/B Switch Cards, another power supply option must be used.

The XK5000 Latching A/B Switch Cards use latching relays or latching optical switching mechanisms, which allow them to retain their selected connections and maintain data flow even when power is lost or removed.

The XK5000 Non-Latching A/B Switch Cards use non-latching relays or non-latching optical switching mechanisms, which will fall back to the "Port C to Port A" connection when power is lost or removed, regardless of which port is selected prior to the failure or removal of power. When power is re-stored, the non-latching switch card will remain in the "Port C to Port A" connection, until switched (manually or with software) to a different state. The non-latching styles of switch cards are often used when a fall-back or "failover" style of connection scheme is desired in the event of power failure.

3. Configuration

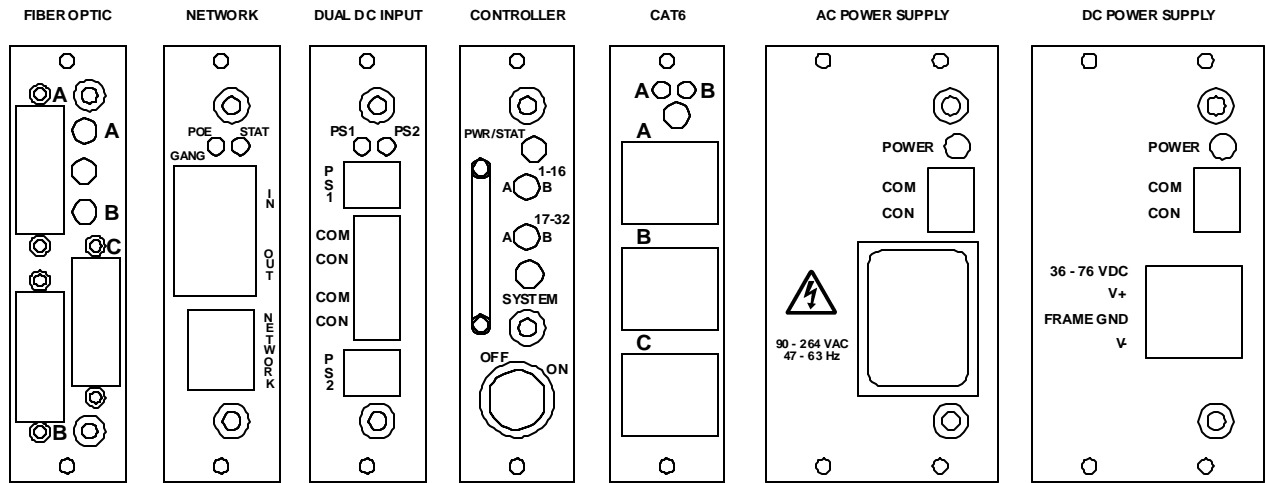


Figure 3.1 – XK5000 Panels

3.1 A/B Switch Card Configuration

The XK5000 A/B Switch cards can be configured to conserve power by turning off the LED indicators when the Key-Lock switch is in the OFF position. The XK5000 A/B Switch card LED indicators can be configured to be controlled by the Key-Lock switch or controlled with the 5 Volt supply to the A/B Switch cards. The Processor version of the Controller card may turn off 5 Volts to the rack when in low power “wake-on-lan” mode, in which case the LED indicators will go OFF. If the LED indicators are controlled by the Key-Lock switch and the Key-Lock switch is ON, the LED indicators will illuminate the currently selected state A or B. When the Key-Lock Switch is OFF, the LED indicators will be OFF. The XK5000 A/B Switch cards have an additional signal to enable the LED indicators. This LED enable signal is used by the Processor version of the Controller card to turn ON the LED indicators during a switching action when the Key-Lock Switch is OFF. This LED enable signal is also available on the Dual DC Input card and the AC and DC Power Supply cards. If the XK5000 A/B Switch Card LED indicators are enabled on the Dual DC Input, AC or DC Power Supply, or the Controller card, they will not turn OFF when the Key-Lock Switch is OFF.

Table 3.1.1 – CAT6 A/B Switch Card Jumper Settings

Jumper	W1
LED Indicator	
Controlled by Key-Lock Switch *	Pin 1 to Pin 2
Controlled by 5 V Supply	Pin 2 to Pin 3

* Factory Default Position

Note: W1 pin 1 is located toward the center of the PC board.

3.2 Controller Card Configuration

Table 3.2.1 – Controller Card Jumper Settings

Jumper	W3
Power Supply Ground	
100 Ohm Connection to Frame Ground *	Pin 1 to Pin 2
Direct Connection to Frame Ground	Pin 2 to Pin 3

* Factory Default Positions

Note: W3 pin 1 is located toward the center of the PC board.

The Processor version of the Controller Card has an 8-position dipswitch SW1, which is used to define the Controller

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Card (or rack) address. The Rack addresses within the system must be unique, but may be repeated in other systems. The XK5000 Rack consists of two virtual racks, the front rack with card addresses 1 through 16, and the back rack with card addresses 17 through 32. The card addresses are assigned by the location in the rack, starting in the front from left to right with card slot 1 next to the Controller Card, and continuing in the back from left to right with card slot 17 at the left. The dipswitch SW1 is used to set an 8-bit binary address from “01” through “FF” (1 to 255 decimal). Address “00” is invalid and must not be used. The first rack in the system should be set to address “01”. If two racks within the same system have the same address, both will try to respond at the same time, causing communication errors. Switch position 1 is the least significant bit, and position 8 is the most significant bit. Set each switch ON (as marked) for a '0', and OFF for a '1'. Address 1 for example would be position 1 OFF, and positions 2-8 ON.

Virtual Rack Address:

For consistency with other SwitchMaster products and software, the XK5000 is divided into two virtual racks, the front rack (cards 1 through 16) and the back rack (cards 17 through 32). Therefore the XK5000 rack actually responds to two “virtual rack” addresses. The physical rack (dipswitch) address “01” corresponds to virtual rack addresses “01” and “02”. The physical rack address “02” corresponds to virtual rack addresses “03” and “04”, and so on. To determine the virtual rack addresses, take the physical rack address (dipswitch) and multiply by two to get the virtual address of the back rack, then subtract 1 to get the virtual address of the front rack.

Dipswitch Setting (HEX)	Physical Rack Address (Decimal)	Virtual Rack Addresses (Decimal)	Card Addresses (Decimal)
0x01	1	Front Rack – 1 Back Rack – 2	1 – 16 17 – 32
0x02	2	Front Rack – 3 Back Rack – 4	33 – 48 49 – 64
0x03	3	Front Rack – 5 Back Rack – 6	65 – 80 81 – 96
0xFF	255	Front Rack – 509 Back Rack – 510	8129 – 8144 8145 – 8160

To calculate the Card Address within a Virtual Rack Address, use the following equations:

$$\text{Card Address} = [(\text{Virtual Rack Address} - 1) * 16] + \text{Slot Number}$$

The slot number is assigned from 1 through 16 from left to right while facing the front or back of the rack.

3.3 Network Card Configuration

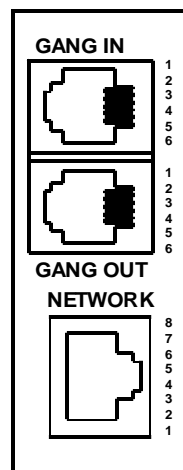


Figure 3.3.1 – Network Card Connector Pin-Out Detail

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Table 3.3.1 – 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

Table 3.3.2 – RJ11 GANG-IN Port Pin Assignment

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

Note: The functions of pins 3 and 4, on the GANG-IN port, are set using jumpers W2 and W3 on the Network Card. They can be configured as TXD and RXD for serial communication, or as V+ and V- to control the system control input with a remote toggle switch. The connections to V+ and V- are through 1 K ohm resistors. The System Control signal is used as an input and an output. As an Input signal it is normally open. This input is driven to +12 VDC to switch the system to A, and is driven to –12 VDC to switch the system to B. As an output, this signal is driven to +10 VDC when the user initiates a system switch to A, and is driven to –10 VDC when the user initiates a system switch to B.

Table 3.3.3 – RJ11 GANG-OUT Port Pin Assignment

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

Note: A standard RJ11 male/male crossover cable is required to connect from the gang-out port on one rack to the gang-in port on the next.

Table 3.3.4 – Network Card Jumper W1 and W11 Settings

Jumper	W1	W11
Power Supply Ground 100 Ohm Connection to Frame Ground * Direct Connection to Frame Ground	Pin 1 to Pin 2 Pin 2 to Pin 3	
RJ45 Shield Connected to Frame Ground * Open		Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Positions

Note: W1 and W11 pin 1 is located toward the center of the PC board. W11 is only populated on Network Cards with Ethernet and/or Power-Over-Ethernet.

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Table 3.3.5 – Network Card Jumper W2 and W4 Settings

Jumper	W4	W2
Gang-In Pin 3 Connected to TXD * Connected to V+ through 1K	Pin 1 to Pin 2 Pin 2 to Pin 3	
Gang-In Pin 4 Connected to RXD * Connected to V- through 1K		Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting

Note: W2 and W4 pin 1 is located toward the center of the PC board. Jumpers W2 and W4 function as a pair to configure the gang-in port. Refer to table 3.3.2 for the GANG-IN port pin assignment. Connect to TXD and RXD to support RS-232 serial communications, or connect to V+ and V- through 1 K ohm resistors to control the system control input with a remote toggle switch. Note that the serial port is required for setup of the network parameters.

Table 3.3.6 – Network Card Jumper W7 and W8 Settings

Jumper	W7	W8
Input Port Source Without Ethernet Module * With Optional Ethernet Module ~	Pin 1 to Pin 2 Pin 2 to Pin 3	
Input Port Source Without Ethernet Module * With Optional Ethernet Module ~		Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting – Network Card Base version

~ Factory Default Setting – Network Card Ethernet version

Note: W7 and W8 pin 1 is located toward the card edge connector, away from the center of the PC board. Jumpers W7 and W8 function as a pair to configure the input port source. It should not be necessary to change these jumpers from their factory set positions. These jumpers configure the source for communications to the internal processor on the Controller Card. If you have a Network Card with an optional SNMP/Ethernet network module installed, both jumpers should be set to connect pins 2 and 3. Otherwise both jumpers should be set to connect pins 1 and 2 to allow the processor to communicate with the RS-232 signals from the GANG-IN port.

Table 3.3.7 – Network Card Jumper W10 Settings

Jumper	W10
POE Power Status POE Power Status Enabled * POE Power Status Disabled	Pin 1 to Pin 2 Pin 2 to Pin 3

* Factory Default Setting

Note: W10 pin 1 is located toward the center of the PC board. W10 is only populated on Network Cards with optional POE. The XK5000 uses a single analog signal to determine the Power Supply status. Each power supply, including the optional POE power supply on the Network Card has a Relay which is energized directly from the power supply. If any of the power supplies is OFF, this Relay will short the analog power status line to ground, causing the XK5000 power status to be “one supply down”. Otherwise, the XK5000 will report “one supply” or “two supplies”, depending on the configuration. It is likely that with the addition of the POE supply, the software will reply with up to “three supplies”, but this has not been implemented at this time.

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3.4 Dual DC Input Card Configuration

Table 3.4.1 – Dual DC Input Card Jumper Settings

Jumper	W5
Power Supply Ground	
100 Ohm Connection to Frame Ground *	Pin 1 to Pin 2
Direct Connection to Frame Ground	Pin 2 to Pin 3

* Factory Default Positions

Note: W5 pin 1 is located toward the center of the PC board.

Table 3.4.2 – Dual DC Input Card Jumper Settings

Jumper	W1	W4
Power Supply 1 Alarm Relay Contact		
Normally Closed Contact *	Pin 1 to Pin 2	
Normally Open Contact	Pin 2 to Pin 3	
Power Supply 2 Alarm Relay Contact		
Normally Closed Contact *		Pin 1 to Pin 2
Normally Open Contact		Pin 2 to Pin 3

* Factory Default Positions

Note: W1 and W4 pin 1 is located toward the center of the PC board.

The Dual DC Input card has two power supply inputs. Each of these inputs power a relay which is intended to provide a set of “alarm” contacts, which can be used to control an external alarm or indicator. These jumpers allow the user to select between the normally closed contact and the normally open contact.

Table 3.4.3 – Dual DC Input Card Jumper Settings

Jumper	W3
Switch Card LED Enable	
Switch Card LED Indicators controlled by Key-Lock Switch *	Pin 1 to Pin 2
Switch Card LED Indicators controlled by 5 V supply	Pin 2 to Pin 3

* Factory Default Positions

Note: W3 pin 1 is located toward the center of the PC board.

See the A/B Switch Card Configuration section for more details on the Switch Card LED control options. If both the Switch Card jumper and the Dual DC Input jumper are set to Key-Lock Switch control, the LED indicators will be controlled by the Key-Lock Switch. If either the Switch Card jumper or the Dual DC Input jumper are set to control the LED Indicators by the 5 V supply, the LED indicators will be controlled by the 5 V supply. The Switch Card jumper configures this option for an individual switch card, while the Dual DC Input jumper configures this option for the entire rack.

3.5 AC / DC Power Supply Card Configuration

Table 3.5.1 – AC / DC Power Supply Card Jumper Settings

Jumper	W1
Power Supply Ground	
100 Ohm Connection to Frame Ground *	Pin 1 to Pin 2
Direct Connection to Frame Ground	Pin 2 to Pin 3

* Factory Default Positions

Note: W1 pin 1 is located toward the center of the PC board.

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Table 3.5.2 – AC / DC Power Supply Card Jumper Settings

Jumper	W3
Power Supply Alarm Relay Contact	
Normally Closed Contact *	Pin 1 to Pin 2
Normally Open Contact	Pin 2 to Pin 3

* Factory Default Positions

Note: W3 pin 1 is located toward the top of the PC board, toward LED D2.

The AC / DC Power Supply card has a relay which is intended to provide a set of “alarm” contacts, which can be used to control an external alarm or indicator. These jumpers allow the user to select between the normally closed contact and the normally open contact.

Table 3.5.3 – AC / DC Power Supply Card Jumper Settings

Jumper	W5
Switch Card LED Enable	
Switch Card LED Indicators controlled by Key-Lock Switch *	Pin 1 to Pin 2
Switch Card LED Indicators controlled by 5 V supply	Pin 2 to Pin 3

* Factory Default Positions

Note: W5 pin 1 is located toward the center of the PC board.

See the A/B Switch Card Configuration section for more details on the Switch Card LED control options. If both the Switch Card jumper and the AC / DC Power Supply jumper are set to Key-Lock Switch control, the LED indicators will be controlled by the Key-Lock Switch. If either the Switch Card jumper or the AC / DC Power Supply jumper are set to control the LED Indicators by the 5 V supply, the LED indicators will be controlled by the 5 V supply. The Switch Card jumper configures this option for an individual switch card, while the AC / DC Power Supply jumper configures this option for the entire rack.

4. Installation

The XK5000 Network Card and Controller Card are installed in the left most slots in the front of the rack. The two right most slots in the rear of the rack are intended for the Dual DC Input Card or the AC or DC Power Supply Card. Since the Dual DC Input Card only requires a single slot, you will need a blank panel to cover the unused slot. A/B switch cards 1 through 16 are installed in the front of the rack from left to right with slot 1 located next to the Controller Card. A/B switch cards 17 through 32 are installed in the rear of the rack from left to right with slot 17 located in the left most position.

4.1. Initial Installation

- 4.1.1 For each rack that contains a Processor Controller Card, you must first set the Controller Card’s address.
- 4.1.2 Using the card guides, carefully slide each card into the rack. 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 If daisy-chaining multiple racks together use a standard RJ11 male/male crossover cable to connect the GANG-OUT port from one rack to the GANG-IN port on the next rack. Repeat this step until all racks have been connected.
- 4.1.5 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.

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 Processor Controller Card, you must first set the Controller Card’s address. The address for the new rack should be unique – see the Controller Card Configuration section for setting the Controller Card’s address DIP switch.
- 4.2.2 Remove power from the last rack in the existing multi-rack system. All of the Latching A/B Switch Cards will maintain the selected connection through a loss of power, so the equipment connected thru the rack that is

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powered down will continue to operate normally. Note: Non-Latching A/B Switch Cards will fail over to the A to C connection state when power is removed. The Non-Latching A/B Switch Cards will stay in the A to C connection state when power is restored, until “switched” to another state.

- 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, using a standard RJ11 male/male crossover cable.
- 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 A/B Switch Cards in the rack be switched from A to B or B to A to insure that all of the latching relays and 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 Dual DC Input Card or the AC or DC Power Supply 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. The Power / Status LED on the Controller Card should illuminate to indicate that power is ON. The Power / Status LED will blink OFF during Controller Card switching operations. On each A/B Switch Card, either the "A" LED or the "B" LED should illuminate to indicate the currently connected port. The A/B Switch Card LED indicators may be controlled by the Key-Lock switch, so if the Key-Lock switch is OFF, the A/B Switch Card LED indicators may be OFF. When first installed, each switch should be cycled from A to B and back. It is possible for the latching relays to have changed state during shipping. Cycling the switch will assure that all relays on the card are in the same state.

When the Key-Lock switch is OFF, the toggle 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, the Ethernet network port, or the “system control” input on the Gang-In or Gang-Out connector.

When the Key-Lock switch is ON, the toggle switches in the rack function normally.

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

The Toggle Switches on the Controller Card are used to switch all cards in the “front” or “rear” rack, and are operated in the same fashion as the individual toggle switches. To switch the “front” rack, hold the toggle switch labeled “1-16” to the desired position A or B. To switch the “rear” rack, hold the toggle switch labeled “17-32” to the desired position A or B. Release the toggle switch when switching is complete. To switch the entire system (multiple racks ganged together) hold the “system” push-button while operating the either of the toggle switches on the Controller Card.

The Controller Card Power / STAT LED should blink under the following conditions:

The front panel toggle 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 Ethernet network port.

5.1 “SYSTEM” Switching Using the Gang-In System Control Signal

The System Control signal on the Gang In connector can be used as an input control signal or as an output indicator signal. When used as an input control signal, this pin should be driven to +12 VDC to switch the system to A, and should be driven to -12 VDC to switch the system to B. The input circuit requires approx ± 0.1 mA to operate properly.

As an output, this signal is driven to +10 VDC when the user initiates a system switch to A, and is driven to -10 VDC when the user initiates a system switch to B. To protect the output circuits, the output goes through a 1 K ohm resistor. Therefore, this output should not be used to drive a large load.

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The Gang In connector can be configured to supply +12 VDC and -12 VDC - refer to the Network Card Configuration section for jumper configuration information. These +12 VDC and -12 VDC outputs are provided through 1 K ohm resistors, and therefore should not be used to drive large loads. These outputs are provided to allow system switching using only a remote contact connected to the System Control pin. In this configuration, a momentary toggle switch or other dry contact closure connected to the Gang In port can be used to remotely control the rack as shown in the Figure below.

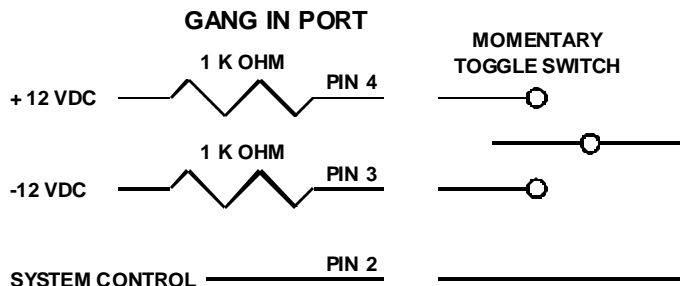


Figure 5.1.1 – System Switching, Using a Remote Momentary Toggle Switch

5.2 RS232 Terminal Commands (Not applicable to Logic Only Controller Cards or Ethernet Network Cards)

This section describes the RS232 commands that are available when using a Processor Controller Card, with a Base Network Card. The Logic Only Controller Cards do not support any serial commands, and Ethernet Network Cards 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 the Ethernet Network Card.

IMPORTANT: To start the “terminal” interface on a Processor 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 6.1.1 for GANG-IN to DB9 Pin Assignment), and press the SPACE KEY.

When the Processor 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 Processor 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 – Processor Controller Card response to “help” command (1200, N, 8, 1)

```
Rack 1
Ctrl Rev A
Commands:
get system
get rack n (n = rack addr, 1 to 510)
get card y (y = card addr, 1 to 8160)
get version n (n = rack addr, 1 to 510)
set system X (X = A or B)
set rack n X (n = rack addr, 1 to 510, X = A or B)
set card y X (y = card addr, 1 to 8160, X = A or B)
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 the Controller Card Configuration section for details on how to set the rack address DIP switch on the controller card. The Controller Card DIP switch is used to set the rack “physical address”. Use the following formulas to calculate the “virtual” address “n” for the front and rear rack:

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$n_{rear} = 2 * (\text{physical address})$; $n_{front} = [2 * (\text{physical address}) - 1]$. For commands that use a card address “y”, use the following formula to determine the card address of any card in any rack: $y = [16 * (\text{virtual rack address} - 1) + \text{slot\#}]$, where the slot number is a value from 1 to 16. Example1: Card in slot 18 in the third chassis, physical address 3. This is Card 2 in virtual rack 6, which is card address $y = [16 * (6-1) + 2] = 82$. Example2: Card in slot 12 in the fifth chassis, physical address 5. This is Card 12 in virtual rack 9, which is card address $y = [16 * (9-1) + 12] = 140$.

Commands are not case sensitive and can be entered as either upper or lower case. The Processor 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 or B)	None. The “system” status returned is the status of rack 1. The status will be A if any of the switch cards in rack 1 are at A. The status will be B only if all the installed switch cards in rack 1 are at B. If there are no switch cards installed in rack 1, the “system” status will be Empty.
set system B	System Set To B	All A/B switch cards in system will switch to B
get rack 1	Rack 1 Status AAAABBBBXXXXAAXX	None. In the response shown, switch cards 1-4, 13 & 14 are in A, 5-8 are in B, and the rest are not present. If the selected rack doesn’t respond within 3 seconds, the Processor Controller Card in rack 1 will reply with “No Response”.
set rack 1 A	Rack 1 Set To A	All A/B switch cards in rack 1 will switch to A
get card 8	Card 8 Status (A, B or Empty)	None
set card 8 B	Card 8 Set To B	A/B switch card 8 will switch to B
get version 1	Rack 1 Version Ctrl Rev. A	None
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 Processor Controller Cards with a Base Network Card. It is not applicable to Network Cards with the optional Ethernet module installed. This section is intended for programmers who want to control the XK5000 Kill Switch System in an automated environment using a computer.

BACKGROUND:

When first energized, the XK5000 Processor Controller Card provides a special rack-to-rack interface at the Gang In connector, operating at 2400, N, 8, 1. When the Processor 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 it 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.

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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.

PROGRAMMING:

First your program must set its RS232 COM port to 1200, N, 8, 1.

Since the XK5000 Processor 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 loses 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 Ethernet Network Cards

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

The Network Card with optional Ethernet module supports an enhanced set of serial commands that are listed below and described in more detail in section 7. To communicate with the Ethernet module, set your RS232 terminal to 9600 baud, no parity, 8 data bits, and 1 stop bit. Connect this terminal to the GANG-IN port (refer to Table 6.1.1 for GANG-IN to DB9 Pin Assignment).

When you apply power to the system, the Network Card Ethernet module will 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:

```
R6000/XK5000 Network Agent Version 2.6d AUG 2009
Copyright <c> 2009
All rights reserved
System starting ...
Rack position A
Console ready
```

>

At this point the Ethernet module is now ready to receive RS232 serial commands via the Gang In connector. If you

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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.

GET ALL	display all settings/configuration parameters
GET VERSION	display software versions
GET[SET] SYSTEM [A/B]	display/set all ports in system
GET[SET] RACK N [A/B]	display/set all ports in a single rack
GET[SET] PORT N [A/B]	display/set a single port in a rack
GET POWER N	display power supply status for a rack
GET[SET] IPADDRESS [X.X.X.X]	display/set IP address of SNMP network module
GET[SET] SUBNETMASK [X.X.X.X]	display/set subnet mask of SNMP network module
GET[SET] GATEWAY [X.X.X.X]	display/set the gateway router’s IP address
GET[SET] READCOMMUNITYNAME [string]	display/set SNMP network module read password
GET[SET] WRITECOMMUNITYNAME [string]	display/set SNMP network module write password
GET[SET] WEBENABLE [ON/OFF]	display/set web browser interface status
GET[SET] WEBPASSWORD [string]	display/set web browser interface password
GET[SET] WEBTIMEOUT [N] (seconds)	display/set web browser interface timeout
GET[SET] WEBPORT [N]	display/set web interface port number
GET[SET] TELNETENABLE [ON/OFF]	display/set telnet interface status
GET[SET] TELNETPASSWORD [string]	display/set telnet interface password
GET[SET] TELNETTIMEOUT [N] (seconds)	display/set telnet interface timeout
GET[SET] TELNETPORT [N]	display/set telnet interface port number
GET[SET] AUTHENTICATIONTRAP [ON/OFF]	display/set authentication trap status
GET[SET] MANAGER N [X.X.X.X]	display/set NMS IP address(es)
GET MANAGER	display all NMS IP address(es)
SAVE	save configuration changes
RESET	restart system (use after SAVE)

6. Ethernet / SNMP / Telnet / Web Setup

To perform the initial setup of a Network Card Ethernet module 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 XK5000 Kill Switch System. The Network Card Ethernet module 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:

```
R6000/XK5000 Network Agent Version 2.6d AUG 2009
Copyright <c> 2009
All rights reserved
System starting ...
Rack Position A
Console ready
```

>

At this point the Ethernet module 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

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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
OK
>set subnetmask 255.255.255.0
OK
>set gateway 192.168.1.1
OK
>set readcommunityname public
OK
>set writecommunityname private
OK
>save
OK
>reset
restarting ...
```

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 Network Card with optional Ethernet module and an available port on your Ethernet hub or switch/router. The Ethernet module will now respond to telnet, SNMP and/or HTTP messages at the assigned IP address depending on which options you enabled on the Ethernet module. Section 7 describes the commands that are available via the serial, telnet, and web browser 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 module. All commands are case insensitive, although several variable parameters are case sensitive (read/write community names, telnet and web password). GET, SET, SYSTEM, RACK, and PORT can all be abbreviated by the first letter of the command, allowing shorthand entry of switching commands.

GET ALL

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

```
System Status: B
IP Address: 192.168.1.30
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.1
Web Enable: Enabled
Web Password: mctech
Web Timeout: 300
Web Port: 80
Telnet Enable: Enabled
Telnet Password: dataman
Telnet Timeout: 80
Telnet Port: 23
Read Community Name: public
Write Community Name: private
Authentication Trap: Disabled
R6000/XK5000: 2.6d AUG 2009, Ctrl Rev. A
SNMP Managers:
```

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GET VERSION

Displays the software revisions of the Ethernet module and firmware on the Processor Controller Card.

R6000/XK5000: 2.6d AUG 2009, Ctrl Rev. A

GET SYSTEM

Displays the system status. This is the same as the status returned by the SNMP variable abSystemGangPort. The GET SYSTEM command is meaningful only if you exclusively use the SET SYSTEM command to control the state of all of the A/B 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. It will report "A" if any cards in the first rack are in position A, "B" if all cards in the first rack are in position B, and "X" if there are no cards installed in the first rack.

System Status: A

SET SYSTEM A[B]

Sets the entire system (all connected racks) to position A or B.

GET RACK N

Displays status of "virtual" rack N (1-510). This is the same as the status returned by the SNMP variable abRackCards. It displays a 16 character string showing the status of each card slot. See SET RACK for description on calculating front and back "virtual" rack addresses.

Rack Status: XXXBXXBXXXXBXAXX

SET RACK N A[B]

Sets the entire rack (up to 16 switch cards) with "virtual" rack address N (1-510) to position A or B.

The front virtual rack address = $[2 * (\text{physical rack address}) - 1]$.

The back virtual rack address = $[2 * (\text{physical rack address})]$.

GET PORT N

Displays the status of A/B switch card N (1-8160). Switch card addresses are assigned using the formula $N = 16 * (\text{virtual rack address} - 1) + \text{slot\#}$. The response will be "A", "B", or "X" (if not present).

Port Status: B

Port Status: X

SET PORT N A[B]

Sets the addressed A/B switch card N (1-8160) to position A or B. Switch card addresses are assigned using the formula $N = 16 * (\text{virtual rack address} - 1) + \text{slot\#}$

GET POWER N

Displays the status of the power supplies for rack N. If a single power supply, such as the AC Power Supply Card is used to power the rack, the response will be "One Supply". If only one power supply is being used with the Dual DC Input Card, or any single power supply 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

SET IPADDRESS X.X.X.X

GET IPADDRESS

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

SET SUBNETMASK X.X.X.X

XK5000 KILL SWITCH SYSTEM

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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 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, numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 8 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, numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 8 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, numerals, and/or printable symbols can be used. The password must be at least 1 char and no more than 8 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

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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 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 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.

SNMP Manager Table:

1: 192.168.1.113

2: 192.168.1.115

3: 192.168.1.149

4: 192.168.1.100

GET MANAGER N

Display SNMP manager N (1-16) IP address.

GET MANAGER

Display all SNMP manager IP addresses.

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. The Ethernet module takes approx 5 seconds to reboot completely.

?

HELP

Displays a list of commands.

R6000/XK5000 CONSOLE COMMANDS:

GET ALL (display all parameters)

GET VERSION (display software versions)

GET[SET] SYSTEM [A/B] (control all system ports)

GET[SET] RACK N [A/B] (control single rack ports)

GET[SET] PORT N [A/B] (control single port)

GET POWER N (display power status)

GET[SET] IPADDRESS [X.X.X.X]

GET[SET] SUBNETMASK [X.X.X.X]

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```
GET[SET] GATEWAY [X.X.X.X]
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] AUTHENTICATIONTRAP [ON/OFF]
GET[SET] MANAGER N [X.X.X.X] (0.0.0.0 to disable an entry)
GET MANAGER (display all SNMP managers)
SAVE save settings for next startup
RESET restart (use after SAVE)
```

8. Web Interface

The Ethernet module 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 module (by entering the 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) 2008.
All rights reserved.
```

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Please logon:

Password:

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 XK5000 Kill Switch 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 module typically takes 5 to 10 seconds to process a command and return a response. Clicking on “submit” or hitting “enter” multiple times while the Ethernet module is processing a command can cause it to decide that the interface is not functioning properly. If this happens, the Ethernet module will become non-responsive until it receives a valid login request i.e. you must re-enter the Ethernet module’s IP address in the address bar of your web browser, and then re-logon when the logon screen appears.

Web Interface Version 1.0
Copyright (c) 2008.
All rights reserved.

Command console:

Enter new command:

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 ALL command.

Web Interface Version 1.0
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Command console:

Output from last command...

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System Status: A
IP Address: 192.168.1.30
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.1
Web Enable: Enabled
Web Password: mctech
Web Timeout: 300
Web Port: 80
Telnet Enable: Enabled
Telnet Password: dataman
Telnet Timeout: 80
Telnet Port: 23
Read Community Name: public
Write Community Name: private
Authentication Trap: Disabled
R6000/XK5000: 2.6d AUG 2009, Ctrl Rev. A
SNMP Managers:

Enter new command:

Figure 8.3 Example Command Results Screen for GET ALL command

The Ethernet module 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

```
[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

[abSwitchSystem] – 1.3.6.1.4.1.9477.1.4
  A/B Switch System

  [abSystemGangPort] – 1.3.6.1.4.1.9477.1.4.1

    [abRackTable] – 1.3.6.1.4.1.9477.1.4.2
      [abRackIndex] – 1.3.6.1.4.1.9477.1.4.2.1.1.RackIndex
```

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[abRackGangPort] – 1.3.6.1.4.1.9477.1.4.2.1.2.RackIndex
[abRackKeyStat] – 1.3.6.1.4.1.9477.1.4.2.1.3.RackIndex
[abRackPowerStat] – 1.3.6.1.4.1.9477.1.4.2.1.4.RackIndex
[abRackSoftwareVersion] – 1.3.6.1.4.1.9477.1.4.2.1.5.RackIndex
[abRackName] – 1.3.6.1.4.1.9477.1.4.2.1.6.RackIndex
[abRackCards] – 1.3.6.1.4.1.9477.1.4.2.1.7.RackIndex

[abSwitchTable] – 1.3.6.1.4.1.9477.1.4.3
[abSwitchIndex] – 1.3.6.1.4.1.9477.1.4.3.1.1.SwitchIndex
[abSwitchPort] – 1.3.6.1.4.1.9477.1.4.3.1.2.SwitchIndex
[abSwitchSoftwareVersion] – 1.3.6.1.4.1.9477.1.4.3.1.3.SwitchIndex
[abSwitchName] – 1.3.6.1.4.1.9477.1.4.3.1.4.SwitchIndex

[IpRequester] – 1.3.6.1.4.1.9477.2

Traps generated by the system

coldStart	generic trap 0
authenticationFailure	generic trap 4
abRackKeyLockChange	specific trap 1
abRackGangSwitchChange	specific trap 2
abSwitchCardChange	specific trap 3
abSwitchPortChange	specific trap 4
abSwitchPortError	specific trap 5
abSystemGangSwitchChange	specific trap 6

A/B Switch System SNMP Variable Definitions:

[abSystemGangPort] – 1.3.6.1.4.1.9477.1.4.1

A/B Switch System gang port. This variable is used to control all A/B switch cards in the system. A system may consist of up to 255 XK5000 32 card racks (510 virtual 16 card racks), up to 8160 A/B switch cards in a XK5000 system. On a “GET” of this variable, only rack with address 0x01 will respond. If any of the A/B switch cards in rack 0x01 are at position A, the “system” status will be A. If all of the A/B switch cards in rack 0x01 are at position B, the “system” status will be B. If there are no A/B switch cards installed in rack 0x01, the “system” status will be Empty.

[abRackTable] – 1.3.6.1.4.1.9477.1.4.2

A/B Switch Rack variable table. This variable is not directly accessible.

[abRackIndex] – 1.3.6.1.4.1.9477.1.4.2.1.1.RackIndex

The RackIndex is the Virtual “Rack” address, with a valid range from 1 to 510. The Controller Card physical address is set via an eight position dip switch on the card. Each Controller Card in the system MUST have a unique physical address, in the range of 0x01 to 0xFF hex. Address 0x00 is invalid, and must not be used. Each physical XK5000 32 card rack address corresponds to two virtual 16 card rack addresses. The front virtual rack address = $[2 * (\text{physical rack address}) - 1]$. The back virtual rack address = $[2 * (\text{physical rack address})]$. This is a read only variable.

[abRackGangPort] – 1.3.6.1.4.1.9477.1.4.2.1.2.RackIndex

A/B Switch Rack gang port. This variable is used to control all A/B switch cards in a virtual rack. A virtual rack may contain up to 16 A/B switch cards. On a “GET” of this variable, the addressed rack will respond as follows. If any of the A/B switch cards in the addressed rack are at position

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A, the “rack” status will be A. If all of the A/B switch cards in the addressed rack are at position B, the “rack” status will be B. If there are no A/B switch cards installed in the addressed rack, the “rack” status will be empty.

[abRackKeyStat] – 1.3.6.1.4.1.9477.1.4.2.1.3.RackIndex

A/B 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 A/B Switches will still respond to switch control signals and commands from the GANG-IN and GANG-OUT ports.

[abRackPowerStat] – 1.3.6.1.4.1.9477.1.4.2.1.4.RackIndex

A/B Switch Rack Power Status. This is a read only variable.

On the Dual DC Input 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”.

[abRackSoftwareVersion] – 1.3.6.1.4.1.9477.1.4.2.1.5.RackIndex

Controller Card Software Version. This is a read only variable, and is limited to a maximum of 14 characters.

[abRackName] – 1.3.6.1.4.1.9477.1.4.2.1.6.RackIndex

Controller Card Identification String. The string is limited to a maximum of 14 characters.

[abRackCards] – 1.3.6.1.4.1.9477.1.4.2.1.7.RackIndex

A/B Switch Rack Card Status, 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 is a READ ONLY variable.

[abSwitchTable] – 1.3.6.1.4.1.9477.1.4.3

A/B Switch Card variable table. This variable is not directly accessible.

[abSwitchIndex] – 1.3.6.1.4.1.9477.1.4.3.1.1.SwitchIndex

A/B Switch “Card” address. Each A/B switch card address is determined by the position it is installed in the rack and the virtual address of the rack. The formula used to determine the switch card’s address is:

card address = 16 * (virtual rack address – 1) + slot #

For example A/B Switch cards 1 through 16 are in rack virtual 1, and A/B Switch cards 17 through 32 are installed in virtual rack 2, and so on up to A/B Switch cards 8145 through 8160 are installed in virtual rack 510.

[abSwitchPort] – 1.3.6.1.4.1.9477.1.4.3.1.2.SwitchIndex

A/B Switch Card connected port. This variable is used to control which port on the A/B switch card is connected to the common port on the switch card. When set to A, the switch card will connect port A to port C. When set to B, the switch card will connect port B to port C. When queried, the status of the A/B switch card will be reported as A or B if the addressed card slot is populated, or the status will be “Empty” if the addressed card slot is empty.

[abSwitchSoftwareVersion] – 1.3.6.1.4.1.9477.1.4.3.1.3.SwitchIndex

A/B Switch Card Software Version. This is a read only variable, and is limited to a maximum of 14 characters. On the XK5000 Kill Switch System, the Controller Card’s software version will be reported when querying the Switch Card software version.

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[abSwitchName] – 1.3.6.1.4.1.9477.1.4.3.1.4.SwitchIndex
A/B Switch Card Identification String. The string is limited to a maximum of 14 characters.

[IpRequester] – 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.

A/B 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.

abRackKeyLockChange – specific trap 1

This trap is sent when the key switch is changed on a rack. It carries the abRackKeyStat variable.

abRackGangSwitchChange – specific trap 2

This trap is sent when a rack gang switch occurs. It carries the abRackGangPort variable.

abSwitchCardChange – specific trap 3

This trap is sent when a card is removed from or inserted into a rack. It carries the abSwitchPort variable.

abSwitchPortChange – specific trap 4

This trap is sent when an individual card is switched. It carries the abSwitchPort variable.

abSwitchPortError – specific trap 5

This trap is sent when a card is unable to switch to the commanded position. This trap indicates a failure within the switch card itself. It carries the abSwitchPort variable.

abSystemGangSwitchChange – specific trap 6

This trap is sent when a system gang switch occurs. It carries the abSystemGangPort variable.

abRackPowerStatChange – specific trap 7

This trap is sent when the power status is changed on a rack. It carries the abRackPowerStat variable.

abSystemAutoSwitchChange – specific trap 8

This trap is sent when an automatic system gang switch occurs. It carries the abSystemGangPort variable.

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