Performance Communications

R6000 AUTOMATIC SWITCHING SYSTEM
USERS MANUAL

October 2004
Part Numbers

R6000 Rack Mount Chassis	R6000	No Power Supply
RS232 Control Card	R6100	Includes Key Lock
SNMP Control Card	R6900	Includes Key Lock
Logic-only Control Card	R6150	Includes Key Lock
RJ45 Switch Card	R6200	Switches All 8 Leads
A/B RS232 (DB25, RS530) Card	R6300	Switches All 25 Leads
A/B DB9 Card	R6600	Switches All 9 Leads
A/B DB15 Card	R6700	Switches All 15 Leads
Fiber Optic switch card - SC connectors	R6500	Full Duplex, 62.5 Um Fiber
Fiber Optic switch card - ST connectors	R6510	Full Duplex, 62.5 Um Fiber
Latching Fiber Optic switch card - SC	R6501	Full Duplex, 62.5 Um Fiber
Latching Fiber Optic switch card - ST	R6511	Full Duplex, 62.5 Um Fiber
Blank Rear Panel	R6000BP	Closes Blank Slots on Chassis
Fiber Optic OCX loopback switch card	R6501OCX	Latching Operation
External Power Supply Module	R6000PS	Two Required for Redundancy

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Performance Communications

Federal Communications Commission (FCC) Statement

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Contents

1. Specifications

Connectors:
RJ45 A/B SWITCH CARD – (3) RJ45 connectors
FIBER OPTIC A/B SWITCH CARD – (3) fiber optic SC receptacles (Model # 5000748; (3) ST – Model 5000760)
DB25 A/B SWITCH CARD – (3) DB25 female connectors
DB15 A/B SWITCH CARD – (3) DB15 female connectors
DB9 A/B SWITCH CARD – (3) DB9 female connectors
RACK A/B SWITCH CONTROLLER – (1) RJ45, (2) RJ11, (2) Two-Position DC Power Entry, (2) Two-Position Alarm Contact Terminal Block
AC Power A/B SWITCH CARD – (1) IEC320 male, (2) IEC320 female (all styles of this card)

Indicators:
A/B SWITCH CARDS – (2) LED, one for A, one for B
A/B SWITCH CONTROLLER – (3) LED, two for power, one for status, (2) Alarm Relay Contacts

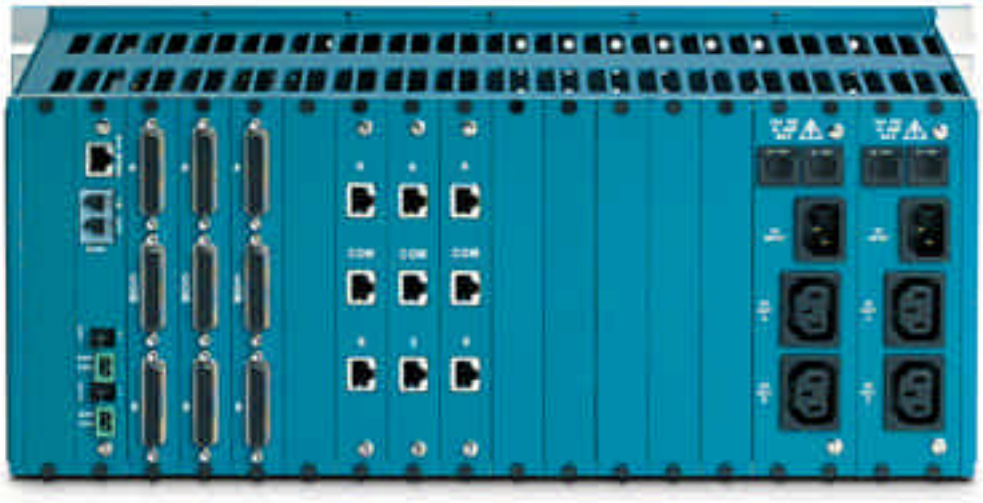
Switches:
A/B SWITCH CARDS – (1) momentary toggle switch
A/B SWITCH CONTROLLER – (1) momentary toggle switch, (2) 8-position dipswitch, (1) momentary push-button switch
4U RACK – (1) key-lock switch

Power:
RJ45, DB9 & DB15 A/B SWITCH CARDS – 12 VDC, 15 mA normal, additional 76.5 mA while switching.
FIBER OPTIC A/B SWITCH CARD – 12 VDC, 15 mA in A position, 95 mA max in B position, additional 15.3 mA while switching.
DB25 & AC A/B SWITCH CARDS – 12 VDC, 15 mA normal, additional 198.9 mA while switching.
A/B SWITCH CONTROLLER – 12 VDC, 50 mA normal, additional 30 mA while switching, and an additional 250 mA with SNMP module.

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.

Rack Size:
RACK – 7.0” H x 19” W x 6.5” D (not including handles and connectors)
RJ45 A/B SWITCH CARD – one slot (0.937 inches wide)
FIBER OPTIC A/B SWITCH CARD – one slot (0.937 inches wide)
DB25 A/B SWITCH CARD – one slot (0.937 inches wide)
RACK A/B SWITCH CONTROLLER – one slot (0.937 inches wide)

The rack has 18 slots. Two slots are reserved for use by the A/B Switch Controller / External Power Supply Card.



Rear View with a selection of A/B switch cards installed: DB25, RJ45 8-wire, AC power

2. Introduction

The rack A/B switch connects port A or port B to port C, through latching telecommunication relays. The switches are designed to fit into a 4U high 19-inch rack. The rack has 18 slots, two of which are used by the A/B Switch Controller / External Power Supply card. The 16 remaining slots can hold up to 16 rack A/B switch cards. Each A/B switch card can be individually switched, or the entire rack can be switched from the A/B switch controller card. The 4U rack has a keyed switch to enable and disable switching from this rack. The controller has two RJ11 ports, used to daisy chain up to 64 racks into a single system, allowing a single rack to control all racks in the system. The A/B switch controller can be controlled with a +/- 12 VDC signal, or a remote toggle switch.

The A/B switch controller is available in three options: (Logic Only, Processor, and SNMP)
The Logic Only version allows Rack and System Gang Switching, in addition to the individual switching allowed on each A/B Switch Card. The Processor version allows all features of the Logic Only version, with the addition of RS-232 communication on the 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 SNMP version allows all features of the Processor version, with the addition of an Ethernet port for SNMP commands. There can only be one SNMP capable card in the system, and it must be in the first rack in the system.

The Fiber Optic A/B switch uses the same latching relays to control an optical switch. The optical switch, however, is available in both latching and non-latching styles. Please refer to the part number chart on the cover of this manual for specific part numbers for latching and non-latching fiber optic switch cards. Latching fiber optic switch cards retain their selected connections even when power is lost or removed. Non-latching fiber optic switch cards fall back to the “Port C to Port A” connection when power is removed or fails, regardless of which port is selected prior to the removal or failure of power When power is re-applied, the latching relay will cause the optical switch in a non-latching fiber optic switch card to reconnect the port selected prior to the loss of power. The non-latching styles of fiber optic switch cards are therefore the preferred choices when a fall-back connection scheme is desired in the event of power failure.

3. Configuration

There are no user configurable settings on the A/B Switch Cards.

3.1 A/B Switch Controller Card Configuration

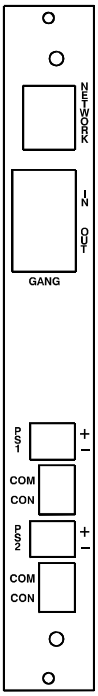


Figure 3.1.1 – A/B Switch Controller Outline

The following discussion will describe all user configurable settings on the A/B Switch Controller Card. Some of these settings are not applicable to all versions.

Switch SW3 on the A/B switch controller card is used to set the card address. The card address is used to identify the rack number when accessing the switch through the serial port or using remote access (SNMP or Web). The card address can be set from 0x00 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. Although the switch can be set to address 0x00, this address 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 a network module is installed (located in the SIMM socket on the controller card), it must be located on the first controller card in a multi-rack system, and that card should be set to address 0x01. Only one network controller card is permitted per multi-rack system.

The A/B Switch Controller Card has user configurable jumpers. The 3-position jumpers are positioned such that pin 1 is located toward the front or top of the card. Note that the LED indicators are located at the front toward the top of the card. Each 3-position jumper has a 2-position shunt, used to connect two of the three positions together.

Table 3.1.2 – A/B Switch Controller Card Shield and Ground Jumper Settings

Jumper	**W1**	**W13**
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

* Factory Default Positions

Figure 3.1.2 – RJ45 and RJ11 Pin Number Diagram

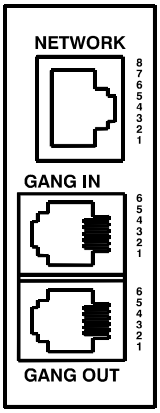


Table 3.1.3 – RJ45 (Optional Ethernet Port) Pin Assignment

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 version of the Controller Card.

Table 3.1.4 – RJ11 GANG-IN Port Pin Assignment

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

Note: Jumpers W2 and W3 select the function of pins 3 and 4 on the GANG-IN port.

Table 3.1.5 – RJ11 GANG-OUT Port Pin Assignment

Pin	Signal Name	Signal Direction
2	System Control (OPEN,+12,-12)	Input and Output
3	Transmit Data	Output
4	Receive Data	Input
5	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 3.1.6 – A/B Switch Controller Gang-In Port Configuration Jumper Settings

Jumper	**W3**	**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

Jumpers W2 and W3 function as a pair 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 V+ and V- to control the system control input with a remote toggle switch. Note: RS-232 serial communication is not supported on the logic only version.

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.

W2 and W3 should be set to TXD and RXD for systems using the serial input port, and for controller cards that have a network (SNMP) module installed.

Jumpers W7 & W8 should be set as follows:

- Both to position 1-2 if there is no network module installed (i.e. controller cards addressed 2 thru 255 in a multi-unit system).
- Both to position 2-3 if there is a network module installed.

  Note: Damage may occur to the network module and/or controller card if these jumpers are set to position 1-2 with a network module installed.

The A/B Switch 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 – A/B Switch Controller Alarm Contact Configuration Jumper Settings

Jumper	**W11**	**W12**
Power Supply 1 Alarm Contact		
Normally Closed Contact *	Pin 1 to Pin 2	
Normally Open Contact	Pin 2 to Pin 3	
Power Supply 2 Alarm Contact		
Normally Closed Contact *		Pin 1 to Pin 2
Normally Open Contact		Pin 2 to Pin 3

* Factory Default Setting

Dip Switch SW4 function is reserved for future development, and should be left in the OFF position. Note: Dip Switch SW4 may not be installed.

4. Installation

The A/B switch cards and the A/B switch controller card are installed from the rear of the rack.

4.1. Initial Installation

4.1.1 For each rack that contains a processor based controller card, you must first set the controllers address.
4.1.2 Using the card guides, carefully slide the 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 plastic snap rivets provided.
4.1.4 Using standard RJ11 male/male crossover cable, connect the GANG-OUT port from one rack to the GANG-IN port on the next. 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 system

The following procedure was developed to prevent inadvertent system switching when adding a rack to an installed system.
4.2.1 If the new rack contains a processor based controller card, you must first set the controllers address.
4.2.2 Remove power from the last rack in the system. The A/B Switch Cards use latching relays, so the connected equipment will not be affected when power is removed. The Fiber Optic A/B Switch uses a latching relay to control a non-latching optical switch. When power is removed, the optical switch will connect port A to port C. When power is restored, the latching relay will cause the optical switch to reconnect the selected port.
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 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.

5. Operation

When power is applied to the A/B Switch 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 A/B Switch Card, either the "A" LED or the "B" LED should illuminate to indicate the currently connected port. When first energized, each switch should be cycled from A to B and back. It is possible for the latching relays to have changed state during shipping, and cycling the switch will assure that all relays on the card are in the same state.

When the Key-Lock switch is OFF, the switches in the rack will be disabled. Note that the rack may still switch in response to a “system” switch command from the gang-in and gang-out connectors.

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

The Toggle Switch on the 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 Switch on the A/B Switch Controller Card is used to switch all cards in the rack, and is operated in the same fashion as the individual toggle switches. To switch the entire system, hold the “system” push-button while operating the toggle switch on the controller card.

The A/B Switch Controller Card STAT LED should blink under the following conditions:
The front panel control switches are used to initiate a “rack” or “system” level switching operation.
The controller card received a switch command from another rack (not applicable on Logic Only version).

5.1 Remote RS-232 Switching (Not applicable to Logic Only version)

This section is applicable to controllers with software 701100A.
Table 5.1.1 – RS-232 System Switching Commands

Command	Description
A <CR>	Switch "system" to A
B <CR>	Switch "system" to B
S <CR>	Request "status"

Notes:
1. Terminal device must be set to 2400 Baud, No Parity, 8 Data Bits, 1 Stop Bit.
2. The one character commands are CASE SENSITIVE, and must be followed by a carriage return.
3. Since these remote commands only allow control of the entire system, the status of all cards in the system should be the same. The status of an unused slot is B. Therefore, the "system" status returned will be A if any of the switch cards are at A, and will be B only if all the installed switch cards are at B.

5.2 "SYSTEM" Switching Using the Gang-In System Control Signal

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. The input circuit requires approximately 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.

The gang-in connector normally accepts RS-232 input signals, but can be configured to supply +12 VDC and –12 VDC. Refer to table 3.1.6 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. It is recommended that a momentary toggle switch be used.

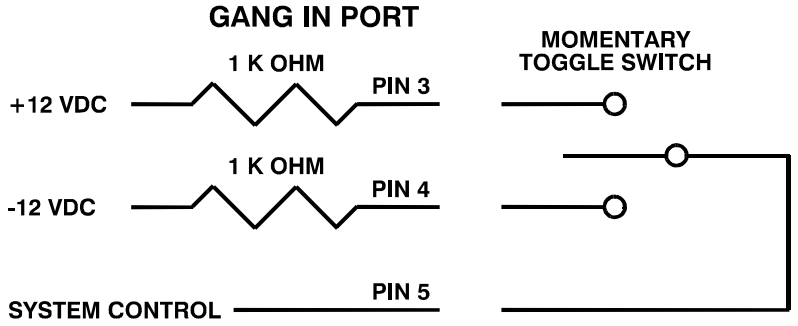


Figure 5.2.1 System Switching, Using a Remote Momentary Toggle Switch

5.3 Enhanced RS-232 Terminal Commands (Not applicable to Logic Only version)

This section is applicable to controllers with software 701101A or later and **WITHOUT** a network module installed.

IMPORTANT: To start the "terminal" interface, set your terminal to 1200 Baud, No Parity, 8 Data Bits, 1 Stop Bit, connect your terminal to the GANG-IN port (refer to Table 3.1.4), and press the SPACE KEY. The enhanced software is NOT compatible with the RS-232 System Switching Commands listed in section 5.1.

The enhanced software was developed to support Simple Network Management Protocol (SNMP) commands. In order to support a more user friendly interface on systems without the SNMP module, the software also accepts the following commands.

When the GANG-IN port detects a 1200 Baud SPACE character, it starts the "terminal" interface. The following table lists the "terminal" commands. The software accepts upper-case or lower-case commands. The software uses only the first character of each word in the command. Each word on a command line must be separated by a single SPACE character. The software echos the command to your terminal, allowing the user to backspace to correct typing errors. The command is processed when you press the ENTER KEY.

Table 5.3.1 – Enhanced RS-232 Terminal Commands (1200, N, 8, 1)

Command	Description
SPACE	start terminal mode
get system	get system status
get rack n	get rack n status (n = rack address, range 1 to 255)
get card y	get card y status (y = card address, range 1 to 4080)
get version n	get rack n software version (n = rack address, range 1 to 255)
set system X	set system to X (X = A or B)
set rack n X	set rack n to X (n = rack address, range 1 to 255, X = A or B)
set card y X	set card y to X (y = card address, range 1 to 4080, X = A or B)
t1	test cards 1 through 16
help	display list of terminal commands
exit	exit terminal mode

With the exception of the SPACE KEY to start terminal mode, the above commands are processed when you press the ENTER KEY. All of the above commands except "t1", "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>".

Since "system" commands are intended to set all cards in all racks in the system, the get system command returns the status from rack 1. The "system" status returned will be A if any of the switch cards in rack 1 are at A, and 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. The "rack" status will be a string of sixteen characters, one for each card slot in the rack from 1 through 16. The character will be A if the card is at position A, it will be B if the card is at position B, and it will be X if that card slot is not used. The "card" status will be A or B if the addressed card slot is used, or the status will be Empty if the addressed card slot is empty.

The command "t1" was developed for factory test, but may be useful when adding new cards to the rack. It is not recommended that you use test command while your switch is in use. This test will first switch all cards in the connected rack to position B, then switch all the cards in the connected rack to position A. Unpopulated card slots will be reported as failed, while cards that respond will be reported as OK. This is not a complete test of the switch cards or the controller.

5.4 Programming Tips For Using the Terminal Commands

This section is applicable to controllers with software 701101A or later and no network module installed. Refer to section 5.3 for a complete description of the Terminal Commands.

This section is intended for programmers who want to control the R6000 Automatic Switching System in an automated system with a computer.

BACKGROUND:
When first energized, the R6000 A/B Switch Controller card provides a SNMP interface, operating at 2400, N, 8, 1. When the A/B Switch Controller receives a 1200 baud SPACE character, it detects a framing error with null data. This causes it to enter "Terminal" mode. 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 collects characters into a buffer until it receives a carriage return character. The received characters are echoed, including the carriage return. The controller ignores characters received while it is processing a command. 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, and waits up to two 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 the RS-232 COM port to 1200, N, 8, 1.

Since your program does not know if the R6000 controller is in SNMP mode or Terminal mode, your program should establish terminal mode. This can be done by sending a SPACE character, followed by a carriage return character. If in SNMP mode, the SPACE character will cause the controller to go into Terminal mode, which will be followed by a prompt character. If already in terminal mode, the controller will respond "Invalid Command", followed by a prompt character.

Your program should wait for this prompt character (">", ASCII HEX 0x3E) before sending each command.

If it has been a while since your last command, you may want to re-establish terminal mode, just in case the controller has lost power since your last command.

The following table shows some example commands, 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
get system	System Status (A or B)	None
set system B	System Set To B	All A/B switches in system will switch to B
get rack 1	Rack 1 Status AAAABBBBXXXXAAXX	None
set rack 1 A	Rack 1 Set To A	All A/B switches in rack 1 will switch to A
get card 8	Card 8 Status A	None
set card 8 B	Card 8 Set To B	A/B switch card 8 will switch to B
set system A	System Set To A	All A/B switches in system will switch to A
exit	Good Bye	Exit terminal mode

6. SNMP/Web Setup

When the controller card has a network module installed, the RS232 gang in interface on the controller card connects to the network module rather than to the normal RS232 controller card interface. Thus the terminal mode operation described in section 5 is no longer available. When the network module is installed, the gang in interface only operates at 9600 bps, and uses the console commands described below and in more detail in section 7. The gang out interface on the controller card, however, remains the same to allow daisy-chaining of racks. To perform initial setup of the network controller you will need a serial terminal capable of 9600 baud, no parity, 8 data bits, and 1 stop bit. Connect this terminal to the GANG-IN port. The necessary connections to a standard IBM compatible PC serial port DB9 connector is as follows:

Table 6.1.1 – GANG-IN to DB9 Pin Assignment

RJ11 PIN	SIGNAL	DIRECTION	DB9
3	RECEIVED DATA	TO TERMINAL	2
4	TRANSMITTED DATA	FROM TERMINAL	3
2	GROUND		5

Attach a 10base-T CAT5 cable to the controller card and an available port on your hub. Configure the remainder of the system per the included documentation (power supply inputs, etc). Apply power to the system. The network controller card requires 30-40 seconds to boot up, while performing self tests and configuring.

After this process is complete you will see a sign-on message displayed on the serial console, i.e.

```
R6000 Network Agent Version 1.04 May 2003
Copyright (C) 2003 Market Central, Inc.
All rights reserved
www.mctech.com

System starting ...
console ready.
>
```

At this point the console is ready for some low level configurations necessary before you will be able to communicate with the network controller using TCP/IP. You will need to enter an IP address and subnet mask, as well as read and write SNMP community names if using SNMP, or a web password for browser access. These parameters will be saved into non-volatile memory, and the system will 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 to suit your application requirements. All the console level commands available are described in detail in section 8.

```
>set ipaddress 192.168.1.200
OK
>set subnetmask 255.255.255.0
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. At this time, the network controller card will respond to SNMP and HTTP messages at the assigned IP address. See the MIB Path Summary for a list of SNMP variables and their functions.

7. Console Commands

The following commands are available from the console prompt of the network controller. All commands are case insensitive, although several variable parameters are case sensitive (read/write community names and web password). GET, SET, SYSTEM, RACK, and PORT can all be abbreviated by the first letter of the command. This allows shorthand entry of switching commands to be compatible with the serial only control version of the controller card.

GET ALL

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

```
System Status: B
IP Address: 192.168.1.200
Subnet Mask: 255.255.255.0
Read Community Name: public
Write Community Name: private
Web Enable: ON
Web Password: mctech
Web Timeout: 300
Authentication Trap: ON
Software Versions: 1.04 May 2003 / Ctrl Rev. D
SNMP Manager Table:
1: 192.168.1.113
2: 192.168.1.115
3: 192.168.1.149
```

GET VERSION

Displays the software revision of the network module and controller card.

```
Software Versions: 1.04 May 2003 / Ctrl Rev. D
```

GET SYSTEM

Displays the system status. This is the same as the status returned by the SNMP variable abSystemGangPort. 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 “not present” if there are no cards installed in the first rack. This is meaningful only when using system level switching commands.

```
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 rack N (1-255). 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.

```
Rack Status: XXXBXXBXXXXBXAXX
```

SET RACK N A[B]

Sets the entire addressed rack N (1-255) to position A or B.

GET PORT N

Displays the status of card N (1-4080). The response will be “A”, “B”, or “not present”.

```
Port 4: B

Port 4: not present
```

SET PORT N A[B]

Sets the addressed card N (1-4080) to position A or B.

SET IPADDRESS X.X.X.X
GET IPADDRESS

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

SET READCOMMUNITYNAME string
GET READCOMMUNITYNAME

SET READCOMMUNITYNAME string
GET READCOMMUNITYNAME

Set or display the current read or write community name as specified. Note that in general these are case sensitive fields. Any change will not become permanent until a SAVE operation is performed.

SET WEBENABLE ON[OFF]
GET WEBENABLE

Set or display the current state of web based access. The network module will not accept any HTTP requests when web enable is off. The system must be SAVEed and then RESET for this setting to take affect.

SET WEBPASSWORD string
GET WEBPASSWORD

Set or display the current web password. Note that this is a case sensitive field. Any change will not become permanent until a SAVE operation 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 network module will request a login. Note that the web timeout cannot be disabled, for security reasons, it can however, be set arbitrarily large.

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 network 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 operation 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 a network system reboot and reloads all parameters from stored settings. An IP address change will not take affect until after a SAVE and RESET. The network module takes 30-40 seconds to reboot completely.

?
HELP

Displays a list of commands.

```
R6000 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[SET]    IPADDRESS [X.X.X.X]
GET[SET]    SUBNETMASK [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]    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 network module provides access to console commands through a web browser interface. When enabled (see SET WEBENABLE command) accessing the default page on the modules IP address (index.html) will present the following page.

Figure 8.1 Logon Screen

After successfully entering the correct web password (see SET WEBPASSWORD command) you will get the following page.

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. The following is an example result of the GET ALL command.

Figure 8.3 Example Command Results Screen

The network controller will allow a maximum of 10 concurrent web access sessions. To free up a session without waiting for the web timeout, click “Logoff”. For this reason, the web timeout should be set to a workable time. Resetting the unit will clear all current web 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
Market Central, Inc. private enterprise number

[mcAgent] – 1.3.6.1.4.1.9477.1
Market Central, Inc. 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
[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 racks, each rack containing up to 16 A/B switch cards. 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
A/B Switch Controller "Rack" address. The A/B Switch Controller address is set via an eight position dip switch on the card. Each A/B Switch Controller 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.

[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 rack. A 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 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 a 4U A/B Switch controller, 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".

On a 2U A/B Switch controller, the rack may contain one or two power supplies. If one power supply is installed and operating, the Power Status will report "OneSupply". If two power supplies are installed and both are operating, the Power Status will report "TwoSupplies". If two power supplies are installed and one is off line, the Power Status will report "One Supply Down".

[abRackSoftwareVersion] – 1.3.6.1.4.1.9477.1.4.2.1.5.RackIndex
A/B Switch Controller 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
A/B Switch Controller 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. This variable may not be implemented on 2U A/B Switch Systems.

[abSwitchTable] – 1.3.6.1.4.1.9477.1.4.3
A/B Switch Rack 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.

On a 4U A/B Switch System, the switch card address is determined by the position it is installed in the rack, and the address of the rack. For example A/B Switch cards 1 through 16 are in rack 0x01, and A/B Switch cards 17 through 32 are installed in rack 0x02, and so on up to A/B Switch cards 4065 through 4080 are installed in rack 0xFF (255 decimal).

On a 2U A/B Switch System, the switch card address is set via an eight position dip switch on the card. Each 2U A/B Switch cards 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.

[abSwitchPort] – 1.3.6.1.4.1.9477.1.4.3.1.2.SwitchIndex
A/B Switch Card port. This variable is used to control the A/B switch card selected port. When set to A, the switch will connect port A to port C. When set to B, the switch will connect port B to port C.

On a 4U A/B Switch System, the status of the A/B switch card will be A or B if the addressed card slot is populated, or the status will be "Empty" if the addressed card slot is empty.

On a 2U A/B Switch System, if the addressed A/B switch card is not present, you will not get a response.

[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 a 4U A/B Switch System, the A/B switch cards do not have software, so this variable will be the same for all A/B switch cards within a given rack. The software resides on the A/B Switch Controller Card.

On a 2U A/B Switch System, the A/B Switch cards have software. Therefore, this variable may be different, depending on the software version on each card.

[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 SNMP controller. 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.

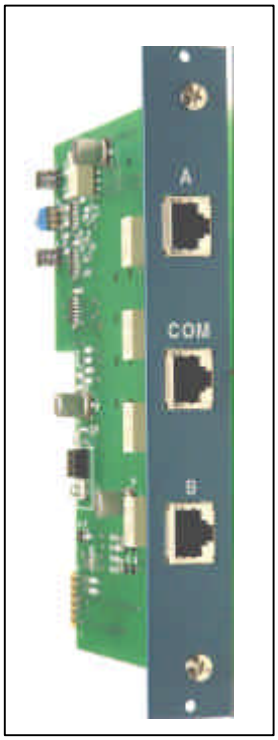
abSwitchCardChange – specific trap 3
This trap is sent when a card is removed from or inserted into a rack. It carries the abSwitchPort variable.

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

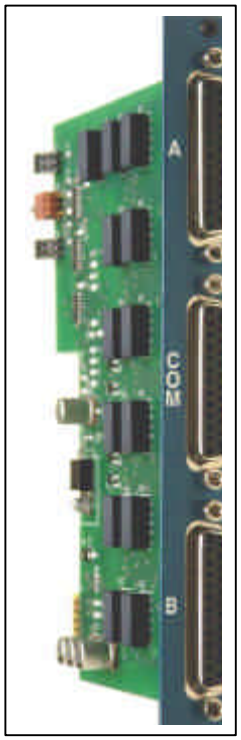
abSwitchPortError – specific trap 5
This trap is sent when a card is unable to switch to the commanded position. This trap indicates a failure within the switch card itself. Not all switch cards are capable of generating this trap. It carries the abSwitchPort variable.

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

10. Appendix



Gigabit RJ45 (Ethernet) Card



DB25 (RS530) Card

Fiber Optic Card (SC also available)

Controller Card

DB9 Card

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