



Roamer™-IP
Remote Management Solution

User's Manual

Firmware v4.6.0

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Chapter 1 - Introduction

Overview

The Rackable Systems™ Roamer-IP Remote Management Solution™ provides standard motherboards with enhanced remote control capabilities as well as serial redirection. Administration can be performed on countless servers from one central location through a simple LAN connection, resulting in dramatically reduced workload for system administrators while improving overall system availability.

Roamer™-IP provides true lights-out management of servers and clusters, including:

- Console access via serial redirection through the internal motherboard serial header (including BIOS access)
- Management across LAN
- Power control: out-of-band access allows rebooting/turning on and off servers
- An optional LCD screen can display text such as IP address, hostname, CPU load, or maintenance message
- An optional LED that can be used to help the operations staff locate servers the need to be serviced
- Remote monitoring of the system power status and ambient case temperature
- Power on delay functionality: which minimizes peak power spike during rack-wide power on, reducing spike power requirements by up to 52%

A problematic server can be flagged for maintenance with an LED or a text message on its optional LCD. A server's internal temperature can be monitored through the Roamer temperature sensor. Unresponsive systems can be given a "hard" reset or can be powered down. The Roamer implements a user-assigned power-on delay value to avoid effects of an initial power-on surge.

Centralized Management

The Roamer is accessed through a standard RJ-45 ethernet connection. Each module can be accessed directly with a telnet client. In a typical data center, the standard method for remote management consists of installing an ethernet switch and wiring each server to the switch. The Roamer is then available via the regular network.

The Roamer has three operating modes: pass-through mode, menu mode, and shell mode. When initially connected, the session will be started in pass-through mode. A module can be connected to a network by either manually setting an IP address, or by using DHCP. Establishing a telnet connection to the determined address through port 10001 will establish a connection with the Roamer. Entering CTRL-Shift-6 will give access to the module commands in menu mode. Alternately, shell mode is designed for advanced scripting can be entered via a proper escape sequence – see the Chapter 4 for more information on using shell mode.

Organization of this Manual

This manual provides details on using the Roamer Remote Management Solution.

The options for remote management can be accessed by:

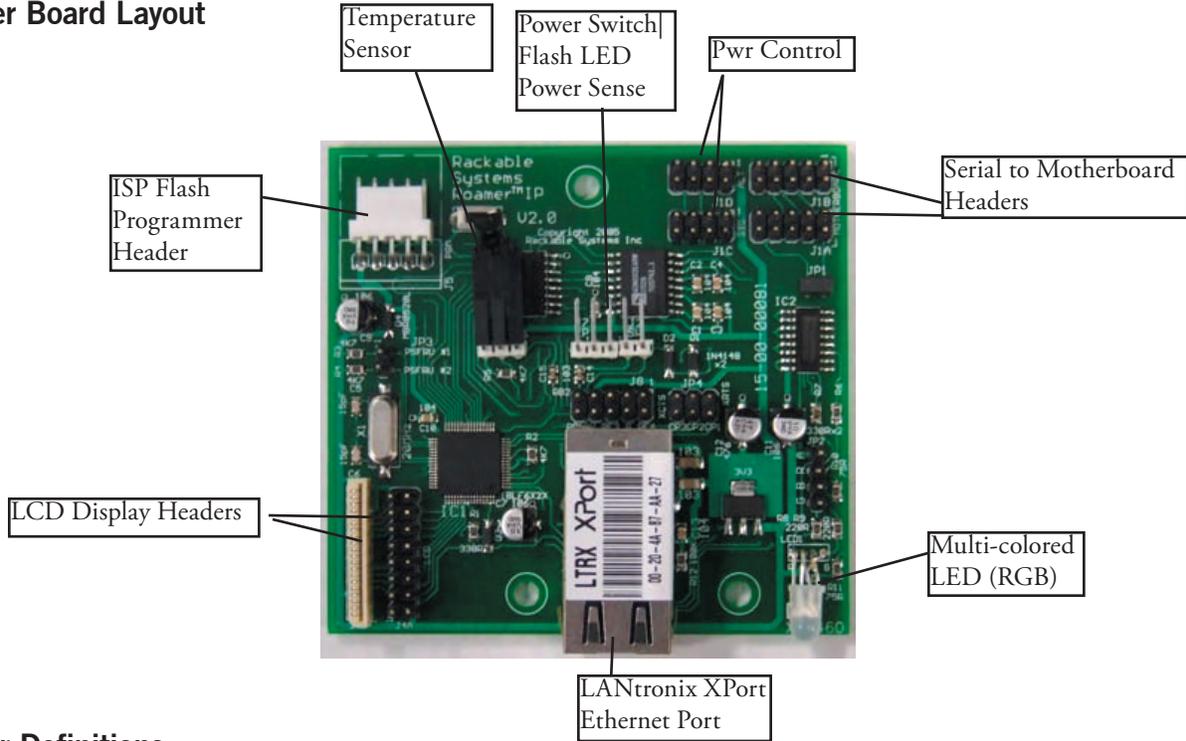
- Menu mode: that is accessible through an IP connection via a telnet session
- Shell mode: that is accessible from the local OS or through an IP connection, via telnet.

The Roamer also allows for serial redirection when operating with certain operating systems, including most distributions of Linux, and Windows 2003. Serial redirection provides the ability to monitor console messages, obtain logging output, and can function as a management shell on the server over a LAN connection. Serial redirection is available via a serial header on the motherboard, making most boot processes visible. The BIOS settings can be changed through this interface, allowing for remote management of the BIOS settings.

This manual will guide you through the useful features of the Rackable Systems Roamer. Please take the time to read this manual before attempting installation or operation.

Chapter 2 – Roamer Physical Layout

Roamer Board Layout



Header Definitions

ISP Flash Programmer (J5)

The ISP Flash Programmer header is used to upgrade the firmware on the Roamer. Currently, upgrading the firmware can only be done by Rackable technicians.

LCD Display Headers (J4A - 100mil 2x8, J4B - 1mm socket)

Pinout of LCD headers J4a and J4b

NOTE: Only one LCD can be attached.
Do not use J4a and J4b at the same time.

J4a Pin	J4b Pin	Name	Description
	1	NC	No Connection
	2	NC	No Connection
1	3	Vss	Ground (0V)
2	4	Vdd	Logic Supply (+5V)
3	5	Vo	Contrast Adjustment Voltage
4	6	RS	Register Select
5	7	R/W	Read / Write
6	8	E	Enable Signal
7	9	DB0	DATA 0 (not used, grounded)
8	10	DB1	DATA 1 (not used, grounded)
9	11	DB2	DATA 2 (not used, grounded)
10	12	DB3	DATA 3 (not used, grounded)
11	13	DB4	DATA I/O 4
12	14	DB5	DATA I/O 5
13	15	DB6	DATA I/O 6
14	16	DB7	DATA I/O 7
15	17	Vled+	LED backlight supply (+5V)
16	18	Vled-	LED backlight ground (0V)
	19	NC	
	20	NC	

The LCD display headers are used to attach an optional LCD display to the Roamer. The optional display can be used to display useful status information, information for temperature monitoring, or any important configuration information. Only one LCD can be attached at a time.

LANtronix XPort Ethernet Port

The ethernet port is used to connect a standard RJ-45 ethernet cable to the Roamer. The Roamer can be connected to a standard ethernet switch, and can be communicated with through port 10001. The onboard LANtronix XPort component that controls the IP interface can be managed on port 9999. The IP address can be configured manually, or can be configured using DHCP.

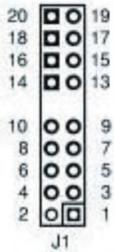
Multi-colored LED (RGB)

This multi-colored LED can be configured through the Roamer menu, options 1,2, and 3. The LED can output the colors: red, green, and blue. The Roamer controls each output color of the LED individually. Each color may be lit individually, or in combination.

Near to the LED is a 4-pin header (JP2) that allows for an external LED to be used with the Roamer. This currently has no functionality.

Serial to Motherboard Headers (J1A - Primary, J1B - Alternate Pinout)

Pinout for J1A Primary Serial Header



Pins 1 to 10 are serial header

Pin	Name	Description
1	NC	No connection
2	DTR/DSR	COM2 DTR loopback to DSR
3	Tx	RS-232 transmit to COM2 Rx
4	CTS	CTS input from COM2 RTS (not used)
5	Rx	RS-232 receive from COM2 Tx
6	RTS	RTS output to COM2 CTS
7	DSR/DTR	COM2 DSR loopback to DSR
8	NC	No connection
9	GND	RS-232 signal ground return
10	NC	No connection

Pins 13 to 20 are power and I/O

13	BL_GND	LCD backlight supply ground return
14	BL_PWR	LCD backlight +5V power
15	GND	Logic supply ground return
16	+5V	Logic +5 Volt supply
17	PO_GND	Server Power-On ground return
18	PO_OUT	Server Power-On control output
19	RS_GND	Server Reset ground return
20	RS_OUT	Server Reset control output

Pin	Name
1	NC
2	Tx
3	Rx
4	DTR
5	GND
6	DSR
7	CTS
8	RTS
9	NC
10	NC

The serial to motherboard headers (both STD and ALT) provide the Roamer with serial connectivity with the system motherboard. Serial connectivity to the motherboard enables the Roamer serial re-direction capability. The STD (standard) header has a conventional serial pinout (shown above). The ALT (alternate) header contains a less common serial pinout used by some motherboard manufacturers. Connecting the serial to motherboard cable to the incorrect header will cause the serial re-direction capability to not function properly (if at all).

Pwr Control (part of the J1C and J1D, in parallel, Pins 13-20 shown above)

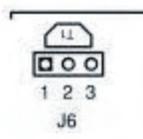
The power control headers are part of the serial to motherboard header. Both J1C and J1D are in parallel, and provide power and reset control through either serial connection (refer to the pinout above).

Power Switch, Flash LED, Power Sense Header (J2)

The J2 header is connected to a push button switch that may be used to manually control the power to the server.

Temperature Sensors (J6)

Pinout of Temperature Sensor T1 header J6



Pin	Name	Description
1	G	Ground (0V)
2	D	Data I/O
3	V	Power (+5V)

Power Sense (J7)

The power sense header enables the Roamer to monitor the power state of the the server.

External Power Supply Monitoring (JP3)

The Roamer is able to monitor the state of some redundant power supply modules. Each pin of JP3 may be connected to the status connector of such redundant power supplies. The feature may be disabled by the user.

Chapter 3 – Functionality

Remote Management Functions

The Rackable Systems Roamer™ provides three basic levels of functionality:

- Serial redirection in pass-through mode, providing remote access to console messages for analysis: these messages can also be routed to a console messages server
- Access to the BIOS settings via pass-through mode during boot
- Management functions in menu or shell mode

The module allows for serial redirection, providing the ability to see console messages, or collect the console messages to a centralized console server. This session is available via the COM header on the motherboard, so all boot processes are visible. The BIOS setting can be changed through this interface, allowing for the remote management of the BIOS settings. Additionally, some RAID cards can be configured through serial redirection.

Networking

Centralized management is provided by using a standard ethernet switch (such as a Linksys or Cisco switch). Each Roamer in a cabinet is connected to a switch via standard RJ-45 ethernet cabling. The switch is then available via an ethernet network as a central access point to all servers being managed remotely.

The Roamer is accessed on the network via a telnet session through an ethernet switch. A telnet session is established with the Roamer through port 10001. The Roamer can be configured to either have an IP address manually assigned, or can be configured to have an address assigned through DHCP.

The networking component controlling the ethernet connectivity of the Roamer is a Lantronix XPort server component. The XPort contains the RJ-45 connection used to interface with the Roamer. Networking configuration can be done by communicating with the XPort component. The XPort component can be configured through a telnet session by establishing a connection to the Roamer-IP ethernet address on port 9999. IP configuration of the Roamer is discussed later in this manual.

Further instructions on how to configure the XPort component can be found on the Lantronix website <http://www.lantronix.com>. Note: Rackable Systems customer support does not support any modifications to the default configuration of the XPort component.

Power Supply Monitoring

The Roamer is capable of monitoring up to two power supplies associated with the system that it is present in. The Roamer monitors the state of the JP3 pins to determine the status of the power supplies. Power supply faults will be displayed on the LCD display, and subsequently stored in LCD display memory for LCD display messages. A message is also passed to the motherboard serial port.

Once a failure has occurred, the failure will trigger an alert message to be sent to the LCD message memory, and must be manually cleared once the failure is fixed.

Chapter 4 – Pass-Through and Menu Modes

Pass-Through Mode

The default Roamer mode is pass-through mode. In pass-through mode, any serial communications from the serial port on the motherboard are passed through to the ethernet port on the Roamer (and vice versa). Pass-through mode allows the user to monitor the serial redirection output and remotely adjust BIOS settings.

Menu Mode Access

Access to the Roamer will normally be achieved through a telnet session. Once the session is established, the menu prompt on the Roamer is reached by entering the key sequence Ctrl-6 (Ctrl-Shift-6 in some telnet programs). When this key sequence is entered, the following prompt will be displayed.

```
Roamer [? for Help]:  
Server is on/off
```

From this prompt, any of the management menu options can be selected. If the “?” is entered, a menu will be displayed.

The menu ends with a prompt for a command. The escape key will return the Roamer to the standard interface status. If no input is received for 15 seconds, the Roamer will exit the menu and return to a blank screen.

To keep the user from inadvertently making a mistake, in module versions starting with 4.0.3 certain menu functions require a password phrase to be entered before accessing the menu function. In all cases, this default password is “P4Confirm”.

```
Rackable Systems Roamer v4.6.0 (c) 2005  
  
A - Change baud rate  
C - Adjust LCD contrast  
D - Enter a new power on delay  
E - Erase the LCD  
F - Fetch saved LCD message  
G - Get all state variables  
I - Power sense: Reset  
J - Enter scratchpad message  
K - View scratchpad  
M - Enter LCD message  
N - Local OS access: Yes  
O - Copy scratchpad to saved LCD area  
P - Turn the server On  
R - Reset the server  
S - Save LCD message to NVRAM  
T - Read temperature  
V - View LCD message  
W - Show saved LCD message: Yes  
X - Reset the Roamer  
Y - Change the password  
1 - Change red LED state (Off)  
2 - Change green LED state (Off)  
3 - Change blue LED state (Off)  
. - Administrative menu  
ESC - Quit  
  
Choose a command
```

Menu Commands

A – Change Baud Rate

This command can be used to change the default baud rate. The default is 9600. This function requires the “P4Confirm” password.

C – Adjust LCD contrast

Choose this menu item to adjust the LCD contrast for optimal viewing. The + and – keys are used to change the current setting. The ESCAPE key is used to save the setting. The contrast setting can range from 0 to 100. This option will only be visible if the LCD is present. A value of 30 is the default system setting.

D - Enter a new power on delay

The power on delay selection on the management menu prompts the user for a delay value. This value can range from 0 to 99. The value is read upon startup or reset and determines the amount of time to wait in seconds before turning the server on. The 99 setting instructs the module not to turn on the server automatically. Valid inputs are a single-digit number followed by a carriage return or a two-digit number followed by a carriage return.

Tech Note: For this feature to work, the BIOS must be set to keep the machine powered off after a hard power reset. The power on delay actually cycles the power, independent of its current state. If power on delay is set to 10 seconds, and the server loses and regains hard power, if the server is turned on within 10 seconds, the module will turn it off due to the power on delay setting.

E - Erase the LCD

This function clears the LCD display and is only visible when an LCD display is attached to the Roamer.

F - Fetch Saved LCD Message

This command will display the current LCD message that is stored in memory.

G - Get All State Variables

This command displays the contents of all of the state variables. This will display all of the current settings of the Roamer, and the contents stored in the TAG, MAC, SER, FD0, FD1, FD2 memory spaces. To change the contents of the memory spaces, access the Admin menu (“.” in the main menu).

I – Power Sense

The power sense option toggles between sensing server power on the reset header or on the J7 header. The option on the menu will display either “reset” or “J7”, depending on the monitoring that is currently set. Most applications will use the “Reset” option. This option should be set before shipping from Rackable Systems, but may need to be reset if the setting was changed after shipping.

J - Enter Scratchpad Message

This command opens up the scratchpad memory space. The scratchpad consists of two lines of twenty character text. The scratchpad is useful for storing information like serial numbers, asset tag numbers, or any information that is unique or vital to the server. The maximum number of characters that can be stored in the scratchpad is 40 characters. They can be entered with a total of two carriage returns, or enters one full 20 character line with another line having a carriage return. The scratchpad will automatically advance to the second line after the 20th character is received. Pressing two carriage returns will end the scratchpad.

K - View Scratchpad

This command will display the information currently stored in the scratchpad memory space.

M – Enter LCD message

LCD messages are sent to the module with this command. The display consists of two lines of twenty character text. The module will automatically advance to the second line after the 20th character is received. Messages with lines shorter than twenty characters can be displayed by entering a carriage return after the desired number of characters. The message is displayed after the user enters 40 characters, enters a total of two carriage returns, or enters one full 20 character line with another line having a carriage return. This option will only be visible if the LCD is present.

Non alphanumeric characters do not have representative fonts on the LCD and should not be used.

N - Local OS Access

This setting dictates which serial port configuration commands can originate from. If the setting is set to “Yes”, then the module will be able to accept commands originating from the motherboard serial port. If set to “No”, then it will only accept configuration commands from the front panel serial port.

O - Copy Scratchpad to Saved LCD Area

This command copies the current scratchpad memory space to the LCD display (if the LCD display is present).

P - Turn the Server On/Off

This function allows the user to either turn on or turn off the attached server remotely. If the server is detected to be off, the help menu item will read “Turn the server on”. If the server is detected to be on, the help menu will read “Turn the server off”. The menu prompt also displays the current state of the server’s power. Confirmation from the user is required for this function.

Note: If this feature does not appear to be working, check the “I - Power Sense” setting, which is set correctly at the factory (varies based on motherboard platform).

Note: VT100+ Statefulness

aka. Garbled output when first connecting to the module or when bringing up the menu.

In the simplest ‘line mode’ of a terminal session, the text output from the serial port is somewhat directly represented on a virtual terminal. This terminal mode is common in UNIX login prompts, shells, and the Windows Serial Access Console (SAC).

When more complex text mode ‘drawing’ is required, various control sequences are sent to represent color changes, cursor positioning, special graphical characters, and other more advanced character output. These more complex vt100+ sequences are sent in output from some shell programs, and in great quantity in all PC BIOS serial redirection output.

These control sequences are ‘stateful’ in nature, in that to represent a terminal command such as a ‘clrscr’, or clearscreen, the server must send specific high ASCII characters to send the client terminal into control mode, send a sequence of characters to represent the clearscreen, then another sequence of characters to return to normal output mode.

This is important in serial redirection because if your terminal enters the serial conversation somewhere mid-control character, it will be unaware of the state of the vt100 term, and will misinterpret the immediate stream of characters. On the output terminal, this will probably be seen as apparently random garbage output.

As PC BIOS redirection is up to 75% vt control characters, the likelihood of seeing some garbage characters when initially connecting, or when initially entering the menu (which is unaware of your client terminal state) is fairly high. This is not abnormal, and is usually remedied by reentering the menu, by clearing the client terminal state, or simply by waiting until a clearing control sequence is eventually sent by the BIOS that corrects the client behavior.

This is a function of the client terminal, and not of the serial stream, and will not affect scripting or expect scripts that rely on direct communication without regard for vt state.

This behavior is most often seen on PC BIOS, and will not occur at normal login prompt, or other normal serial line-mode communications.

R - Reset the Server

This function allows the user to perform a remote hard reset of the attached server. The user will be prompted for confirmation before the server is reset.

S – Save LCD Message to NVRAM

This function saves the current LCD text to the module's memory. The message will not be erased if power is removed. The saved message can be displayed upon the server startup. (See **W – Show Saved LCD**)

T – Read Temperature

This command displays the current temperature of the module sensor. The temperature is in Fahrenheit degrees. This screen will be updated once per second until the ESC key is pressed.

V – View LCD Message

This function will return the current contents of the LCD display. The response is displayed in two lines of 20 characters exactly as it appears on the LCD. This option will only be visible if the LCD is present.

W – Show Saved LCD Message

This function toggles the flag for showing a saved LCD message upon server startup. The menu item on the help screen, will update to show the current state of the flag. The system default is “Yes”.

X - Reset the Roamer

This command will reset the Roamer.

Y - Change the Password

This command allows the default password to be changed. The default password is “P4Confirm”. It is recommended that the password not be changed from the default. The password is required to execute many of the configuration commands on the Roamer.

1 - Change the red LED State <On/Off/Blinking>

This command allows the red LED portion of the multi-colored LED to be set to “On”, turned “Off”, or set to “blinking”. Multiple LEDs can be set simultaneously.

2 - Change the green LED State <On/Off/Blinking>

This command allows the green LED portion of the multi-colored LED to be set to “On”, turned “Off”, or set to “blinking”. Multiple LEDs can be set simultaneously.

3 - Change the blue LED State <On/Off/Blinking>

This command allows the blue LED portion of the multi-colored LED to be set to “On”, turned “Off”, or set to “blinking”. Multiple LEDs can be set simultaneously.

. - Administration Menu

This command will bring the user to the administration control menu. This command is password protected. The command can be executed using the password “P4Confirm” (if it was not changed from the default). Definition of the commands contained in the administration menu are defined in the next section.

ESC – Quit

This command exits the menu, and returns to the blank initial screen.

? – Help Menu

This command displays the main menu screen of the Roamer and waits for a valid menu selection. Some menu items may be absent if the required hardware is not present. After 15 seconds of idling at this menu, the screen will revert back to the menu prompt.

Administration Menu Commands

```
A - Set asset number (TAG)
M - Set MAC address (MAC)
S - Set serial number (SER)
Z - PS monitoring: No
0 - Field 0 (FD0)
1 - Field 1 (FD1)
2 - Field 2 (FD2)
# - Reset the X-Port
U - Update firmware
ESC - Quit

Please make a selection. █
```

A - Set asset tag number (TAG field)

This command allows the TAG field to be edited. The TAG field stores 12 characters, and is primarily intended for storing asset tag information. It can store any numeric and alphanumeric characters.

M - Set MAC address (MAC field)

This command allows the MAC field to be edited. The MAC field stores 12 characters, and is primarily intended for storing MAC address information. It can store any numeric and alphanumeric characters.

S - Set serial number (SER field)

This command allows the SER field to be edited. The SER field stores 12 characters, and is primarily intended for storing serial number information. It can store any numeric and alphanumeric characters.

Z - PS Monitoring: (YES/NO)

This command allows power supply monitoring to be toggled “on” or “off”. After pressing this command, the Roamer will prompt for the password to be entered. Once the password is entered the Roamer will return to the main blank screen. Pressing “Ctrl-Shift-6” will then show the menu prompt, and the PS Monitoring menu item will show a toggled state. When power supply monitoring is enabled, server power supplies are monitored as described in chapter 3.

0 - Field 0 (FD0)

This command allows the field 0 (FD0) field to be edited. The FD0 field is a 12 character space that can be used to store additional information.

1 - Field 1 (FD1)

This command allows the field 1 (FD1) field to be edited. The FD1 field is a 12 character space that can be used to store additional information.

2 - Field 2 (FD2)

This command allows the field 2 (FD2) field to be edited. The FD2 field is a 12 character space that can be used to store additional information.

- Reset the X-Port

This command resets the XPort device on the Roamer. It performs a “soft” reset to the device.

U - Update the firmware

This command is used to update the firmware of the Roamer. This command is currently unsupported.

ESC – Quit

This command exits the menu, and returns to the blank initial screen.

Chapter 5 – Shell Mode

The Roamer has an alternate mode of operation named “shell mode”. In this mode, the module does not display a menu prompt and only returns short responses to requests. No confirmation is required for any of the commands. This mode is meant to be controlled by third party software which can be GUI based. Shell mode is entered by sending the byte 0x1D (Ctrl-]) to the module while it is at the menu prompt. Shell mode is exited by sending the byte 0x1E (Ctrl-6).

To access shell mode, type “Ctrl-]”. This will prompt for the Roamer password. A correctly entered password will produce an “ok” response. Entering an incorrect password will yield a blank screen, and the Roamer will continue operating in Pass-Through mode.

Shell Mode Commands

Action	Cmd	Parameters (<i>x</i>)	Responses	Comments
Change Baud Rate	A <i>x</i>	'1' - set to 9600 '2' - set to 19200 '3' - set to 38400 '4' - set to 57600 '5' - set to 115200 '?' - query setting	Success: “ok\r” Failure: “er\r” Query: “[1-5]\r”	Failure will occur if the parameter is out of range. Baud rate will take effect after power cycle or module reset.
Blink LED State	B <i>xyz</i>	x=red, y=green, z=blue '0' - off '1' - blink	Success: “ok\r” Failure: “er\r”	Failure will occur if the parameter is not '0' or '1'.
Set LCD Contrast	C <i>x</i>	[0x00-0x64] - setting '?' - query setting	Success: “ok\r” Failure: “er\r” Query: “[8 bit value]\r”	<i>x</i> is a single byte. Failure will occur if the 8 bit value is out of range.
Set Power-up Delay	D <i>x</i>	[0x00-0x62] - 0-98 sec. 0x63 - Off '?' - query setting	Success: “ok\r” Failure: “er\r” Query: “[8 bit value]\r”	<i>x</i> is a single byte. Failure will occur if the 8 bit value is out of range.
Erase LCD	E	None	Success: “ok\r” Failure: “er\r”	Failure will occur if command is issued without an LCD attached.
Change Power Sense Pin	I <i>x</i>	'0' - reset header '1' - J7 header '?' - query setting	Success: “ok\r” Failure: “er\r” Query: “[0-1]\r”	Failure will occur if the parameter is not '0', '1', or '?'. A response of 'B' indicates blinking.
LED Control	L <i>xyz</i>	x=red, y=green, z=blue '0' - turn LED off '1' - turn LED on 'B' - Blink LED	Success: “ok\r” Failure: “er\r” Query: “[0-1,B]\r”	Failure will occur if the parameter is not '0', '1', or '?'. A response of 'B' indicates blinking.
Display LCD Message	M[40 <i>chars</i>]	40 characters of LCD data	Success: “ok\r” Failure: “er\r”	The LCD data must be padded with spaces to total 40 characters. Failure will occur if no LCD is attached.
Motherboard Access	N <i>x</i>	'0' - no mb access '1' - allow mb access '?' - query setting	Success: “ok\r” Failure: “er\r”	Failure will occur if the parameter is not '0', '1', or '?'. New selection will take effect after module reset.

Action	Cmd	Parameters (x)	Responses	Comments
Change Server Power State	Px	'T' - toggle state '1' - turn server on '0' - turn server off '?' - query power state	Success: "ok\r" Failure: "er\r" Query: "[0-1]\r"	Failure will occur with "P0" and "P1" if the module fails to change the power state. "PT" is supported for legacy compatibility.
Reset Server	R	None	Success: "ok\r"	Reset pulse is 500ms. There are no failures for this command.
Save Current LCD Message	S	None	Success: "ok\r" Failure: "er\r"	Failure will occur if no LCD is attached. This message can be displayed upon module startup by setting "Show Saved LCD Message on Startup" to '1'.
Get Temperature	T	None	Success: "XXX\r" Failure: "er\r"	Temperature is returned in degrees Celsius and padded with zeroes to 3 characters. Failure will occur if no temperature sensor is detected.
Retrieve Current LCD Message	V	None	Success: "[40 characters]\r" Failure: "er\r"	Failure will occur if no LCD is attached.
Show Saved LCD Message on Startup	Wx	'0' - do not show message '1' - show message '?' - query setting	Success: "ok\r" Failure: "er\r" Query: "[0-1]\r"	Failure will occur if the parameter is not '0', '1', or '?'.
Reset the Module	X	None	Success: "ok\r"	This command has no failure.
Power Supply Monitoring	.Z	'0' - off '1' - on	Success: "ok\r"	
Exit Shell Mode	[0x1E]	None	Success: "ok\r"	The byte 0x1E is the Ctrl-6 character.
Set Asset Tag Field (TAG)	.A	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Set Serial # Field (SER)	.S	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Set MAC Address Field (MAC)	.M	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Set 0 Field (FD0)	.0	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Set 1 Field (FD1)	.1	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Set 2 Field (FD2)	.2	Enter 12 characters	Success: "ok\r"	12 characters must be entered. If data is less than 12 characters, it must be padded with spaces.
Reset the XPort Device	.#	None	No notification of success given	

Chapter 6 – Server Commands

LCD Access from the OS

The Roamer has the ability to write directly to the optional LCD panel from the local OS. Any of the menu options are available through the local OS as described in the previous chapter. The server can only send direct write commands to the Roamer while it is not at a menu prompt and is not in shell mode.

The Roamer will automatically advance to the second line after the 20th character is received. Messages with lines shorter than 20 characters can be displayed by sending a carriage return and line feed after the desired number of characters. The message is displayed after the server sends 40 characters, a total of two carriage returns and line feeds, or one full 20 character line with another line having a carriage return and line feed.

This functionality can be scripted, allowing updates to the LCD panel with real-time information. This allows management functionality such as displaying the hostname and IP address at boot time, or displaying current I/O rates, job rates, CPU utilization, or other real-time information on the LCD panel. Tying this together with the ability to change the contrast on the LCD or to make the LED turn on or blink can be a powerful method for visually identifying servers that our outside of normal operational parameters.

Note that the execution environment must have access to the serial port in order for this scripting to work. A very common example in Linux is with “agetty” running on the serial port (as a login prompt on the port), “agetty” locks the serial port and does not allow access by other programs. To get around this, try performing any LCD programming before “agetty” is launched (usually by init/inittab) in a startup rc.d file. This is generally done in rc.local under Red Hat Linux, or boot.local under SuSE Linux. Either file can be found in /etc/rc.d/.

Linux scripting sample

The following is a sample Perl script that sets the LCD to display the hostname and IP address dynamically:

```
#!/usr/bin/perl -w

#set default serial device
$dev="ttyS1";

#find ip address on eth0
$__ = `ifconfig eth0 |grep inet`;
($inet) = ( /([0-9]+\.[0-9]+\.[0-9]+\.[0-9]+)/ );

#get hostname
$mesg=`hostname`;
chomp $mesg;

#write to lcd
open(LCD,">/dev/$dev")||die "ERROR: can not write to /dev/$dev\n";
$|=1; print LCD "LCD:\n $mesg\n $inet \n";

#uncomment this to debug your LCD message
#print "LCD:\n $mesg\n $inet \n";
```

Chapter 7 – IP Address Configuration

Configuring the IP Address

The IP address for the Roamer can be either configured manually or through DHCP. In order for the Roamer to be configured correctly, the IP address chosen (or assigned) must be a unique address. In most applications, the Roamer is configured for DHCP operation.

To configure the Roamer IP address manually, consult Rackable Systems technical support for assistance. Configuring the IP address without support assistance is possible, but is not recommended. The LANtronix DeviceInstaller configuration utility and associated documentation (found at www.lantronix.com) are needed to discover, and configure the Roamer devices present on the network.

LANtronix XPort Device Access/Management

The LANtronix XPort device controls all of the IP functionality of the Roamer. A telnet session to the Roamer accessing port 9999 accesses the XPort configuration mode window. Instructions on how to configure the XPort device can be found on the LANtronix website (www.lantronix.com). Rackable Systems does not recommend or support any changes made to the default LANtronix XPort device settings.

Appendix I - Contacting Support

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