FMS
User Guide

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www.rletech.com   RLE Technologies   800.518.1519

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Revision History

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Manufacturer's Notes

This product is manufactured by RLE Technologies, 104 Racquette Drive, Fort Collins, CO, 80524.

If this product is used in any manner other than that specified by the manufacturer, the protection provided by the equipment may be impaired.

Product Warranty

Warranty information for RLE products can be found at www.rletech.com.

Product Registration

Product registration helps RLE Technologies inform owners of:
- Product upgrades
- Firmware enhancements
- New products and technologies
- Special offers available only to registered users

Any information provided to RLE Technologies through the registration form will be regarded as confidential. RLE will not sell or distribute any of the information to third parties.

Technical Support

Personal assistance is available Monday through Friday, from 8:00 a.m. to 5:00 p.m. MST.

A request for assistance may be sent to support@rletech.com.

Otherwise, please call us directly at: **800.518.1519.**

The following information is located on the bottom of each FMS unit. Please have this information available whenever a technical support call is placed:

Product Model Number	
Product Serial Number	
Product Manufacture Date	

The FMS is not a field-serviceable item and must be sent back to RLE Technologies for mechanical repair. Power must be disconnected (unplugged) from the FMS any time the unit is mechanically serviced. Physically unplug power from the unit any time you are making wiring connections to or from the FMS.

RLE cannot accept an item for repair without a Return Materials Authorization number, which must be provided by RLE.

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SYSTEM OVERVIEW

1.1.   Product Description

The Falcon Facilities Monitoring System (FMS) is a comprehensive system which provides additional equipment protection by monitoring critical operating parameters in enterprises, remote network facilities, communication rooms, remote and unmanned facilities, and critical support systems. The FMS is a stand alone system. It operates via embedded firmware that handles all data collection, alarm reporting, and multiple concurrent communication mediums.

The FMS typically monitors analog, dry contact, Modbus, and SNMP integer outputs from a wide variety of devices.

During operation, the FMS performs internal diagnostics and monitors its status. It uses LED indicators to report its condition.

The FMS embedded firmware enables system configuration, I/O setup, status inquiries, alarm reports, data logs, and troubleshooting. The FMS is menu driven and operates with any Web browser, ASCII terminal, or terminal emulation application (e.g., HyperTerminal).

1.2.   1U and 2U FMS Devices

A base FMS unit ships in a 1U rack-mount enclosure. Up to four expansion cards can be added to the base FMS to increase the functionality of the device. The 1U enclosure has room for one expansion card, in addition to the base FMS unit. A 2U FMS has room for three expansion cards, in addition to the base FMS functionality. If you add more than one expansion card to a base FMS, your device will be upgraded to a 2U rack mount enclosure.

Refer to Appendix A, "FMS Expansion Cards" on page 179 to learn more about the different FMS expansion cards and their capabilities.

1.3. Front Panel Indicators and Controls
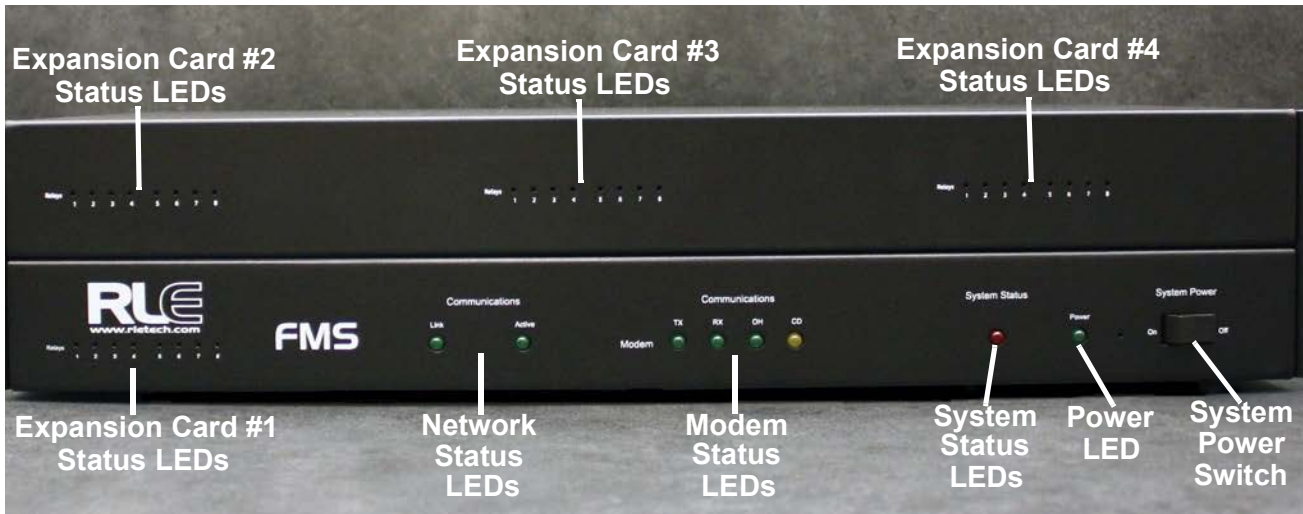
Figure 1.1 FMS 2U Front Panel Indicators and Controls

Indicator	Description
Expansion Card Relay Status	Only available on Expansion Card A, the green LED illuminates when the relay is active.
	Expansion Card #1 LEDs are on the left hand side of the 1U FMS enclosure. Expansion cards #2, #3, and #4 are located across the top of the 2U FMS enclosure.
Communication Network Status LEDs	Link – Green if network link is established. Red if there is no connection.
	Active – Illuminated green when transmitting or receiving data.
Communication Modem Status LEDs	TX - Green when information is being transmitted.
	RX - Green when if information is being received.
	OH - Green when he Modem detects a dial tone (off hook).
	CD - Yellow when if a carrier is detected.
System Status LED	Flashes red during initial boot up, approximately 30 seconds.
	If the initial boot up fails, the LED continues to flash. This indicates a condition that requires service; users must contact RLE for more information.
	After the boot up, this LED turns off if no alarms are present, or turns solid when the unit is in an alarm condition.
Power LED	Green when the power is on.
System Power Switch	Use this switch to turn power to the unit on and off.

1.4. Terminal Block Designations

Figure 1.2 FMS Terminal Block Designations

TB1-1	(+) Input for 24 or 48VDC (optional) power
TB1-2	(-) Input for 24 or 48VDC (optional) power

P1	24VDC wall adapter input (center +) (not available with 48VDC version)

TB2-1	24VDC positive (+) external output (power for sensors)
TB2-2	24VDC positive (+) external output (power for sensors)
TB2-3	Channel 1 positive (+)
TB2-4	Channel 1 negative (-)
TB2-5	Channel 2 positive (+)
TB2-6	Channel 2 negative (-)
TB2-7	Channel 3 positive (+)
TB2-8	Channel 3 negative (-)
TB2-9	Channel 4 positive (+)
TB2-10	Channel 4 negative (-)

TB3-1	Channel 5 positive (+)
TB3-2	Channel 5 negative (-)
TB3-3	Channel 6 positive (+)
TB3-4	Channel 6 negative (-)
TB3-5	Channel 7 positive (+)
TB3-6	Channel 7 negative (-)
TB3-7	Channel 8 positive (+)
TB3-8	Channel 8 negative (-)
TB3-9	24VDC ground external output (power for sensors)
TB3-10	24VDC ground external output (power for sensors)

TB4-1	Relay 1 normally closed (NC)

Table 1.1 Terminal Block Designations

TB4-2	Relay 1 normally open (NO)
TB4-3	Relay 1 common (C)
TB4-4	Relay 2 normally closed (NC)
TB4-5	Relay 2 normally open (NO)
TB4-6	Relay 2 common (C)
TB5-1	Keypad column 1
TB5-2	Keypad column 2
TB5-3	Keypad column 3
TB5-4	Keypad row 1
TB5-5	Keypad row 2
TB5-6	Keypad row 3
TB5-7	Keypad row 4
TB5-8	COM1 EIA-485 positive (+) (configurable)
TB5-9	COM1 EIA-485 negative (-) (configurable)
TB5-10	EIA-485 ground
SW1-1	Unit EIA-485 termination switch
SW1-2	Reserved for future use.
P2	COM1 EIA-232 male DB9 pin
P3	COM2 EIA-232 female DB9 pin connector (configurable)
P4	RJ11 telephone line connector
P5	RJ45 Ethernet 10/100BaseT connector

Table 1.1   Terminal Block Designations (continued)

1.5.   Rear Panel Indicators

The rear panel of the FMS houses a series of green LEDs. The chart below tracks indicator status when the corresponding green LED is illuminated:
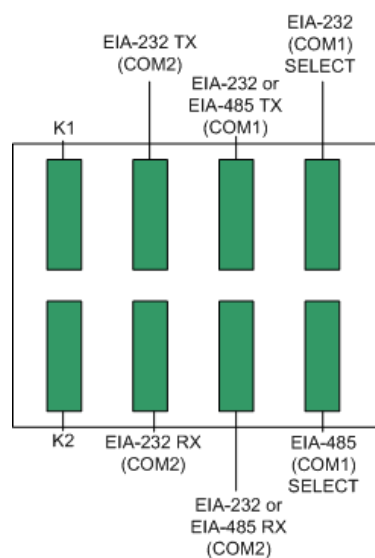
Status	Indicator
K1 (Output Relay)	Relay is energized.
EIA-232 TX (COM2) Interface	Data is being transmitted.
EIA-232 or EIA-485 TX (COM1) Interface	Data is being transmitted.
EIA-232 (COM1) Select Interface	EIA-232 selected (P2)
K2 (Output Relay)	Relay is energized.
EIA-232 RX (COM2) Interface	Data is being received.
EIA-232 or EIA-485 RX (COM1) Interface	Data is being received.
EIA-485 (COM1) Select Interface	EIA-485 selected (TB5)

Figure 1.3   Rear Panel Indicators

1.6.   SW1 Switch Settings

♦ SW1-1: EIA-485 Termination switch should be in the down position (ON) if the FMS is an end device on an EIA-485 network.

♦ SW1-2: Reserved for future use.

Figure 1.4   SW1-1 Switch and SW1-2 Switch

SW1-1 switch is in the down position (ON) and SW1-2 switch is in the up position (OFF).

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GETTING STARTED

To begin using the FMS, users must install the unit, wire and connect the power, and set the IP address. Any accessories for the FMS should also be connected at this time (e.g., keypad connection, Modbus connections, Expansion Cards, etc.)

2.1.   Installation

The Falcon FMS comes in a 19 inch (.48m) rack mount enclosure. Install the FMS in the rack. Use the proper anchoring method to mount the unit securely. Supply either 24VDC (standard) or 48VDC (optional) to the unit.

WARNING Units have different model numbers. Before applying power to the unit, verify the model number and power rating located on the back of the unit. The voltage indicator is the last number on the unit model number. The FMS will either be a 24VDC or a 48VDC.

2.2.   Falcon FMS Wiring

RLE Technologies recommends an 18AWG stranded copper wire for connection from each monitored point to a terminal block (TB) connection on the FMS. RLE recommends no more than 500 feet (152.4m) of wire at this specification. If longer runs are needed, please contact RLE Technologies for application guidance. Shielded twisted pair wiring is recommended for analog signal transmitters being wired outside of conduit runs and dropped ceiling applications.

2.2.1 Power Supply and Ground Connections

Connect an 18AWG ground wire from the ground terminal to a suitable earth ground.

If you are installing a 24VDC model FMS, plug the wall adapter into P1 and a UPS outlet as shown below. The wall adapter has a 5 foot (1.524m) power cord. RLE Technologies

recommends powering the FMS from a UPS supply to allow the FMS to send alarm notification during a power outage.
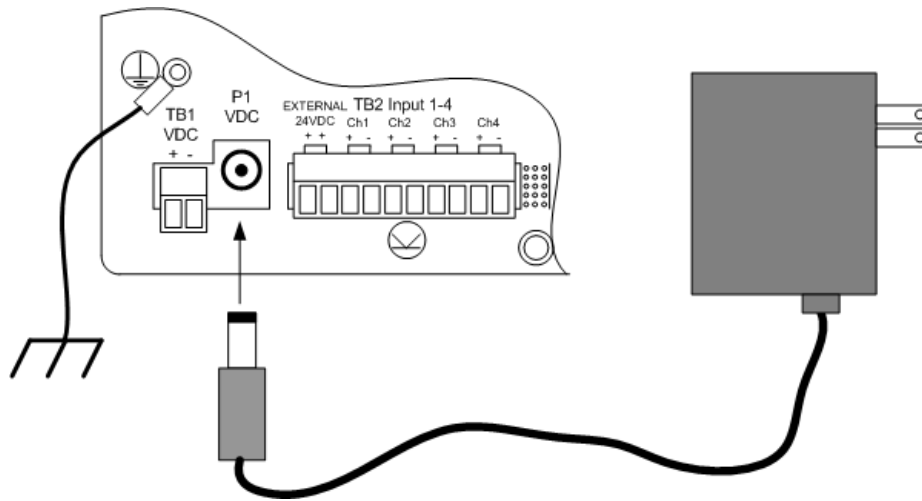
Figure 2.1   24VDC Power Supply Connection

If you are installing a 48VDC FMS, the FMS must be connected to either:

a   An external 48VDC supply that can be unplugged or switched off.

b   The 48VDC supply bus via a switch or a circuit breaker. The switch or circuit breaker must be suitable located and easily reached. It must be clearly marked as the disconnecting device for the FMS.

For a 48VDC model FMS, connect a 48VDC supply through a circuit breaker to TB1 as shown below. In telecommunications applications, the 48VDC supply is typically connected to the 48VDC battery system through a DC distribution panel.
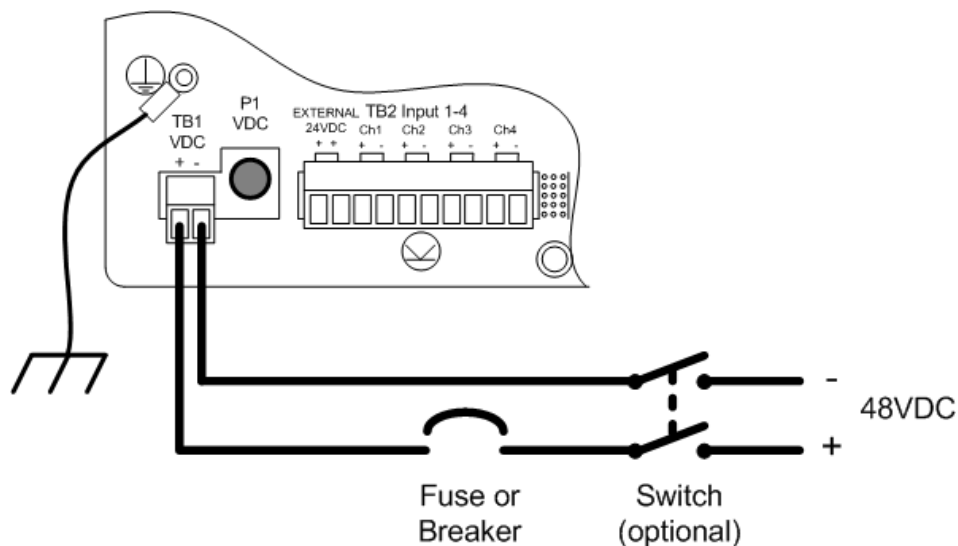
Figure 2.2   48VDC Power Supply Connection

2.2.2 Universal Input Connections

The eight non-isolated universal inputs are connected to TB2 and TB3. Universal input channels can be individually configured through the FMS to monitor a 4-20mA signal, a Normally Open (NO) dry contact, or a Normally Closed (NC) dry contact; see Figure 2.3 for examples of typical sensor wiring. See Appendix D, "FMS Accessories Wiring" on page 191, for further details on wiring other RLE accessory sensors, or refer to our Falcon Integration Guide, found online at http://rletech.com/resource/falcon-integration-guide/.

Some temperature and humidity sensors have internal jumper settings that may be used to select sensor range and output voltage or current. Jumper settings should be set before power is applied to the equipment. **The sensor range (50–95°F, 22–122°F, etc.) should be documented at this time**. The sensor range is required to determine the gain and offset settings when configuring the input through software.

Note   The Falcon has 24VDC available (TB2-1, TB2-2 +24VDC, TB3-9, TB3-10 24VDC comm.) to power external sensors. The 24VDC external supply is internally fused at 300mA.
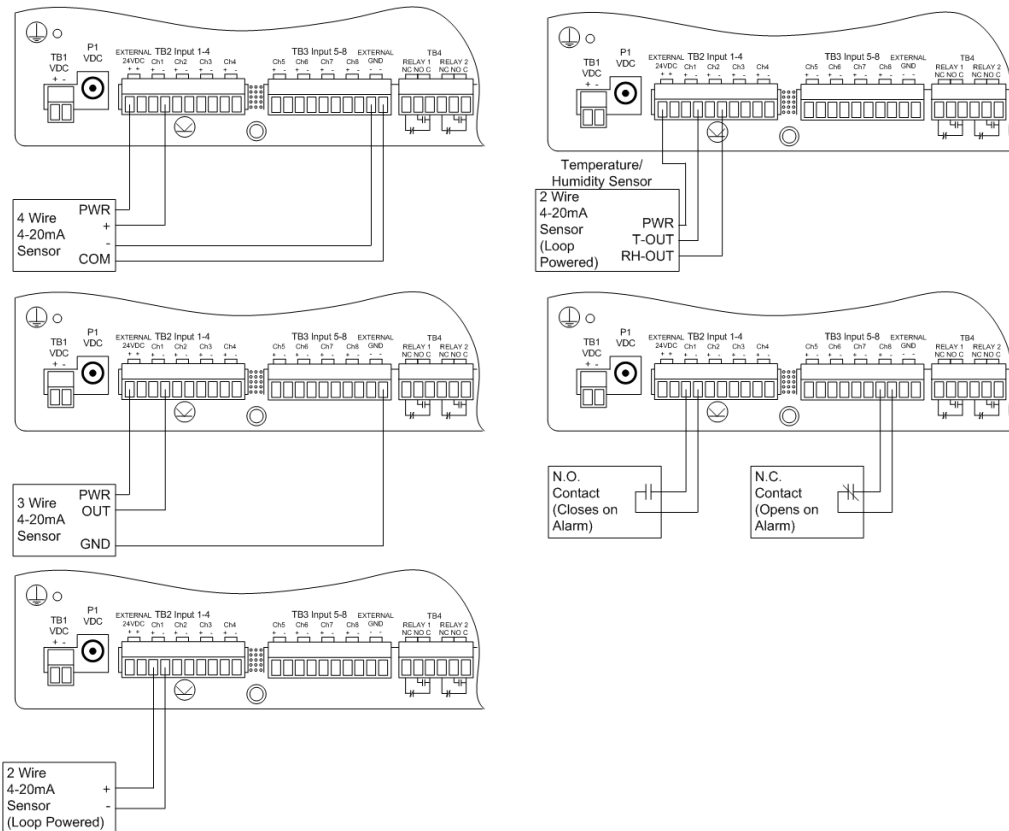
Figure 2.3 Universal Input Wiring Examples

Some equipment may have several dry contact outputs with a Common Ground. Connect this equipment as shown in Figure 2.4.
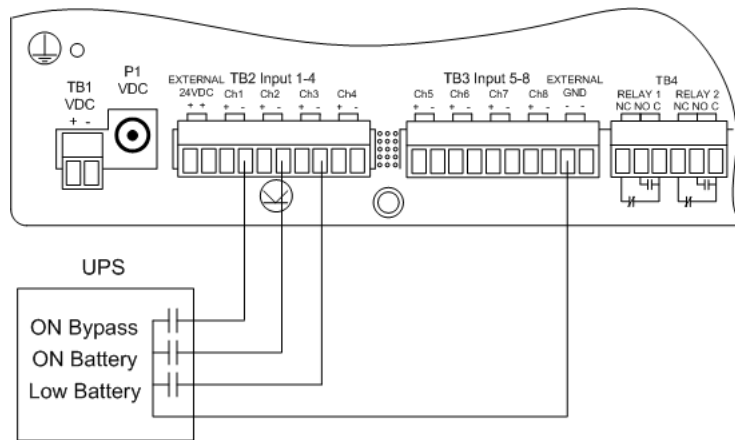
Figure 2.4 Dry Contact Inputs with Common Ground

2.2.3 Relay 1 and 2 Connections

Relay outputs may be used to unlatch doors, signal annunciators, signal IP cameras, and to turn on auxiliary equipment such as exhaust fans. Relay outputs are form c (spdt). Refer to specifications in Appendix D, "FMS Accessories Wiring" on page 191, for relay contact ratings. Relays may be configured, through the FMS for Normally Open (NO—unsupervised or normally de-energized), or Normally Closed (NC—supervised or normally energized) operation; see Figure 2.5 for examples.
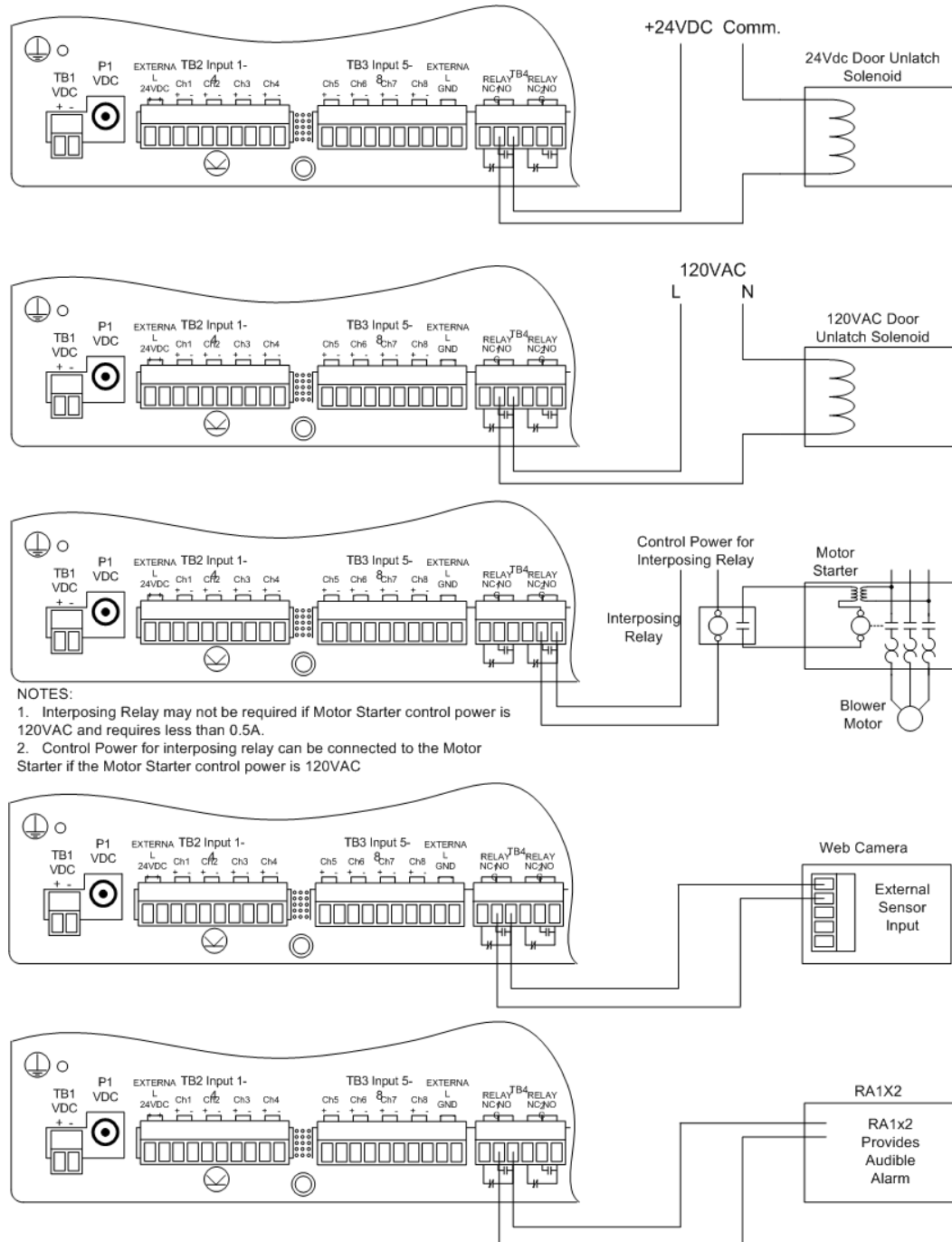
Figure 2.5 Relay Output Wiring Examples

2.2.4 Keypad Connection

The FMS can be configured with a 3 x 4 keypad interface. Entering a user code, configured through software, activates a relay output which unlatches a door and allows an individual to enter the secure area. Entering the correct user code can also trigger a relay output to signal an IP camera to snap a picture and email it to a predefined recipient. Connect the keypad as shown in Figure 2.6. For more information on configuring the keypad function, see 4.15., "Keypad/DTMF Access Users" on page 77.
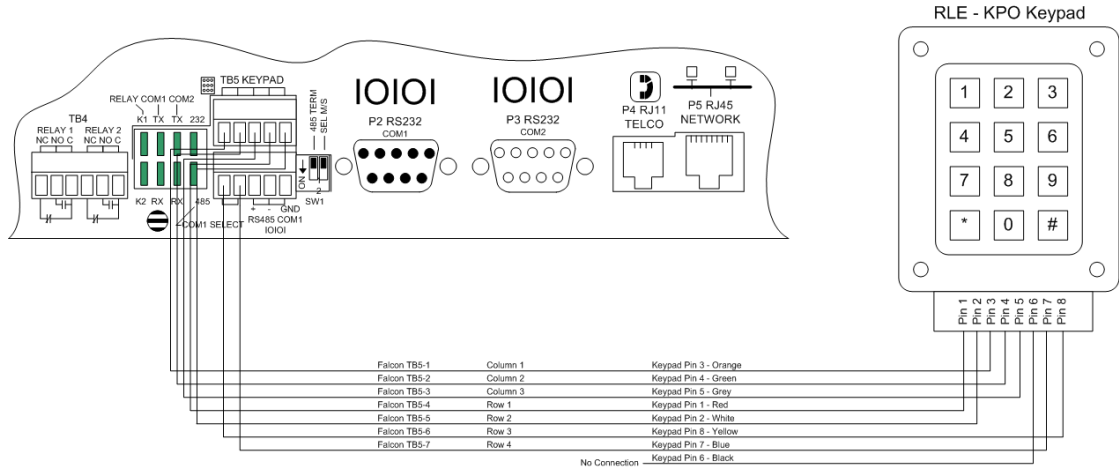
Figure 2.6 Keypad Wiring

2.2.5 EIA-232 COM2 Connection

The EIA-232 port can be connected to a PC for IP configuration, firmware downloads, and troubleshooting. It is typically a temporary connection. Connect the straight through, 9-pin, cable as shown in Figure 2.7.
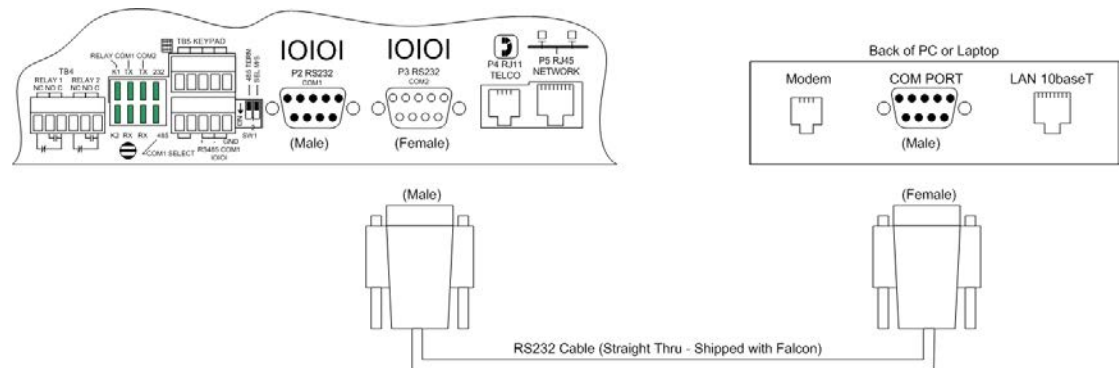
Figure 2.7 EIA-232 COM2 Connection

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2.2.6 RJ11 Phone Line Connection

The FMS may contain an optional internal modem for dial in and dial out capabilities. The modem can be used for:

♦ Email notification through an Internet Service Provider (ISP).

♦ Remote connection to accomplish a variety of tasks, including: viewing alarms, changing IP Configurations, and acknowledging alarms.

♦ Remote alarm acknowledgment and access through DTMF. This allows a user to dial the FMS from a touch tone telephone-standard phone or cell phone-and enter an acknowledgment code or access code.

♦ Pager notification to an alpha-numeric pager or cell phone (TAP changer).

2.2.7 RJ45 Ethernet Connection

The FMS has an internal 10/100BASE-T Ethernet port used to configure and monitor the FMS. The Ethernet port supports Web browser access, email (SMTP), BACnet slave, Modbus slave, SNMP, BACnet master and Modus master. Figure 2.6 and Figure 2.7 show the physical connections. Figure 2.8 shows a direct connection between the FMS and a PC using the crossover cable supplied with the FMS. Figure 2.9 shows a typical FMS connection on a subnet using a hub or switch and straight through CAT5 cables.
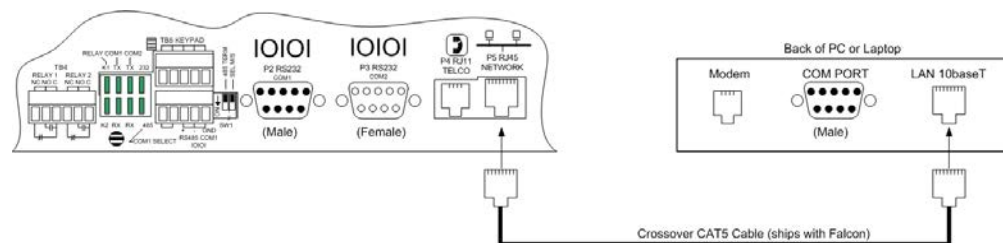
Figure 2.8 FMS Ethernet Connection to a PC using a Crossover Cable
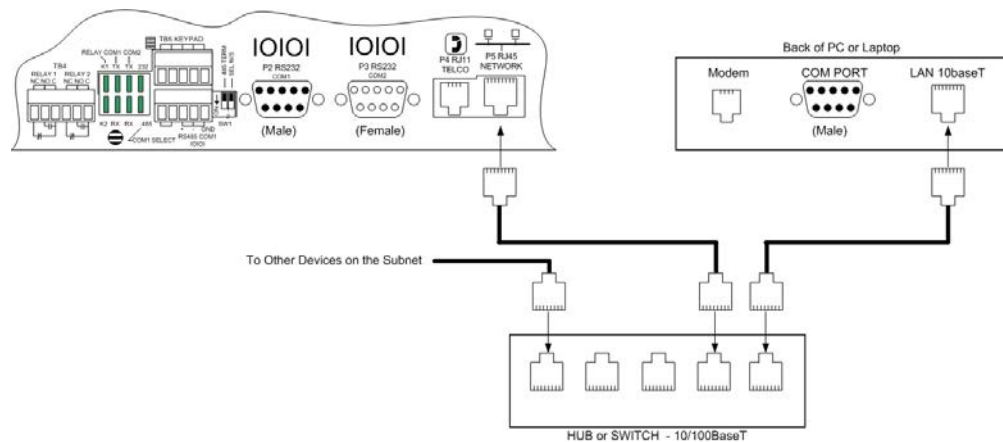
Figure 2.9 FMS Ethernet Connection to a PC on a Subnet

2.2.8 Modbus EIA-485 Connections

The FMS can function as a Modbus Master or Slave over an EIA-485, 2-wire hardware connection.
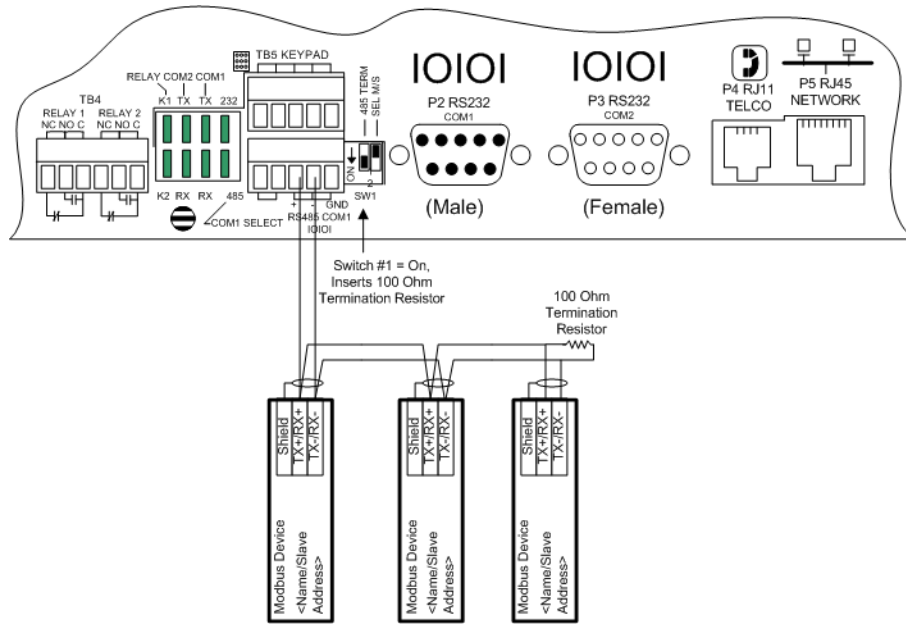
Figure 2.10 FMS EIA-485 Connection

2.2.9 Modbus EIA-232 Connections

The FMS can function as a Modbus Master or Slave over an EIA-232 hardware connection. The EIA-232 port is configured as a DTE device.
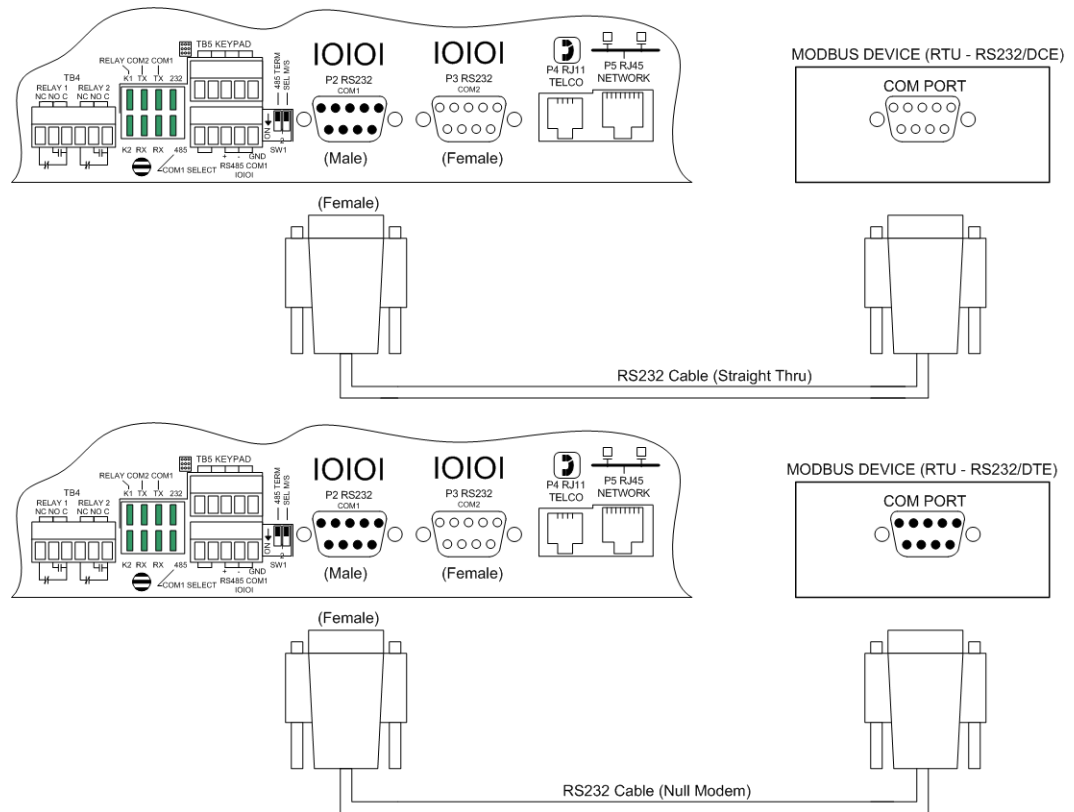
Figure 2.11 FMS EIA-232 Connection to a DCE or DTE Device

2.2.10 Expansion Card A Connections

A sticker identifying the expansion cards as A or C is located on each Expansion Card. The following wiring diagrams show the Expansion Card in slot 1. However, the Expansion Card may be in Slot 2, 3 or 4 based on the FMS configuration. The I/O for each card type appears on the back of the FMS for reference during field wiring; see Figure 2.12 and Figure 2.16 for typical wiring. For information on Expansion Card B, see Appendix A, "FMS Expansion Cards" on page 179.

Expansion Card A has 12 non-isolated analog input channels and 8 relay output channels. The analog input channels can be wired for 4-20ma, 0-5vdc, 0-10VDC, NO (normally open) dry contact or NC (normally closed) dry contact. The circuit board has internal jumpers to select an ma input or a voltage input. The factory default is set as a 4-20ma input. See Appendix A, "FMS Expansion Cards" on page 179, for jumper location and settings.
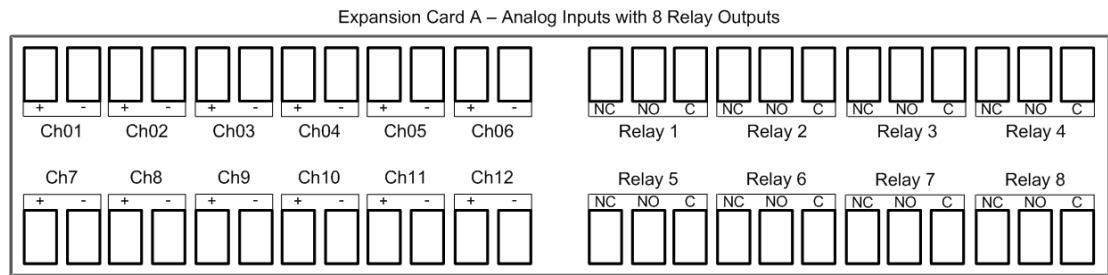
Figure 2.12 I/O Terminals for Expansion Card A
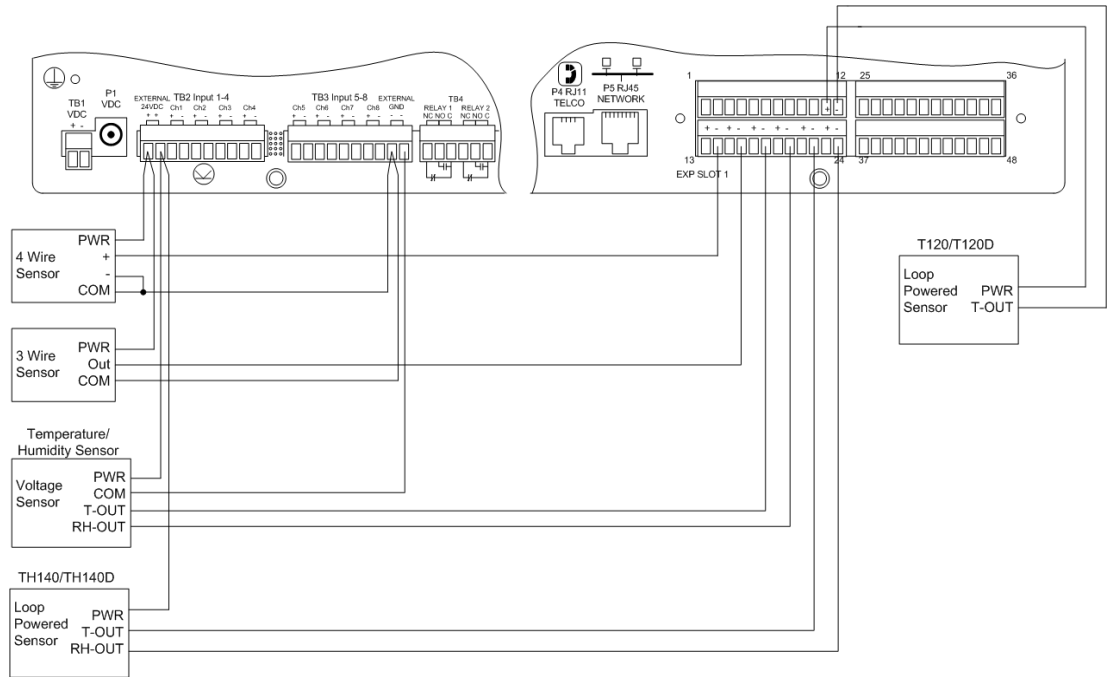
Figure 2.13 Analog Input Wiring for Expansion Card A

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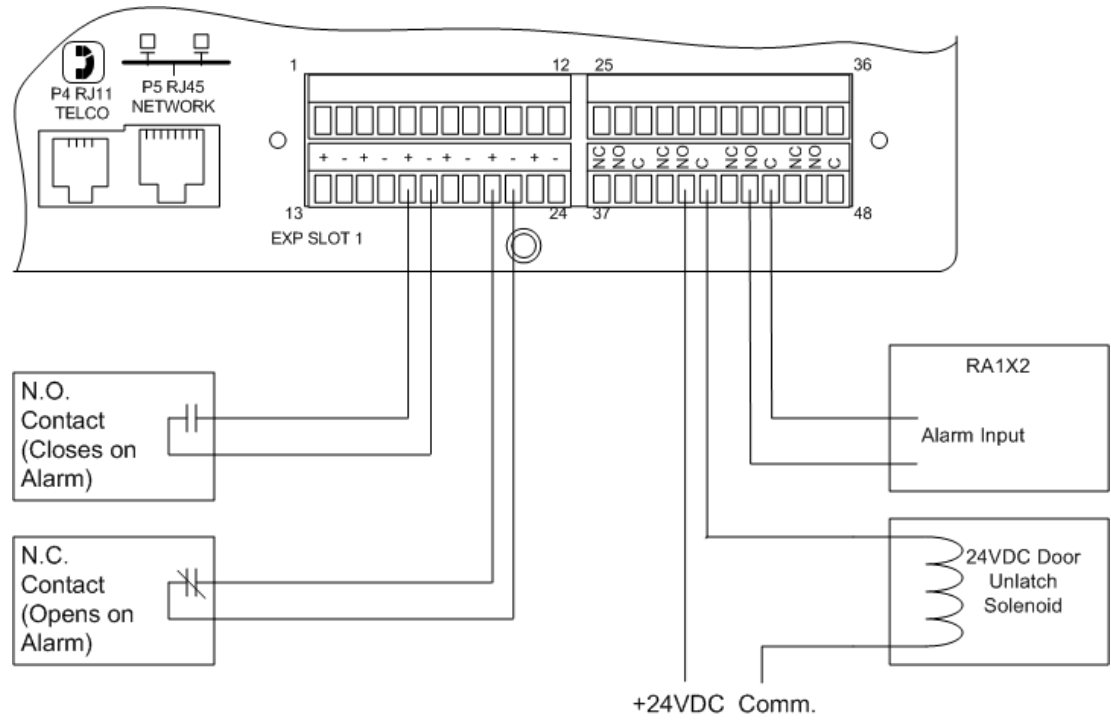
Figure 2.14 Dry Contact Inputs with Ground and Relay Outputs, Expansion Card A

2.2.11 Expansion Card C Connections

Expansion Card C has 24 dry contact input channels.
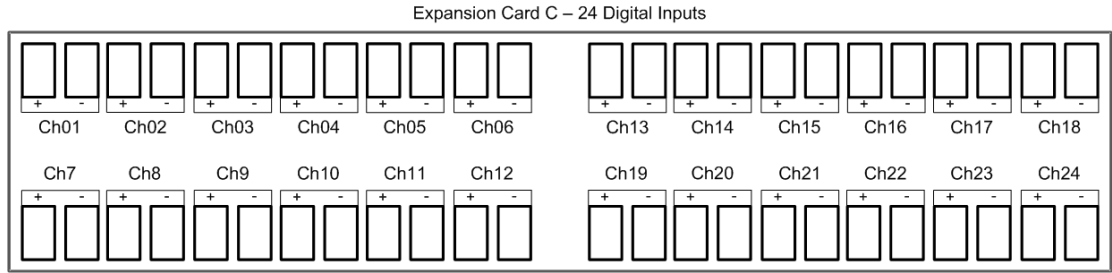
Figure 2.15 I/O Terminals for Expansion Card C
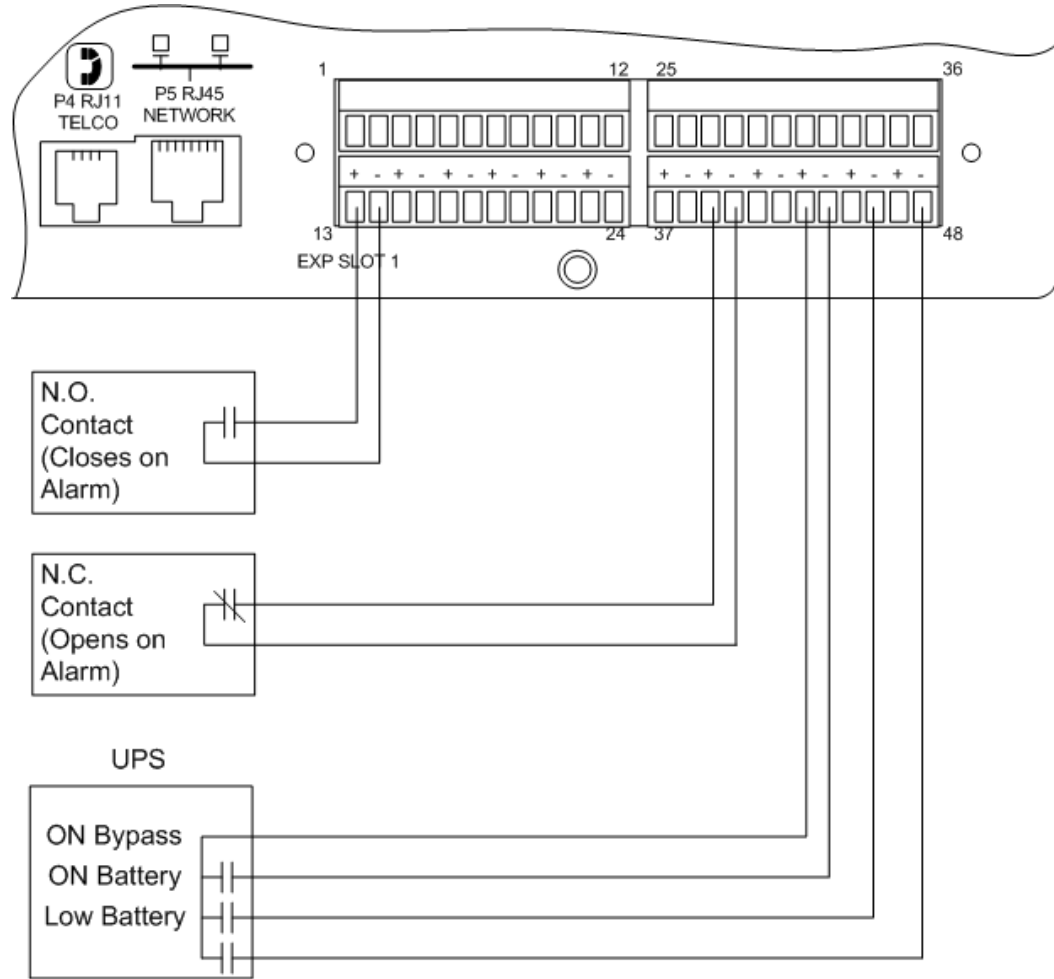
Figure 2.16 Typical Wiring for Expansion Card C

2.3. Communication

The FMS will not communicate over a user's network the first time it is connected to the network. The manufacturer programs the FMS with a default IP address: 10.0.0.188, Subnet Mask: 255.255.255.0. This default address must be changed to an IP address that corresponds with the user's network before the FMS can communicate over the network.

Follow the steps in this section to change the default address.

2.3.1 Set the FMS IP Address

There are three ways to set the FMS IP address:

- Via the ARP and PING commands
- Via the Web browser
- Via the EIA-232 interface

2.3.2 Set the IP Address Using the ARP and PING Commands

To set the IP address of a manufacturer programmed FMS, use the ARP (Address Resolution Protocol) command together with the PING (ICMP echo request) command. To use the ARP, you must know the Ethernet address of the FMS.

2.3.2.1 Obtain the Ethernet Address (MAC Address)

Each network device must have its own unique identification. This identification sets it apart from all other manufacturers and ensures that no two network devices have the same address. Each manufacturer must use a six digit numbering convention (six sets of two digits with both letters and numbers). The first three digits determine the actual manufacturer, and the remaining three digits determine the unique network serial number of each individual FMS.

A typical Ethernet address (also known as a MAC address - Media Access Control) from the FMS looks like this: 00:90:5B:00:02:45

The Ethernet (MAC) address for the FMS is on the model number sticker located on the bottom of the device.

2.3.2.2 Use the ARP Command

Once you know the Ethernet address of the FMS, use the ARP command with the correct parameters from any computer located on the FMS subnet (e.g., Class C with a subnet of 255.255.255.0).

For example, enter the following from a command prompt:

```
arp -s 192.168.1.14 00-90-5b-00-02-45
```

This command tells the computer from which the ARP command was entered that the network device with an IP address of 192.168.1.14 uses the Ethernet (MAC) address of 00-90-5b-00-02-45.

2.3.2.3 Use the PING Command

After the ARP command has been entered, the PING command must be entered from the same computer in order to set up the IP address of the FMS. The PING command will use the ARP entry added from 2.3.2.1, "Obtain the Ethernet Address (MAC Address)" on page 33, to send the IP address information directly to the FMS (which is just one of several methods to initially configure the IP address on a new FMS).

To do this, enter the following from a command prompt:

    PING ip_address

Where "ip_address" is the IP address that was entered using the ARP command. In the above example, the following would be entered:

    PING 192.168.1.14

This command changes the IP address of the FMS to: 192.168.1.14.

2.3.2.4 Troubleshooting the ARP/PING Commands

If problems are encountered, it may be for one of the following reasons:

♦ The FMS already has a non-default TCP/IP address. Once the IP address of the FMS has been changed from the default of 10.0.0.188, it is not possible to change it again with the ARP/PING commands. This method of setting up the FMS IP address can only be used on an FMS that still has its original default IP address, as shipped from the manufacturer.

♦ The device is not on the same Class C subnet as the computer from which the ARP/PING commands were sent. The FMS default router and Subnet Mask must be changed via a Web browser pointed at the FMS default IP address (i.e., http://10.0.0.188) or via a direct EIA-232 terminal connection to the FMS-both of which are alternate methods for setting up the FMS IP address.

2.3.3 Set the IP Address Using a Web Browser

1 Plug a crossover network cable into the laptop or workstation that will be used to configure the FMS. This cable is not intended to be connected to a network hub.

2 Write down the computer's IP address and Subnet Mask. Then change the IP address and Subnet Mask of the computer from its existing address to one that will allow it to communicate with the FMS, such as 10.0.0.180. It may be beneficial to set the IP address to one that is one number different from the FMS IP address. Consult the computer's manual or your IT Department before attempting this.

3 Connect the other end of the network cable to the Ethernet port on the back of the FMS. Access the FMS through a Web browser by typing the IP address (10.0.0.188) into the location bar. Enter the FMS user name and password when prompted.

Note   The default user name is "falcon" and there is no default password – leave the password field empty.

4 Select the **Configuration Menu** link, then select the **System** link. Select the **IP Configuration Menu** link and change the IP address, Subnet Mask, and default Gateway to one provided by the network administrator. Press the **Submit Changes** button. The FMS will save the new IP address and reboot. Once the FMS reboots, the system status LED stops flashing. Use the new IP address and reset the computer to its original IP address and Subnet Mask.

5 Change the IP address of the computer back to its original IP address. If the computer was configured as DHCP (the network domain controller assigns an IP address) return it to this state. This may require assistance from your IT Department, or consult the computer's manual.

6 The computer and the FMS are now both configured to communicate on the network. Both should be accessible via the network. Connect the PC and the FMS to the network. From the PC Web browser, type in the IP address of the FMS. Enter the user name and password as stated above to verify network access to the FMS.

2.3.4 Set the FMS IP Address using an EIA-232 Connection

To use the EIA-232 interface:

1 Connect the EIA-232 port (P3 - Com2) on the FMS to a terminal or PC running terminal emulation software (HyperTerminal) with a 9-pin male-female straight through serial cable.

2 Set the appropriate communication port to **9600 baud**, **NO parity**, **8 data bits**, **1 stop bit**, **(9600/N/8/1)**, and **no software or hardware flow command**.

3 Once the terminal emulation software starts, press **Enter** on the keyboard and the FCF> should appear. If the FCF> does not appear, check the communication settings and make sure the unit is powered on.

4 **IP Address**: From the FCF> type "**IP**" then press <enter> to view the current IP address. To change the IP address, type IP, <space> and the new address to be assigned, then press the enter key, example: IP 192.168.1.225 <enter>.

5 **Subnet Mask**: From the FCF> type "**NM**" then <enter> to view the current Netmask address. To change the Netmask address, type NM, <space> and the new address to be assigned, then press the enter key, example: NM 255.255.255.243 <enter>.

6 **Default Gateway**: From the FCF> type "**DG**" then press <enter> to view the current Default Gateway address. To change the Default Gateway address, type DG, <space> and the new address to be assigned, then press the enter key, example: DG 192.168.1.1 <enter>.

7 Every time you make a change the Falcon FMS will automatically save the changes.

See Chapter 5, "EIA-232 Interface" on page 161, for more information on the EIA-232 command set.

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3

WEB INTERFACE CONFIGURATION

The FMS Web interface provides a convenient way to check and monitor the FMS status through a web browser.

To access the FMS web interface, you must first have configured the FMS to communicate on your network. If you haven't done this already, refer to Chapter 2, "Communication" on page 33.

Once the FMS is communicate on your network, type the IP address of the FMS into the location bar of the Web browser. When the prompt appears, enter the FMS's default user name (**falcon**) and password - the FMS is shipped without a user name so leave this field blank. Press Enter.

3.1.   Home Page

The top of the page provides links to other pages for additional monitoring, control and configuration. The sections in this chapter will explain the functionality available on each screen within the web interface.

The main page within the web interface acts as a dashboard for the FMS. This page is highly customizable - you can change everything from the logo that appears in the upper left corner of the page, to the way the inputs display in the middle of the page, to the interactive map and camera view that can occupy the space on the right side of the dashboard. Many of the home page specific options are configured via "Input Groups" on page 58.

Once it's configured, the FMS home page may look similar to this:

Figure 3.1   Configured FMS Home Page

As you can see in our example, each input has a box with its number, name, and status. The box is shaded to signal the inputs status. Color codes are as follows.

Color	Description
Green	Input is normal-not in an alarm state.
Yellow	Analog inputs only-input is in a high alarm 1 or low alarm 1 state.
Red	Analog input is in a high alarm 2 or low alarm 2 state. Digital input is in an alarm state.
Blue	Alarm/Input disabled by a schedule.
White (no shading)	Input is not configured-spare point for future use.
Magenta, Green, or Gold	Digital Status point is on. This color is configurable under the System Configuration Menu.

Table 3.1   Color Definitions

Note the XML Status link in the middle right side of the page. This link allows a user to download data collected by the FMS as an XML file and then import it into a spreadsheet for viewing, logging, and analyzing. If you'd like to save this file from the web interface, right click on the link and select "Save Target As". If you left click on the link, you will just be able to view the information.

3.2. Alarms

The Alarms page provides a single view of all active alarms on the FMS unit.

Figure 3.2 Alarms Menu

Field	Description
Date/Time	The time the alarm was triggered.
Input	The input that is alarm. This is a clickable link. If the link connects to a slave unit, use the link to learn more about the alarm condition. Otherwise, click this link to go directly to the Configuration page for the input.
Description	The label description that you have entered for this input.
Type	The type of input, as recorded on the input's configuration screen
Severity	The severity level of the alarm.
Present Value	Indicates the current status of the input.
Alarm Description	Provides a more complete description of the alarm condition.

3.3.   Identity

The Identity link displays basic FMS information including Model Number, System Name, MAC Address, which Expansion Cards are installed in which slots, Firmware Version, and IP Address. Most of these values can be adjusted through the Configuration screens. This page is intended for reference only, not system adjustment.

Figure 3.3   Identity Menu

3.4. Configuration

The **Configuration** page allows authorized users with administrator or read-write privileges to adjust the FMS settings. Each link on the Configuration page displays more information about specific configuration settings.
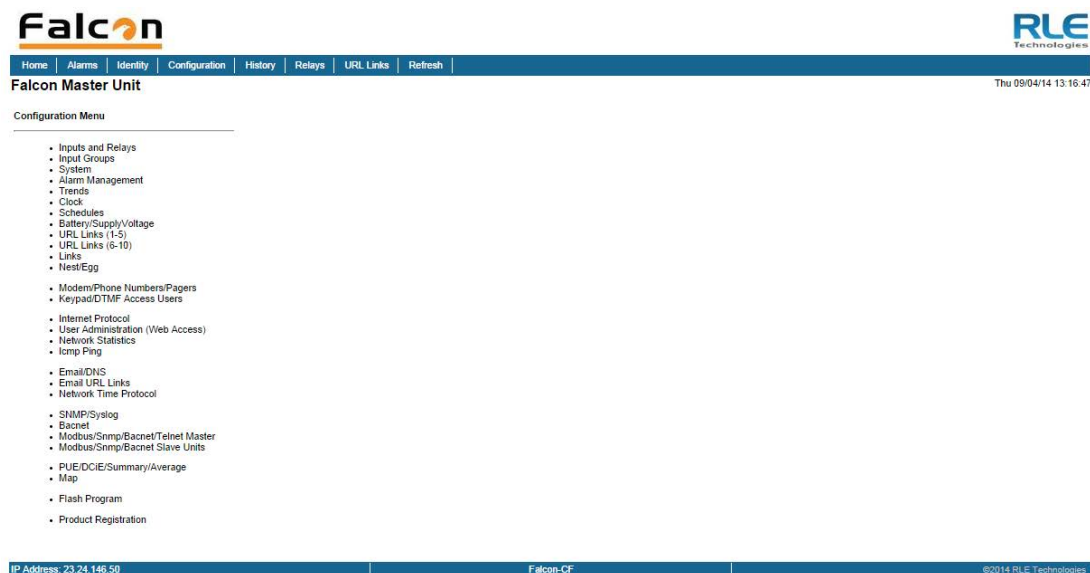
Figure 3.4 Configuration Page

NOTE: If any of the fields within the sub-menus are edited, be sure to click the Submit Changes button to save the changes. If you edit the fields and navigate from the web pages without clicking the Submit Changes button, all changes will be lost.

3.4.1 Inputs and Relays

Inputs and Relays allows users to program specific parameters for each FMS input and relay. Only installed inputs and relays are displayed.

Different FMS models allow different numbers of inputs and relays. A1U will include the Main Board inputs, and has room for one expansion card - either an A card or a C card.

A 2U FMS allows 4 expansion cards to be added to the unit - each expansion card slot can be outfitted with either an A card or a C card.

◆ Main Board Inputs 1-8 - Every FMS has a main board. This board provides 8 inputs configurable as analog 4-20mA or digital NO/NC.

◆ Expansion Card A Inputs and Outputs- adds an additional 12 inputs, configurable as analog 4-20mA, 0-5V, 0-10V or digital NO (**cannot be configured as** NC), as well as 8 form C relay outputs.

◆ Expansion Card C Inputs - adds an additional 24 digital NO/NC inputs. There are no additional relay outputs on a C card

.

Inputs											
S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label
T	(1)	Server Isle A	Eas	(2)	Server Room	T	(3)	Server Isle B	Nor	(4)	Server Room
A1	(5)	FM200 System	Alar	(6)	Water Leak	Alar	(7)	Water Leak	Alar	(8)	Water Leak
1.1 T	(9)	Server Isle C	1.2	(10)	(Demo) Alarm	1.3 T	(11)	Server Isle D	1.4 Wes	(12)	Server Room
1.5 T	(13)	Server Isle F	1.6 T	(14)	Server Isle G	1.7 Sou	(15)	Server Room	1.8 T	(16)	Server Isle I
1.9 T	(17)	Server Isle J	1.10 T	(18)	Server Isle K	1.11 T	(19)	Server Isle L	1.12 T	(20)	Server Isle M
2.1 Room	(33)	Generator	2.2 F1	(34)	UPS Room 5th	2.3 Tem	(35)	Outside Air	2.4 F1	(36)	MCC Room 3rd
2.5 Offic	(37)	1st Floor	2.6 Offic	(38)	2nd Floor	2.7 Motor/	(39)	Elevator	2.8 C1	(40)	Tape Storage
2.9	(41)	ANALOG #2.9	2.10	(42)	ANALOG #2.10	2.11	(43)	ANALOG #2.11	2.12	(44)	ANALOG #2.12
3.1	(57)	ANALOG #3.1	3.2	(58)	ANALOG #3.2	3.3	(59)	ANALOG #3.3	3.4	(60)	ANALOG #3.4
3.5	(61)	ANALOG #3.5	3.6	(62)	ANALOG #3.6	3.7	(63)	ANALOG #3.7	3.8	(64)	ANALOG #3.8
3.9	(65)	ANALOG #3.9	3.10	(66)	ANALOG #3.10	3.11	(67)	ANALOG #3.11	3.12	(68)	ANALOG #3.12
4.1	(81)	ANALOG #4.1	4.2	(82)	ANALOG #4.2	4.3	(83)	ANALOG #4.3	4.4	(84)	ANALOG #4.4
4.5	(85)	ANALOG #4.5	4.6	(86)	ANALOG #4.6	4.7	(87)	ANALOG #4.7	4.8	(88)	ANALOG #4.8
4.9	(89)	ANALOG #4.9	4.10	(90)	ANALOG #4.10	4.11 Service	(91)	Out Of	4.12 Act	(92)	Dry Contact
5.1 Temper	(105)	Internal	5.2 Humidi	(106)	Internal						

Input Group Labels   Download Points List Export CSV Table

Figure 3.5 FMS Input Configuration Menu

Inputs and relays located on expansion cards are identified by their name and slot channel number, referred to in the Inputs table as S.Ch. For example, an input with a S.Ch number of 1.9 is located on the expansion card in slot one, and is the 9th input on that card. An input with a S.Ch number of 4.2 is located on the expansion card in slot 4, and is the 2nd input on that card. If an input has no S.Ch number, that means it is located on the FMS's main card.

Relays work the same way. A relay with no S.Ch number is located on the FMS's main board. A relay with an S.Ch number of 1.4 is located on the expansion card in slot 1, and is the 4th relay on that card.

Clicking an input link will display one of three input configuration pages - each card has its own configuration page. Only the options available for the particular inputs on the card will be displayed.

Relay configuration works the same way. Click a relay link to display that relay's configuration information. Only the configuration options available for that particular relay will appear.

You'll notice a link placed between the Inputs and Relays tables:

Option	Description
Download Points List Export CSV Table	Click this link to view a CSV list of all the inputs configured on this FMS unit.

Table 3.2 Inputs and Relays Configuration Page - Additional Link

3.4.1.1 Main Card - Input Channels 1-8

Inputs 1 - 8 reside on the FMS's main circuit board. Click the input you'd like to configure. The number of the input you're configuring appears in the bar at the top of the configuration page. Depending on which type of input you're configuring, you'll have different menu options. The following table should address all the options available across the different input types.

Note Users must push the **Submit Changes** button after they configure each input. Changes not submitted before proceeding to the next input will be lost.

Figure 3.6   FMS Main Board Input Configuration

Option	Description
Current Readings	Displays the input current as sensed by the FMS and the calculated value which factors in the designated gain and offset settings.
Next Input / **Prev Input**	Click these links to advance to the next installed FMS input, or move back to the previous input.

Table 3.3   FMS Main Board Configuration Options

Option	Description
Select Input Type	**Select Input Type**: Select the correct input type based on the type of device connected to the input channel. Options include: • **Not Configured**: Select when there is nothing connected to the input. • **Analog 4-20mA**: Select when the device connected to the input provides a 4-20mA output. • **Digital NO**: Select when the device connected to the input is a dry contact that is normally open and closes on an alarm condition. • **Digital NC**: Select when the device connected to the input is a dry contact that is normally closed and opens on an alarm condition. • **Digital Status**: Select when the device connected to the input is a dry contact that should only be monitored for status, and will not need to report alarm conditions. **Select the way you'd like the information to**: • **Physical**: This allows you to configure the channel to display inputs that are wired to the FMS (Channels 1 - 104). • **Import**: This allows users to import Modbus data to a physical point. Through this feature you can display Modus Register information on the main page of the FMS and use Modbus information to trigger other events and responses. Virtual Slots can be added to the main page of the FMS to display more Modbus Points; see Chapter 4, "Advanced Communications - Modbus, BACnet, and Telnet" on page 133 for more information.

Table 3.3 FMS Main Board Configuration Options

Option	Description
Gain & Offset	Inputs like temperature, humidity, pressure, etc. connected to the FMS convert information to a 4-20mA signal. The FMS reads this raw 4-20mA signal and calculates a value based on the input and the predetermined gain and offset settings. The idea is to determine the correct gain and offset values so that the FMS calculates and displays an accurate reading. Without setting the correct gain and offset, the FMS will not convert the raw data correctly. As a result, missed alarms or nuisance alarms could occur. To set gain and offset values, click the **Calculator** link. **4-20ma Gain/Offset Calculator: Input #2** Current Readings: Raw = 6.213 mA Calc = 42.8 Gain: 25 Offset: 4 Sensor Range High 20ma = 129 Sensor Range Low 4ma = 29 [Calculate] **Return to Input 2 Configuration** Enter the sensor's range and press the **Calculate** button. Click the **Return to Input 1 Configuration** link so that the gain and offset fields are automatically entered with the correct offset and gain settings. Gain and offset values can also be determined by using the following formulas: **Gain for 4-20mA Transducer = (Sensor High Range Value-Sensor Low Range Value) / 4** **Offset for 4-20mA Transducer = Sensor Low Range Value - Gain** *Example:* Temperature sensor with a sensing range of 50-95°F - displayed in Fahrenheit Gain = (95-50) / 4 = 11.25 | Offset = 50 - 11 = 38.75 *Example:* Temperature sensor with a sensing range of 50-95°F - displayed in Celsius Convert 50-95°F to 10-35°C and use the Celsius range for the calculations Gain = (35-10) / 4 = 6.25 | Offset = 10 - 6 = 3.75 *Example:* Humidity sensor with a range of 0 - 100% RH Gain = (100-0) / 4 = 25 | Offset = 0 - 25 = -25 **Gain for 0-5V or 0-10V Transducer = Sensor High Range Value-Sensor Low Range Value** **Offset for 0-5V or 0-10V Transducer = Sensor Low Range Value** *Example:* A 0-5V Transducer with a range of -30-175°F Gain = 175 - -30 = 205 | Offset = -30 *Example:* A 0-5V Transducer with a range of 0 - 100%RH Gain = 100 - 0 = 100 | Offset = 0

Table 3.3   FMS Main Board Configuration Options

Option	Description
Hysteresis	Applies when the input type is Analog 4-20mA and is active for High Limit 1, High Limit 2, Low Limit 1 and Low Limit 2. Hysteresis (also referred to as deadband) designates the amount an input reading must sway from its preset alarm reading before it is classified as returned to normal. It effectively provides a deadband around the limit settings, which prevents sensors from sending multiple alarm and return to normal alerts when the sensor's value hovers around its alarm limit. *Example:* A temperature sensor alarms when it reaches its High Limit 1 of 80°F. If Hysteresis is set at two, the sensor must register less than 78°F before the FMS reports it as returned to normal. In another example, a humidity sensor alarms when it reaches its Low Limit 2 of 30% RH. If the Hysteresis is set at five, the humidity must register more than 35% before the FMS reports it as returned to normal.
UOM/Map Label	The 10 character field used to assign a unit of measure label to analog values, such as °F, °C, % RH, Amps, Volts, PSI, etc. The unit of measure field is only required when the input type is Analog 4-20mA. The unit of measure field is displayed on the Main Menu and in notification (email/pager messages and SNMP Trap).
Alarm Delay	The amount of time the FMS waits to send an alert after an alarm condition is detected. The FMS uses this same time delay to report a return to normal after the alarm condition clears. The alarm delay is active for all input types except Not Configured. *Example:* An CRAC unit input is configured with an alarm delay of 10 seconds. If the CRAC unit goes into alarm and then returns to normal within10 seconds, no alarm is generated in the FMS. If the CRAC unit remains in alarm for 10 seconds or more, the FMS records the alarm and generates notification per the input settings. If the CRAC unit returns to normal but then alarms again within 10 seconds, the FMS does not record this as a return to normal. Once the CRAC unit returns to normal for greater than 10 seconds, the FMS records a return to normal and generates its notifications.
High Limit2 (Major)	Applies only to analog 4-20mA inputs. The FMS will record an alarm and send notification when the FMS calculated value exceeds this limit. The High Limit 1 and High Limit 2 are disabled when they are both set to 0. High Limit 2 will also activate any designated relays.
High Limit1 (Minor)	Applies only to analog 4-20mA inputs. The FMS will record an alarm and send notification when the FMS calculated value exceeds this limit. The High Limit 1 and High Limit 2 are disabled when they are both set to 0.

Table 3.3 FMS Main Board Configuration Options

Option	Description
Low Limit1 (Minor)	Applies only to analog 4-20mA inputs. The FMS will record an alarm and send notification when the FMS calculated value falls below this limit. The Low Limit 1 and Low Limit 2 are disabled when they are both set to 0.
Low Limit2 (Major)	Applies only to analog 4-20mA inputs. The FMS will record an alarm and send notification when the FMS calculated value falls below this limit. The Low Limit 1 and Low Limit 2 are disabled when they are both set to 0. Low Limit 2 will also activate any designated relays.
Pager Alarms	Use the Configuration>Modem/Phone Numbers/Pagers link to configure alarm recipients. You can configure up to 15 phone numbers, and each will go into a numbered slot, 1 - 15. Then come back to this field and designate up to five recipients who should be notified when this point goes into alarm. Separate the recipients' ID numbers with commas. The FMS will first dial the lowest number listed, regardless of the order in which the numbers are listed. Enter zero to disable this feature. *Example:* If the Alarm dial out string is set to "3, 5, 1, 0, 0," the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs. Pager notification will be sent when an input alarms (high limit 2, high limit 1, low limit 1, low limit 2 is exceeded or the digital input is in alarm). See 3.4.13, "Modem/Phone Numbers/Pagers" on page 76 for more information.
Label	Enter a unique name for this input. Applies to all input types except "Not Configured." • For Analog input types, this label is displayed on the FMS Main Menu and the Input Configuration Menu. When the input alarms and/or returns to normal, the label is included in the Alarm History and notification messages. • For Digital NO and Digital NC inputs, the label is displayed on the FMS Main Menu, Input Configuration Menu, Alarm History page and in notification messages only when the device is in alarm. • For Digital Status inputs, the label is displayed on the FMS Main Menu when the input is on. When the input turns on, the label is also included in the Digital Status History.

Table 3.3   FMS Main Board Configuration Options
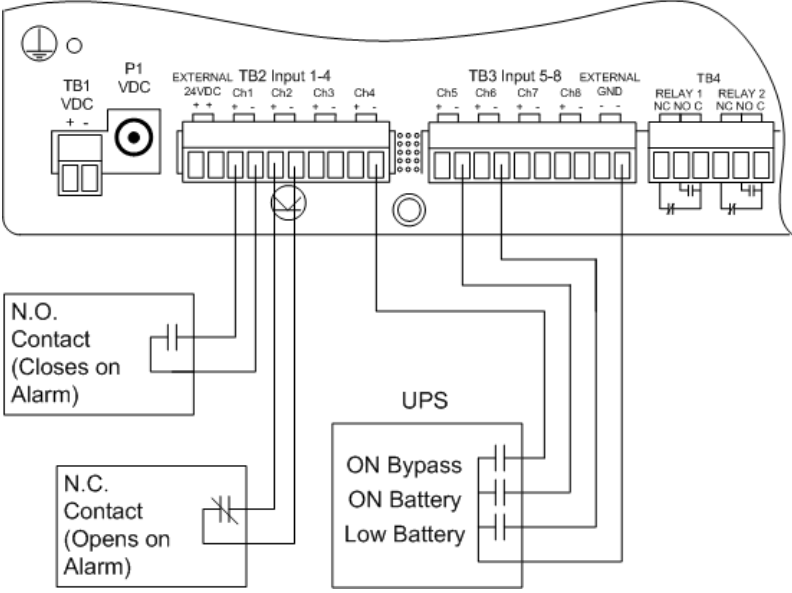
Option	Description
Label (Digital input normal)	Applies to input types Digital NO, Digital NC and Digital Status.
	This label is displayed on the main page when the input is normal, in the Alarm History when the input returns to normal and in notification messages. For Digital Status inputs, the label is displayed on the Home page when the input is off. When the input turns off, the label is also included in the Digital Status History.
	This field may be left blank. If it is left blank, the FMS displays the Label (from above).
"OR Gate" Relay (1-16) Control **and** **"OR Gate" Relay (17-32) Control**	This uneditable field reflects information entered on this specific relay's configuration screen. Access the configuration page for this relay to edit these fields.
Relay Configuration Link	Used to assign a High Level 2, Low Level 2, or Digital Alarm generated by this input to the OR gate function block of the Relay Control Logic to a specific relay. To select the relay(s), click on the link and check the relay box(es). See Appendix G, "Relay Control Logic" on page 213.
Group Assignment	Use the Configuration>Input Groups link to configure up to 8 groups into which you can organize your inputs.
	Then return to this page and determine whether your input should be placed into one of those groups.
	If this input should be part of a group, specify that group's number here.
Digital Alarm Severity	The FMS allows you to set a digital output alarm code.
	Choose from Critical, Major, Minor, or Warning in the drop down menu.
Email Recipient Notification	Use the Configuration>Email/DNS link to configure email addresses that can receive alarms from the FMS. You can configure up to 8 email addresses, and they will each go into a numbered slot, marked 1-8.
	Email addresses will be displayed next to the checkboxes on this page once they are configured on the Email Configuration page.
	Use the checkboxes to eight email addresses for notification if the input goes into alarm. Email notification will be sent to recipients whose names are checked when an input alarms and, if designated, when an alarm returns to normal.
Email URL Link	Email links can be included in FMS notification - popular links include links to emergency recovery plans and links to user guides.
	If you'd like, you can include one URL link in each email message. Use the Configuration>Email URL Links page to set up the URL links, and then enter the number associated with the link you'd like to send here.

Table 3.3   FMS Main Board Configuration Options

Option	Description
Alarm Disable by Schedule	Use the Configuration>Schedules link to define a timeframe for Schedules A and B.

Then return to this page and use this field to designate a period of time the input will be disabled or inactive. To do this, select either the A or B schedules.

Within the scheduled time, the point on the Main Menu will turn Blue to indicate that the input is currently being disabled during its scheduled time. Once the scheduled time has passed, the point will reactivate and return to its normal color. |
| **Input Polarity Reversal by Schedule** | If this input is Digital NO/NC, you may need to reverse the input polarity at certain times of the day. Use the Configuration>Schedules link to define a timeframe for Schedules A and B.

Then return to this page and use this field to designate a period of time the input polarity will be reversed. To do this, select either the A or B schedules. |
| **Snmp Trap** | Use this feature to enable or disable SNMP traps. The trap can also be disabled during one of the schedules that was established on the Configuration>Schedules page. |
| **Snmp Trap Recipients** | Use the Configuration>SNMP/Syslog page to set up your SNMP Communities. Once communities are configured, their IP address will appear next to the checkboxes in these fields.

Check the boxes of the recipients that should receive messages when this input goes into alarm. |
| **High1/Low1 Snmp Traps** | Used to disable SNMP notification for the first level analog alarm. Notification is not sent until alarm reaches the more critical level 2. |
| **Snmp OID** | The SNMP OID is provided here for informational purposes only. |
| **Display Value** | Used to show either Signed or Unsigned Values for the displayed value calculated by the FMS.

Example: If a selected value is Unsigned, the FMS will not display a negative number on the calculated reading. |

Table 3.3   FMS Main Board Configuration Options

Option	Description
Individual Ground Type (digital in only)	Only applies to Digital Inputs. Defines the type of digital input as either Individual Ground or Common Ground. • **Individual Ground**: Used if the monitored input is a single relay contact and two contacts- common and NO or NC-are accessible. • **Common Ground**: Used if multiple relays are to be monitored that have the commons bussed or tied together (only one common input connection) and only the NO or NC contacts are available for each individual relay output. See the example below or see 2.2., "Falcon FMS Wiring" on page 21, for more information. *Example:* Configure input channels 1-2 for Individual Ground, and configure input channels 4-6 for Common Ground: **Figure 3.7** NOI/NC Wiring Example
BACnet Instance	The BACnet object identifier. It is a numerical code used to identify the input. This code must be unique within the BACnet device.
BACnet Units	A numerical code used to assign engineering units to this BACnet Instance. Refer to the BACnet standard for further information.
The next five rows contain information that pertains to graphical mapping. If you'd like more information regarding mapping, refer to ####	
Map Box Size	If you're creating an interactive map for your facility, this field is helpful. It allows you to customize the size of the mapped object for this input point. By default, the height of the object, as it appears on the map, is approximately 20 pixels, and the width automatically adjusts to the length of the text. This setting allows users to expand the size of the object to fill a defined area.

Table 3.3   FMS Main Board Configuration Options

Option	Description
Text Direction	Used for graphical mapping - decide if you'd like the text on the map for this object (temperature reading, humidity reading, sensor value, etc.) to be horizontal or vertical.
Map Coordinate	Fine tune the location of the object on the map. Refer to "Facility Mapping" on page 129 for further information.
Graphical Mapping	Designate the device's location on the FMS graphical map.
Test Map	View the mapped location of the point you're currently configuring.
Digital Input Color - Active and Inactive	Inputs configured for Digital Status do not trigger notification. Instead, use this option to set the display color for Digital Status points on the Main Menu when the input in its inactive state, and also when it is turned on to its active state. The options include red, gold, magenta, gray, and green. Typically, points are configured to be green in their inactive state and then to turn red on alarm.

Table 3.3   FMS Main Board Configuration Options

Note   Press the Submit Changes button when done to save all changes.

3.4.1.2 Expansion Card "A" Input Configuration

Expansion Card A contains 12 inputs, configurable as analog 4-20mA, 0-5V, 0-10V(analog 0-5V and 0-10V require additional jumper configuration) or digital NO (**cannot be configured as NC**), plus 8 form C relay outputs.

While units will vary depending on individual configurations, inputs for Expansion Card A are typically numbered 1.1-1.12, 2.1-2.12, etc.

This page will be displayed when configuring an input on an Expansion Card A. It is identical to the FMS Main Board Input Configuration page—see 3.4.1.1, "Main Card - Input Channels 1-8" on page 43—with the following exceptions:

♦ The Expansion Card "A" does not except common ground digital inputs. Therefore, the option for Individual Ground Type (digital input only) is removed.

♦ Analog 0-5VDC and Analog 0-10VDC options are added to the Input Type. The Expansion Card "A" accepts analog inputs individually configurable through internal jumpers, as 4-20mA, 0-5VDC or 0-10VDC.

Figure 3.8 Expansion Card A Configuration Page

3.4.1.3 Expansion Card "C" Input Configuration

Expansion Card C contains 24 digital NO/NC inputs.

While units will vary depending on individual configurations, Expansion Card C is typically numbered 1.1-1.24, 2.1-2.24, etc.

This page will be displayed when configuring inputs for Expansion Card C. It is similar to the FMS Main Board Input Configuration page – see 3.4.1.1, "Main Card - Input Channels 1-8" on page 43—with the following exceptions:

♦ The Input Type options do not include Analog 4-20mA since Expansion Card "C" only accepts dry contact inputs.

♦ The Gain, Offset, Hysteresis, Unit of Measure, High Limit 2, High Limit 1, Low Limit 1, and Low Limit 2 are not available since Expansion Card "C" does not accept analog inputs.

♦ The option for Individual Ground Type (digital input only) is removed. Expansion Card "C" accepts Individual and Common Ground inputs; however, it does not require any software configuration.

Figure 3.9 Expansion Card "C" Configuration Page

3.4.1.4 Internal Temperature and Internal Humidity Configuration

Internal temperature and humidity sensors are optional, and are not included on all FMS configurations. Internal Temperature, Ch. 105, and Internal Humidity, Ch. 106, have the same options as a standard channel configured as an analog input, but the gain value cannot be changed-it has a fixed value internally. The Input Type for Internal Temperature is used to specify and display the input in Fahrenheit or Celsius.

3.4.2 Relay Configuration

From the Configuration>Inputs and Relays page, select the relay you'd like to configure. Then use this page to configure the FMS's relays.

Figure 3.10 Relay Configuration Page

Option	Description
Type	Each relay output can be configured for one of the following types- only one type per relay output:
	• **NO (Non-Supervised)**: Configures the relay output to be normally de-energized. The relay output will energize when activated by an input or by a schedule. The silkscreen labeling for the relay outputs (NC, NO and C) refer to the state of the relay output when it is de-energized.
	• **NC (Supervised)**: Configures the relay output to be normally energized. The relay output will de-energize when activated by an input or by a schedule. The silkscreen labeling for the relay outputs (NC, NO and C) refer to the state of the relay output when it is de-energized.
	• **Force On**: Energizes the relay out and allows a user with Read-Write or Administrator privileges to turn on a relay output for control or testing purposes.
	• **Force Off**: Energizes the relay out and allows a user with Read-Write or Administrator privileges to turn off a relay output for control or testing purposes.
	• **Keypad Controlled**: Configures the relay output to be controlled by a keypad code or DTMF code. The User Code Configuration link appears to the right of the Label field once the Keypad Controlled option is selected and submitted. The User Code Configuration link allows users to link which access code will active the relay output.
	Figure 3.11 Keypad/Relay Configuration
	• **Button Controlled**: Adds a button to the Relay Control page allowing users with Read-Only privileges to turn on or off a relay output for control purposes.
	• **Modbus Controlled**: Configures the relay output to be controlled by a Modbus/SNMP Slave device in alarm.
Label	Used for relay identification. This label appears on the Relay Status and Relay Control pages.
BACnet Instance	The BACnet object identifier. It is a numerical code used to identify the input. This code must be unique within the BACnet device.

Table 3.4 Relay Configuration Menu Options

Option	Description
OR'D Alarm IDs	Displays the Alarm IDs of the inputs specified through the Relay Configuration link on the Input Configuration Menu. The Alarm IDs displayed can be translated by using Appendix E, "Alarm ID Reference Tables" on page 199. The Alarm IDs are also displayed on the Input Configuration page. The Relay Control Logic diagram in Appendix G, "Relay Control Logic" on page 213, shows how the OR'd Alarm IDs, AND'd Alarm IDs and the Combo Gate are internally connected.
AND'd Alarm IDs	Allows up to four Alarm IDs (High Limit, Low Limit or Digital Alarms) to be specified for the AND Gate Function Block input of the Relay Control Logic. Alarm IDs can be obtained from Appendix E, "Alarm ID Reference Tables" on page 199. The Alarm IDs are also displayed on the Input Configuration page. The Combo Gate Function Block of the Relay Control Logic will either OR or AND the OR'd Alarm and AND'd Alarm inputs together. The Relay Control Logic diagram in Appendix G, "Relay Control Logic" on page 213, shows how the OR'd Alarm IDs, AND'd Alarm IDs and the Combo Gate are internally connected.
Combo Gate	The Combo Gate allows OR'd and AND'd IDs to be used in conjunction with each other. The Relay Control Logic diagram in Appendix G, "Relay Control Logic" on page 213, shows how the OR'd Alarm IDs, AND'd Alarm IDs and the Combo Gate are internally connected.
On-Delay Time	Specifies the number of seconds the Relay Control Logic will be delayed before activating the relay on alarm.
On-Duration Time	Specifies how long the relay will be active after a valid alarm combination is recognized through the Relay Control Logic. • A positive number entry in seconds will keep the relay in its alarm state (activated) for the fixed period specified. • A negative number entry in seconds will keep the relay in its alarm state (activated) after the alarm condition has returned to normal for the fixed period specified. • A zero entry will configure the relay to be active until the alarm condition returns to normal.
Latch Mode (Non-Latching, Latching, Silenceable)	Latching will cause the relay to latch, or remain in its alarm state, when activated until it is reset by the user. If latching is selected, the on-duration time function will be disabled.
Schedule	Designates which of the schedules (None, A or B) the relay will follow. The schedules are specified in the Configuration Menu. If schedule A or B is selected, all other function blocks of the Relay Control Logic for that relay will be disabled. This allows the relay output to be energized based on day-of-week and time-of-day.
The next four rows contain information that pertains to graphical mapping. If you'd like more information regarding mapping, refer to ####	
Map Label	Assign a label to this relay, so you can identify the point on the graphical map.
Map Coordinate	Fine tune the location of the object on the map. Refer to "Facility Mapping" on page 129 for further information.
Graphical Mapping	Designate the device's location on the FMS graphical map.

Table 3.4   Relay Configuration Menu Options

Option	Description
Test Map	View the mapped location of the point you're currently configuring.
Relay Logic Diagram	This link displays the FMS's relay logic diagram. Refer to Appendix G, "Relay Control Logic" on page 213, for further information.

Table 3.4   Relay Configuration Menu Options

3.4.3 Input Groups

Sometimes it's easier to monitor the status of inputs when they're grouped together. The FMS allows you to organize individual inputs into groups, that can then be displayed in their grouped configuration on the FMS's home page. You can also receive group alarm notification via a single SNMP Trap and a single alarm notification coordinate on the interactive map.

Use this page to establish input groups and notification settings. Then return to the individual input configuration pages to designate which inputs should be placed into which groups - each input has a Group Assignment field near the middle of the configuration page. Enter the appropriate group number for each input to place the input in the group. When you return to the FMS's home page, you should see your inputs properly grouped within the main body of the page.

Figure 3.12 Input Groups Configuration

Option	Description
Input Groups	Activate the Input Groups home page display with this option. Disabled - No groups will display. Enabled - Horizontal will display the groups together in rows. Enabled - Vertical will display the groups together in columns.
Group	This uneditable field specifies the group number.
Label	Specify a name for the input group. This name will be displayed on the FMS home page.
Description	Designate a description for this group.
Snmp Traps	When an input group SNMP is enabled, a falconInputGroupTrap is generated in place of the individual input trap. The group label and description are appended to the trap. Only one group trap is sent when multiple alarms are present in that group. A clear trap is not sent until all inputs of the group have cleared of an alarm. The SNMP input group traps are escalating. If you would like an SNMP trap sent for this group, enable that feature here.
Mapping	If you would like an icon for this group to display on the interactive map, enter the box size and coordinates here. Graphical Mapping link: Click this link to use the drag and drop feature to place the icon on the graphical map.

Table 3.5 Input Groups Configuration Options

3.4.4 System

The System link lets you configure many of the FMS's home page display options.

Figure 3.13 System Configuration

Option	Description
MAC Address	This field displays the MAC address, which is assigned to the FMS by the manufacturer. This field is uneditable, and is intended for reference only.
IP Address	The FMS's IP address. If necessary, adjust the IP address here.
System Name	Designate a name for the FMS. This name appears on the upper left corner of the web interface, under the main horizontal menu. The system name is also included as part of email notifications.
Web Title Bar Text	You can control the text that appears in the title bar of the web browser, and also on the tab for the web interface's web page.
Web Refresh Rate	The web refresh rate is the amount of time the system waits until it updates the web interface with current data. Typical setting are between 15 and 30 seconds.

DO NOT set the refresh rate between 1 and 5 seconds. This can cause the screen to freeze or lock up.

If the refresh rate is set to 0 the FMS will not refresh at all. Users must set a refresh rate in order for the system to automatically update.

Default setting: 0 seconds |

Table 3.6 System Configuration Options

Option	Description
PDA Screen Width	Sets the width of the PDA web pages in the FMS to match the PDA device. The PDA web pages can be accessed from the Web browser by entering /pda after the IP Address (e.g., 10.0.0.188/ pda). The FMS includes a PDA web page view for the Main Menu, Identity and Alarm History pages only.
Analog Average	Allows users to change the averaging method for analog inputs. Normally, the system samples analog points once a second while tracking high and low values for each analog point. After sixty seconds, the high and low values for these points and the average of these readings are recorded in the Minute Log. To alter this method of averaging, change the value to one of the values listed in the drop down menu. Zero or one maintains the method described above; a higher value changes the method of averaging, and the manner by which high and low values are recorded. See Appendix B, "Analog Averaging" on page 187.
HTML Main Page	Determines the number of monitoring points displayed on the Main Menu. With the default of "0," the Summary Alarm Box, Internal Temperature and Humidity Box and a link to View All Points are displayed. Settings greater than "0" will display the selected points with links to the remaining points. Typically users display all installed points. If the FMS is continuously monitored with a Web browser, it may be desirable to set the HTML Main Page Points to "'0'" and monitor the View all Points page.
Digital Status Active Color	Determines the color of Digital Status points on the Main Menu when the input is turned on. The options are green, gold and magenta. Typically, points are configured to be green and turn red on alarm. However, inputs configured for Digital Status do not trigger notification. For these points, this setting determines the color of the point when the input is on.
HTML Alarm History Display	This option allows users to choose how alarms are acknowledged in the Alarm History page. The FMS is defaulted to "And all acknowledgments." This means that at least two people must acknowledge the alarm for the history to show it has been acknowledged. If users want to allow only one person to acknowledge the alarm to have the Alarm History page log it, select the "Or the acknowledgments."
Falcon Unit Map Coordinate	You can add a link to this FMS home page to the FMS's interactive map. Use these fields to fine tune the coordinates of the FMS Home Page link. Refer to Chapter 7, "Add a Link to the FMS Home Page" on page 135 for further information.
Graphical Mapping	If you'd rather drag and drop the FMS icon to adjust its location, click the Graphical Mapping link. Your FMS map will appear in the browser window. Drag and drop the icon for this FMS (a capital F (F) in a shaded circle) until it is where you would like it to be. Click the Falcon Unit - Submit Changes link when you are done to save your changes.

Table 3.6   System Configuration Options

Option	Description
Default URL	Designate the view you'd like to see when you type the IP address of the FMS into your browser's display bar. • Home Page - displays the FMS's home page (IP/index.htm) • Alarms Page - displays the alarms page (IP/alarms.htm) • Falcon Nest Map - displays the FMS nest map page • Floor Map - displays the map loaded into the FMS as Map Image#1. Go to the Configuration>Map page to upload an image.
Button Controlled Relay Password	An individual relay can be configured as button controlled - do this on the specific relay's configuration page. This allows a relay to be activated by clicking a button on the web interface. This button will appear next to the relay on the Relays page. If you wish, you can password protect the button so only users with the password can push the button. Set that password here.
Graph Type	The FMS generates graphs for data trending. If you choose to use Java graphs, you must have Java installed and updated on your computer, and may have difficulties viewing the graphs on some machines. Default: Dy Graph
Exit to Bootloader	Click this link to access the FMS's bootloader. This features should be reserved for system updates and troubleshooting, and should only be accessed by individuals with the technical knowledge to use this feature.

Table 3.6   System Configuration Options

3.4.5 Alarm Management

The **Alarm Management** link allows users to perform advanced maintenance tasks on the FMS. Some tasks are accomplished by simply clicking a button - others require submitting an acknowledge code or entering your initials before the task can be executed.

Click the **Submit Changes** button to save all modifications.

Figure 3.14 Alarm Management Configuration Page

Option	Description
Acknowledge Alarms by Code	Enter the appropriate alarm acknowledge code to acknowledge specific alarms.
Acknowledge All Alarms	Acknowledge all active alarm on this FMS.
Clear Alarm History	Clear the FMS's entire alarm history.
Clear Access History	Clear the FMS's entire access history log.
Clear Digital Status History	Clear the history log of all digital status information.
Acknowledge Persistent Traps	Click this button to acknowledge all persistent SNMP traps.
Silence/Relays	Click this button to silence the relays.

Maintenance Options

If you have a technician performing maintenance on the FMS, this option will effectively suspend the device during the maintenance period - that way users will not receive alarms caused by the maintenance services.

Table 3.7 Alarm Management Configuration Options

Option	Description
Maintenance Time	Designate an amount of time for the maintenance session. Sessions can be 1 hour, 2 hours, 4 hours, or 8 hours in length. Select Disabled to disable this feature.
Logging	If you'd like to leave the FMS's logging enabled during the maintenance window, you may do so. Select Yes for logging, and the FMS will log all the alarms that occur during the maintenance session. If you select No for logging, none of the alarms that occur during the maintenance session will be logged.
Set Maintenance Time	Click this button to begin the maintenance session.

Table 3.7   Alarm Management Configuration Options

3.4.6 Trends

This feature allows users to configure custom trending on an analog point, either physical or Modbus.

Figure 3.15 Trends Configuration Page

Data can be trended for 8 or 32 points. If you choose to trend 8 points, the FMS will trend 16128 entries per point. If you choose to trend 32 points, the The FMS compiles 3840 entries per point. Once the maximum number of entries has been reached, the FMS eliminates 40 entries at a time and overwrites the data, from oldest to newest. You determine the time interval for the data collection, depending on how detailed you'd like the information.

Time intervals range from 1 minute to 8 hours, and total sample collection is as follows:

Interval	Samples per Day	Total Days	Interval	Samples per Day	Total Days
1 minute	1440	2.6	2 hours	12	320
5 minutes	288	13.3	4 hours	6	640
15 minutes	96	40	6 hours	4	960
1 hour	24	160	8 hours	3	1280
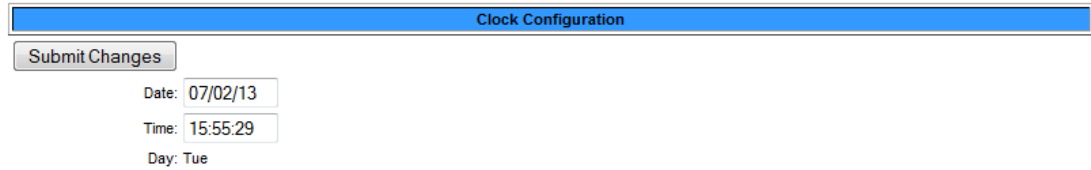
Table 3.8 Trend Interval Chart

Option	Description
Point	The physical channel or Modbus index number.
Type	Select either Physical or Modbus SNMP.
Interval	Select the Interval you'd like to use for trending.
Info	Uneditable field.
Format	Once all your information has been filled out, click this button.

Figure 3.16 Trend Configuration Menu Options

3.4.7 Clock

Use this link to adjust the date and time, as needed. Click the **Submit Changes** button to save all modifications.

Figure 3.17 Clock Configuration Page

Option	Description
Date	Enter the current date in mm/dd/yy format.
Time	Enter the current time in 24-hour hh:mm:ss format, where the hour is a two digit number between 01 and 24.
Day	This non-editable field automatically populates based on the date entered in the date field.

Table 3.9   Clock Configuration Options

3.4.8 Schedules

The **Schedules** page allows users to schedule the activation and deactivation of relay outputs. This is useful for cycling redundant equipment such as chillers, generators, etc. Relays are assigned these schedules through the Relay Configuration menus.

Figure 3.18 Schedules Configuration Page

Option	Description
Status	A non-editable field, this will show the schedule as active or inactive depending on the criteria you enter in the date and time fields.
Begin DOW	The day of the week the schedule will begin.
End DOW	The day of the week the schedule will end.
Begin Time	The time the schedule will begin.
End Time	The time the schedule will end.

Table 3.10 Schedules Configuration Options

3.4.9 Battery Supply/Voltage

The **Battery/Supply Voltage** page allows users to configure power monitoring when the FMS is running off a 48V battery.

Figure 3.19 Battery/Supply Voltage Configuration Page

Option	Description
Input Power Option	A non-editable field, this tells you how the FMS is being powered.
48V Voltage Reading	This field shows the input voltage supplied by the 48V source connected to the FMS.
24V Voltage Reading	This field shows the input voltage supplied by the 24V source connected to the FMS.
Battery/Supply Voltage Alarm	If the **Installed** option is selected, email notification can be sent to any previously designated recipient when the battery enters an alarm state. If you select **Not Installed**, no action will be taken.
Low Voltage Trip	If the input voltage drops beneath this value, an alarm will be triggered.
Pager Alarms	Use the Configuration>Modem/Phone Numbers/Pagers link to configure alarm recipients. You can configure up to 15 phone numbers, and each will go into a numbered slot, 1 - 15. Then come back to this field and designate up to five recipients who should be notified when this point goes into alarm. Separate the recipients' ID numbers with commas. The FMS will first dial the lowest number listed, regardless of the order in which the numbers are listed. Enter zero to disable this feature. *Example:* If the Alarm dial out string is set to "3, 5, 1, 0, 0," the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs. Pager notification will be sent when an input alarms (high limit 2, high limit 1, low limit 1, low limit 2 is exceeded or the digital input is in alarm). See 3.4.13, "Modem/Phone Numbers/Pagers" on page 76 for more information.
Input Voltage Offset	A negative or positive number used to adjust the input voltage reading. + adds offset and - subtracts offset.

Table 3.11 Battery/Supply Voltage Configuration Options

3.4.10 URL Links (1-5) and URL Links (6-10)

The FMS's Home page displays a large image and links to other images. These images can be graphics, logos or images from an IP camera.
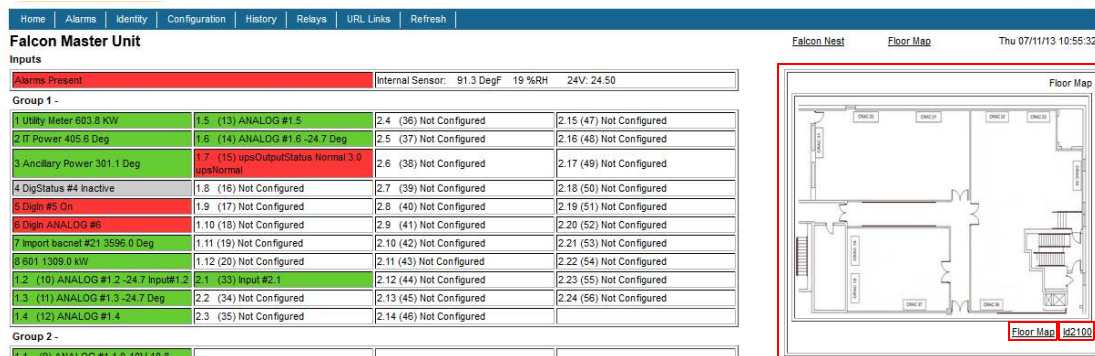
Figure 3.20 URL Links (1-5) Configuration Page

The **URL Links (1-5)** page allows users to specify which images and URLs will be available from the first five of these links. The **URL Links (6-10)** page allows users to specify which images and URLs will be available from the last five of these links.
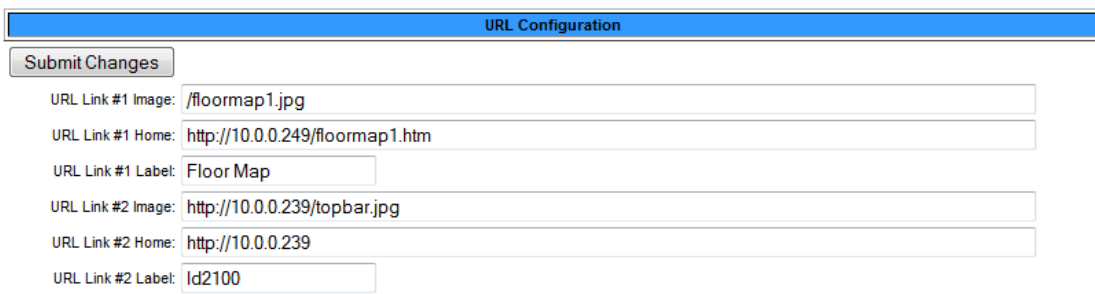
Figure 3.21 URL Links (1-5) and (6-10) Configuration Page
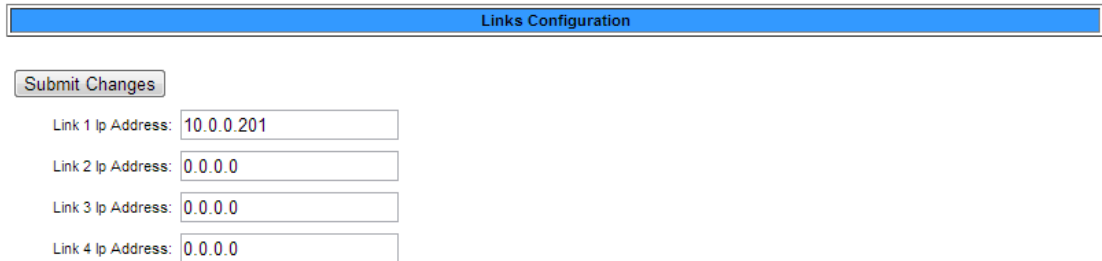
Option	Description
URL Link # Image	Enter the URL of the image you'd like to display. For Axis207 Web Cameras set the URL link image to: http://*insert camera's IP here*/jpg/image.jpg For Panasonic KX-HCM110A Web Cameras, set the URL link image to: http://*insert camera's IP here*snapshotjpeg?resolution=320x240&quality=standard
URL Link # Home	The URL Link # Image itself will become a clickable link. When you click on the image, the URL you put in this box will pop up in a smaller separate window. For Axis207 Web Cameras set the URL link home to: http://*insert camera's IP here* For Panasonic KX-HCM110A Web Cameras, set the URL link home to: http://*insert camera's IP here*/ImageViewer?Mode=Motion&resolution=320x240&quality=standard
URL Link # Label	The text that appears as a link under the main URL link image on the home page.

Table 3.12 URL Links (1-5) and (6-10) Configuration Options

3.4.11 Links

Most users will choose to link to other FMS units through the FMS's Nest/Egg feature - "Nest/Egg" on page 71. If you choose not to enable Nest/Egg, you can still display links to up to four FMS units. Once configured, these links will appear at the bottom of the FMS's home page. Use this page to designate the IP addresses of these linked FMS units.

Enter the IP addresses in the fields as necessary. Click the **Submit Changes** button to save your edits.

Figure 3.22 Links Configuration Page

3.4.12 Nest/Egg

The FMS contains a web page, or "Nest," that can monitor up to 32 other FMSs, or "Eggs." The Nest will display the name and a summary alarm from each Egg. The summary alarm status of each Egg will automatically refresh based on the Web refresh rate determined for that individual FMS.

The Nest also provides a link for each Egg. When an alarm occurs, the summary alarm box turns red and the operator can select the link to open the alarming FMS web page to view the alarm.

Once configured, a "Nest Map" link appears at the top of the Main Menu. Clicking the "Nest Map" link opens either an image (we've loaded a map of the U.S.) or the Nest page where all configured Eggs are displayed. The Nest Map link will turn red if an egg is in an alarm state.

Advanced functionality also allows users to configure a "Nest of Nests." This means one FMS can monitor a Nest, which - instead of having Eggs inside it - has links to other Nests inside it. If you'd like to monitor a complex environment with a Nest of Nests, contact RLE.

Figure 3.23 Nest/Egg Configuration Page

3.4.12.1 Nest Map Configuration

The **Nest Map** link appears at top right corner of the Home Page once the Nest and Eggs have been configured. The Nest can display either as a table or a map, with the Eggs appearing as links on the map. The nest map is created in much the same way as the FMS floor map, and the instructions are very similar. Basic mapping directions can be found below. For more detailed mapping instructions, refer to .

Figure 3.24 Nest/Egg Configuration Page

Option	Description
Nest Type	Select IFrames to display the eggs in a table. Select Map Image to display the eggs on a map.
Home Nest Map Link	When you click on a link to an FMS Egg, you can either go to that Egg's home page or to the floor map of that FMS Egg. Select the appropriate option here.
Egg Login	Egg devices will be connected to this nest, and these devices may ask for a login. Decide if the user should be required to supply a login to view the map of a device connected to this nest as an egg. Referred - Nologin: If the user gets to the egg device from a referral link, they will not be required to login. Always login: users will always be required to log into the egg device Default: Referred - Nologin
Nest Refresh Rate	Determine how often you'd like the Nest view to refresh. Default: 30 seconds
Egg Refresh Rate	Decide how often you'd like the Egg view to refresh. Default: 30 seconds

Table 3.13 Nest/Egg Configuration Options

FMS User Guide

Option	Description
Nest/Map Coordinate	This coordinate represents the spot on the map where the Nest is located. Specify the point by clicking the Graphical Mapping link and designating the location. Fine tune it, if you wish, by adjusting the coordinate values in the boxes.
Graphical Mapping	Designate a location on the FMS graphical map.
Test Map	View the mapped location of the nest.
Nest/Egg Map Offline Timeout	If an Egg quits communicating, its icon on the Nest map will turn orange to indicate its offline status. Use this feature to set an amount of time that the Egg must be offline before the Nest reports a problem. If you'd like the FMS to wait a set amount of time before indicating an Egg as offline, set that amount of time here.
Enable Mouseover Labels	If you'd like labels to appear when you mouseover mapped points, select Yes.
Delete Nest Image Button	Delete the currently uploaded nest map image from the FMS memory.
Nest Image Upload Box	Click the browse button to designate the map image (saved on your computer) you wish to upload. The image must be a .jpg, .png, or .gif file, no more than 500kb. Click the Upload button to upload the file. Once uploaded, the file name appears just above the upload box.

Table 3.13 Nest/Egg Configuration Options

3.4.12.2 Egg Configuration

Once you've decided how your nest should work, it's time to configure your eggs. The table at the bottom of the Nest/Egg Configuration screen shows all available eggs, and the number in the "Egg" column is a link that takes you to the configuration screen for that particular egg.
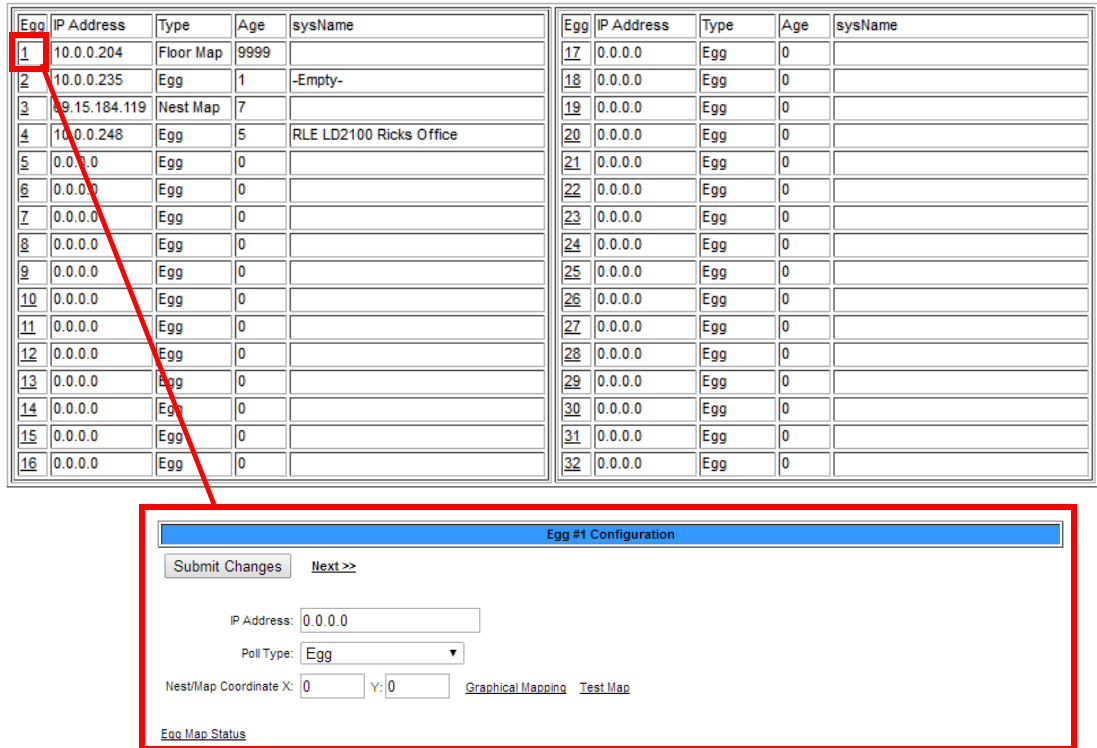
Figure 3.25 Egg Configuration Page

Option	Description
<<Prev and Next>> Links	Click this link to configure the previous and next eggs in the list.
IP Address	Enter the IP address of the device assigned to this egg.
Poll Type	Egg: If your Egg is a non-FMS product, select this option. FMS Nest Map Link & FMS Floor Map Link: If your Egg is an FMS, you can choose to link either to the floor map on that FMS or to the nest map on that FMS. This nest map feature allows you to jump from one nest to another, viewing a nest of nests. Default: Egg

Table 3.14 Egg Configuration Options

Option	Description
Nest/Map Coordinate	This coordinate represents the spot on the map where the Egg is located. Specify the point by clicking the Graphical Mapping link and designating the location. Fine tune it, if you wish, by adjusting the coordinate values in the boxes.
Egg Map Status	Displays more detailed Egg information, in a text format. This information can be particularly helpful if the Nest experiences a communications problem with the Egg - access this page to help diagnose the problem.

Table 3.14 Egg Configuration Options

3.4.13 Modem/Phone Numbers/Pagers

Use this page to instruct the FMS when, how, and whom to call when an alarm occurs

The top of this configuration page allows users to configure the FMS internal modem.

The section of the page below the ruled line allows users to configure phone numbers can be notified when the FMS goes into alarm condition.

Figure 3.26 Modem/Phone Numbers/Pagers Configuration Page

Option	Description
Initialization String	A maximum of 38 characters. **&c1 and &d3 are mandatory**. **s0=1** sets the modem to answer after one ring. **s0=0** disables the auto answer and prevents dial-in access. Default: at&c1&d3s0=1
Dial Prefix	Should be a specific Hayes compatible command or dial modifier depending on pager requirements. It is also limited to 38 characters. Default: atdt
Pager Deliveries	Designates the number of times (0-255) the pager is called until the alarm is acknowledged. Pagers are called in sequence. *Example:* If Pager Deliveries is set to 3 and pagers 1, 7, and 10 are programmed to be notified, the FMS dials 1, 7, 10, 1, 7, 10, 1, 7, 10. As soon as the alarm is acknowledged, the FMS quits dialing the pagers with that particular access code. Pagers with different access codes are still dialed.
Pager Interval	Determines the number of minutes to wait between redials.

Table 3.15 Modem/Phone Numbers/Pagers Configuration Options

Option	Description
Pager Baud Rate	Allows users to determine the connection speed. Select 300, 1200, 2400, 9600, or 33.6k. Default: 1200
Pager Bits/Parity	Allows the user to set the pager communications settings. Select 7 bit, even parity or 8 bit, no parity to match the settings of the pager service provider's TAP service phone number.
Pager Resend	Yes: When the FMS sends an alarm notification, it will send all unacknowledged alarms in the Alarm History Menu. No: When the FMS sends an alarm notification, it will send only the last unacknowledged alarm. The FMS will also auto-acknowledge all alarms associated with that particular pager once a successful page has occurred. Default: No
Modem Password	Defines a remote access password, seven characters maximum. The password is used when remotely logging into the FMS through a modem.
Redial Attempts	Determines the number of times (1–255) to call a number until the call is successful. Enter 0 to disable this function.
Redial Interval	Establishes the number of minutes (1—255) to wait between redials. Enter 0 to disable this function.
Force Alarm Acknowledge Code	Establishes a code that acknowledges all unacknowledged alarms. This acts as a master code and can override all other alarm acknowledge codes. Default: None (left blank)
Pager Message Strip Timestamp	Check to remove the alarm timestamp from the pager message. This reduces the size of the pager message as the user can estimate when the alarm occurred based on when the page was received. Default: unchecked

Table 3.15 Modem/Phone Numbers/Pagers Configuration Options

3.4.13.1 Configure Phone Numbers

Up to 15 unique phone numbers can be configured to receive FMS alarm notifications. Use the numerical links at the bottom of the phone number configuration screen to set these pager and cell phone numbers.

Figure 3.27 Phone Number Configuration

Option	Description
Select Phone Type	Determines which type of device the FMS calls. • Choose the Alpha-numeric Pager/Cell Phone option to dial an alphanumeric pager or cell phone. • Choose SMS/TEXT/GSM if using a GSM modem that is connected to the FMS COM1 EIA-232 port. • Choose SNPP for paging over Ethernet - this is a feature some cell/pager providers do not support.
TAP Number/SNPP Server	Enter the pager service number for alphanumeric pager or cell phone entries. If using the SMS/TEXT/GSM, enter the cell phone number to dial. Each comma after the number represents a two second delay. This delay allows time for the service to answer before requesting the pager ID. *Typically, it will only be necessary to use one comma between pager numbers.* However, based on set-up and pager services, users may need to experiment with the number of commas that are used. In some cases, a 9 must be entered to access an outside line.

Table 3.16 Phone Number Configuration Options

Option	Description
Pager ID	This is mandatory for numeric and alphanumeric pagers.
	Alphanumeric pager: The ID entered is sent to the paging service along with all queued alarm messages. The ID is the unique PIN for a specific pager. The ID may be a maximum of 16 characters.
	Numeric pager: The ID entered may be configured to deliver different numeric messages. The ID can contain 15 characters: any combination of the numerals 0 through 9 and a * or #. These are the only characters that will be transmitted to the paging service. A $ can be added or inserted anywhere in the message. This is converted into a 5 digit alarm code: YZZZZ.
	• **Y** - Binary Alarm Condition: 1=on, 0=return to normal (RTN)
	• **ZZZZ** - Alarm ID Number; see the Appendix E, "Alarm ID Reference Tables" on page 199.
	• *Example:* A **10011** message is an Input 1, High Limit 1 Alarm. A **04030** message means that Digital Input #83 (in slot 4) has Returned to Normal.
	NOTE: When using the $, if multiple unacknowledged alarms are present in the Alarm History Log, the alarm code will be 99999.
	An effective numeric page depends largely on the parameters established by the paging service. Users may need to experiment with different parameters in order to achieve desired results.
Acknowledge Code	Designate a number, up to six digits, used to acknowledge receipt of alarms and to terminate any additional call outs for this specific phone number. This code will acknowledge only those alarms sent to this phone number.
	The Acknowledge Code should be different than the access codes. If this code is the same as one of the access codes, the Falcon will acknowledge the alarms associated with the acknowledge code, enter a successful entry in the Access Log, and activate the relay outputs which are set for keypad activation.
	To use this code, dial the FMS with a touch tone phone and enter this code followed by the # sign.
	Multiple phone numbers can use the same acknowledge code. This allows one user to acknowledge alarms sent to multiple pager numbers.
Dial Back on Returns	Determines whether to call the number again once the alarm condition returns to normal.

Table 3.16 Phone Number Configuration Options

3.4.13.2 Configure Phone Number 16 (PPP)

If you're configuring a dial-up networking (DUN) account, use the 16 (PPP) link at the end of the phone number configuration links.

Figure 3.28 Phone Number 16 (PPP) Configuration

Option	Description
DUN Phone #	Enter the phone number of the Internet Service Provider (ISP) to connect to.
DUN User Name	Enter your Internet Service Provider (ISP) account user name.
DUN Password	Enter the password associated with the Internet Service Provider (ISP) account.

Table 3.17 Phone Number 16 (PPP) Configuration Options

3.4.14 Keypad/DTMF Access Users

If your FMS has a keypad attached to it, use the **Keypad/DTMF Access Users** link to configure a maximum of 20 access codes and user names.

Figure 3.29 Keypad/DTMF Access Users Configuration

Option	Description
Id Code	Up to six digits long, users enter this code into the keypad to gain access.
User Name	Enter a user name that will be linked to the access code. The user name can be up to 20 characters long.
Type	Permanent - The code is active for an unlimited amount of time. Temporary - This code is only active during the parameters specified in the Temporary Time Settings.
Temporary Time Setting	Access codes designated as temporary are only active during this specific window of time, which is established near the bottom of the Keypad Configuration Page. Configure the appropriate span of time and click the Set Temporary Time button to activate the settings. The amount of time remaining in the temporary window displays on the countdown clock. Once the time frame has expired, the temporary users will not be allowed access. However, their information will remain in the Keypad/DTMF field until it is manually removed. While temporary users will not be allowed access to a facility after their allotted time slot, no alarm notification will be transmitted if they try to re-enter the facility through the keypad. Their information must be manually removed from the system in order to activate the alarm notification.

Table 3.18 Keypad/DTMF Access Users Configuration Options

3.4.15 Internet Protocol

The **Internet Protocol** link allows users to change a variety of settings, including the FMS IP address, Default Router and Net Mask.

IP Configuration
Warning: Changing these parameters will cause the network interface to operate differently, only change parameters if you are sure the changes are correct.

Submit Changes

MAC Address: 00:90:5B:FE:FA:FB

DHCP: ○ Enabled ● Disabled
Dhcp Server: 0.0.0.0
Last Update:
Renewal time: 0
Rebinding time: 0
IP address lease time: 0
Current lease timer: 0:00:00

IP Address: 10.0.0.249
Net Mask: 255.255.255.0
Def Route: 10.0.0.1
Http Port: 0   (Default 0 = 80)
TFTP Server Enable: ● Yes ○ No   (udp port 69)
TCP Max Seg Size: ● 1436 ○ 536
PPP Server: 0.0.0.0
PPP Assignment: 0.0.0.0

Figure 3.30 IP Configuration Menu

Option	Description
MAC Address	The MAC address is a unique identifier set by the manufacturer, and is non-editable.
DHCP	DHCP allows the FMS to automatically obtain a valid IP address from a server. If you choose to use DHCP, enable it here.
IP Address	The FMS is shipped with a default IP address of 10.0.0.188. Contact your IT department for an appropriate IP address, if you wish to change this field. Default: 10.0.0.188
Net Mask	The FMS is shipped with a default Subnet Mask of 255.255.255.0. Contact your IT department for an appropriate Subnet Mask, if you wish to change this field. Default: 255.255.255.0
Def Route	The FMS is shipped with a default Gateway Route of 10.0.0.1. Contact your IT department for an appropriate Gateway Route, if you wish to change this field. Default: 10.0.0.1

Table 3.19 IP Configuration Options

Option	Description
Http Port	Some ISPs use alternate http ports as an added security measure. Edit this field in accordance with your ISPs security settings. By default, the FMS broadcasts its web pages on Port: 80 of the assigned IP Address. A zero in the field defaults the FMS to Port: 80. Default: 0 = Port 80
TFTP Server Enable (udp port 69)	This setting opens or closes Port 69 on the LAN connection to the FMS. This TFTP port is used to upgrade firmware and save and load configurations. It can be disabled for security reasons and only opened for short periods of time during firmware upgrades. See Chapter 8, "Load Firmware and Configuration Data" on page 171 for more information.
TCP Max Seg Size	This adjusts the size of the web page packets being broadcast. Default size is set to 1436, you may need to set it to 536 for VPN access or satellite uplink networks. Default: 1436
PPP Server	This option sets the IP Address of the FMS network connection when accessing the FMS via its internal modem. This is required to allow a remote PC to view the FMS web pages over a dial-up connection; see Chapter 7, "Point-to-Point Protocol" on page 169, for more information.
PPP Assignment	Use this feature to set the IP Address of the remote PC's network connection when accessing the FMS via its internal modem. This is required to allow a remote PC to view the FMS web pages over a dial- up connection. The remote PC's dial-up settings should be set to "Obtain an IP Address Automatically."

Table 3.19 IP Configuration Options

3.4.16 User Administration (Web Access)

The **User Administration (Web Access)** page allows the administrator to configure eight separate accounts, user names, passwords and privileges for Web access accounts.

This page is ONLY available to users with Administrator access.

Figure 3.31 Web Access Configuration

Option	Description
User Name	Assign each user a unique name.
Password	If you wish, assign the user name a password. You can leave this field blank. If you do, users can access the FMS using this ID and no password, so be careful not to assign advances privileges to an ID without a password.

Table 3.20 Web Access Configuration Options

Option	Description
Privilege	• **Administrator** privileges allow the user to have full read-write access to all pages including this User Administration (Web Access) page. • **Read-Write** privileges allow the user to have full read-write access to all pages **except** this User Administration (Web Access) page. • **Read-Only** A Read-Only user cannot change any settings. They can view the Main Menu, Keypad Access History, Alarm History, Event History, Digital Data History, Identity, Relay Status, Relay Control and URL Links web pages. The Configuration pages cannot be viewed or changed by a Read-Only user. A Read-Only user can acknowledge alarms by entering their acknowledge code at the bottom of the Alarm History page.
Last Web Access	This static field displays the last time each user ID accessed the FMS web interface.

RADIUS/LDAP Configuration - If you are utilizing SNMPv3, you can use this link to configure RADIUS and LDAP web authentication.

Table 3.20 Web Access Configuration Options

Option	Description
Authentication	Use the drop down menu to select either RADIUS or LDAP authentication.
Server IP Address	Enter the IP address of the RADIUS or LDAP server.
RADIUS Secret	Enter the RADIUS secret. The secret is used between the RADIUS client and the RADIUS server to encrypt passwords. The secret is administered by the server and must be known by the client.
LDAP Binding	Binding is locked as Anonymous. This field is uneditable.
LDAP Authorization	Designate whether LDAP users will have read only or read/write access.
LDAP baseObject	Enter the LDAP baseObject as defined by the LDAP server.
LDAP Filter	Enter an LDAP filter for the username. Default: uid
LDAP Attribute	Enter an LDAP attribute for the user password. Default: userPassword
User Log	The user log displays the last eight logins. Each user password is cached for one hour.
Delete User Cache Button	Press this button to clear the user cache and clear any cached user passwords.
Username/Ldap Filter	Enter the RADIUS username or LDAP filter.
Radius Password	Enter the RADIUS password.
Server Test Button	Click the button to test the usernames and passwords.
Last Server Test Results	The results from the server and the authorization level will be displayed.
Dictionary Entry	Some RADIUS servers will need modified files to support the FMS. The RADIUS server will need to have a dictionary entry added for RLE. RADIUS uses the vendor's SNMP enterprise number as the vendor ID. The RLE entry can be cut and pasted from the RADIUS configuration page.
User Files	Some RADIUS servers will need modified files to support the FMS. The RADIUS server will need to have the users file to contain the user names, passwords, and service type (authorization levels). Two other RADIUS server files contain generic configuration data. The users.conf file may contain some default passwords, and the cliens.conf file may specify one secret for a network of clients.
Web User Configuration Options	
Emstp Password	An emstp password is configured on the Email/DNS Configuration page. If you forget that password, it is revealed in this field.

Table 3.20 Web Access Configuration Options

Option	Description
Web Page Logo Images	The web page logos are the two images that appear above the upper blue menu bar, on the left and right corners of the screen. Logo images must be .jpg images, and must each be less than 64KB. If you make the images much larger than the standard RLE images, your web interface page views may not fit within the expected areas - large images at the top of the screen will bump the rest of the content down lower on the screen, which means you may need to scroll down to view all the web page content. Five options are available on the Web Page Logo Image dropdown menu: • Factory/RLE - Puts the Falcon logo in the Image #1 location and the RLE logo in the Image #2 location. • Disabled - No logos appear above the blue menu bar. • Custom - Uses graphics you upload in the Image #1 and Image #2 locations. • OEM - PTI - Employs custom PTI graphics. • OEM - Employs custom DC Group graphics. If you change the option in the Web Page Logo Image dropdown, be sure to click the Submit Logo Changes button. Default: Factory/RLE
User Image Logos	If you choose to use Custom images, you'll need to upload two images. Do this in the fields below the horizontal rules on the page. Use the Browse button to locate the appropriate image on your computer. Click the Upload button when you're ready to upload the image. Note that there are two separate upload fields. If you're uploading two images, you'll need upload one image into each location. If you already have images uploaded to the FMS, the names and sizes of the images will appear above the image upload boxes. If you would like to delete an uploaded image, use the corresponding Delete Image Logo button.

Table 3.20 Web Access Configuration Options

3.4.17 Network Statistics

This page displays network and EIA-485 statistics including: network packets received, packets transmitted, and errors.

```
Netstats for Mac: 00:90:5B:04:03:28 IP: 10.0.0.204

ints:        5511      inpackets:   5494      processed:   5495
refused:     0         arp:         1866      ip:          3593
tx sent:     1958      tx refused:  0         tcp retries: 0
tcp_timeouts:7

RMON_T_DROP         = 0          RMON_T_PACKETS      = 1958
RMON_T_BC_PKT       = 8          RMON_T_MC_PKT       = 0
RMON_T_CRC_ALIGN    = 0          RMON_T_UNDERSIZE    = 0
RMON_T_FRAG         = 0          RMON_T_JAB          = 0
RMON_T_COL          = 0          RMON_T_P64          = 457
RMON_T_P65TO127     = 1179       RMON_T_P128TO255    = 18
RMON_T_P256TO511    = 16         RMON_T_P512TO1023   = 288
RMON_T_P1024TO2047  = 0          RMON_T_P_GTE2048    = 0
RMON_T_OCTETS       = 291293     IEEE_T_DROP         = 0
IEEE_T_FRAME_OK     = 0          IEEE_T_1COL         = 0
IEEE_T_MCOL         = 0          IEEE_T_DEF          = 0
IEEE_T_LCOL         = 0          IEEE_T_EXCOL        = 0
IEEE_T_MACERR       = 0          IEEE_T_MACERR       = 0
IEEE_T_CSERR        = 1958       IEEE_T_SQE          = 0
IEEE_T_FDXFC        = 0          IEEE_T_OCTETS_OK    = 291293
RMON_R_PACKETS      = 6373       RMON_R_BC_PKT       = 2681
RMON_R_CRC_ALIGN    = 0          RMON_R_UNDERSIZE    = 0
RMON_R_OVERSIZE     = 0          RMON_R_FRAG         = 0
RMON_R_JAB          = 0          RMON_R_RESVD_0      = 0
RMON_R_P64          = 3458       RMON_R_P64          = 3458
RMON_R_P65TO127     = 1707       RMON_R_P128TO255    = 77
RMON_R_P256TO511    = 1106       RMON_R_512TO1023    = 25
RMON_R_P_GTE2048    = 0          RMON_R_1024TO2047   = 0
RMON_R_OCTETS       = 768595     IEEE_R_DROP         = 0
IEEE_R_FRAME_OK     = 5518       IEEE_R_CRC          = 0
IEEE_R_ALIGN        = 0          IEEE_R_MACERR       = 0
IEEE_R_FDXFC        = 0          IEEE_R_OCTETS_OK    = 500996
```

Refresh netstats page

Figure 3.32 Network Statistics Page

Option	Description
Refresh Netstats Page	Click the link to poll the device and load the most recent set of statistics.
Reset Netstats	Delete all logged information for the network statistics.
Return to Configuration	Click this link to return to the FMS Configuration menu.

Table 3.21 Network Statistics Options

3.4.18 ICMP Ping

ICMP Ping: Allows a user to ping an IP address from the FMS. The results of the ping will display below in the "Last Ping Results" table.

Figure 3.33 ICMP Ping Page

Option	Description
IP Address to Ping	Enter the IP address of the device you'd like to ping. Click the Submit Changes button to ping the device, at which time the results will load into the fields below the address.

Table 3.22 ICMP Ping Options

3.4.19 Email/DNS

Use the **Email/DNS** page to configure the FMS to send email notifications when inputs are in an alarm state. The FMS sends one email message per alarm instance to a maximum of eight email recipients.

E-Mail Configuration
Submit Changes

Access Type: ○ None ● LAN ○ PPP
Primary DNS Server: 10.0.0.10
Secondary DNS Server: 0.0.0.0
Alternate Smtp Port: 0   (0 = Use default port 25)
Mail (SMTP) Server: smtp.bizmail.yahoo.com
Mail Sender Address: support@rletech.com
Mail Subject: FMS ALARM @204
Mail Recipient (1): 9705551212@vtext.com   Alarm Acknowledge Code:
Mail Recipient (2):   Alarm Acknowledge Code:
Mail Recipient (3):   Alarm Acknowledge Code:
Mail Recipient (4):   Alarm Acknowledge Code:
Mail Recipient (5):   Alarm Acknowledge Code:
Mail Recipient (6):   Alarm Acknowledge Code:
Mail Recipient (7):   Alarm Acknowledge Code:
Mail Recipient (8):   Alarm Acknowledge Code:

Email Message Strip TimeStamp: ☐   Append Falcon link to message: ☐   Append Falcon password to link: ☐
Email Interval: ● 30 ○ 10 (Seconds)
Smtp Authentication: ○ None ● Plain ○ Login (Do not enable this unless instructed by your ISP or IT dept!)
Smtp Username: support@rletech.com   Smtp Password: ********

Alarm History Entries: 256 Emails sent: 6 Emails unsent: 0

Mail Server DNS address logged for: "smtp.bizmail.yahoo.com" 68.142.200.11
Mail Server Dns TTL: 291
Ntp Server DNS address logged for: "us.pool.org" 64.99.80.30
Ntp Server Dns TTL: 9

View Smtp Log

Figure 3.34 Email/DNS Configuration Page

Option	Description
Access Type	Select None to disable the email feature. Select LAN to send alerts through a local network connection. Select PPP to send alerts over a PPP dial-up connection. Default: LAN
Primary DNS Server	Enter the IP address for the primary DNS server, as provided by your internet service provider. Default: 0.0.0.0

Table 3.23 Email/DNS Configuration Options

Option	Description
Secondary DNS Server	Enter the IP address for the secondary DNS server, as provided by your internet service provider. Default: 0.0.0.0
Alternate SMTP Port	Some ISPs use alternate SMTP ports as an added security measure. Edit this field in accordance with your ISPs security settings. By default, the FMS uses Port: 25. A zero in this field defaults the FMS to Port: 25. Default: 0 = Port 25
Mail (SMTP) Server	Enter the URL of your SMTP mail server.
Mail Sender Address	This is the email address assigned to the FMS. This address displayed in the "From" field of the email message.
Mail Subject	This is the text that appears in the subject field of the email messages. Adding &m in this field inserts the MAC Address of the FMS into the email subject line.
Mail Recipient (1)– Mail Recipient (8)	Alerts can be sent to eight recipients. Enter up to eight unique email addresses.
Alarm Acknowledge Code (per recipient)	Each email address can be assigned a unique alarm acknowledgement code. If you wish, assign those codes here.
Email Message Strip TimeStamp	Check this box if you'd like to have the time stamp that tells when an alarm condition occurred stripped from email alert messages.
Append Falcon link to message	Select this message to insert a link to the FMS in each alarm message.
Append Falcon password to link	If you check this box, a temporary password will be added to email alert messages. This password will allow users only to access the FMS's home page and the History tab at the top of the page.
Email Interval	The amount of time that lapses between email alerts.
SMTP Authentication	Used for ESMTP. Use the default setting unless instructed differently by your IT Department.
SMTP User Name	Used for ESMTP. Use the default setting unless instructed differently by your IT Department.
SMTP Password	Used for ESMTP. Use the default setting unless instructed differently by your IT Department.
Email Heartbeat	If you enable this feature, the FMS will send a message to recipients once a day to confirm the unit's functionality.
Email Heartbeat Time	If you enable the email heartbeat feature, designate at which time of day you'd like the message to be sent.

Table 3.23 Email/DNS Configuration Options
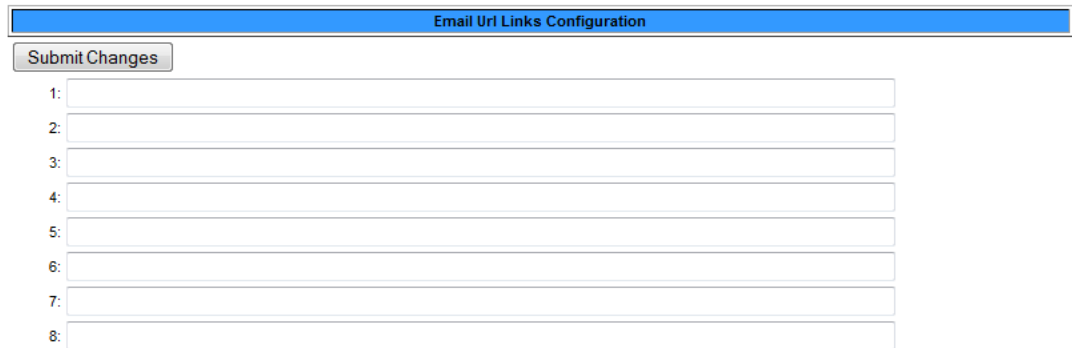
Option	Description
Email Heartbeat Recipient Notification	Check the boxes to designate which recipients should receive the FMS email heartbeat message.
View SMTP Log	Use this link to view a log of the messages sent from the FMS.
Send Test Email	If you've added new email recipients or are troubleshooting your email setup, you may need to test your email communications. The "Send Test Email" link on the View SMTP Log page will send a test email message to all configured recipients.

Table 3.23 Email/DNS Configuration Options

3.4.20 Email URL Links

This page allows users to configure up to eight URL links that are sent out with email notifications. Use these links to direct email recipients to web sites, online documentation, user guides, maintenance procedures, etc.

After you enter the URLs here, you'll need to go to the configuration page for the individual inputs and specify which email links will be distributed with which email alarm messages. The "Email Url Link" field is located at the bottom of each input's individual configuration page.

Figure 3.35 Email URL Links Configuration Page

3.4.21 Network Time Protocol

NTP, or Network Time Protocol, is used to synchronize clocks of computer systems. NTP synchronizes the time of a computer or device (the FMS) with another computer or referenced time source. NTP maintains a high level of accuracy and reliability in time stamped events.

Figure 3.36 Network Time Protocol Configuration Page

Option	Description
NTP Server	The IP address or hostname of the NTP server with which your FMS will synchronize. Public NTP servers include us.pool.ntp.org and time.nist.gov Default: blank
Update Interval	Designate how often you'd like the FMS to access and synchronize with the NTP server. This is a number of minutes, from 5-1440. Enter 0 to disable this feature. Default: 0 (disabled)
Select Time Zone	Select the time zone in which this particular FMS resides.
Daylight Savings Time	Enable or disable Daylight Savings Time and designate at which time DST goes into effect in your time zone. Default: Disabled
DST Begin Date	Set the day DST begins at your location. Default: Second Sunday - March
DST End Date	Set the day DST ends at your location. Default: First Sunday - November

Table 3.24 Network Time Protocol Options

3.4.22 SNMP/Syslog

Use this page to configure SNMP and Syslog notification options.

	SNMP/Syslog Configuration			
Submit Changes				
	MIB-2 System			
System Name:	FMS Ricks Office			
System Contact:	Uninitialized			
System Location:	Uninitialized			
	V1/V2C Community Names			
Get/Read:	rletech	(Leave empty to disable V1/V2 access)		
Set/Write:	rletech	(Leave empty to disable V1/V2 access)		
Trap:	rletech			
	Traps			
Select Snmp Trap Type:	V1-Trap ▼	Input Trap Delivery:	◉ LAN ○ PPP	
Trap Type:	○ AlarmEntryAdded ◉ PortTraps			
Analog Trap varbinds:	◉ Value/UOM/Label ○ Label Only	Trap Severity Varbind:	○ No ◉ Yes	
Persistent Trap/Inform Interval:	0 (1-999) Minutes (0=Send Once)	Configuration Changed Trap Community:	0 (1-4, 0=Disabled)	
Syslog Facility:	Local0 ▼			

	Trap Destinations			
#	IP Address		TrapEnable	Syslog Message
1	10.0.0.232		☑	☐
2	10.0.0.231		☑	☐
3	0.0.0.0		☐	☐
4	0.0.0.0		☐	☐

	SnmpV3			
Engine ID: 80000C700300905B040951	Context Name:		V3 Trap User (1-4): 1	
#	User Name	Access Mode	Auth-Password (8-24 chars)	Priv-Password (8-24 chars)	RW Access
1	fred	No-Auth ▼			○ Read-only ◉ Read/Write
2	barney	Auth-MD5 ▼	betty123		○ Read-only ◉ Read/Write
3	pebbles	PrivAuth-MD5 ▼	dino1234	bambam12	○ Read-only ◉ Read/Write
4		No-Auth ▼			○ Read-only ◉ Read/Write

unsupportedSecurityLevel:0 / notInTimeWindow:0 / unknownUserName:0
unknownEngineID:0 / wrongDigest:0 / decryptionError:0

Figure 3.37 SNMP Configuration Page

Option	Description
MIB-2 System Options	
System Name	Designate a unique name for this FMS. This name appears on the FMS Main Menu and is included as part of email and pager notifications. The System Name can also be viewed and changed in the System Configuration Menu.
System Contact	This is the individual responsible for the FMS. This system contact identifier is only available through SNMP Gets and is not included in email, pager, or SNMP Trap notifications.

Table 3.25 SNMP Configuration Options

Option	Description
System Location	List the physical location of the FMS. It is used to help identify the FMS when viewing the web pages. The System Location is not included in email, pager, or SNMP Trap notifications.
V1/V2C Community Names	
Get/Read	Enter the appropriate community name.
Set/Write	Enter the appropriate community name.
Trap	Enter the appropriate community name.
Traps Options	
Select SNMP Trap Type	Select the SNMP version that best suits your needs; V1-Trap, V2C-Trap, V2C-Inform, V3-Trap, or V3-Inform.
Input Trap Delivery	Choose whether you'd prefer LAN or PPP (modem/dial-up).
Trap Type	AlarmEntryAdded: This setting simplifies configuration of the NMS, since the NMS only needs to be configured for a couple Traps. • An "AlarmEntryAdded" Trap will be sent anytime a new alarm is added to the Alarm History log. The "AlarmEntryAdded" Trap contains the Alarm Label. The NMS can receive this Trap and extract and display the Alarm Label. • An "AlarmEntryRemoved" Trap (also contains the Alarm Label) will be sent anytime a Return to Normal Alarm is added to the Alarm History log. falconPortTraps: This option requires more configuration at the NMS, but may make it easier to display, set severity, and parse the data in the NMS. This option enables two Traps per FMS input: • "FalconPortxxTrap" which is sent when an input goes into alarm • "FalconPortxxTrapClear" which is sent when the input returns to normal. Default: AlarmEntryAdded
Analog Trap Varbinds	This feature is used for communication to an NMS via SNMP Traps. The default adds the Value, UOM (Unit of Measure), and Label fields to the message. Label Only: Sends only the label on analog Traps. This makes analog Traps the same format as digital Traps, which may make parsing the Traps easier for the NMS. Default: Value/UOM/Label
Trap Severity Varbind	If the severity should be included in the trap, indicate that here.

Table 3.25 SNMP Configuration Options

Option	Description
Persistent Trap/ Inform Interval	This feature allows the FMS to issue continuous SNMP Traps until an alarm acknowledgment is received by the FMS or until the alarming point returns to normal. The SNMP Traps do not include any delivery verification. Traps can be acknowledged from the Alarm Management page. A Persistent Trap setting of 5 or 10 minutes will trigger the FMS to send the Trap on a regular interval in case the previous Trap did not reach the Network Management System (NMS). Typically, the NMS can be set to ignore duplicate Traps to prevent re-alarming at the NMS. This user-defined time interval is set in minutes. Enter 0 to send the message just once.
Configuration Changed Trap Community	If someone changes the FMS's configuration, it will send a trap to each of the four communities listed below. 0 disables this functionality. Default: 0 (disabled)
Syslog Facility	The severity is communicated to the Syslog server. A facility level is used to specify what type of program is logging the message.
Trap Destinations	
IP Address	The IP address of the server to the trap information to.
TrapEnable	Check this box to indicate that trap information should be sent to the specified server.
Syslog Message	Check this box to indicate that syslog messages should be sent to the specified server.
SnmpV3	
Engine ID	An uneditable field that lists the engine ID.
Context Name	Enter the alphanumeric name used for the SNMP v3 interface.
V3 Trap User (1-4)	Enter the number of the user you are creating or modifying.
#	An uneditable field used to designate individual users.
User Name	Enter a unique name for each user.
Access Mode	Choose from the following: No Authentication Authentication - MD5 Privacy Authentication - MD5 A user name is need for No Authentication, and a user name and password are required for Authentication and Privacy Authentication access.
Auth-Password	Enter the authentication password - the password must be between 8 and 24 characters long.

Table 3.25 SNMP Configuration Options

Option	Description
Priv-Password	Enter the privacy (encryption password - the password must be between 8 and 24 characters long.
RW Access	Designate whether the user has read only or read/write access.

Table 3.25 SNMP Configuration Options

3.4.23 BACnet

Use this page to allow a Building Management System (BMS) to poll the FMS inputs using the BACnet protocol over LAN connections. Options are at the top of the page; supported BACnet capabilities are at the bottom of the page. For further information, consult the BACnet standard or your IT department.

If you wish to configure your FMS as a BACnet master or slave, you must first configure BACnet communications on this page.

Figure 3.38 BACnet Configuration Pages

Option	Description
BACnet Device Name	Assign a name - up to 38 characters - to the unit for BACnet discovery and integration. This is the name of the FMS as it will appear on the BACnet network.
BACnet Device ID	Assign a unique identifier for this BACnet device, up to 30 characters.
BACnet Description	Add any additional details for the device, up to 38 characters.

Table 3.26 BACnet Configuration Options

Option	Description
BACnet UDP Port	This is the port to which the FMS will respond to BACnet requests. Enter a 0 to specify port 47808 (0xBAC0) as the UDP port. If another port is specified by your device, enter that value here. Default: 0
Register as Foreign Device IP	This is the IP address of the master device with which you're trying to communicate. Requires a BBMD for foreign device discovery.
Registration Time-to-Live	Time, in seconds, for foreign device discovery.

BACnet BBMD-BDT

BACnet BBMD information will usually not need to be edited from the FMS. If the FMS is acting as a BACnet router, these fields will automatically be populated by the BACnet network controller.

Option	Description
Falcon IP Address	An uneditable field, this is the IP address of the FMS you're currently logged into.
#1 - #4 IP Address **Port** **Mask** **BACnet Packet Log**	These fields are usually written TO by other devices, and not configured through these screens. If there is data in these fields, it means another device has communicated with this FMS via BACnet BBMD.

Table 3.26 BACnet Configuration Options

3.4.24 Modbus/SNMP/BACnet/Telnet Master

This section provides configuration information for basic Master unit functionality. If you'd like to configure more advanced features, refer to Chapter 4, "Advanced Communications - Modbus, BACnet, and Telnet" on page 133.

These pages allow users to configure Modbus, SNMP, BACnet, and Telnet features. While most functionality is detailed here, some advanced communications and logging options are described in greater detail in Chapter 4, "Advanced Communications - Modbus, BACnet, and Telnet" on page 133.

If you wish to configure the unit as a BACnet Master, BACnet communications must first be configured. Refer to section "BACnet" on page 99 for more information.

If you'd like to use the FMS's Telnet capabilities, refer to "Telnet/COM1 Configuration" on page 158.

Figure 3.39 Modbus/SNMP/BACnet/Telnet Master Configuration

Option	Description
Modbus/TCP Slave Enable	Use this option to enable the FMS as a Modbus Slave over Ethernet TCP/IP.
Modbus/TCP Slave Unit Identifier	Set the FMS Modbus/TCP Slave address (1-254). 0 = disabled.

Table 3.27 Modbus/SNMP/BACnet/Telnet Master Options

Option	Description
Serial Com 1 Protocol Type	Configures the Serial COM Port 1 (EIA-232 or EIA-485). Available options are: • **Modbus Master**: Enables the FMS to operate as a Modbus Master over Serial COM1. • **Modbus Slave**: Enables the FMS to operate as a Modbus Slave over Serial COM1. • **Telnet**: Allows the FMS to communicate via Serial COM Port 1. • **SMS/Text**: Enables the FMS to communicate to a SMS modem via Serial COM1.
Master Protocol Type	Configures the FMS Master Protocol type to be used, via Serial or TCP/IP. Select one of the following options: • **None**: Disables Modbus support. • **Modbus/SNMP/BACnet Master - 32 Units**: This is the most typical configuration for the FMS. Select this option when there is at least one Slave unit. This option can be configured to poll data from up to 32 Slave devices. • **Modbus Master BCM H663 - 4 Units**: Select this option when there are 1 to 4 BCMs (Branch Circuit Monitors) and no other Slave devices. This option enables web pages that are unique to the BCM allowing for easier setup. SNMP (Get, Set and Traps) is supported for the BCMs. • **Modbus Master BCM H663 - 16 Units**: Select this option when there are 5 to 16 BCMs (Branch Circuit Monitors) and no other Slave devices. This option enables web pages that are unique to the BCM allowing for easier setup. SNMP (Get, Set and Traps) is not supported for the BCMs. SNMP is still supported for the local I/O (Inputs 1 - 104). If SNMP is required for the BCMs, additional FMSs are required to allow a maximum of 4 BCMs per FMS.
Telnet Server	Use this option to enable or disable the telnet server.
Serial Baud Rate	This option sets the Serial COM Port 1 to 1200, 2400 or 9600 Baud. All the devices connected to the FMS Serial COM Port 1 must be set to operate at the same Baud rate.
Serial Interface Type	Enable the FMS Modbus to operate on the EIA-485 or EIA-232 COM Port 1.
Telnet Inactivity Timeout	After this many minutes of inactivity, the FMS will timeout of Telnet communication.
Modbus Serial Slave Address	This option sets the FMS Modbus Slave address for the Serial COM Port 1 - this field is required when the Serial Protocol is set to "Modbus Slave." Each Slave on the Modbus network must have a unique address.
Master Poll Timeout	This is the amount of time the FMS waits for a response from the Slave device before moving on to read the next register. It is adjustable from 1 to 10 seconds. The timeout is active only when the Serial Protocol is set to "Modbus Master Generic - 32 Units," "Modbus Master BCM H663 - 4 Units" or "Modbus Master BCM H663 - 16 Units." Default: 1 second

Table 3.27 Modbus/SNMP/BACnet/Telnet Master Options

Option	Description
Master Poll Interval	This is the amount of time between when a response is received from a Slave and when the FMS asks for the next register. This interval is adjustable from 250 to 9999ms.
	The interval is active only when the Serial Protocol is set to a Modbus Master option.
	The interval effects the overall scan rate. If the FMS is configured to read 60 Modbus variables and the poll interval is set to 1000ms (1second), each Modbus variable will be read approximately once per minute.
	Default: 250 mS
Master Retry Attempts	This value determines how many times the FMS will request the same register when there is no response from the Slave before moving on to read the next register. This value is adjustable from 1 to 99 seconds.
	Default: 1 second
Enable Virtual Slot #1-4	The number of available virtual slots varies from 1 to 4 depending on the FMS's physical configuration.
	Virtual slots can only be created if the slot is not occupied by a physical card. These virtual points can be used in conjunction with Modbus/SNMP registers to allow individual alarming, notification and relay activation per Modbus register.
BCM Zero Amp Level Alarm	Determines if the branch circuit current is zero (CB open or tripped). It is active when Serial Protocol is set to "Modbus Master BCM - 4 Units" or "Modbus Master BCM - 16 Units." This applies to all branch circuits in all the BCMs. Each branch circuit has a "Zero Amp" Enable to enable or disable the zero amp alarm. This setting is adjustable from 0 to 1 Amp.
BCM Status Display	Designates the how the BCM status is displayed.
Modbus Slave Register Display Log **Modbus Packet Log** **Modbus/Snmp Master Poll Data Log** **SMS/Text Modem Log** **BACnet Packet Log** **BACnet Master Data Log**	The FMS logs a wide variety of information that is available for trending and troubleshooting. Access the logged information as necessary. A more extensive explanation of these logs and the information found in them can be found in Chapter 4, "Advanced Communications - Modbus, BACnet, and Telnet" on page 133.
Reset Modbus Port	This link allows users to reset the Modbus port so that the contents of the polling registers will be cleared.

Table 3.27 Modbus/SNMP/BACnet/Telnet Master Options

3.4.25 Modbus/SNMP/BACnet Slave Units

This section provides configuration information for basic Slave unit functionality. If you'd like to configure more advanced features, including Modbus Register Configuration, refer to Chapter 4, "Advanced Communications - Modbus, BACnet, and Telnet" on page 133.

The Modbus/SNMP Slave Unit Configuration can only be configured after the Modbus/ SNMP/BACnet/Telnet Master has been set up; see "Modbus/SNMP/BACnet/Telnet Master" on page 101. Users must tell the FMS that they are using it for Modbus communications before users can configure the Modbus slave units.

The Slave Unit Configuration page will change depending on what type of Protocol users set it up for (i.e., Modbus/SNMP/BACnet Master - 32 Units, Modbus Master BCM H663 - 4 Units, or Modbus Master BCM H663 - 16 Units). This option is selected on the Modbus/SNMP/ BACnet/Telnet Communication page; see Figure 3.26 on page 76.

If you're configuring a Branch Circuit Monitor, refer to "Modbus/Slave Units Configuration – Modbus Master Branch Circuit Monitor– 4 or 16" on page 152.

If you'd like to

Most frequently, the FMS will be configured for Modbus/SNMP/BACnet Master - 32 Units, and the following page will display. Use this page to configure the information regarding the Modbus Slave devices from which the FMS will poll.

Modbus/Snmp/Bacnet (Slave) Unit Configuration				
Unit #	Protocol	Access	Address	Unit Description
1	Modbus	TCP/IP	23.24.146.57 Id:1	LD5200 Web Demo Modbus/Tcp
2	Bacnet/IP	UDP/IP	23.24.146.56	LD2100 - Bacnet
3	Snmp V1	UDP/IP	23.24.146.53	LD1500 Snmp
4	Modbus	Serial	1	Veris 8036
5	Modbus	TCP/IP	23.24.146.57 Id:1	UPS A
6	Modbus	TCP/IP	23.24.146.57 Id:1	UPS B
7	Modbus	Serial	2	TestUnit7
8	Snmp V1	UDP/IP	23.24.146.56	LD2100-Snmp
9	Modbus	TCP/IP	23.24.146.54 Id:2	Wi-MGR
10	Snmp V1	UDP/IP	0.0.0.0	(Blank)
11	Modbus	Serial	0	(Blank)
12	Modbus	Serial	0	(Blank)
13	Modbus	Serial	0	(Blank)
14	Modbus	Serial	0	(Blank)
15	Modbus	Serial	0	(Blank)
16	Modbus	Serial	0	(Blank)
Units 17-32			Poll RTT Modbus: 25.9 Secs / Snmp: 1.6 Secs	

Registers 1-100   Registers 201-300   Registers 401-500   Registers 601-700   Registers 801-900
Registers 101-200   Registers 301-400   Registers 501-600   Registers 701-800   Registers 901-1000
Read / Preset Modbus Register
Preset Configuration
Enumerated Labels Configuration

Figure 3.40 Modbus/Snmp/BACnet Slave Unit Configuration Page

The numbers in the Unit # column are links. Click the links to configure the individual slave devices.

Figure 3.41 Modbus/SNMP/BACnet Slave Configuration Page

Option	Description
Communications	Configure the FMS to send Modbus requests to a specific slave device over either a serial connection (EIA-232 or EIA-485) or over TCP/IP. This configuration can be different for each slave unit.
TCP/UDP/IP IP Address	Enter the IP address of the slave unit here.
Protocol	This option allows the FMS to send appropriate requests to each slave device. Refer to the documentation of the slave device for proper configuration. The FMS supports the following communications protocols: • Modbus Standard • Modbus Extended • JBus • SNMP V1 • SNMP V2 • BACnet/IP
BACnet Destination Network	If the device is on another network, specify the destination network here.

Table 3.28 Modbus/SNMP/BACnet Slave Configuration Options

Option	Description
RTU Station Address	Enter the address of the Modbus Slave device. Be sure this matches the address programmed on the particular Slave device. Enter a 0 to disable this functionality.
SNMP Community	Assign a community name to provide an added layer of security, and control access to the SNMP device.
Description	Enter a description for the Slave device.
Pager Alarms	Enter the Phone Number Configuration Entry ID for up to five pager numbers to which the FMS will send notification when any alarm for this Slave occurs. The Entry ID numbers correspond to phone numbers configured from the Configure Phone Number links at the bottom of the Modem Configuration page. Separate the ID numbers with commas. Enter zero to disable. The FMS will dial the lowest number listed regardless of the order the numbers are listed. *Example:* If the Alarm dial out string is set to "3, 5, 1, 0, 0," the FMS will dial Pager #1, Pager #3 and then Pager #5 when an alarm occurs.
Summary Relay	When any alarm is activated on the Modbus device, a designated relay can be tripped.
Web Page URL Link	When this feature is enabled, a link to the IP address of this slave device will appear on the slave unit's register status page within the FMS's web interface.
Map Coordinate	Adjust the numbers in the X and Y coordinate boxes to fine tune the location of this Slave unit on the FMS's graphical map. If you edit the values in the boxes, be sure to click the Submit Changes button at the top of the screen to save the new information If coordinates do not appear in these boxes, then the Slave unit has not yet been added to the Falcon's graphical map.
Graphical Mapping	To add the Slave device to the FMS's graphical map, click the Graphical Mapping link. A blue dot that represents this slave unit will appear on the upper left corner of the screen. Drag and drop the blue dot into the appropriate position. Click the Submit Changes link at the bottom of the map to save the unit's location. If you have further questions regarding Mapping, refer to 3.4.27, "Map (Facility Mapping)" on page 114.
Test Map	Click this link to view the mapped location of this Slave unit.
Email Recipient Notification	Check the recipient email addresses that require notification when any alarm occurs on this Slave. Email addresses are displayed once they are entered on the Email Configuration page.

Table 3.28 Modbus/SNMP/BACnet Slave Configuration Options
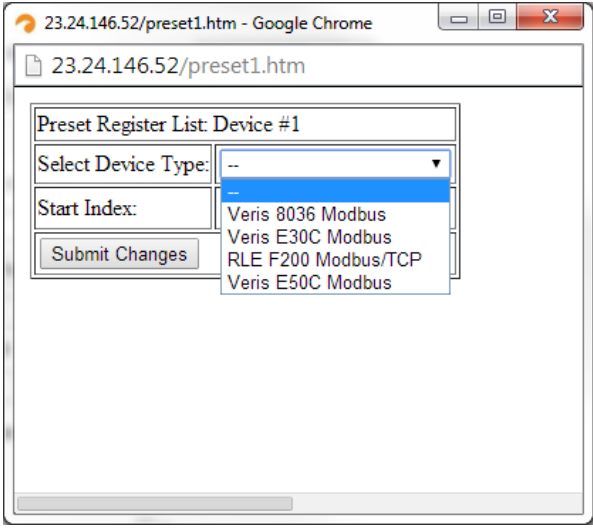
Option	Description
Preset Register Button	You can configure a button that will appear on this device's display page. The button will reset a specific register when it's clicked. This functionality is intended to be used for data that starts at a set point and continues to increase - like KWH - and not data that is a single readable value, like a temperature or humidity reading.
Register	This is the register number that will be reset when the button is pushed.
Data	This is the value that the register should be reset to.
Preset Register Button Text	Type the text that will appear on the button on the web page.
Return	Click this link to return to the previous page.
Download xml for this device	Click this link to download xml from this specific Slave device.
Upload xml for this device	Click this link to upload xml to this specific Slave device.
Preset Registers	If you're configuring a Veris 8036, a Veris E30C, a Veris E50C, or an F200, we've done some of the work for you. Click the Preset Registers button, select the appropriate device type, and enter the start index number. Click the Submit Changes button when you're done to populate the data. **Figure 3.42** Preset Registers Menu
Remove Device Registers	This button provides a quick way to delete one or multiple Modbus slave registers. If you click this button for a particular device, all related registers associated with this device will be deleted.

Table 3.28 Modbus/SNMP/BACnet Slave Configuration Options

3.4.26 PUE/DCiE/Summary/Average

PUE and DCiE calculations are valuable metrics used by data centers to track their energy efficiency. PUE measures the efficiency of the computing equipment, while DCiE measures the efficiency of the data center's infrastructure. Maximizing the energy efficiency of computing equipment and the data center infrastructure helps reduce energy costs and can minimize data center down time.

The FMS provides a set of tools that help track real-time PUE and DCiE information, as well as logging long-term PUE/DCiE trending information. A chart with PUE/DCiE information can be found on the lower right side of the FMS home page.
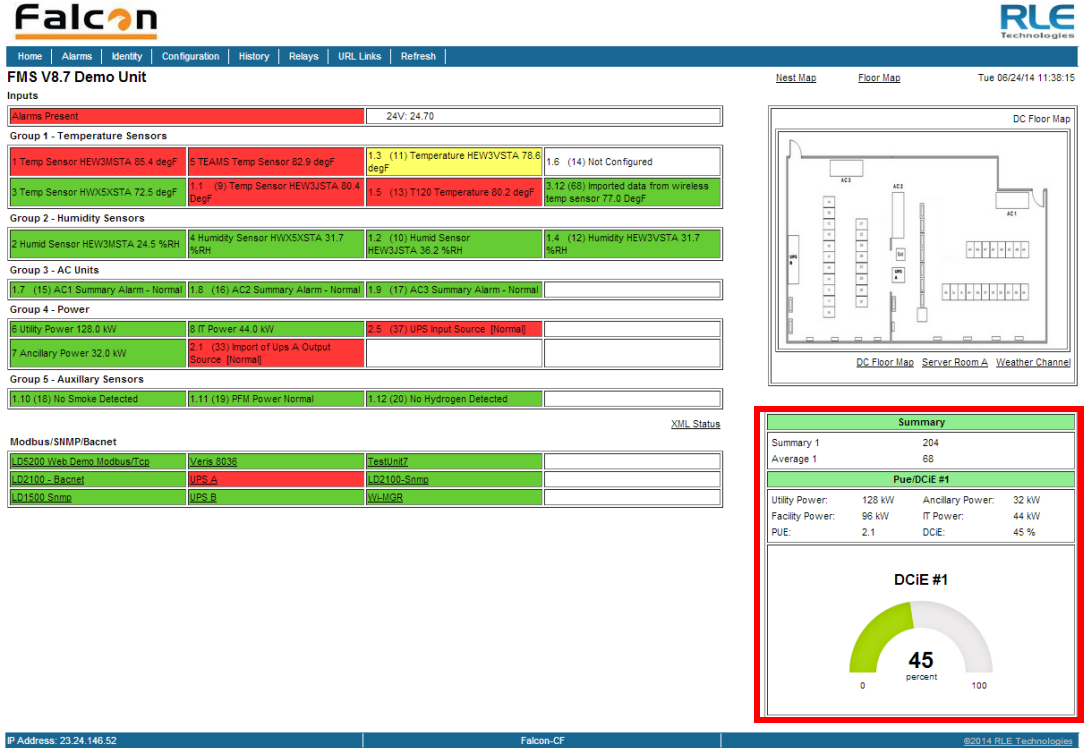
Figure 3.43 PUE/DCiE Data on FMS Home Page

Before you can generate PUE/DCiE data through the FMS, you need some data for the FMS to work with. Submeters need to be wired, or SNMP/Modbus communications need to be established to gather the following kilowatt (kW) readings:

♦ Utility load - The main power feed into the building - usually obtained through a submeter.

♦ IT load - Power consumed by all computing devices - usually obtained through a submeter or through protocol SNMP/Modbus communications.

♦ Ancillary load (optional) - The portions of the building outside the data center, including warehouse space, offices, etc. - usually obtained through a submeter or through protocol SNMP/Modbus communications.

3.4.26.1 Designating PUE/DCiE Data

1   Before you can generate the PUE/DCiE data, you need to know where to tell the FMS to find the raw kW readings. The Modbus registers for this information should already be configured. On the FMS interface, go to Configuration > Modbus/SNMP Slave Units.

2   Click the appropriate link to access the range of Registers where your devices are located. Write down the index numbers of the kW-related Modbus registers. You'll need to enter these index numbers on the PUE/DCiE Configuration page.

Modbus Register Configuration	
# -Ut-Reg Label	# -Ut-Reg Label
1 -1 -40259-Energy KWH	51 -2 -40307-Minimum Demand KW
2 -1 -40261-Demand KW	52 -2 -40309-Maximum Demand KW
3 -1 -40263-Reactive Power VAR	53 -3 -40259-Energy KWH
4 -1 -40265-Apparent Power VA	54 -3 -40261-Demand KW
5 -1 -40267-Power Factor	55 -3 -40263-Reactive Power VAR
6 -1 -40269-Voltage L-L	56 -3 -40265-Apparent Power VA

Modbus Registers - kW Data

Figure 3.44 Gather Modbus Register Information

3   On the FMS interface, return to the to Configuration>PUE/DCiE/Summary/Average screen.

4   At the top of the PUE/DCiE/Summary/Average Configuration page, you'll see a drop down menu to enable or disable the PUE/DCiE feature. Select an option as follows to begin the setup:

♦ DC1 - generate one PUE/DCiE value

♦ DC2 - generate two PUE/DCiE values

♦ DC1+2 - generate two PUE/DCiE values and a summary and/or average of those values

5   You can view PUE/DCiE information on the main FMS page in two ways - either as statistics, or as statistics and a gauge. The FMS can generate a Java-based gauge graphic on its home page that allows you to see a graphical representation of either your PUE or your DCiE value. If you'd like to display this gauge, select either PUE or DCiE from the drop down menu next to the PUE/DCiE Gauge field. If you leave this setting disabled, only statistics will display on the FMS home page.

PUE/Dcie/Summary/Average Configuration		
Submit Changes		
PUE/DCiE Feature: DC 1 ▼	PUE/DCiE Gauge: DCiE ▼	
Summary/Average #1: Summary ▼	Summary/Average #1 Label: Summary 1	
Summary/Average #2: Average ▼	Summary/Average #2 Label: Average 1	
Summary/Average #3: Disabled ▼	Summary/Average #3 Label:	
Summary/Average #4: Disabled ▼	Summary/Average #4 Label:	
Summary/Average #5: Disabled ▼	Summary/Average #5 Label:	
Summary/Average #6: Disabled ▼	Summary/Average #6 Label:	

Figure 3.45 Enable PUE/DCiE and Designate Gauge Behavior

6 You can also generate summary or average values that will summarize or average analog points monitored by the FMS. Enable either up to 8 summary or average values in the drop-down menus, or leave these fields disabled.

If you've decided to create summary or average values, enter a label for each value in the corresponding box. This label will appear with the values on the FMS home page.

7 Next you'll see a table labeled Meters. Up to 32 inputs can be used to develop metrics. Each number represents one submeter or output device's kW reading.

a First, you'll need to specify if the device is a physical meter or a Modbus/SNMP/BACnet input.

b Next, if necessary, input the Modbus register index number for the data.

c Then, you'll need to designate if the reading represents an IT load, a utility load, an ancillary load, or a summary/average value. Since you can generate multiple sets of metrics, the load types are differentiated with a 1 or a 2. Make sure your selection corresponds with the correct metric.

Meters					
#	Port	Point	Load Type	Info	Last Reading
1	Physical ▼	6	Utility-1 ▼	kW Utility Power	128
2	Physical ▼	7	Ancillary-1 ▼	kW Ancillary Power	32
3	Physical ▼	8	IT-1 ▼	kW IT Power	44
4	Physical ▼	6	Summary/Ave-1 ▼	kW Utility Power	128
5	Physical ▼	7	Summary/Ave-1 ▼	kW Ancillary Power	32
6	Physical ▼	8	Summary/Ave-1 ▼	kW IT Power	44
7	Physical ▼	6	Summary/Ave-2 ▼	kW Utility Power	128
8	Physical ▼	7	Summary/Ave-2 ▼	kW Ancillary Power	32
9	Physical ▼	8	Summary/Ave-2 ▼	kW IT Power	44
10	Physical ▼	0	Utility-1 ▼		
11	Physical ▼	0	Utility-1 ▼		
12	Physical ▼	0	Utility-1 ▼		

Figure 3.46 Designate kW Gathering Devices

8 Once all your information has been loaded into the table, click the **Submit Changes** button to save the information. This process may take up to two minutes. Once the data is saved, the Info and Last Reading fields of the table will populate.

9 Information has also populated at the bottom of the chart. Use this information if you wish to output the PUE/DCiE information to a third party application or generate PUE/DCiE trending information. Modbus, BACnet, and SNMP output information is provided.

```
Local Modbus Registers: DCiE #1: 40181 PUE #1: 40182 DCiE #2: 40183
PUE #2: 40184 DCiE #1+2: 40185 PUE #1+2: 40186 Summary #1: 40187 Summary #2: 40188
Local Bacnet Instances:
DCiE #1:    ai:1629 PUE #1:    ai:1630
DCiE #2:    ai:1631 PUE #2:    ai:1632
DCiE 1+2:   ai:1633 PUE 1+2:   ai:1634
Summary #1: ai:1635 Summary #2: ai:1636
Local Snmp Objects:
DCiE #1:    Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.629 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.629
PUE #1:     Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.630 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.630
DCiE #2:    Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.631 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.631
PUE #2:     Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.632 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.632
DCiE #1+2:  Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.633 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.633
PUE #1+2:   Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.634 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.634
Summary #1: Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.635 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.635
Summary #2: Data: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.3.636 Label: 1.3.6.1.4.1.3184.1.5.1.12.4.3.1.4.636
```

Figure 3.47 Data for Third Party Applications

3.4.26.2 PUE/DCiE Trending

Now that the FMS is generating PUE/DCiE information, it can log long-term trending data. The trending program can log 3840 entries. Once 3840 entries have been logged, the system will eliminate 40 entries at a time and overwrite the data, from oldest to newest. Long-term trending is the most effective way to use PUE/DCiE data.

Format Trends

1 On the FMS interface, go to Configuration>Trends.

2 You may already have some trending tasks operating on the FMS. Select the next available index number. Use the following points to trend your data:

Point Value	Trended Data
629	DCiE 1
630	PUE 1
631	DCiE 2
632	PUE 2
633	DCiE 1 + 2
634	PUE 1 + 2
635	Summary 1
636	Summary 2

3 Select **Modbus/SNMP** as the type.

4 Now, determine the interval at which you wish to trend the data. The interval is selectable, from a 1 minute interval to an 8 hour interval - it just depends how detailed you'd like your data to be. At a 1 minute interval, the FMS will store approximately 2.5 days worth of data

before it begins to overwrite. At an 8 hour interval, the FMS will store approximately 3.5 years of data before it begins to overwrite the oldest data.

#	Point	Type	Interval	Info	Format
1	629	Modbus/Snmp	15 Min	DCiE	Format Trend 1
2	630	Modbus/Snmp	15 Min	PUE	Format Trend 2

Figure 3.48 Establish Trending

5 Click the **Format Trend** button to save your information. Once the information has been saved, you'll notice the Info field for that trend will populate itself.

NOTE Because of the way the FMS saves its data, you need to fully configure one trend and click the **Format Trend** button on its line before you configure the next trend. If you attempt to configure multiple trends at once, only the data associated with the Format Trend button you click will be saved.

View Trends

1 On the FMS interface, go to History>Extended Trends.

Point	Description	Graph	CSV
1	Utility Meter	Graph	CSV
2	IT Power	Graph	CSV
3	Ancillary Power	Graph	CSV
4	ANALOG #4.11	Graph	CSV
5	SumTotalPower	Graph	CSV

Figure 3.49 View your Trending Data

2 Locate the point number you configured. Click the **Graph** link to access a Java-based graph of the data. The X and Y axis of the graph are adjustable. Click and drag the bars on the axes to a more or less detailed view of your data.
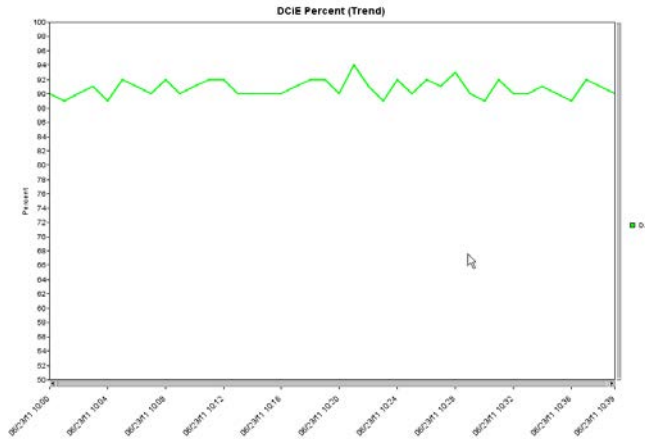
Figure 3.50 Trending Graph

3 Click **CSV** to view a comma separated value download of your information. If you select the CSV option in Internet Explorer and Excel is loaded on your computer, the data will be displayed in an Excel spreadsheet. If you select the CSV option with Mozilla Firefox, the information will display as comma separated values in a separate browser window with no additional formatting.

IE, exported to Excel   Firefox, exported as CSV

Figure 3.51 CSV Data

3.4.27 Map (Facility Mapping)

The FMS allows users to upload a map of their facility and populate it with FMS data. This provides users with a real-time view of their facility, and the physical location and status of all their digital, analog, and Modbus/SNMP slave inputs.

Through the FMS mapping process, the Falcon creates an overlay for an uploaded map image. It superimposes the locations of your inputs - based on coordinates you designate - over the top of your map image. Once uploaded and populated, the map is accessible through links on the FMS home page.
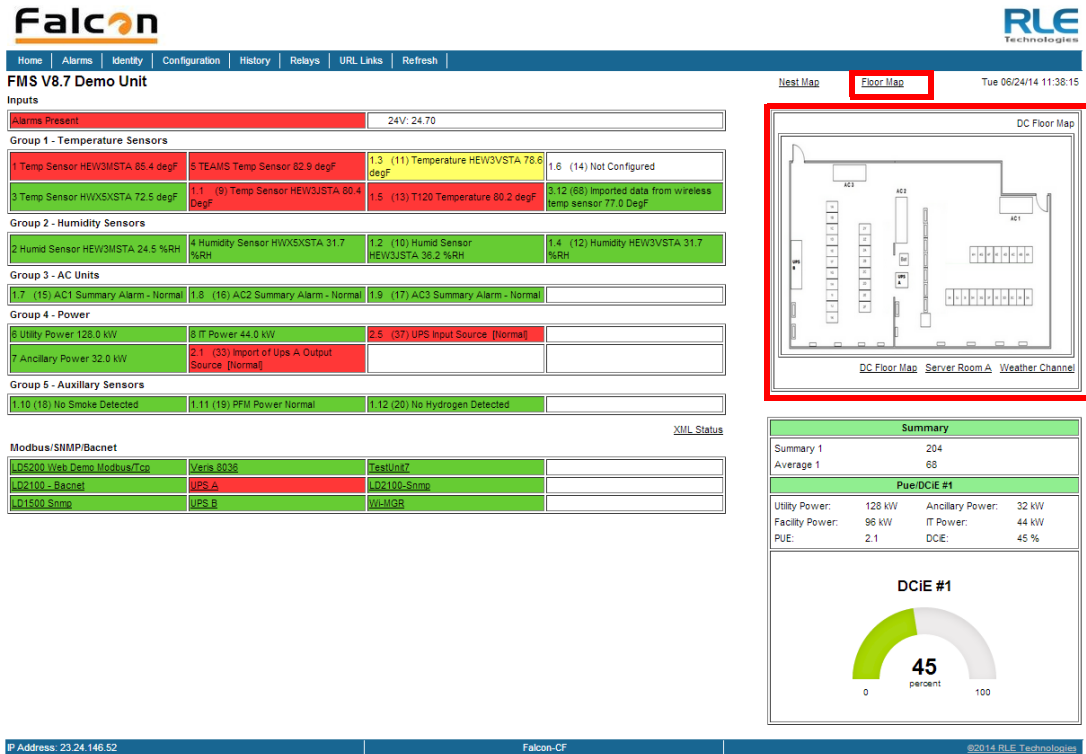
Figure 3.52 FMS Map

Mapping is the last step in the FMS setup process. Do not attempt to map your facility until your monitoring area is completely assembled - all of your sensors and equipment are in place, wired, and functional. Mapping is faster if all your inputs have been configured through the FMS Configuration Menu.

Several tasks are key to the success of facility mapping. First, update the firmware on your FMS (refer to Chapter 8, "Load Firmware and Configuration Data" on page 171 for firmware uploads). Facility mapping is only available on FMS firmware version 8.6.4 or greater.

Secondly, you'll need a map of your facility. The map needs to be in .jpg format, and must have a file size less than 500kb. The maximum physical size of the map is 4000 x 4000 pixels. Since the Falcon never actually edits your map, if you should need to update your map image, previously designated map points will not need to be reconfigured. As long as you do not change size of your map, previously mapped coordinates should not need to be adjusted when you upload a new version of your map.

3.4.27.1 Create An Interactive Map

Creating the interactive map requires access to several pages within the FMS's Configuration menu.

Upload the Map Image

To begin the mapping process, access the Configuration>Map page and upload your map image. Options on the Map page are as follows:

Figure 3.53 Map Configuration Page

Option	Description
Browse	Click this button to select the map image on your computer.
Upload	Upload the selected image.
Delete Image #	The FMS can accommodate one map at a time. This button allows you to delete a map that is already uploaded to the FMS.
Delete All Coordinates	If you have previously uploaded a map to the FMS, you may also have mapped coordinates for your monitored points and equipment. Click this link to delete all previously mapped coordinates.
Mouseover Modbus Units	Select Yes if you'd like descriptive information to pop up when you mouseover Modbus Units on the map.
Mouseover Modbus Points	Select Yes if you'd like descriptive information to pop up when you mouseover Modbus Points on the map.
Mouseover Inputs	Select Yes if you'd like descriptive information to pop up when you mouseover Inputs on the map.

Table 3.29 Map Configuration Page Options

1 To upload an image click the **Browse** button.

2 Locate and select the map file (.jpg) that you have previously created and saved. Click the **Open** button. The path and name of the map file displays in the field to the left of the Browse button.

3 Click the **Upload** button.

The Upload button displays a *Please Wait* message while the file uploads. The upload should take about seven seconds. Once the image of the map has uploaded, the FMS displays a message confirming that it has uploaded the new file.

Image file has been uploaded ..
.
Return
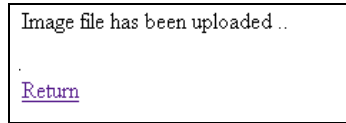
Figure 3.54 Map Image Upload Message

If you receive the following error message, the file did not upload:

Error: File type is not supported.

Hit the back button or click here to return.
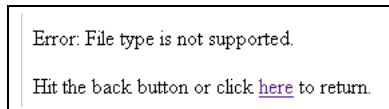
Figure 3.55 Map Image Upload Error Message

Verify your file's size and type, and repeat the upload process.

4 Once the file has uploaded, click **Return** to exit to the Map File Configuration Menu.

5 Return to the FMS home page. Click the **Floor Map** link at the top right side of the page to view your uploaded map image and ensure it has uploaded correctly.

Map Inputs

Once the map image has been uploaded, you're ready to designate inputs on the map.

Throughout the mapping process, you will use a blue box to designate the location of your mapped inputs. This blue box represents the location of the point you are mapping, and its blue color indicates you are in mapping configuration mode. Initially, you will find it in the upper left corner of your screen. Use your mouse to drag and drop it where you'd like it to appear on your map.
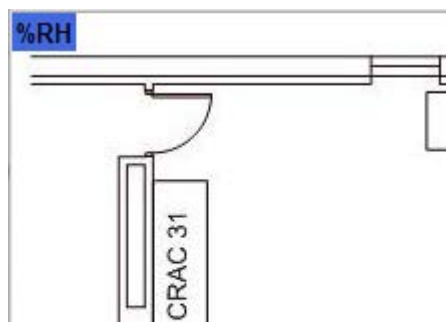
Figure 3.56 FMS Drag and Drop Mapping - Configuration Mode

When mapped, inputs appear on the map as follows:

Input	Map Display
Analog	Value on a colored background
	Green - OK
	Yellow - Stage 1 alarm
	Red - Stage 2 alarm
Digital	Colored square
	Red or green, represents the on/off value
Modbus/SNMP slave	Colored circle
	Green - OK
	Yellow - High 1 / Low 1 analog alarm
	Red- Stage 2 analog alarm or
	digital alarm change of state
	Orange - Loss of communications
FMS Home Link	Colored circle with F in the center
	Green - OK
	Red - A point on the system is in alarm

Figure 3.57 FMS Map Key

Map Analog and Digital Input Points and Relays

1 From the FMS home page, go to Configuration>Inputs and Relays. All of your previously configured FMS inputs and relays will display.

Inputs											
S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label
	(1)	Utility Meter		(2)	IT Power		(3)	Ancillary Power		(4)	DigStatus #4 Ac
	(5)	AC Unit On/Off		(6)	DigIn ANALOG #6		(7)	Import bacnet #		(8)	601
1.1	(9)	ANALOG #1.1 0-1	1.2	(10)	ANALOG #1.2	1.3	(11)	ANALOG #1.3	1.4	(12)	ANALOG #1.4
1.5	(13)	ANALOG #1.5	1.6	(14)	ANALOG #1.6	1.7	(15)	upsOutputStatus	1.8	(16)	ANALOG #1.8
1.9	(17)	ANALOG #1.9	1.10	(18)	ANALOG #1.10	1.11	(19)	ANALOG #1.11	1.12	(20)	ANALOG #1.12
2.1	(33)	Input #2.1	2.2	(34)	Input #2.2	2.3	(35)	Input #2.3	2.4	(36)	Input #2.4
2.5	(37)	Input #2.5	2.6	(38)	Input #2.6	2.7	(39)	Input #2.7	2.8	(40)	Input #2.8
2.9	(41)	Input #2.9	2.10	(42)	Input #2.10	2.11	(43)	Input #2.11	2.12	(44)	Input #2.12
2.13	(45)	Input #2.13	2.14	(46)	Input #2.14	2.15	(47)	Input #2.15	2.16	(48)	Input #2.16
2.17	(49)	Input #2.17	2.18	(50)	Input #2.18	2.19	(51)	Input #2.19	2.20	(52)	Input #2.20
2.21	(53)	Input #2.21	2.22	(54)	Input #2.22	2.23	(55)	Input #2.23	2.24	(56)	Input #2.24
5.1	(105)	Internal Temper	5.2	(106)	Internal Humidi						

Input Group Labels   Download Points List Export CSV Table

Relays											
	(1)	RELAY #1		(2)	RELAY #2	1.1	(3)	RELAY #1.1	1.2	(4)	RELAY #1.2
1.3	(5)	RELAY #1.3	1.4	(6)	RELAY #1.4	1.5	(7)	RELAY #1.5	1.6	(8)	RELAY #1.6
1.7	(9)	RELAY #1.7	1.8	(10)	RELAY #1.8						

Figure 3.58 FMS Input/Output Configuration Menu

2 Click the **link** to take you to the Configuration screen for the input or relay you'd like to map.

3 At the very bottom of the Input or Relay Configuration screen you'll see several mapping fields. a field labeled Map Coordinate: X, Y and a Graphical Mapping link. Click the **Graphical Mapping** link.

Map Box Size: W: 100   H: 100   Text Direction: Horizontal ▼

Map Coordinate: X: 365   Y: 109   Graphical Mapping   Test Map
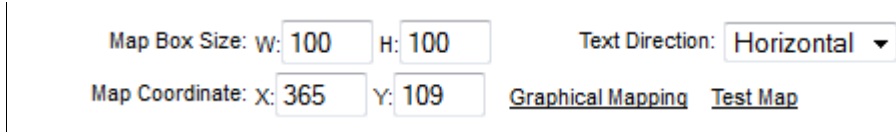
Figure 3.59 FMS Mapping Fields

These options have the following functions:

Option	Description
Map Box Size (Inputs Only)	The size of the box that represents the input will default to the size and shape of the text it contains - usually the value of the input followed by the unit of measure assigned to it. Sometimes, you may like to adjust the size of the box to fill an area, rather than just be the size of the text. This option allows you to do that. By default, the height of the object, as it appears on the map, is approximately 20 pixels, and the width automatically adjusts to the length of the text. If you wish, use this setting to expand the size of the object to fill a defined area.
Text Direction (Inputs Only)	Decide if you'd like the text on the map for this object (temperature reading, humidity reading, sensor value, etc.) to be horizontal or vertical.
Map Label (Relays Only)	Designate a map label for the relay.
Map Coordinate	Fine tune the location of the object on the map.
Graphical Mapping	Designate the device's location on the FMS graphical map.
Test Map	View the mapped location of the point you're currently configuring.

Table 3.30 FMS Mapping Menu Options

4 The Graphical Mapping link takes you to a view of your map image. This is where you'll designate the physical location of your input or relay. Look at the upper left corner of the map and locate the blue box. This blue box represents the location of the point you are mapping, and its blue color indicates you are in mapping configuration mode. Use your mouse to drag and drop it where you'd like it to appear on your map.

CRAC 20

CRAC 31
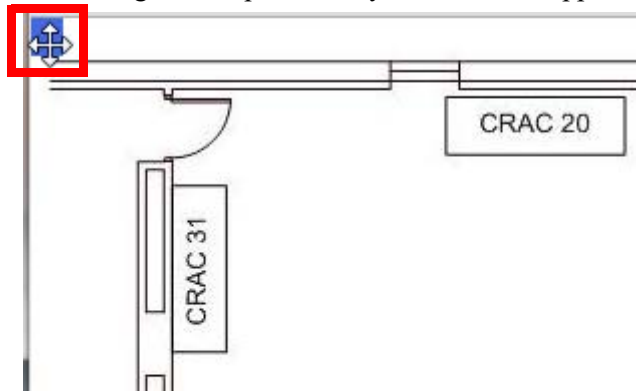
Figure 3.60 FMS Mapping Configuration Mode - Drag and Drop Your Point

5   Drag and drop the blue square into the desired location. The X and Y coordinate boxes at the bottom of the screen will populate to indicate the coordinates of the monitored point. You can drag and drop the point as many times as you need to in order to place it correctly.
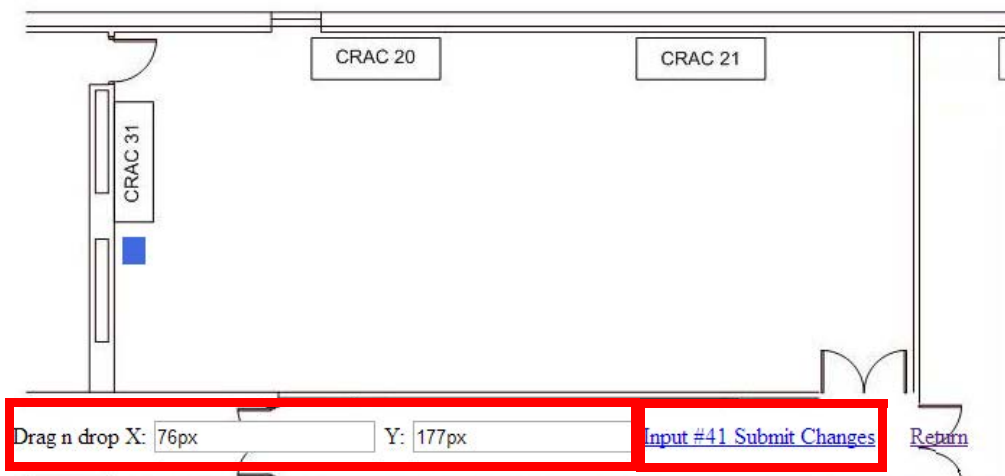
Figure 3.61 Place the Point and Submit Changes

6   Once you are satisfied with the point's location, click the "Submit Changes" link. You'll see a brief *System Updating* message, and then be redirected back to the Configuration Input page. You'll then notice that the X and Y coordinate boxes at the bottom of the page have been filled in with the location you selected when you placed the object on the map. You can accept these coordinates as they are, or if you feel a need to fine tune the location, you can edit the coordinates directly.

7   You will also see Map Box Size fields. These fields allow you to adjust the size of the input as it appears on the map. Analog inputs appear on the map as a value, highlighted by a red, yellow, or green box. Changing the numbers in the Map Box Size fields adjusts the size of the highlighted area. You can expand the box to fill a predetermined area on your map, or leave it the same size as the displayed analog value.

NOTE   Unlike configuring the inputs themselves, you do not need to click the Submit Changes button on each Configuration Input page to save the map coordinates. The FMS saves the coordinates before it populates them in the X,Y coordinate boxes. If, however, you choose to manually adjust any values in the coordinate boxes, you will need to click the Submit Changes button to save those adjusted values.

8   Click the **Next Input>>** link at the top of the page to map the next input.

NOTE   The map you see through the Configuration screens is ONLY a view of the input you're mapping - not a comprehensive view of all the points mapped on the FMS. Through this view, the FMS is simply accepting data for ONE mapped point at a time, not showing you the map in its entirety. To view the entire map, click the Test Map link. This will show you all inputs mapped to date.

Map Modbus, SMNP and BACnet Slave Units

Modbus and SNMP Slave Units are mapped just like analog and digital inputs.

1 From the FMS home page, go to Configuration>Modbus/SNMP Slave Units. All of your previously configured points will display.

Figure 3.62 Modbus/SNMP/BACnet Slave Unit Configuration Screen

2 Click on the number of the unit you wish to map. This will take you to the Configuration page for that device.

Figure 3.63 Map a Slave Input

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3 Near the middle of the Configuration screen, you'll see the same Map Coordinate: X, Y fields, Graphical Mapping link, and Test Map link you saw on the analog and digital input configuration screen. Click the **Graphical Mapping** link and drag and drop the blue rectangle to pinpoint the location of the slave unit.

4 Once you are satisfied with the point's location, click the "Submit Changes" link. You'll see a brief *System Updating* message, and then be returned to the Modbus/SNMP/BACnet Slave Configuration page. The X and Y coordinate boxes will be populated with the coordinates you designated. If you would like to fine tune the location by adjusting the coordinates or alter the map box size, please remember to click the **Submit Changes** button once your adjustments are complete.

5 Click the **Next >>** link at the top of the page to map the next device.

NOTE When you map a slave unit device, you are mapping its physical location. The indicator that appears at the map location is a clickable link that takes you to a table that details the status of the points monitored by the device. Click the **Floor Map** link at the bottom of that page to return to the floor map.

LD2100			
Leak Detected	Leak Distance 0	Cable Length 699	Resistance/Ft 2788
Cable Break	Units 1=Ft; 0=Meters 1	Loop1 Resistance 1947	
Cable Contamination	Leakage Current on Cable 0	Loop2 Resistance 1951	

Floor Map

Figure 3.64 Modbus / SNMP Slave Unit Detailed View

3.4.27.2 Add a Link to the FMS Home Page

You can also add FMS home page link to the map. The link will appear as a round circle with the letter **F** in the middle. Clicking on this image on the map will take you to the FMS home page.

1 From the FFS home page, go to Configuration>System. At the bottom of the System Configuration page, you'll see the Map Coordinate: X, Y fields and the Graphical Mapping link. Click the **Graphical Mapping** link.

2 Drag and drop the blue circle to designate the location of the link. Once your satisfied with the location, click the Falcon Unit - Submit Changes link to return to the System Configuration page.

3 If necessary, fine-tune the map coordinates in the X and Y boxes. If you manually adjust the coordinates, you must click the **Submit Changes** button to save the adjusted data.

3.4.27.3 Back Up the Map Data
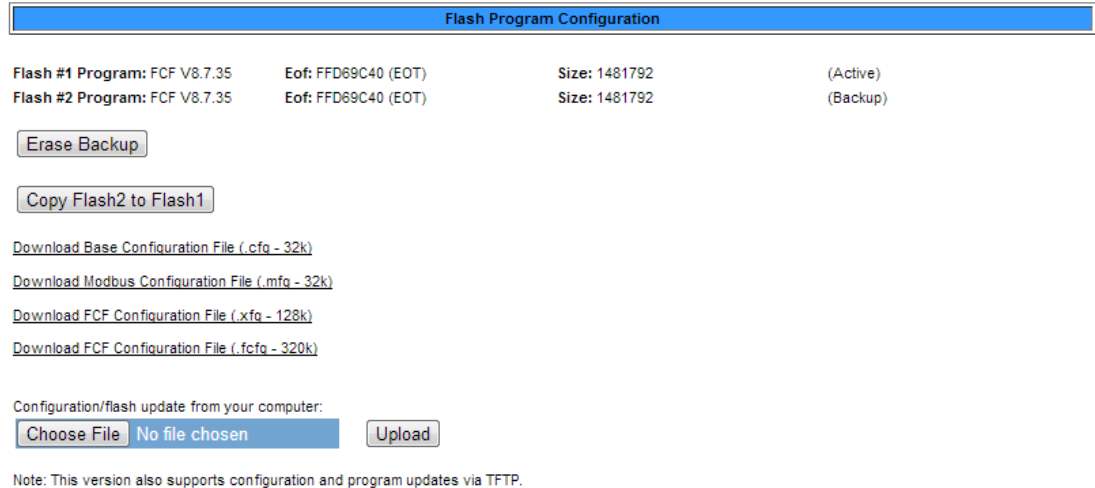
Once you've finished mapping all your devices, return to the FMS home page and click the **Floor Map** link. Verify the accuracy of your map. If your map is complete and accurate, it's time to back up the data.

1 From the FMS home page, go to Configuration>Flash Program

2 Click the link that says **Download FCF Configuration File (.xfg - 128k)**

3 If you're using Internet Explorer, a File Download pop-up will appear. Click the **Save** button. Navigate to the location where you'd like to save the file. You can use any file name, but the file name MAY NOT contain spaces, and must be a .xfg file format.

4 If you're using Mozilla Firefox, a pop-up window will appear. Select Save File and click the **OK** button. The file will save into the Downloads folder on your computer, typically located in Documents and Settings>My Documents. After the download is complete, you can navigate to it and rename it as you'd wish. Again, you can use any file name, but the file name MAY NOT contain spaces, and must be a .xfg file format.

3.4.28 Flash Program

The **Flash Program** link displays the Flash Program Configuration page, which allows you to load firmware as well as save and load configuration files for the FMS. For instructions and more information, see Chapter 8, "Load Firmware and Configuration Data" on page 171.

Flash Program Configuration

Flash #1 Program: FCF V8.7.35   Eof: FFD69C40 (EOT)   Size: 1481792   (Active)
Flash #2 Program: FCF V8.7.35   Eof: FFD69C40 (EOT)   Size: 1481792   (Backup)

[Erase Backup]

[Copy Flash2 to Flash1]

Download Base Configuration File (.cfg - 32k)

Download Modbus Configuration File (.mfg - 32k)

Download FCF Configuration File (.xfg - 128k)

Download FCF Configuration File (.fcfg - 320k)

Configuration/flash update from your computer:
[Choose File] No file chosen   [Upload]

Note: This version also supports configuration and program updates via TFTP.

Figure 3.65 Flash Program Configuration Page

3.4.29 Product Registration

The **Product Registration** link sends users to rletech.com and allows you to register an FMS with RLE. The FMS IP Address, Subnet Masks, and Default Gateway must be configured before this link will be operational. Once configured, complete the registration form and click the Register button to submit your information to RLE.

3.5. History

The **History** link provides access to a wide variety of logged historical data for the FMS.

3.5.1 Alarm History

Alarm History displays the last 256 alarms captured by the FMS. Alarms are ranked from most recent (top of the list) to least recent (bottom of the list).
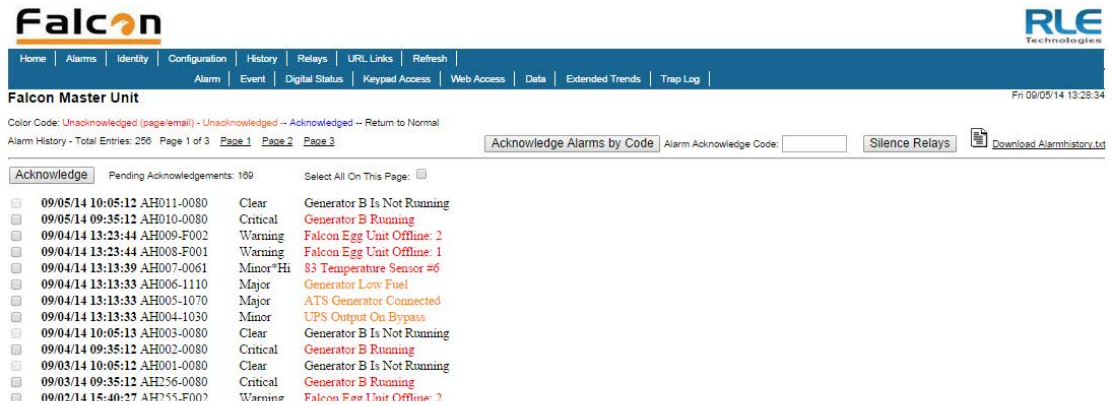
Figure 3.66 Alarm History Page

The following format is used to record each alarm entry:

Date Time AH###-ID-Condition Severity (Value UOM) Label

♦ Date and Time is the internal date and time stamp of the alarm condition.

♦ AH### is the alarm entry index.

♦ ID is the alarm identifier number; see Appendix E, "Alarm ID Reference Tables" on page 199.

♦ Condition is On, High1, High2, Low1, Low2, or RTN (Returned to Normal).

♦ Severity is Critical, Major, Major*Hi, Minor, Minor*Hi, Warning, or Clear.

♦ Label is the alarm descriptor, up to 64 characters long.

♦ Value and Unit of Measure (UOM) is captured for analog channels only. The value recorded is the actual analog value that exceeded its alarm threshold.

The Alarm History log entries are color-coded as follows:

Color	Description
Red	A point configured for dial out (pager) is in alarm and is unacknowledged. The alarm will be red if the point is configured for both pager and email notification.
Orange	A point not configured for dial out (pager) is in alarm and is unacknowledged.
Blue	The alarm has been acknowledged.
Black	The alarm has returned to normal.

Table 3.31 Alarm History Log Entries

If you have an active alarm, you can silence it by clicking the Alarm Silence button on this page.

3.5.1.1 Acknowledge Alarms

Alarms can be acknowledged from this page. To acknowledge alarms in bulk, click the checkbox next to the desired alarms and click the Acknowledge button.

Figure 3.67 Acknowledge Multiple Alarms at Once

Unacknowledged dial out alarms (marked in red) can also be acknowledged from this page. To do so, type the appropriate code in the box at the top of the page and click the Acknowledge Alarms by Code button. Acknowledge codes are set under the Modem/Phone Number/Pagers or Email/DNS Configuration pages.

Figure 3.68 Acknowledge Dial Out Alarms By Code

3.5.1.2 Download Alarmhistory.txt

If you choose to download the alarmhistory.txt file, you'll need to right click the link and select either "Save Link As" or "Save Target As". Specify a name for the file and save it to your local directory. If you left click the "Download Alarmhistory.txt" link, the file will open in a browser window instead of downloading.

3.5.2 Event History

Event History displays the past 100 events, as recorded by the FMS. Typical events that are logged include System Booted, Email Accepted by Server, No Dial Tone, Busy, No Carrier, Page Successful, Alarm History Cleared, Digital Status History Cleared, Force Acknowledge by <initials>, and Program Upload - TFTP.

Falcon Master Unit

```
EL37-10/20/13 12:00:01 Schedule A Off - K1
EL36-10/20/13 10:12:01 Schedule A On -  K1
EL35-10/13/13 12:00:01 Schedule A Off - K1
EL34-10/13/13 10:12:01 Schedule A On -  K1
EL33-10/10/13 12:48:59 System Booted - power up
EL32-10/10/13 11:00:21 System Booted - power up
EL31-10/10/13 09:58:26 System Booted - power up
EL30-10/10/13 09:49:58 System Booted - power up
EL29-10/09/13 14:12:40 System Booted - power up
EL28-10/06/13 12:00:01 Schedule A Off - K1
EL27-10/06/13 10:12:11 Schedule A On -  K1
EL26-10/02/13 09:34:45 Email accepted by server
EL25-10/01/13 09:16:11 System Booted - watchdog
EL24-09/29/13 12:00:01 Schedule A Off - K1
EL23-09/29/13 10:12:01 Schedule A On -  K1
EL22-09/22/13 12:00:02 Schedule A Off - K1
EL21-09/22/13 10:12:02 Schedule A On -  K1
EL20-09/18/13 11:05:10 System Booted - watchdog
EL19-09/18/13 10:53:28 System Booted - watchdog
EL18-09/18/13 10:34:45 System Booted - watchdog
```

Figure 3.69 Event History Page

3.5.3 Digital Status History

Digital Status History displays a history of the state of digital points configured as "Status" points. A digital input can be configured as NO (normally open), NC (normally closed) or Status. If the digital input is configured as Status, it will not alarm, but any changes will be noted and appear on this page. The log displays the past 100 status changes, as recorded by the FMS.

Falcon Master Unit

```
SH094-0040-RTN-10/22/13 06:30:12 DigStatus #4 Inactive
SH093-0040-On -10/22/13 06:30:11 DigStatus #4 Active
SH092-0040-RTN-10/22/13 06:29:31 DigStatus #4 Inactive
SH091-0040-On -10/22/13 06:29:30 DigStatus #4 Active
SH090-0040-RTN-10/22/13 06:28:53 DigStatus #4 Inactive
SH089-0040-On -10/22/13 06:28:52 DigStatus #4 Active
SH088-0040-RTN-10/22/13 06:27:56 DigStatus #4 Inactive
SH087-0040-On -10/22/13 06:27:55 DigStatus #4 Active
SH086-0040-RTN-10/22/13 06:27:52 DigStatus #4 Inactive
SH085-0040-On -10/22/13 06:27:51 DigStatus #4 Active
SH084-0040-RTN-10/22/13 06:27:47 DigStatus #4 Inactive
```

Figure 3.70 Digital Status History Page

3.5.4 Keypad Access History

Keypad Access History displays the last 100 keypad entries captured by the FMS.

```
AL07-******-12/07/09 10:41:18 Access Granted - User #9
AL06-******-12/07/09 10:41:07 Access Granted - User #8
AL05-******-12/07/09 10:40:56 Access Granted - User #7
AL04-******-12/07/09 10:40:17 Access Granted - User #9
AL03-******-12/07/09 10:40:05 Access Granted - User #8
AL02-******-12/07/09 10:39:54 Access Granted - User #7
AL01-******-11/21/09 12:38:04 Access Granted - fred
```

Figure 3.71 Keypad Access History View

The following information is displayed:

◆ Access Log Index (ALxxx)

◆ Date and Time of Event

◆ Access Granted or Denied

◆ Access denied is entered into the log when three consecutive invalid codes are entered.

◆ Access is granted when a valid code is entered followed by the # key. The * key clears the code allowing a user to reenter their code.

◆ Method of Entry (keypad or DTMF)

◆ Access Code Description

3.5.5 Web Access History

Web Access records the most recent 100 Web interface users.

Falcon Master Unit

```
WU013-10/22/13 14:58:29 User2: falcon
WU012-10/22/13 14:31:20 User2: falcon
WU011-10/22/13 14:06:29 User2: falcon
WU010-10/22/13 13:45:30 User2: falcon
WU009-10/22/13 13:22:22 User2: falcon
WU008-10/22/13 12:08:12 User2: falcon
WU007-10/22/13 11:16:03 User2: falcon
WU006-10/22/13 10:14:12 User2: falcon
WU005-10/22/13 09:46:26 User2: falcon
WU004-10/22/13 09:24:13 User2: falcon
WU003-10/22/13 08:50:54 User2: falcon
WU002-10/21/13 16:33:20 User2: falcon
WU001-10/21/13 16:00:00 User2: falcon
WU100-10/21/13 15:32:24 User2: falcon
WU099-10/21/13 15:10:18 User2: falcon
WU098-10/17/13 15:43:58 User2: falcon
```

Figure 3.72 Web User Access Log

3.5.6 Data History

Data History provides an intermediate page to assist in navigating to the desired data. Only points configured as analog 4-20mA are shown.

Falcon Master Unit

CH	Description	60 Minute		24 Hour		7 Day	
1	Utility Meter	Text	Graph	Text	Graph	Text	Graph
2	IT Power	Text	Graph	Text	Graph	Text	Graph
3	Ancillary Power	Text	Graph	Text	Graph	Text	Graph
7	Import bacnet #21	Text	Graph	Text	Graph	Text	Graph
8	601	Text	Graph	Text	Graph	Text	Graph
1.1 (9)	ANALOG #1.1 0-10V	Text	Graph	Text	Graph	Text	Graph
1.2 (10)	ANALOG #1.2	Text	Graph	Text	Graph	Text	Graph
1.3 (11)	ANALOG #1.3	Text	Graph	Text	Graph	Text	Graph
1.6 (14)	ANALOG #1.6	Text	Graph	Text	Graph	Text	Graph
1.7 (15)	upsOutputStatus Normal	Text	Graph	Text	Graph	Text	Graph
1.8 (16)	ANALOG #1.8	Text	Graph	Text	Graph	Text	Graph
TS	Internal Temperature Sensor	Text	Graph	Text	Graph	Text	Graph
HS	Internal Humidity Sensor	Text	Graph	Text	Graph	Text	Graph

Modbus/Snmp/Bacnet Points 1-58
Modbus/Snmp/Bacnet Points 59-116
Modbus/Snmp/Bacnet Points 117-174
Modbus/Snmp/Bacnet Points 175-232

Figure 3.73 Data History Page

- ♦ The **Modbus Points** links at the bottom of the page are shown if the FMS is equipped with the EXP-MBCS option. These links provide access to the Modbus Data History pages.

- ♦ Click the **Text** or **Graph** link for each sensor or Modbus point to view the history in text or graph format. If you choose to view a sensor's or point's history in text format, you can download the data to a comma separated value (.csv) file.

3.5.6.1 Minute, Hour, and Day Views

The **Minute**, **Hour**, and **Day** columns on the Data History page display the detailed information the FMS records in its logs. The Minute log displays the high, low, and average values per minute for the last 60 minutes. The Hour log displays the high, low, and average values per hour for the last 24 hours. The Day log displays the high, low, and average values per day for the last seven days. These values can be downloaded to a comma separated value (.csv) file via the Data History Text Downloads button.

```
Channel:            1
Data Type:          Minute
Description:        Utility Meter
Unit of Measure:    KW

Date Time          Avg    High    Low
10/22/13 14:10     603    603     603
10/22/13 14:11     603    603     603
10/22/13 14:12     603    603     603
10/22/13 14:13     603    603     603
10/22/13 14:14     603    603     603
10/22/13 14:15     603    603     603
10/22/13 14:16     603    603     603
10/22/13 14:17     603    603     603
10/22/13 14:18     603    603     603
10/22/13 14:19     603    603     603
10/22/13 14:20     603    603     603
10/22/13 14:21     603    603     603
10/22/13 14:22     603    603     603
```

Download CSV File

This link is located on the right side of every Text data history page.

Figure 3.74 Data History - Minute Page

3.5.6.2 Data History Text Downloads

If you choose to download the CSV file from the Data History page you'll need to right click the link and select either "Save Link As" or "Save Target As". Specify a name for the file and save it to your local directory. If you click the "Download CSV File" link, the file will open in a browser window instead of downloading.

3.5.7 Extended Trends

The Falcon FMS provides extending trending for up to 32 physical and/or Modbus points. Users can view a Java-based graph or download a .CSV file by clicking on the links on this page.

Point	Description	Graph	CSV
1	Server Isle A Temperature	Graph	CSV
2	Server Room East Humidity	Graph	CSV
3	Server Isle B Temperature	Graph	CSV
4	Server Room North Humidity	Graph	CSV
5	Server Isle A-3 Temperature	Graph	CSV
6	Server Isle A-3 Humidity	Graph	CSV
7	Telco Closet	Graph	CSV
8	MCC Room	Graph	CSV
9	Meter #1 Energy KWH	Graph	CSV
10	Meter #2 Energy KWH	Graph	CSV
11	Meter #3 Energy KWH	Graph	CSV
12	Meter #4 Energy KWH	Graph	CSV
13	Meter #5 Energy KWH	Graph	CSV
14	Meter #6 Energy KWH	Graph	CSV
15	Meter #8 Energy KWH	Graph	CSV
16	Meter #8 Energy KWH	Graph	CSV
17	Meter #9 Energy KWH	Graph	CSV
18	Meter #10 Energy KWH	Graph	CSV
19	Server Isle C Temperature	Graph	CSV
20	Server Isle D Temperature	Graph	CSV
21	Server Room West Humidity	Graph	CSV
22	Server Isle F Temperature	Graph	CSV
23	Server Isle G Temperature	Graph	CSV
24	Server Room South Humidity	Graph	CSV
25	Server Isle I Temperature	Graph	CSV
26	Server Isle J Temperature	Graph	CSV
27	Sensor 2-1 Temperature	Graph	CSV
28	Sensor 3-1 Temperature	Graph	CSV
29	900MHz Wi-THS Temperature	Graph	CSV
30	900MHz Wi-THS Humidity	Graph	CSV
31	900MHz Wi-TS Temperature	Graph	CSV
32	418MHz TH-Bapi Temperature	Graph	CSV

Figure 3.75 Extended Trends Page

3.5.8 Trap Log

This page allows users to view trap information sent from the FMS to a BMS or NMS.

Falcon Master Unit

```
10/14/13 15:37:07 ip:10.0.0.231-ch:005-Return-DigAlarm-Sent
10/14/13 15:35:56 ip:10.0.0.231-ch:005-Alarm-DigAlarm-Sent
10/14/13 15:35:17 ip:10.0.0.231-ch:005-Return-DigAlarm-Sent
10/14/13 15:28:13 ip:10.0.0.231-ch:005-Alarm-DigAlarm-Sent
10/14/13 15:26:21 ip:10.0.0.231-ch:005-Return-DigAlarm-Sent
10/10/13 12:49:14 ip:10.0.0.231-ch:006-Alarm-DigAlarm-Sent
10/10/13 12:49:14 ip:10.0.0.231-ch:005-Alarm-DigAlarm-Sent
```

Figure 3.76 Trap Log

3.6. Relays

Relays displays the current status of each FMS relay output. The Status field is color coded. White indicates the relay output is de-energized; yellow indicates that the relay output is energized.

Figure 3.77 Relay Status Page

Through the Relay Configuration screen (section 3.4.2 on page 54), a button can be configured to control each relay output. Clicking the button will turn on the associated relay output. Pressing the button again will turn it off.

Click the link in the Channel column to view more detailed information about the configuration and status of the relay.

Figure 3.78 Relay Status Page - Detailed Relay Information

3.7.   URL Links

URL Links displays still images (.jpg) from all IP cameras and other URLs linked to the FMS. Click the links to access the linked devices directly from this page.
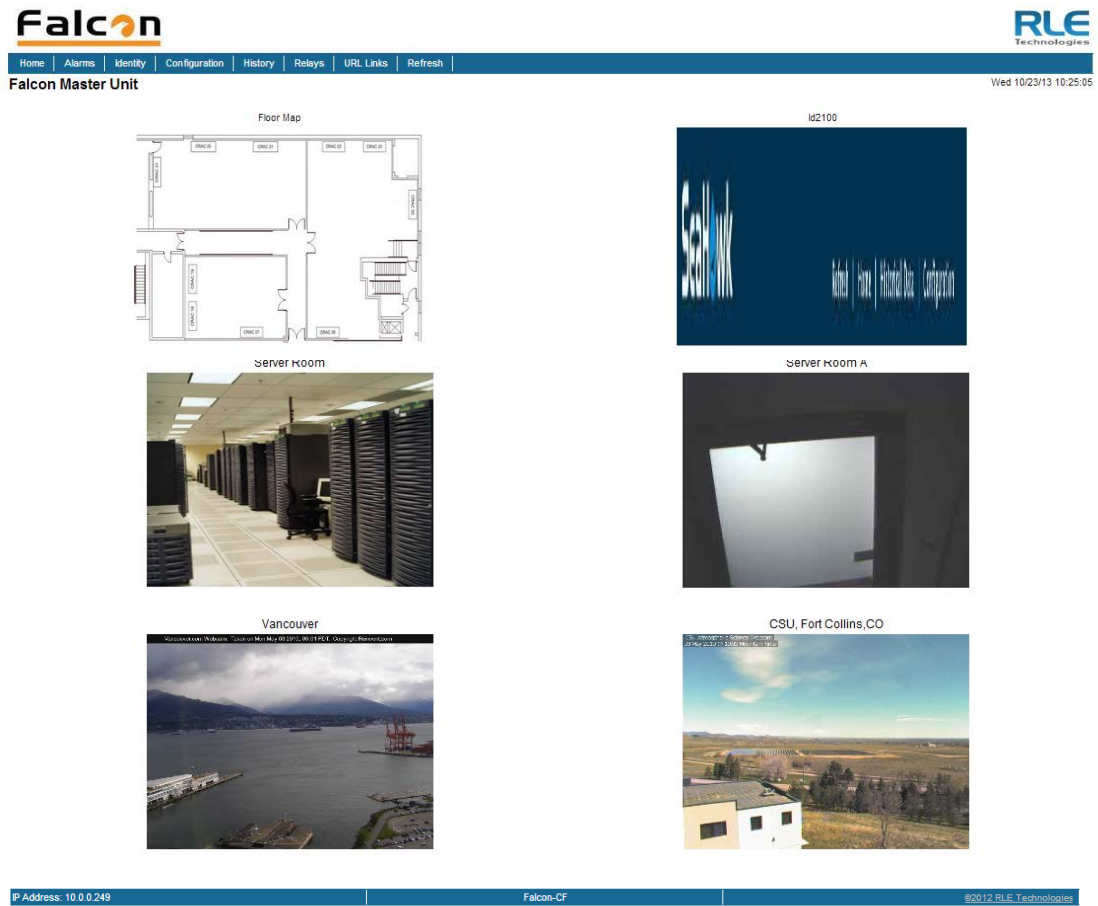
Figure 3.79 Links on the URL Links page

3.8.   Refresh

Click this link to refresh whichever page your on within the FMS web interface.

4

ADVANCED COMMUNICATIONS - MODBUS, BACNET, AND TELNET

4.1.   Modbus

The FMS supports the following from the factory:

♦ Modbus Master (RTU) over EIA-485 or EIA-232

♦ Modbus Slave (RTU) over EIA-485 or EIA-232

♦ Modbus Master (TCP/IP)

♦ Modbus Slave (TCP/IP Port 502) over Ethernet

The FMS can operate as a Master over EIA-485 (or EIA-232) and as a Slave over Ethernet at the same time. The FMS can operate as a Slave over EIA-485 (or EIA-232) and as a Slave over Ethernet at the same time. The FMS can NOT operate as a Master over EIA-485 (or EIA-232) and as a Slave over EIA-485 (or EIA-232) at the same time.

Most basic Modbus Master configuration information can be found in . Most basic Modbus Slave information can be found in . Once you've exhausted the resources in Chapter 3, refer this chapter for more complex configuration information.

4.2.   Hardware Connections

The Modbus connections are located on the back of the FMS. There are status LEDs to indicate if COM Port 1 is configured (in software) for EIA-232 or EIA-485. The COM Port 1 Transmit and Receive LEDs are also located on the back of the FMS.

4.2.1 EIA-232

The EIA-232 COM Port 1 on the FMS is used to connect the FMS-as a Modbus Master-to one Modbus Slave device, or it is used to connect a Modbus Master device to the FMS as a Modbus Slave. The Modbus EIA-232 (DTE) is active over COM1 (DB9 male connector). The EIA-232 port allows communications between the FMS and one other device (point to point connection). The EIA-232 port has maximum cable length of 50 feet (15.2m).

Pin	Description
1	Data Carrier Detect
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Signal Ground
6	No Connection
7	Request to Send (internally connected to Pin 8)
8	Clear to Send (internally connected to Pin 7)
9	No Connection

Table 4.1   COM1 DB9 Male Pin Out
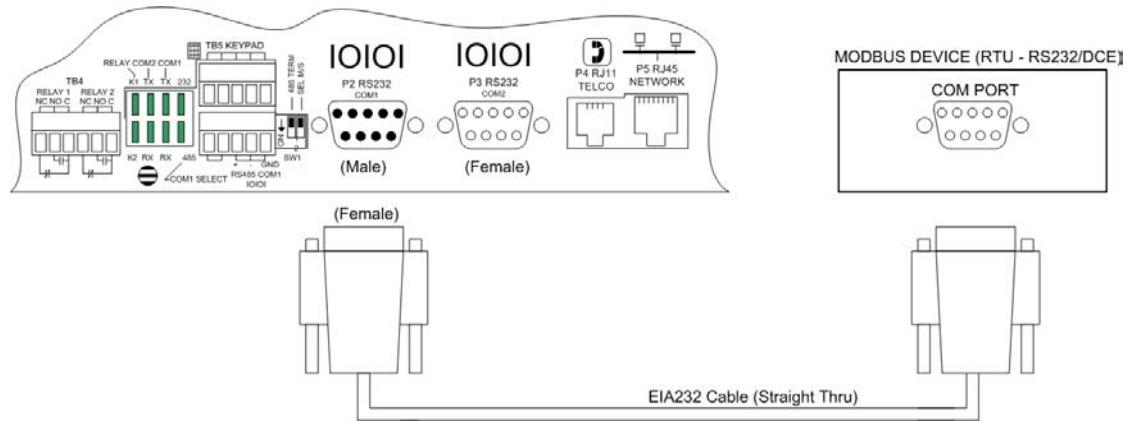
Figure 4.1   FMS Modbus EIA-232 Connection to an EIA-232 DCE Device
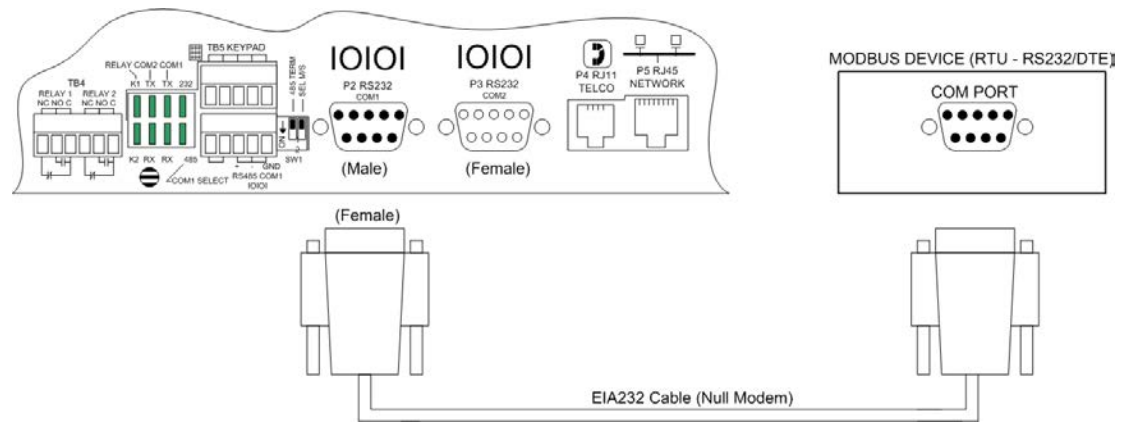
Figure 4.2 FMS Modbus EIA-232 Connection to an EIA-232 DTE Device

4.2.2 EIA-485

The EIA-485 COM Port 1 on the FMS is used to connect the FMS-as a Modbus Master-to one or more Modbus Slave devices or it is used to connect a Modbus Master device to the FMS as a Modbus Slave. The Modbus EIA-485 is active over COM1 (TB5 Pins 8, 9 and 10). The EIA-485 port allows communications between one Modbus Master and one or more Modbus Slave devices. EIA-485 can accommodate up to 4,000 feet (1,219m) of cable length. There are many variations on how terminals are labeled on EIA-485 2-wire (e.g., some devices use (+) and (-) or A and B, and some use (-) and (+) or B and A. Therefore, if a Slave unit is not responding, try swapping the wires.

Pin	Description
8	EIA-485(+)
9	EIA-485(-)
10	Ground

Table 4.2 COM1 TB5 Pin Out
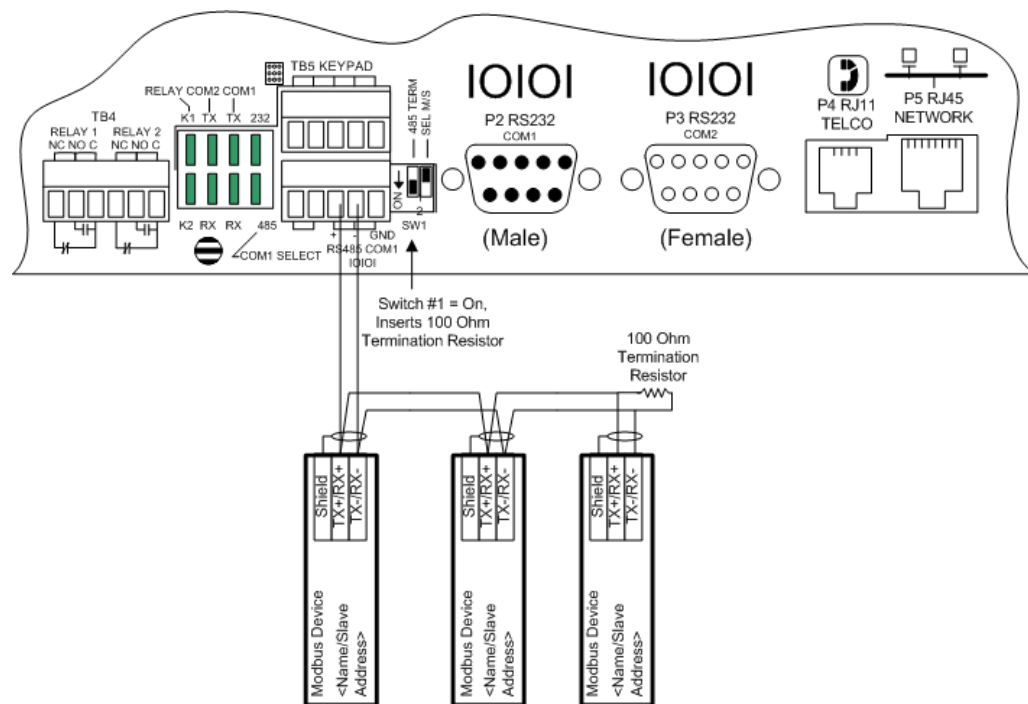
Figure 4.3 EIA-485 Wiring Connections
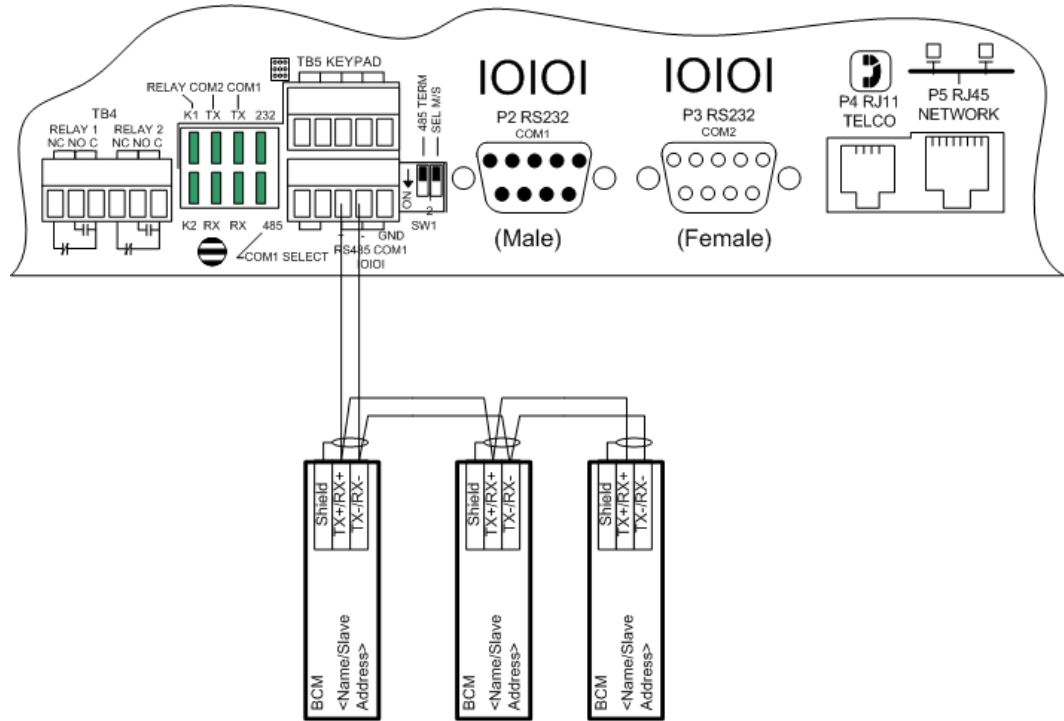
Figure 4.4 EIA-485 Wiring to RLE/Veris BCMs (Branch Circuit Monitors)

4.3. Modbus Master

Please refer to section 3.4.24, "Modbus/SNMP/BACnet/Telnet Master" on page 101 for detailed descriptions of the Modbus Master Configuration screens.

4.3.1 Communications Logs

The FMS logs a vast amount of communications data. Links to the follow logs are found near the bottom of the Configuration > Modbus/Snmp/BACnet/Telnet Master web page.

4.3.2 Modbus Slave Register Display Log

This link displays the current contents of the FMS Slave Registers. The rows correspond to the FMS channel numbers (inputs 1–104) with each row containing the Modbus Slave Registers that pertain to that particular input.

```
Modbus slave register map/values

40001 - 40106  Input "live" values
40200          Number of alarms present
40201 - 40306  Input alarm bitfield  (Inputs 1-106)
               Value of 0 = No Alarm
               Bit:0 = High1 Alarm
               Bit:1 = Low1 Alarm
               Bit:2 = High2 Alarm
               Bit:3 = Low2 Alarm
               Bit:4 = Digital Alarm
40401 - 40506  Input configuration (Inputs 1-106)
               0 = Not Installed
               1 = Not Configured
               2 = Analog 4-20ma
               3 = Digital NO
               4 = Digital NC
               5 = Digital Status
               6 = Analog 0-5V
               7 = Analog 0-10V

1:    40001: 73        40201: 0      40401: 2 (a)
2:    40002: 42        40202: 0      40402: 2 (a)
3:    40003: 73        40203: 0      40403: 2 (a)
4:    40004: 43        40204: 0      40404: 2 (a)
5:    40005: 0         40205: 0      40405: 3 (a)
6:    40006: 0         40206: 0      40406: 3 (a)
7:    40007: 0         40207: 0      40407: 3 (a)
8:    40008: 0         40208: 0      40408: 3 (a)
9:    40009: 70        40209: 0      40409: 2 (a)
10:   40010: 0         40210: 0      40410: 3 (a)

11:   40011: 70        40211: 0      40411: 2 (a)
12:   40012: 42        40212: 0      40412: 2 (a)
13:   40013: 70        40213: 0      40413: 2 (a)
14:   40014: 67        40214: 0      40414: 2 (a)
15:   40015: 43        40215: 0      40415: 2 (a)
16:   40016: 69        40216: 0      40416: 2 (a)
17:   40017: 70        40217: 0      40417: 2 (a)
18:   40018: 67        40218: 0      40418: 2 (a)
```

Figure 4.5 Modbus Slave Register Display Log

Column	Description
1	Displays the Falcon Channel or Input Number (1-104).
2	Displays the Falcon Slave Register Number for the Channel Input Reading.
3	Displays the Value of the Current Channel Input. Channels configured for digital will be a "0" when the input is normal and "1" when the input is in alarm.
4	Displays the Falcon Slave Register Number for the Channel Input Alarm Status.

Table 4.3 Modbus Slave Register Display Log Fields

Column	Description
5	Displays the Contents of the Channel Input Alarm Register.
	The number displayed will be the sum of all active alarms. For example, if an input is above the High1and High2 limits, the number displayed will be 5 (1 + 4 = 5).
	0 = No Alarm
	1 = High 1 Alarm
	2 = Low 1 Alarm
	4 = High 2 Alarm
	8 = Low 2 Alarm
	10 = Digital Alarm
6	Displays the Falcon Slave Register Number for the Channel Input Configuration Status.
7	Displays the contents of the Channel Input Configuration Register.
	0 = Not Installed
	1 = Not Configured
	2 = Analog 4-20mA
	3 = Digital NO
	4 = Digital NC
	5 = Digital Status
	6 = Analog 0–5VDC
	7 = Analog 0–10 VDC
8	Provides Additional Information for the Falcon Input
	(0) = Input is Not Installed (an Expansion Card not installed for this channel).
	(a) = This Channel is an Analog Input (Main Board input or Expansion Card "A").
	(d) = This Channel is a Digital Input (Expansion Card "C").
	(R) = This Channel is a Relay Output.

Table 4.3 Modbus Slave Register Display Log Fields

4.3.3 Modbus Packet Log

This link displays a log of the Modbus packets that the FMS is sending and receiving.

```
0003062706 M0013 485-Tx: 01 03 01 1C 00 02 04 31
0003062716 M0013 485-Rx: 01 03 04 3F 78 51 EC 4A 23
0003062736 M0014 485-Tx: 01 03 01 1E 00 02 A5 F1
0003062746 M0014 485-Rx: 01 03 04 43 F0 80 00 8E 44
0003062766 M0015 485-Tx: 01 03 01 20 00 02 C4 3D
0003062792 M0015 485-Rx: 01 03 04 43 F0 00 00 EF 84
0003062812 M0016 485-Tx: 01 03 01 22 00 02 65 FD
0003062832 M0016 485-Rx: 01 03 04 43 EF 80 00 BF 82
0003062852 M0017 485-Tx: 01 03 01 24 00 02 85 FC
0003062872 M0017 485-Rx: 01 03 04 43 71 00 00 BF AC
0003062892 M0018 485-Tx: 01 03 01 26 00 02 24 3C
0003062902 M0018 485-Rx: 01 03 04 43 70 00 00 EE 6C
0003062922 M0019 485-Tx: 01 03 01 28 00 02 45 FF
0003062932 M0019 485-Rx: 01 03 04 43 6F 00 00 DF AA
0003062952 M0020 485-Tx: 01 03 01 2A 00 02 E4 3F
0003062962 M0020 485-Rx: 01 03 04 42 74 FE 4B AE 06
0003062982 M0021 485-Tx: 01 03 01 2C 00 02 04 3E
0003062992 M0021 485-Rx: 01 03 04 42 70 FE 4B EF C7
0003063020 M0022 485-Tx: 01 03 01 2E 00 02 A5 FE
0003063030 M0022 485-Rx: 01 03 04 42 6C FE 4B 2E 01
0003063050 M0023 485-Tx: 01 03 01 30 00 02 C5 F8
```

Figure 4.6   Modbus Packet Log

Column	Description
1	System Up Time.
2	Modbus Master Register Number.
3	Direction of Packet:
	OUT = Packet Sent from the Falcon (Master Request).
	IN = Packet Received by the Falcon (Slave Response).
4	Modbus Packet.

Table 4.4   Modbus Packet Log Fields

4.3.4 Modbus Master Poll Data Log

This link allows users to view the raw data the FMS receives from the Slave(s).

```
 1   11:40:44 4 404593
 2   11:40:44 4 83.26
 3   11:40:44 4 3.12
 4   11:40:45 4 26.34
 5   11:40:45 4 0.98
 6   11:40:45 4 480.00
 7   11:40:46 4 118.99
 8   11:40:46 4 55.59
 9   11:40:46 4 27.22
10   11:40:47 4 26.68
11   11:40:47 4 26.15
12   11:40:47 4 0.99
13   11:40:47 4 0.98
14   11:40:48 4 0.97
15   11:40:48 4 481.00
16   11:40:48 4 480.00
17   11:40:49 4 479.00
18   11:40:49 4 241.00
19   11:40:49 4 240.00
20   11:40:50 4 239.00
21   11:40:50 4 57.07
22   11:40:50 4 56.07
```

Figure 4.7   Modbus Master Poll Data Log

Column	Description
1	Falcon Modbus Master Register Number (1-628).
2	Time the Data is received, in HH (hour): MM (minute): SS (second) format where HH is a number 1-24.
3	Number of Bytes Reserved for Data. This will be 2 unless the Modbus Master register is configured to read a Long or Float value, in which case it would be 4.
4	Slave Data in decimal form

Table 4.5   Modbus Master Poll Data Log Fields

4.3.5 SMS/Text Modem Log

This link allows users to view the communications between the FMS and the modem.

4.3.6 BACnet Packet Log

Use this log to view BACnet packet communications information.

4.3.7 BACnet Master Data Log

This log provides BACnet Master information.

4.4.   Import Modbus Information to a Physical Point

From the Configuration Menu, click on the **Inputs and Relays** link. Select any input not currently in use.

Inputs											
S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label	S.Ch	(#)	Label
	(1)	Utility Meter		(2)	IT Power		(3)	Ancillary Power		(4)	DigStatus #4 Ac
	(5)	AC Unit On/Off		(6)	DigIn ANALOG #6		(7)	Import bacnet #		(8)	601
1.1	(9)	ANALOG #1.1 0-1	1.2	(10)	ANALOG #1.2	1.3	(11)	ANALOG #1.3	1.4	(12)	ANALOG #1.4
1.5	(13)	ANALOG #1.5	1.6	(14)	ANALOG #1.6	1.7	(15)	upsOutputStatus	1.8	(16)	ANALOG #1.8
1.9	(17)	ANALOG #1.9	1.10	(18)	ANALOG #1.10	1.11	(19)	ANALOG #1.11	1.12	(20)	ANALOG #1.12
2.1	(33)	Input #2.1	2.2	(34)	Input #2.2	2.3	(35)	Input #2.3	2.4	(36)	Input #2.4
2.5	(37)	Input #2.5	2.6	(38)	Input #2.6	2.7	(39)	Input #2.7	2.8	(40)	Input #2.8
2.9	(41)	Input #2.9	2.10	(42)	Input #2.10	2.11	(43)	Input #2.11	2.12	(44)	Input #2.12
2.13	(45)	Input #2.13	2.14	(46)	Input #2.14	2.15	(47)	Input #2.15	2.16	(48)	Input #2.16
2.17	(49)	Input #2.17	2.18	(50)	Input #2.18	2.19	(51)	Input #2.19	2.20	(52)	Input #2.20
2.21	(53)	Input #2.21	2.22	(54)	Input #2.22	2.23	(55)	Input #2.23	2.24	(56)	Input #2.24
5.1	(105)	Internal Temper	5.2	(106)	Internal Humidi						

Input Group Labels   Download Points List Export CSV Table

Relays											
	(1)	RELAY #1		(2)	RELAY #2	1.1	(3)	RELAY #1.1	1.2	(4)	RELAY #1.2
1.3	(5)	RELAY #1.3	1.4	(6)	RELAY #1.4	1.5	(7)	RELAY #1.5	1.6	(8)	RELAY #1.6
1.7	(9)	RELAY #1.7	1.8	(10)	RELAY #1.8						

Figure 4.8   Input and Relay Configuration Menu

1 To indicate the input will be pulling in Modbus information, change the Select Input Type drop down menu from Physical to Modbus Import.

2 Click the Submit Changes button.

3 Once this has been configured as a Modbus Import, the physical channel is no longer available for additional equipment.

4 Once Modbus Import has been submitted, a new field will appear called Register/Instance Index. Enter the register index number on the register screen for the selected function.

5 Edit the other fields as necessary. Descriptions of the fields on the Input Configuration screen can be found on "Inputs and Relays" on page 41.

4.5. Modbus/SNMP/BACnet Slave Units

Basic Slave Unit configuration information can be found in section 3.4.25, "Modbus/SNMP/ BACnet Slave Units" on page 104. The following information is available for more advanced functionality.

4.5.1 Register Configuration

Selecting a Register link at the bottom of the Modbus/Bacnet/Snmp Slave Unit Configuration page will display a page similar to the one shown here. Use this page to navigate among the configuration registers.

Modbus Register Configuration	
# -Ut-Reg Label	# -Ut-Reg Label
1 -1 -40001-Utility Power	51 -5 -40301-Generator In Auto
2 -1 -40004-Ancillary Power	52 -5 -40002-(Blank)
3 -1 -40003-IT Power	53 -0 -00000-(Blank)
4 -0 -40007-Test Reg 40007	54 -0 -00000-(Blank)
5 -0 -00000-(Blank)	55 -0 -00000-(Blank)
6 -2 -30001-Leak Detected	56 -0 -00000-(Blank)
7 -2 -30001-Cable Break	57 -0 -00000-(Blank)
8 -2 -30004-psi	58 -0 -00000-(Blank)
9 -0 -00000-(Blank)	59 -0 -00000-(Blank)
10 -0 -00000-(Blank)	60 -0 -00000-(Blank)
11 -0 -40001-Test Reg 40001	61 -6 -40001-Amps w/3000 CT1
12 -0 -40002-Test Reg 40002 degF	62 -6 -40002-Amps w/1600 CT1
13 -0 -40003-Test Reg 40003 degF	63 -6 -40003-Power w/3000 CT1
14 -0 -40004-bitflag test	64 -6 -40004-Power w/1600 CT1
15 -0 -40005-Enum Test	65 -6 -40003-Power w/3000 CT1
16 -0 -00000-(Blank)	66 -6 -40003-Power w/1600 CT1

Figure 4.9   Register Configuration Menu

If you select a Modbus register to configure, you'll see options similar to the ones listed below:

Figure 4.10 Individual Modbus Register Configuration Screen

Option	Description
Switch View	Toggle this option to view either the Modbus Register, SNMP Object, or BACnet Instance
Submit Changes Button	Click this button to save any changes entered on the page. If you access another page, or press the <<Prev or Next>> links without clicking the Submit Changes button, all your changes will be lost.
Unit	Enter the Slave Unit Number. This is *not* the Slave address, but the Slave Unit Number shown on the Slave Unit Configuration page; see section 3.4.25, "Modbus/SNMP/BACnet Slave Units" on page 104.

Table 4.6 Individual Modbus Register Configuration Options

Option	Description
Register Acquisition	Designate how the register should be acquired.
Register/Offset	Enter the Register Number for the data to be read. The Register Number is located on the Slave Units Register Map; see 4.7.1, "Slave Register Map" on page 155.
Register Type	Select the Data Type of the Register. • Unsigned Int • Signed Int • Long • Float • Alarm Bit/ ON= ALARM • Alarm Bit/ OFF=ALARM • Status Bit - No Log • Status Bit - Logged • Coil Status • Input Status **NOTE:** Refer to the manufacturer's equipment guide for the register numbers and the data type.
Scaler	Select a multiplier for the data value.
Custom Gain	If you'd like a gain to be applied to the value, designate that here.
Offset	Allows users to fine-tune analog values. Offset adjustment may be required by certain manufacturers.
Bitflag	Applies to Data Types, Alarm Bit, Status Bit-Logged and Status Bit - No Log. Selects which bit is read from the 16 or 32 bit register value.
Registers	Designate the correct type of read holding/input register.
Word Order	Applies to Data Types Long and Float. Long and Float Data Types read two consecutive registers. The word order selects if the first register is the larger or smaller part of the number.
Label	Enter a label to describe the Data Point.
UOM/Map Label	Specify the unit of measure you are using for this specific point.
Log Index	Applies to Data Types Signed Int, Unsigned Int, Long and Float. The FMS has 232 entries reserved for logging (Min, Hour and Day Logs). Enter a value of 1 to 232 if the point is to be internally logged on the FMS. Each register to be logged requires a unique entry number.
UOM Conversion	Convert a unit of measure from the way it is communicated by the device to the way you would like to have it displayed. • deg C - deg F (1,10,100,1000 Scale) • deg C - deg F (1/32 Scale) • kPa - PSI (1/8, 1/28 Scale)
Enumerated Label Set	Sets of enumerated labels can be configured from the **Enumerated Labels Configuration** link on the bottom of the Modbus/Snmp/Bacnet Slave units page. If you have a label set configured, designate which one you'd like to use here.

Table 4.6 Individual Modbus Register Configuration Options

Option	Description
Alarm Type	Designate which type of alarm this will be.
Alarm Thresholds: **High 2, High1, Low1, Low2**	Set high and low - or major and minor - thresholds for alarm analog alarm values being read by these points.
Enumerated Active Value	If you'd like to designate an enumerated active value, do so here.
Snmp Trap Recipients	The SNMP/Syslog page allows you to configure SNMP trap recipients. Once those are configured, you can designate which IP addresses should receive traps for this register.
Map Box Size	Customize the size of the mapped object. By default, the height of the object, as it appears on the map, is approximately 20 pixels, and the width automatically adjusts to the length of the text. This setting allows users to expand the size of the object to fill a defined area.
Map Coordinate	Fine tune the location of the object on the map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Graphical Mapping	Designate the device's location on the FMS graphical map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Test Map	View the mapped location of the point you're currently configuring.

Table 4.6 Individual Modbus Register Configuration Options

If you select an Snmp register to configure, you'll see options similar to the ones listed below:

Figure 4.11 Individual Snmp Register Configuration Screen

Option	Description
Switch View	Toggle this option to view either the Modbus Register, SNMP Object, or BACnet Instance
Submit Changes Button	Click this button to save any changes entered on the page. If you access another page, or press the <<Prev or Next>> links without clicking the Submit Changes button, all your changes will be lost.
Unit	Enter the Slave Unit Number. This is *not* the Slave address, but the Slave Unit Number shown on the Slave Unit Configuration page; see section 3.4.25, "Modbus/SNMP/BACnet Slave Units" on page 104.
Register Acquisition	Designate how the register should be acquired.
OID	Designate the object identifier (OID).

Table 4.7 Individual Snmp Register Configuration Options

Option	Description
Object Type	Select the appropriate object type: • Long Integer (32 bits) • Float (Converted Display String)
Scaler	Select a multiplier for the data value.
Custom Gain	If you'd like a gain to be applied to the value, designate that here.
Offset	Allows users to fine-tune analog values. Offset adjustment may be required by certain manufacturers.
Label	Enter a label to describe the Data Point.
UOM/Map Label	Specify the unit of measure you are using for this specific point.
Log Index	Applies to Data Types Signed Int, Unsigned Int, Long and Float. The FMS has 232 entries reserved for logging (Min, Hour and Day Logs). Enter a value of 1 to 232 if the point is to be internally logged on the FMS. Each register to be logged requires a unique entry number.
UOM Conversion	Convert a unit of measure from the way it is communicated by the device to the way you would like to have it displayed. • deg C - deg F (1,10,100,1000 Scale) • deg C - deg F (1/32 Scale) • kPa - PSI (1/8, 1/28 Scale)
Enumerated Label Set	Sets of enumerated labels can be configured from the **Enumerated Labels Configuration** link on the bottom of the Modbus/Snmp/Bacnet Slave units page. If you have a label set configured, designate which one you'd like to use here.
Alarm Type	Designate which type of alarm this will be.
Alarm Thresholds: **High 2, High1, Low1, Low2**	Set high and low - or major and minor - thresholds for alarm analog alarm values being read by these points.
Enumerated Active Value	If you'd like to designate an enumerated active value, do so here.
Snmp Trap Recipients	The SNMP/Syslog page allows you to configure SNMP trap recipients. Once those are configured, you can designate which IP addresses should receive traps for this register.
Map Box Size	Customize the size of the mapped object. By default, the height of the object, as it appears on the map, is approximately 20 pixels, and the width automatically adjusts to the length of the text. This setting allows users to expand the size of the object to fill a defined area.
Map Coordinate	Fine tune the location of the object on the map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Graphical Mapping	Designate the device's location on the FMS graphical map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Test Map	View the mapped location of the point you're currently configuring.

Table 4.7 Individual Snmp Register Configuration Options

If you select an Bacnet register to configure, you'll see options similar to the ones listed below:

Figure 4.12 Individual Bacnet Register Configuration Screen

Option	Description
Switch View	Toggle this option to view either the Modbus Register, SNMP Object, or BACnet Instance
Submit Changes Button	Click this button to save any changes entered on the page. If you access another page, or press the <<Prev or Next>> links without clicking the Submit Changes button, all your changes will be lost.
Unit	Enter the Slave Unit Number. This is *not* the Slave address, but the Slave Unit Number shown on the Slave Unit Configuration page; see section 3.4.25, "Modbus/SNMP/BACnet Slave Units" on page 104.
Register Acquisition	Designate how the register should be acquired.

Table 4.8 Individual Bacnet Register Configuration Options

Option	Description
Object Type	Select the appropriate object type: • Analog Input • Analog Output • Analog Value • Binary Input • Binary Output • Binary Value • Multistate Value
Instance-PV	Designate the appropriate instance-pv.
Binary Alarm	Check this box if the register is a binary alarm.
Label	Enter a label to describe the Data Point.
UOM/Map Label	Specify the unit of measure you are using for this specific point.
Log Index	Applies to Data Types Signed Int, Unsigned Int, Long and Float. The FMS has 232 entries reserved for logging (Min, Hour and Day Logs). Enter a value of 1 to 232 if the point is to be internally logged on the FMS. Each register to be logged requires a unique entry number.
Enumerated Label Set	Sets of enumerated labels can be configured from the **Enumerated Labels Configuration** link on the bottom of the Modbus/Snmp/Bacnet Slave units page. If you have a label set configured, designate which one you'd like to use here.
Analog Alarm Type	Designate which type of analog alarm this will be.
Alarm Thresholds: **High 2, High1, Low1, Low2**	Set high and low - or major and minor - thresholds for alarm analog alarm values being read by these points.
Multistate Active Value	If you'd like to designate an multistate active value, do so here.
Snmp Trap Recipients	The SNMP/Syslog page allows you to configure SNMP trap recipients. Once those are configured, you can designate which IP addresses should receive traps for this register.
Map Box Size	Customize the size of the mapped object. By default, the height of the object, as it appears on the map, is approximately 20 pixels, and the width automatically adjusts to the length of the text. This setting allows users to expand the size of the object to fill a defined area.
Map Coordinate	Fine tune the location of the object on the map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Graphical Mapping	Designate the device's location on the FMS graphical map. Refer to "Map (Facility Mapping)" on page 114 for further information.
Test Map	View the mapped location of the point you're currently configuring.

Table 4.8   Individual Bacnet Register Configuration Options

4.5.2 Read/Preset Modbus Register

The **Read/Preset Modbus Register** link at the bottom of the Modbus/Snmp/Bacnet Slave Unit Configuration page displays the following. This page reads or writes individual registers for troubleshooting and for configuring Slave parameters.

Figure 4.13 Read/Preset Single Register Page

4.5.3 Preset Configuration

The **Preset Configuration** link at the bottom of the Modbus/Snmp/Bacnet Slave Unit Configuration page displays the following. This page allows you to configure a unit quickly with specific preset Modbus registers.

Figure 4.14 Modbus Preset Configuration Page

4.5.4 Enumerated Labels Configuration

The **Enumerated Labels Configuration** link at the bottom of the Modbus/Snmp/Bacnet Slave Unit Configuration page displays the following. This page allows you to configure five sets of enumerated labels that can be used by multiple registers..

Figure 4.15 Enumerated Labels Configuration Page

4.6. Modbus/Slave Units Configuration – Modbus Master Branch Circuit Monitor– 4 or 16

The FMS can be configured as a Modbus Master for 4 or 16 branch circuit monitors (BCMs). This configuration is used to configure the information regarding the Modbus Slave BCMs from which the FMS will poll data.

To access this page, select Modbus Slave Units from the Configuration Menu (you must have already configured the Modbus/SNMP/BACnet/Telnet setting to Modbus Master BCM-4 or BCM-16).

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
1	Standard	Serial	0	BCM #1	
2	Standard	Serial	0	BCM #2	
3	Standard	Serial	0	BCM #3	
4	Standard	Serial	0	BCM #4	

Figure 4.16 Modbus BCM-4 Unit Configuration

Modbus BCM Unit Configuration					
Unit #	Protocol	Access	Address	Unit Description	Register Link
1	Standard	Serial	0	BCM #1	
2	Standard	Serial	0	BCM #2	
3	Standard	Serial	0	BCM #3	
4	Standard	Serial	0	BCM #4	
5	Standard	Serial	0	BCM #5	
6	Standard	Serial	0	BCM #6	
7	Standard	Serial	0	BCM #7	
8	Standard	Serial	0	BCM #8	
9	Standard	Serial	0	BCM #9	
10	Standard	Serial	0	BCM #10	
11	Standard	Serial	0	BCM #11	
12	Standard	Serial	0	BCM #12	
13	Standard	Serial	0	BCM #13	
14	Standard	Serial	0	BCM #14	
15	Standard	Serial	0	BCM #15	
16	Standard	Serial	0	BCM #16	

Modbus BCM-16 Unit Configuration Page

Select an available slave unit number, and configure the data as outlined in "Modbus/SNMP/BACnet Slave Units" on page 104.

When you configure the RTU Station Address, enter the address of the Modbus Slave device. Be sure this matches the address set by the Dip Switches on the BCM. Each BCM requires a unique address.

4.6.1 Modbus Register Links

Clicking a **Modbus Registers** link next to the BCM on the Modbus BCM Unit Configuration page displays the following page.

BCM #1					
CB	Label	Value		CB	Label
1	BCM #1 Circuit Breaker #1	1.353		2	BCM #1 Circuit Breaker #2
3	BCM #1 Circuit Breaker #3	5.018		4	BCM #1 Circuit Breaker #4
5	BCM #1 Circuit Breaker #5	2.475		6	BCM #1 Circuit Breaker #6
7	BCM #1 Circuit Breaker #7	1.324		8	BCM #1 Circuit Breaker #8
9	BCM #1 Circuit Breaker #9	2.070		10	BCM #1 Circuit Breaker #10
11	BCM #1 Circuit Breaker #11	0.000		12	BCM #1 Circuit Breaker #12
13	BCM #1 Circuit Breaker #13	4.565		14	BCM #1 Circuit Breaker #14
15	BCM #1 Circuit Breaker #15	4.806		16	BCM #1 Circuit Breaker #16
17	BCM #1 Circuit Breaker #17	0.000		18	BCM #1 Circuit Breaker #18
19	BCM #1 Circuit Breaker #19	0.000		20	BCM #1 Circuit Breaker #20
21	BCM #1 Circuit Breaker #21	0.000		22	BCM #1 Circuit Breaker #22
23	BCM #1 Circuit Breaker #23	0.000		24	BCM #1 Circuit Breaker #24
25	BCM #1 Circuit Breaker #25	0.000		26	BCM #1 Circuit Breaker #26
27	BCM #1 Circuit Breaker #27	0.000		28	BCM #1 Circuit Breaker #28
29	BCM #1 Circuit Breaker #29	0.000		30	BCM #1 Circuit Breaker #30
31	BCM #1 Circuit Breaker #31	2.015		32	BCM #1 Circuit Breaker #32
33	BCM #1 Circuit Breaker #33	0.000		34	BCM #1 Circuit Breaker #34
35	BCM #1 Circuit Breaker #35	0.000		36	BCM #1 Circuit Breaker #36
37	BCM #1 Circuit Breaker #37	0.000		38	BCM #1 Circuit Breaker #38
39	BCM #1 Circuit Breaker #39	0.000		40	BCM #1 Circuit Breaker #40
41	BCM #1 Circuit Breaker #41	8.560		42	BCM #1 Circuit Breaker #42

Figure 4.17 Modbus Registers (BCM) Page

4.6.1.1 CB# Links

Pressing a **CB #** (CH#) link displays the Circuit Breaker Configurations for each BCM.

BCM #1					
CB	Label	Value	CB	Label	Value
1	BCM #1 Circuit Breaker #1	1.385	2	BCM #1 Circuit Breaker #2	1.357
3	BCM #1 Circuit Breaker #3	4.766	4	BCM #1 Circuit Breaker #4	0.000
5	BCM #1 Circuit Breaker #5	2.667	6	BCM #1 Circuit Breaker #6	0.000
7	BCM #1 Circuit Breaker #7	1.265	8	BCM #1 Circuit Breaker #8	9.104
9	BCM #1 Circuit Breaker #9	1.341	10	BCM #1 Circuit Breaker #10	0.000
11	BCM #1 Circuit Breaker #11	0.000	12	BCM #1 Circuit Breaker #12	0.000
13	BCM #1 Circuit Breaker #13	4.517	14	BCM #1 Circuit Breaker #14	0.000
15	BCM #1 Circuit Breaker #15	4.774	16	BCM #1 Circuit Breaker #16	0.266
17	BCM #1 Circuit Breaker #17	0.000	18	BCM #1 Circuit Breaker #18	0.000
19	BCM #1 Circuit Breaker #19	0.000	20	BCM #1 Circuit Breaker #20	0.000
21	BCM #1 Circuit Breaker #21	0.000	22	BCM #1 Circuit Breaker #22	0.000
23	BCM #1 Circuit Breaker #23	0.000	24	BCM #1 Circuit Breaker #24	0.000
25	BCM #1 Circuit Breaker #25	0.000	26	BCM #1 Circuit Breaker #26	0.000
27	BCM #1 Circuit Breaker #27	0.000	28	BCM #1 Circuit Breaker #28	0.000
29	BCM #1 Circuit Breaker #29	0.000	30	BCM #1 Circuit Breaker #30	0.000
31	BCM #1 Circuit Breaker #31	1.458	32	BCM #1 Circuit Breaker #32	0.000
33	BCM #1 Circuit Breaker #33	0.000	34	BCM #1 Circuit Breaker #34	0.000
35	BCM #1 Circuit Breaker #35	0.000	36	BCM #1 Circuit Breaker #36	0.000
37	BCM #1 Circuit Breaker #37	0.000	38	BCM #1 Circuit Breaker #38	0.000
39	BCM #1 Circuit Breaker #39	0.000	40	BCM #1 Circuit Breaker #40	0.000
41	BCM #1 Circuit Breaker #41	1.930	42	BCM #1 Circuit Breaker #42	0.000

Figure 4.18 Circuit Breaker Configurations for Individual BCMs

Option	Description
Label	Enter a label to describe the circuit breaker. The label is included in notifications and for identification on the Slave Unit Monitoring page.
Zero Amp Enable	Check to enable alarm and notification if the branch circuit current falls below the zero amp level as set on the Slave Configuration page.
Breaker Size	Enter the circuit breaker size in the BCM.
Warning Threshold	Enter the warning threshold level-in percent-in the BCM.
Alarm Threshold	Enter the alarm threshold level-in percent-in the BCM.
Warning Time Delay	Enter the warning time delay-in seconds-in the BCM.
Alarm Time Delay	Enter the alarm time delay-in seconds-in the BCM.

Table 4.9 Circuit Breaker Configurations for Individual BCMs

4.7. Additional Modbus Information

4.7.1 Slave Register Map

Register	Description	Range
40001	Input #1 value	-32678 – 32767
40104	Input #104 value	-32678 – 32767
40105	Internal Temperature Sensor	-32678 – 32767
40106	Internal Humidity Sensor	-32678 – 32767
40107-40187	Reserved	
40188-40193	MAC address	00:90:5b:01:01:01
40194-40197	IP address	10.0.0.203
40198	Model Number	100
40199	Firmware Version	73
40200	Number of Alarms Present	0 – 65535
40201	Input #1 alarm bit map	0 – 0x0010
40304	Input #104 alarm bit map	0 – 0x0010
40305	Internal Temperature Sensor - alarm bit map	0 – 0x0010
40306	Internal Humidity Sensor - alarm map	0 – 0x0010
40307-40400	Reserved	
40401	Input #1 config code	0 – 7
40504	Input #104 config code	0 – 7

Table 4.10 Slave Register Map

4.7.2 Alarm Bit Map (Reg 40201–-40306)

Bit Map	Description
0x0000	No Alarm
B:0 0x0001	High1 Alarm
B:1 0x0002	Low1 Alarm
B:2 0x0004	High2 Alarm
B:3 0x0008	Low2 Alarm
B:4 0x0010	Digital Alarm

Table 4.11 Alarm Bit Map

4.7.3 Configuration Codes (Reg 40401–40504)

Code	Description
0	Not Installed
1	Not Configured
2	Analog 4-20ma
3	Digital NO
4	Digital NC
5	Digital Status
6	Analog 0-5V
7	Analog 0-10V

Table 4.12 Configuration Codes

4.8.   Telnet

The FMS supports a Telnet connection over IP port 23. When properly configured a Telnet user can use the Com1 port of the FMS to communicate to external EIA-232 enabled devices.

4.8.1 Hardware Connections

The Com1 port is located on the back of the FMS. The COM1 Transmit and Receive LEDs are also located on the back of the FMS.

The EIA-232 port allows communications between the FMS and one other device (point-to-point connection). The EIA-232 port has maximum cable length of 50 feet (15.2m).

Pin	Description
Pin 1	Data Carrier Detect
Pin 2	Receive Data
Pin 3	Transmit Data
Pin 4	Data Terminal Ready
Pin 5	Signal Ground
Pin 6	No Connection
Pin 7	Request to Send (internally connected to Pin 8)
Pin 8	Clear to Send (internally connected to Pin 7)
Pin 9	No Connection

Table 4.13 COM1 DB9 Male Pin Out
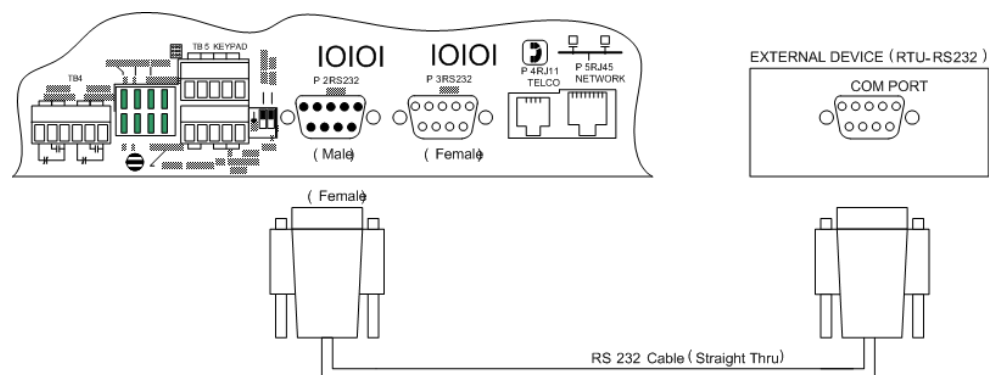
Figure 4.19 FMS Connection to an EIA-232 Device

Connect a nine-pin, straight-through serial cable to the FMS and to the other device.

Once you connect the serial cable, the FMS automatically switches to EIA-232 mode.

4.8.2 Telnet/COM1 Configuration

The Modbus/SNMP/BACnet/Telnet Master Configuration page allows the user to configure the FMS Telnet features.

Figure 4.20 Modbus/SNMP/BACnet/Telnet Configuration Page

If you'd like to utilize Telnet communications, configure the following fields:

Option	Description
Serial Com 1 Protocol Type	Configures the Serial COM Port 1 (EIA-232 or EIA-485). Select Telnet to activate Telnet capabilities. • **Telnet**: Enables the FMS to communicate via Serial COM Port 1.
Serial Baud Rate	This option sets the Serial COM Port 1 to 1200, 2400 or 9600 Baud. All the devices connected to the FMS Serial COM Port 1 must be set to operate at the same Baud rate.
Serial Interface Type	Enable the FMS Modbus to operate on the EIA-485 or EIA-232 COM Port 1.
Telnet Inactivity Timeout	After this many minutes of inactivity, the FMS will timeout of Telnet communication. Set this value in seconds, from 0 - 999.
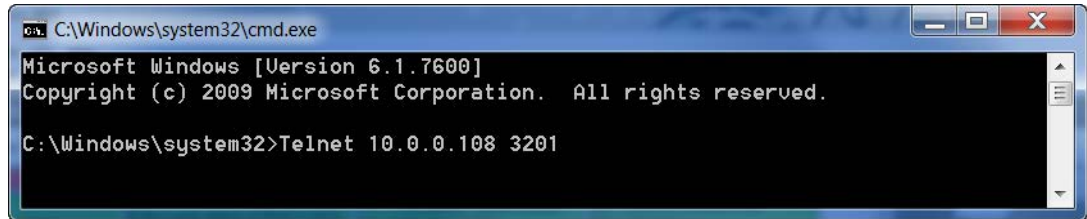
Table 4.14 Telnet Communications Options

4.8.3 Telnet Communication

To access a device through the FMS:

1 Open a Command Prompt window and type the following:

Telnet[sp](Falcon IP address)[sp](Port number)
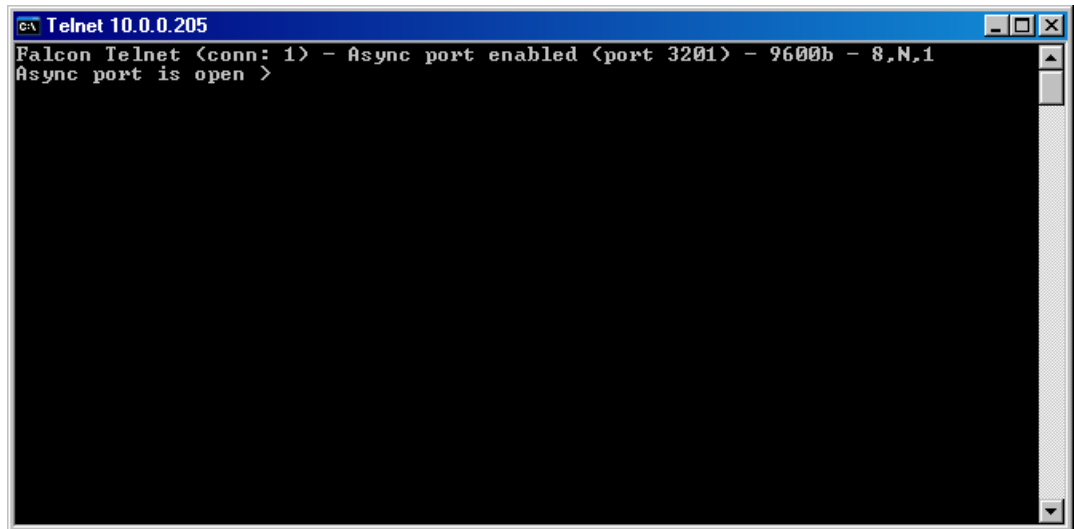
Telnet Communication, IP Address of 10.0.0.108, Port 3201

Note If the FMS is going to be looped back into itself, the Command Prompt line feed must be set to carriage return (CR) only.

⚠️ **WARNING**
Do not Telnet back into the Falcon. This could cause severe problems, including system freezing or complete shutdown of the system.

2 Press **Enter**. The device connects.

Figure 4.21 Example Telnet Connection Showing Specific Parameters

Once a Telnet connection is established, the menu displays for the connected device. Menus vary depending on the device.

EIA-232 INTERFACE

The FMS EIA-232 interface provides a more detailed and intricate view of the FMS. It also allows users to access more elaborate IP configurations and diagnostics.

In order to proceed through this chapter, the FMS must be connected to a PC via the EIA-232 port. If the FMS is not yet connected to a PC, connect the FMS EIA-232 COM2 port as follows:

1 Connect the EIA-232 port on the FMS to a terminal or PC running terminal emulation software (HyperTerminal) with a 9-pin male-female straight through serial cable.

2 Set the appropriate COM Port to **9600 baud**, **NO parity**, **8 data bits**, **1 stop bit**, **(9600/N/8/ 1)**, and **no software or hardware flow control**.

3 Once the terminal emulation software starts, press **Enter** on the keyboard, then press **?** and the Main Menu should appear. If the Main Menu does not appear, check the communication settings and make sure the unit is powered on.

WARNING

The Bootloader section is designed for experienced technicians or users responsible for maintaining the system. Exit immediately if you have not been trained in the use of the Bootloader commands. Contact RLE for more information regarding the commands in this section.

5.1.   Unit Start Up

When the unit is powered up, diagnostic tests are performed and the Flash Program code is verified. The main system code is executed after a five second delay. During the boot up sequence, the System Status LED will flash at a rapid rate of 10 flashes per second. If the System Status LED continues to flash for more then 20 seconds, there is a fault with the unit and service is required, contact RLE Tech support for more information.

5.2.   Flash Executable Code

After the boot up sequence, the main program executes from Flash memory. In order to run properly, the unit must have a unique MAC address (assigned by the manufacturer) and an IP address. The factory default for the IP address is `10.0.0.188`. If the unit is connected to the enterprise's network, an IP address must be obtained from the network administrator. The FMS must be reconfigured with this new IP address. This reconfiguration can be done in the field; see the Table 5.1.

Once the system reaches this point, press **Enter** to display the System Main Menu.

5.3.   Main Menu

All system functions begin in the Main Menu. Users can display information, execute commands and display submenus for additional inquiry and system configuration functions.

Command	Description	Function
netcfg	Network Configuration	`netcfg` displays the current MAC address, IP address, subnet mask, default gateway. Users can set the MAC address, IP address, Subnet mask, default gateway, ping, network debug, network statistics, arp table, mail trace1, mail trace2 and test email.
time	Display Date/Time	`time` displays the FMS current time and date. To enter the time manually, type time one space then the current time in 24 hour format, including the seconds; e.g., hh:mm:ss
date	Display Date/Time	`date` displays the FMS current time and date. To enter the date manually, type date one space then the current time date; e.g., mm/dd/yy.
reset	bootloader Menu	`reset` displays the FMS bootloader menu. The options are mac, ip, nm, dg, nd, ns, arp, ping, time, date, reset, id, blank, erase prgm, load prgm xmodem, erase saX, run, diag and rlyx.
id	Firmware Identification	`id` displays the FMS unit name, firmware file name and file size.

Table 5.1   EIA-232 Main Menu

5.3.1 Network Configuration – netcfg

Typing `netcfg` at the command prompt on the Main Menu displays the **Network Configuration Menu** that lists all items for system setup and configuration. This menu may be password protected. If it is, the password must be entered when the **SC** menu selection is made. To enter the password, type **SC**, press the space bar once, and then type the appropriate password; see Table 5.2 for the Main Configuration Menu Options.

Command	Description	Function
mac	Media Access Control	`MAC` will display the current MAC address for the FMS. The MAC address should never be changed on the FMS, if it needs to be changed, contact RLE Technologies.
ip	Internet Protocol	`IP` is the network address that is part of the TCP/IP protocol suite for the FMS to communicate over the network.
nm	Subnet Mask	`nm` allows users to configure the subnet mask address for the network.
dg	Default Gateway	`dg` allows the user to configure the default gateways/router address for the network.
ping	ICMP Ping	`ping` allows users to send a communication request to other network device top check for network conductivity.
nd	Network Debug	`nd` allows users to troubleshoot the network devices seen by the FMS.
ns	Network Statistics	`ns` allows users to view the network activity seen by the FMS.
arp	Address Resolution Protocol	`arp` allows users to view the arp table entries by the FMS.
mt1	Mail Trace 1	`mt1` allows users a simple view of the communications between the mail server and FMS while trying to sending an email.
mt2	Mail Trace 2	`Mt2` allows users a detailed view of the communications between the mail server and FMS while sending an email.
tm	Test Mail	`tm` allows users to generate a test email from the FMS to the mail server. Users can view the communication between the FMS and mail server. The email page must be configured for this test feature to work.

Table 5.2 Main Configuration Menu Options (SC)

5.3.1.1 Bootloader Menu

The **bootloader menu** is accessed by typing `reset` at the command prompt. This menu is used to establish IP/TCP and PPP interaction with the network. The FMS must be set up with an IP address, Subnet Mask, and default router. These addresses can be obtained from your Network Administrator or IT Department. To enable the SNMP receiving stations, or to create communities, the FMS MIB, available on RLE's website, must be loaded on a system(s) running a Network Operating System (NOS). This MIB is compiled through standard functions of the NOS. Consult with your Network Administrator for proper installation of the FMS MIB on the NOS. Once the MIB is loaded, the FMS can be discovered and configured over the network. For proper operation, the IP addresses configured in the FMS communities must match the IP addresses on the receiving stations.

Only the administrator's username/password may be changed from this menu. All other Web users must be changed via the Web interface.

Command	Description	Function
`mac`	Media Access Control	`MAC` will display the current MAC address for the FMS. The MAC address should never be changed on the FMS, if it needs to be changed, contact RLE Technologies.
`ip`	Internet Protocol	`IP` is the network address that is part of the TCP/IP protocol suite for the FMS to communicate over the network.
`nm`	Subnet Mask	`nm` allows users to configure the subnet mask address for the network.
`dg`	Default Gateway	`dg` allows the user to configure the default gateways/router address for the network.
`ping`	ICMP	`ping` allows users to send a communication request to other network device top check for network conductivity.
`time`	Time	`time` displays the FMS current time and date. To enter manually, type time one space then the current time in 24 hour format, including the seconds. example: hh:mm:ss.
`date`	Date	`date` displays the FMS current time and date. To enter manually, type date one space then the current time date. example: mm/dd/yy.
`reset`	Bootloader	`reset` allows the user to return to the bootloader menu
`id`	Firmware Identification	`id` displays the current firmware file name and file size.
`blank`	Firmware fileCheck	`blank` displays what firmware files are present in the FMS memory.
`erase prgm`	Erase Firmware	`erase prgm` allows users to erase the back up firmware file in the FMS.
`Load prgm xmodem`	Load firmware file via the EIA-232	`Load prgm xmodem` allows users to upload firmware files via the EIA-232 using a serial packet transfer with a terminal emulation program.
`erase saX`	Erase sectors of memory	`erase saX` allows users to erase the specific sections of memory from the FMS.

Table 5.3   IP Configuration Menu

Command	Description	Function
run	Start Application	run allows users to erase the back up firmware file in the FMS.
diag	Diagnostics	diag allows users to run the current firmware file for the FMS to run its application.

Table 5.3   IP Configuration Menu (continued)

FMS User Guide

6

REMOTE ACCESS

6.1.   Remote Access Configuration

The FMS can be remotely accessed with any terminal emulation software package. To establish a proper dial-out session, set the appropriate modem port as follows:

♦ 33.6K baud

♦ NO parity

♦ 8 bits

♦ 1 stop bit

♦ (2400/N/8/1)

♦ No software or hardware flow control

Once the proper settings are made, dial the phone number assigned to the FMS. Once communication is established, press **Enter**. A login prompt displays on the screen. Leave the username field blank. Type the password and press **Enter**. The session begins.

Note   The factory default password is `rletech` (case-sensitive).

Type a question mark (**?**) to view the **Help Menu**. To terminate the session, execute the command in the software package that disconnects the modem. The commands for accessing the system remotely are identical to the ones described in 2.3.1, "Set the FMS IP Address" on page 33.

There is a limited command set for remote access. The available commands include:

```
FCF Modem Help Menu
id - display program info
ca - print current alarms
ka - kill all alarms notifications
aa - alarm acknowlege by code (xxxx)
ip   XXX.XXX.XXX.XXX   - enter an IP address
nm   XXX.XXX.XXX.XXX   - enter a net mask
dg   XXX.XXX.XXX.XXX   - enter a default gateway
mss (1436/536) tcp max seq size
FCF>
```

Figure 6.1   FMS Dial-Up Menu

Pages can be acknowledged by phone number during a remote access session by entering `aa` followed by the alarm acknowledgement code for that phone number.

7

POINT-TO-POINT PROTOCOL

Point-To-Point Protocol (PPP) is an alternate method that may be used to communicate with the FMS. PPP can only be used through a modem, over a phone line. Both the FMS and the user's computer must be configured correctly in order for PPP to work.

7.1. Configure the FMS

1 Access the FMS Web interface.

2 Click the **Configuration** link. Enter the correct user name and password (if necessary).

3 From the **Configuration Menu**, click on the **System** link.

4 On the **System Configuration** page, click on the **IP Configuration Menu** link.

The **IP Configuration** page lists the IP addresses configured on the FMS. Both the **PPP Server** and **PPP Assignment** fields need to be completed in order for PPP to work.

> **PPP Server**: Assigns an IP address to the FMS for PPP communications. Any IP address may be used, as long as it is not in the same subnet as the FMS primary IP address. A good example of an IP address to use is: 192.168.1.2. Use this address to view the FMS Web interface through a browser when communicating with the FMS through PPP.

> **PPP Assignment**: Tells the FMS what IP address to assign to the PC the user dials in from. Again, any IP address may be used, as long as it is in the same subnet as the PPP Server IP address. A good example of an IP address to use is: 192.168.1.3

7.2.   Configure the PC

Now the user is ready to configure the PC they will be dialing in from. These directions were written from a Windows XP machine. To configure the PC:

1   Click on **Start**, **Control Pane**l, then **Network**. Select **New Connection**.

2   When the **Internet Properties** window appears, select the **Connections** tab at the top of the window and click on the **Setup** button to start the **New Connection Wizard**.

3   Click the **Next** button to begin the Wizard.

4   Select **Connect to the Internet** and click the **Next** button.

5   Select the **Set up my connection manually** button and click **Next**.

6   Select the **Connect using a dial-up modem** button and click **Next**.

7   Type "**Falcon**" as the name of the Internet Service Provider (ISP) in the space provided and click Next.

8   Enter the **phone number** of the phone line that connects to the FMS. Click the **Next** button.

9   Enter the FMS Modem **User name** and **Password** and click **Next**.

10 Add a shortcut to the desktop. Click the **Finish** button. Use this desktop shortcut to establish a PPP connection with the FMS.

C H A P T E R

8

LOAD FIRMWARE AND CONFIGURATION DATA

8.1.　Load FMS Firmware

You can download current versions of firmware from RLE's web site at www.rletech.com. It is important to confirm the correct version of firmware before downloading and installing it. The FMS MAC ID is printed on a sticker on the bottom of the unit. FMS units with MAC IDs **00.90.5B.02.00.00 and above** accept different firmware than other Falcons.

♦ FMS8002, 8126, and 2006 Falcons support firmware version 5.x only

♦ FMS8, 20, 20U and FMS32 Falcons support firmware version 6.x only.

♦ FLS8 and FLS8-M (Falcon Lite), and F-Series support firmware version 2.x only.

♦ FMS-X/FMS-XXXX with bootloader 7.x.x support firmware version 7.x only.

♦ FMS-X/FMS-XXXX With Bootloader 2.x.x supports firmware version 8.3.x only.

♦ FMS-X/FMS-XXXX With Bootloader 3.x.x supports firmware version 8.4.x only.

<div style="border:1px solid">⚠ WARNING</div>

DO NOT ATTEMPT TO LOAD THE WRONG FIRMWARE ONTO THE FMS. If you have any questions regarding firmware compatibility, visit our FMS web page at www.rletech.com or call us directly.
The firmware load procedure involves using the MIME (multipurpose Internet mail extensions) standard from the FMS web interface. To load firmware to the FMS:

8.1.1 Load Firmware Through the Web Interface

1 Go to the FMS support page on RLE's website: http://www.rletech.com/support/FMS.

2 Firmware (a .bin file) is on the Downloads tab. *Using the same filename*, save the firmware to a local disk.

IMPORTANT Do not change the name of the firmware file when you save it. Otherwise, the FMS will not recognize the file.

3 On the FMS web interface, go to Configuration>Flash Program.
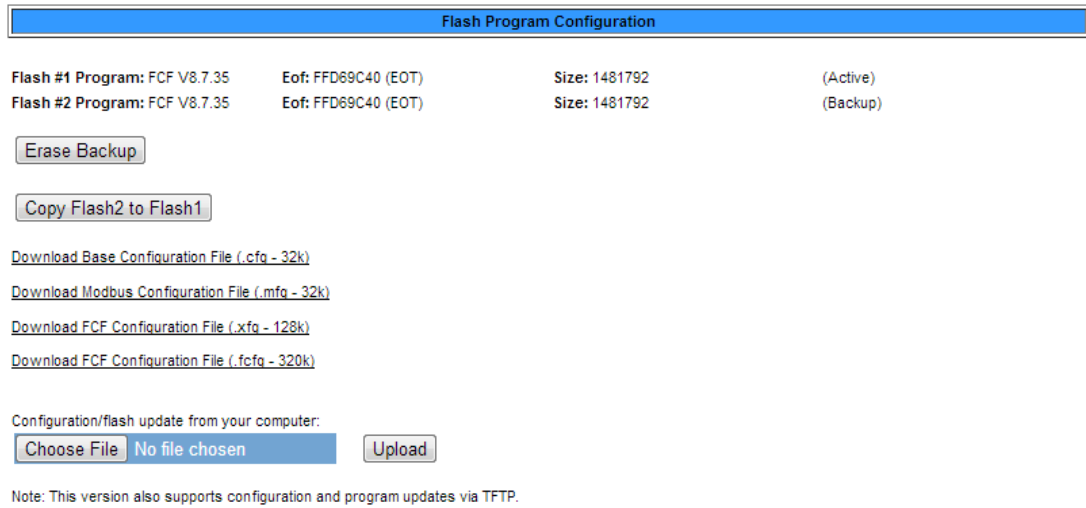
Figure 8.1 Flash Program Configuration Page

4 Click the Choose File or Browse button.

5 Locate and choose the firmware file (.bin) that you saved from the RLE website.

The path and name of the firmware file (.bin) displays in the field to the left of the Browse button.
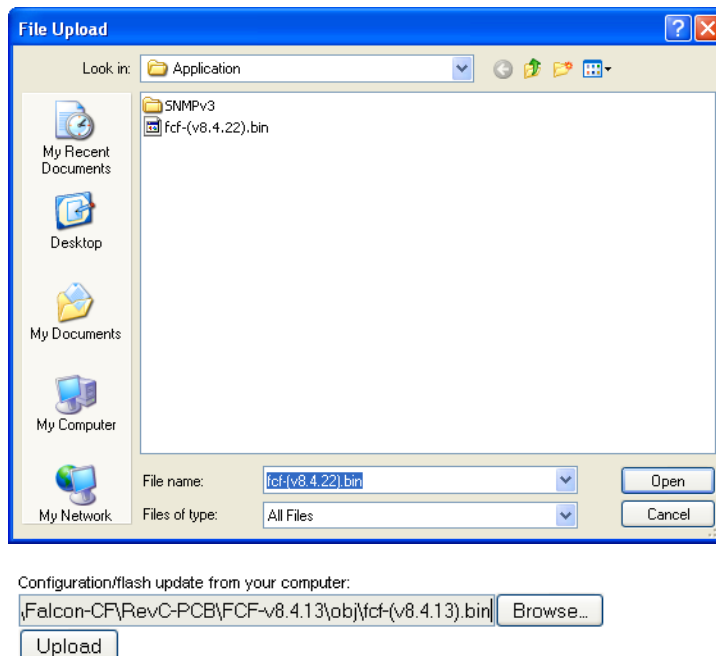
Figure 8.2 Choose the Firmware File

6 Click the Upload button.

The firmware is loaded while the FMS displays a message confirming that it is loading the new file.

File has been uploaded and bin file verified

File will now be copied to flash #2, this will take about 60 seconds

Then verify the file is contained in flash #2 and then press the Copy Flash2 to Flash1 button

If your browser does not automatically redirect you, please click here after waiting.
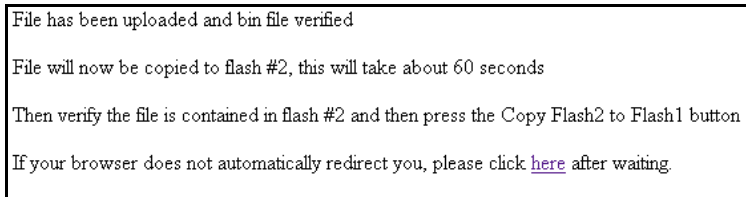
Figure 8.3   Firmware Load Messages

The file is loaded to the Flash #2 Program area, which is also called the Backup area. The Flash #1 Program area (also called the Active area) contains the current flash firmware that is in use.

7 To copy the firmware you just uploaded from Flash #2 Program to Flash #1 Program, click the Copy Flash2 to Flash1 button. The following prompt displays:

The page at http://63.253.110.243 says:

Are you sure? - This will erase Flash #1 and Copy Flash #2 to #1

OK   Cancel
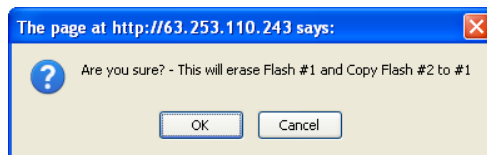
Figure 8.4   Flash Copy Prompt

8 Click OK to start the erase and copy process.
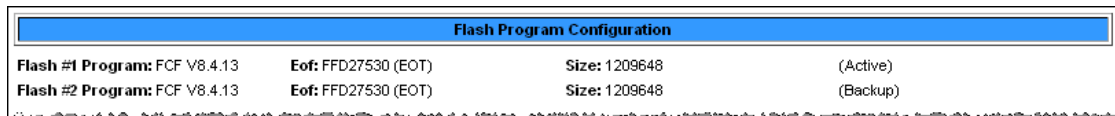
During this process, the following messages display:

RLE-CF FCF

The system is erasing flash #1, copying flash #2 to #1 and re-booting, this will take a 60 seconds

If your browser does not automatically redirect you, please click here.
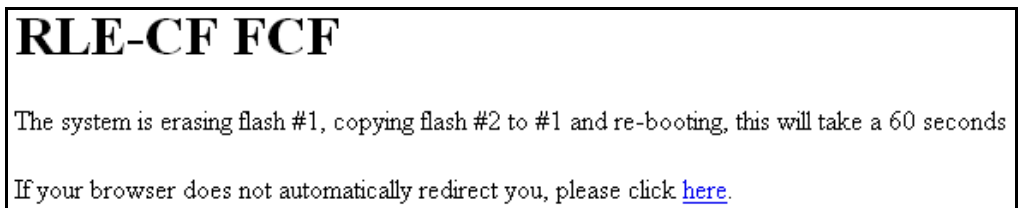
Figure 8.5   Flash Overwriting Message

9 If the system does not reboot on its own, click the here link to display the FMS Home page.

10 You can verify which firmware version is loaded by going to Configuration>Flash Program and viewing the information under the blue bar.

Flash Program Configuration			
Flash #1 Program: FCF V8.4.13	**Eof:** FFD27530 (EOT)	**Size:** 1209648	(Active)
Flash #2 Program: FCF V8.4.13	**Eof:** FFD27530 (EOT)	**Size:** 1209648	(Backup)

Figure 8.6 Current Firmware Version As Shown in FMS Interface

8.1.2 Load Firmware Using TFTP Client

This is an alternate method for loading firmware. Note that it does not work with a PPP connection.

1 Uploading firmware via TFTP requires a TFTP Client. It may be possible to download a free license TFTP Client from the Internet. Consult your IT department to determine a compatible client program.

2 Verify that the PC and the FMS are on the same subnetwork (LAN).

3 Open the TFTP client. Configure the client as follows.

    a **Host** = Falcon IP Address

    b **Port** = 69

    c **Block** Size = 64, 128, 256, 512, or 1024

Note   The file must be sent in BINARY (not ASCII).

4 Send or PUT the firmware file to the FMS. It may take ~10 seconds for the firmware upload to begin. This will put the new firmware into effect. Once the transfer is complete, the FMS will reboot.

5 After one minute, refresh the FMS Flash program webpage. Notice that the active Flash now contains the latest firmware. Repeat the above steps to upgrade firmware in the second Flash chip.

8.1.3 Update FMS Firmware via the EIA-232 COM2 Port (X-Modem)

1 Connect to the FMS using HyperTerminal. For instruction on how to do so, see our support document "Connect HyperTerminal" on the Documentation/Files section of the FMS webpage at www.rletech.com.

2 Start firmware updates by either:

    ♦ Pressing any key after power-up when a 10 second window provides an opportunity to abort the Flash Main Program, or

    ♦ Typing **RESET** to exit to Bootloader once the Main Menu appears.

3 From the FMS Boot prompt, type **?** and press Enter to see the list of available commands.

4 From the FMS Boot prompt, type **ID** and press Enter. Note which Flash has the lowest serial number. The Flash with the lowest serial number is the backup. The idea is to erase the backup, load the new version - which becomes the active Flash - then erase and load the other Flash.

5 From the FCF Boot Prompt, erase the back up Flash program (the one with the lowest serial number) by typing **ERASE PRGM** followed by Enter. After a few seconds, the screen will update with an ok and **FCFBoot>**.

6 From the FCF Boot prompt, type **LOAD PRGM1 XMODEM** or **LOAD PRGM2 XMODEM** followed by Enter. Select the same program that was erased.

7 From the HyperTerminal menu select **Transfer -> Send File**. Use the browse button to select the FMS firmware file from the computer's directory. The file must be binary and have a **.bin extension**. Select the file and upload it using the **1K X-Modem protocol**. Then click **Send**.

8 A transfer status screen will be displayed. The transfer takes about 10 minutes. Once the transfer is complete, the transfer status window will automatically close. The HyperTerminal window will indicate that the upload is complete.

9 From the FCF Boot prompt, type **RUN** or power down the FMS and restart it to verify that the new Flash program runs.

10 Press **Enter** to display the FCF Main Menu and repeat the steps above to erase and download to the other Flash program chip.

Once the firmware upgrade is complete, disconnect the serial cable and close HyperTerminal.
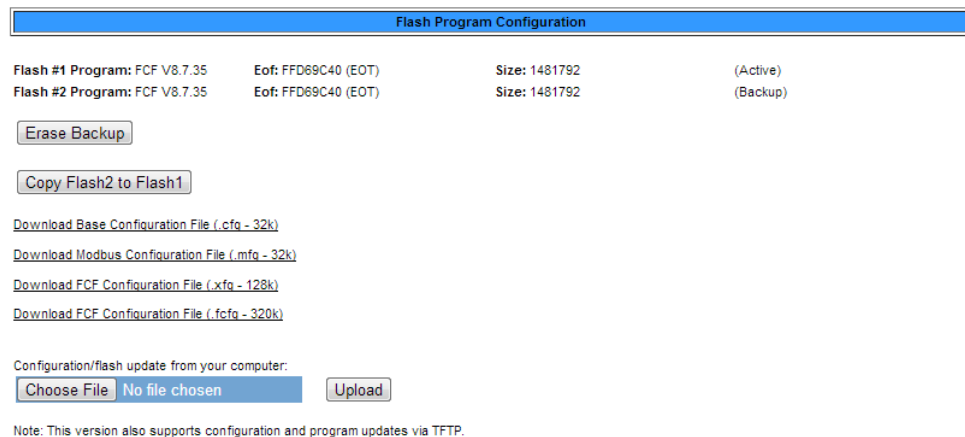
8.2.   Load and Save FMS Configuration Data

You can save FMS configuration data for backup purposes and to load the same configuration onto other FMS units. In the unlikely event the FMS fails, a replacement FMS can be placed back in service faster by loading the saved configuration information onto it. The configuration settings are saved to a binary file, which cannot currently be edited off line.

8.2.1 Save Configuration Data

1 On the FMS interface, go to Configuration>Flash Program.

   The Flash Program Configuration page displays.

Flash Program Configuration			
Flash #1 Program: FCF V8.7.35	Eof: FFD69C40 (EOT)	**Size:** 1481792	(Active)
Flash #2 Program: FCF V8.7.35	Eof: FFD69C40 (EOT)	**Size:** 1481792	(Backup)

Erase Backup

Copy Flash2 to Flash1

Download Base Configuration File (.cfg - 32k)

Download Modbus Configuration File (.mfg - 32k)

Download FCF Configuration File (.xfg - 128k)

Download FCF Configuration File (.fcfg - 320k)

Configuration/flash update from your computer:

Choose File No file chosen   Upload

Note: This version also supports configuration and program updates via TFTP.

Figure 8.7   Save Configuration File (Flash Program Configuration Page)

You can save four different types of configuration files:

♦ Base configuration (.cfg) — Information about physical points other than Modbus points (FMS versions 7.x).

♦ Modbus configuration (.mfg) — Information about Modbus points (FMS versions 7.x).

♦ FCF configuration (.xfg) — Information about all points, a combination of the .cfg and .mfg files (FMS versions 8.0.x through 8.6.x).

♦ FCF configuration (.fcfg) - Information about all points, a combination of the .cfg and .mfg files, plus all configuration options added in v8.7 (FMS versions 8.7.x and higher).

2 To save a configuration file, click the link for the type of file you want to save. A popup prompts you to open or save the file.

3 Select the Save File radio button and click OK. The file is saved to your web browser's download area, or you are prompted to choose a location for the file.

4 Use Windows Explorer to verify that the files exist on the PC's hard drive. Copy the files to the desired file backup location.

IMPORTANT   Do not change the three-letter extension (.cfg, .mfg, .xfg, or .fcgf) of the file name, or the FMS will not recognize the file if you try to load it. You can change the base file name if desired.

8.2.2 Load Configuration Data

1 On the FMS interface, go to Configuration>Flash Program.

The Flash Program Configuration page displays.
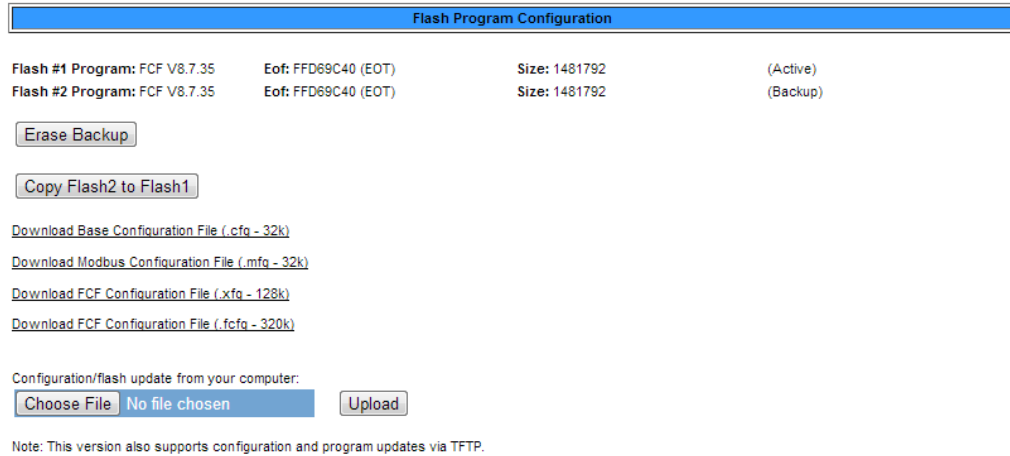
Figure 8.8 Load Configuration File (Flash Program Configuration Page)

2 Click the Browse button to navigate to the location of the configuration file you want to load.

IMPORTANT Make sure you have not changed the three-letter extension (.cfg, .mfg, or .xfg) of the configuration file, or the FMS will not recognize it.

3 Once you have selected the file, click the Upload button.

The configuration file is uploaded while the following messages display:

File has been uploaded and bin file verified

File will now be copied to flash #2, this will take about 60 seconds

Then verify the file is contained in flash #2 and then press the Copy Flash2 to Flash1 button

If your browser does not automatically redirect you, please click here after waiting.

Once the configuration file is uploaded, the FMS reboots itself.

A

FMS EXPANSION CARDS

A.1.   Expansion Card Descriptions

Expansion cards can be added to a base FMS unit to increase its functionality. A 1U FMS has room for one expansion card. A 2U FMS has room for three expansion cards. Currently, Expansion Card A and Expansion Card C are available from RLE.

Note   While expansion card B and expansion card M were once available, these cards are discontinued products that are no longer available from RLE. Expansion Card M was also known as the EXP-MBCS option, and needed to be installed in an FMS unit at the factory.

Expansion cards A and C are populated as follows:

Card	Features	RLE Product #
A	12 Analog Inputs (AI) Individually configurable through jumpers, as 4-20mA, 0-5VDC, or 0-10VDC 8 Relay Outputs (RO)	EXP-A-24/48
C	24 Digital Inputs (DI) Select the 24VDC or 48VDC option	EXP-C-24 (24VDC) EXP-C-48 (48VDC)

Table A.1   Expansion Card Descriptions

A.2. Expansion Card Installation

Expansion cards can be installed at the factory at the time of the initial product order, or they can be ordered at a later date and installed by the customer. If customers order an expansion card after they have possession of the FMS unit, they must install the expansion card themselves.

A.2.1 Install an Expansion Card in a 2U FMS

The FMS expansion card is shipped with five screws. Remove the two screws that hold the expansion card plate from the slot on the FMS where the card will be installed. Place the screws back into the holes once the plate is removed.

1   Remove the four hex standoffs from the COM1 and COM2 connectors located on the back panel. Remove the bottom two screws located along the bottom edge of the back of the unit.
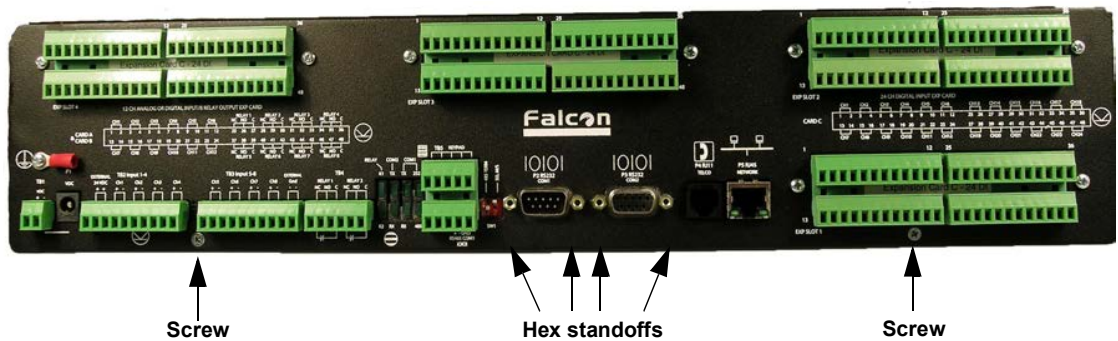
Figure A.1   Back of 2U FMS Showing Hex Standoffs and Screws to Remove

2   Remove the two top screws that attach the side plate (rack ears) to the unit from both sides and slide the base and cover apart.
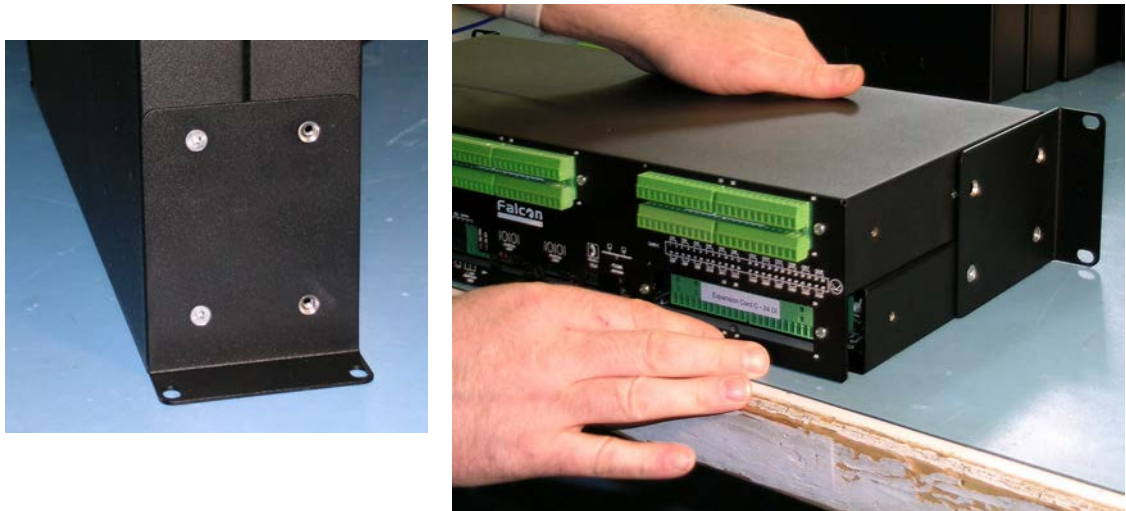
Figure A.2   Side Plate ("Ear") with Two Mounting Screws Removed; Slide the Base and Cover Apart

3 Gently lift and hinge the top lid to the side and lay it next to the base (bottom chassis).
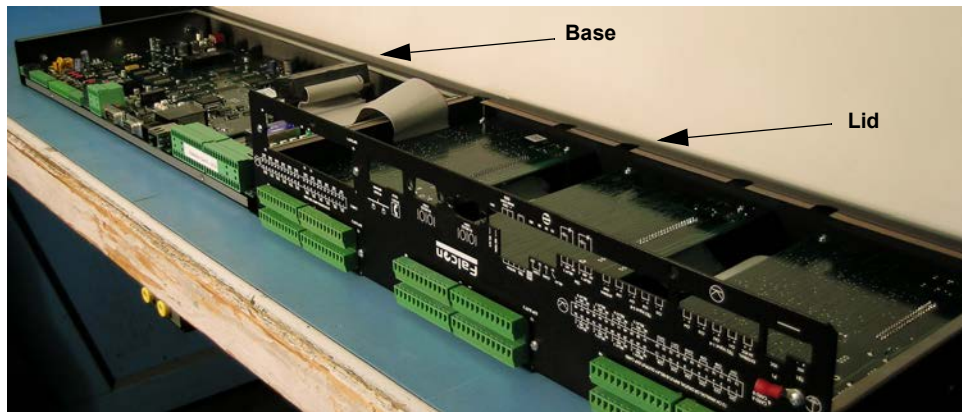
Figure A.3 2U FMS Unit - Opened

4 On the expansion card, set the card slot address (SW2 DIP switches) to the slot number where the card will reside (1 through 4). Table A.2 lists the position of the switches based on the slot number. Figure A.4 shows the location of the DIP switches.

Slot	DIP Switch 1	DIP Switch 2	DIP Switch 3	DIP Switch 4
1	On	Off	Off	Off
2	Off	On	Off	Off
3	Off	Off	On	Off
4	Off	Off	Off	On

Table A.2 SW2 DIP Switch Settings for Expansion Card Slots
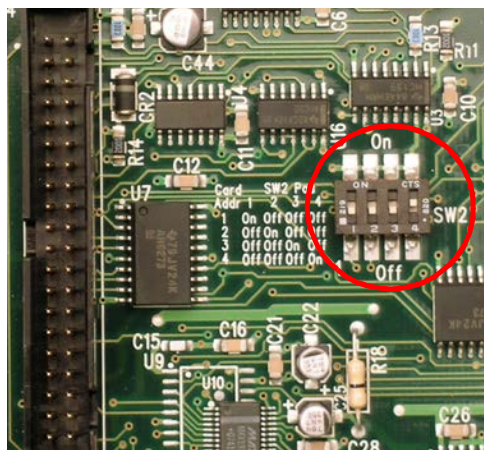
Figure A.4 SW2 DIP Switches

5 Now you need to mount the expansion card. The expansion card will either mount in slot 1 in the base of the unit, or in slot 2, 3, or 4, in the lid of the unit.

If the expansion card is to be mounted in the base (Slot 1):

a Attach the ribbon cable to the card.

b Secure the provided screw into the remaining hole.

Note   **Do not overlook installation of the screw. This screw grounds the expansion card and is critical to the FMS performance.**

6 If the expansion card is to be mounted in the lid (Slots 2, 3, and 4), mount the card as follows:

a Attach the ribbon cable to the expansion card, making sure that the correct connector is attached.

Note   The ends of the ribbon cable are keyed, which means they will only fit onto the two double rows of pins in one direction. Align the keyed side of the ribbon cable with the notches in the plastic surrounding the rows of pins and push down securely. Always place and remove the ribbon cable with a straight up and down motion. Pulling the cable to one side or another will damage the pins in the connector and damage the board.
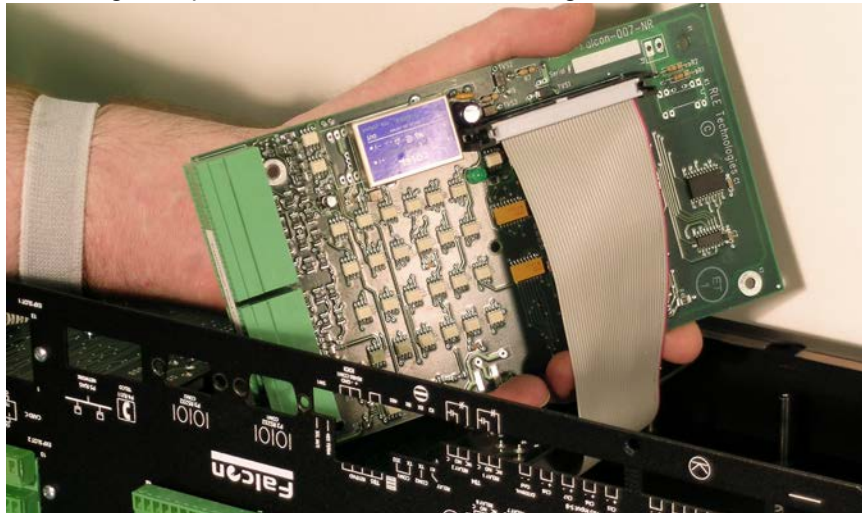
Figure A.5 Expansion Card with Ribbon Cable Attached

b Angle the card toward the front of the FMS as you slide it into place with the bottom of the card facing out and the terminal blocks positioned in the rear opening. Align the screw holes on the card with the posts.
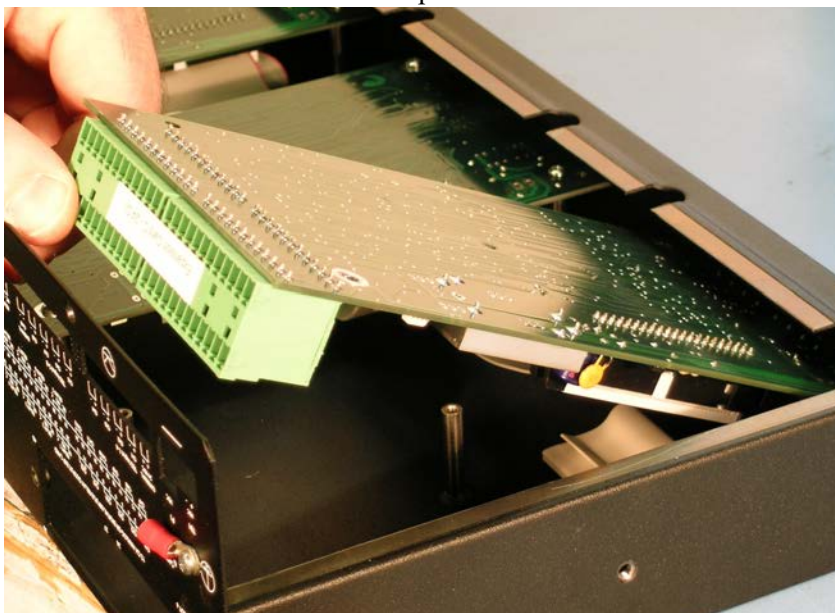
Figure A.6 Expansion Card Mounting in a Two-Rack Unit

c Secure the card to the lid using the five mounting screws supplied.
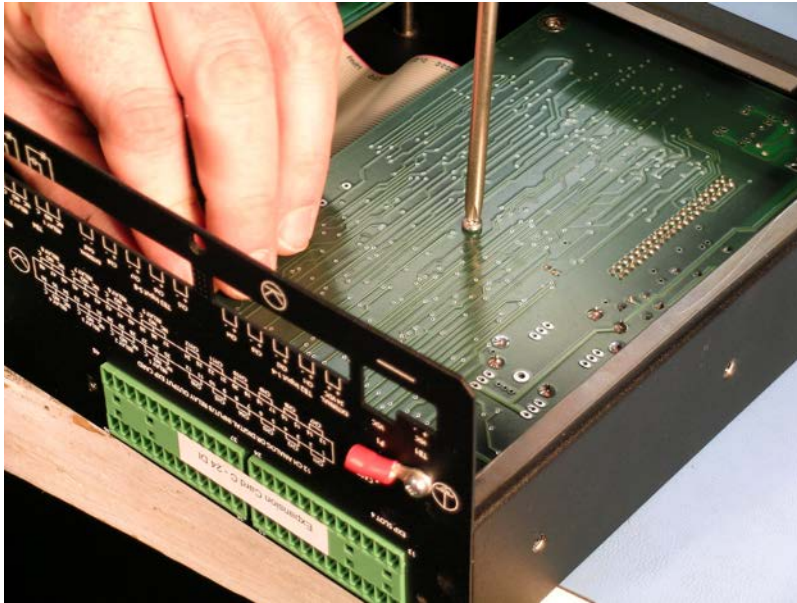
Figure A.7 Expansion Card Final Placement in a Two-Rack Unit

7 If you are finished installing expansion cards:

a Hinge the lid back in place over the base.

b Reattach the side brackets using the two mounting screws on the back plate and the hex posts for COM1 and COM2.

A.2.2 Install an Expansion Card in a 1U FMS

Expansion cards are shipped with a ribbon cable and five screws, although only one screw will be used for the installation process. To install a FMS expansion card:

1   Remove the four screws that secure the lid to the FMS. Lift off the lid. Then, remove the four hex standoffs on the two COM1 ports (for the location of the hex standoffs, see Figure A.1 on page 180).

2   Remove the terminal blocks.

3   Remove the cover plate labeled Expansion Card from the back of the lid.

4   On the expansion card, set the card slot address (SW2 DIP switches) to address 1 (for a location of the DIP switches, see Figure A.4 on page 181). Switch 1 should be On, and switches 2 through 4 should be Off.

5   Align the holes in the card with the four posts and one screw setting on the main FMS unit. Make sure the two double rows of pins align next to each other, and the green inputs point toward the rear of the unit.

6   Snap the card onto the four posts and secure the provided screw into the remaining hole.

You will know the card is in place if it is very difficult to remove.

⚠ WARNING   Do not overlook installation of the screw. This screw grounds the expansion card and is critical to the FMS performance.

7   Connect the ribbon cable between the main FMS board and the expansion card.

Note   The ends of the ribbon cable are keyed, which means they will only fit onto the two double rows of pins—one on the main board, one on the expansion card—in one direction. Align the keyed sides of the ribbon cable with the notches in the plastic surrounding the rows of pins, and push down securely. Always place and remove the ribbon cable with a straight up and down motion. Pulling the cable to one side or another will bend the pins in the connectors and damage the boards

8   Installation is complete. Place the lid back on the FMS and secure it with the four screws in the lid and the four hex standoffs.

A.3. Convert Current Input Channels to Voltage Input Channels on Expansion Card A

When the FMS optional 12 channel analog input card is delivered, its channels are configured for current inputs (4-20mA). Some sensors, however, may require voltage input channels (0-5V or 0-10V). The customer may manually reconfigure any or all current input channels as voltage input channels if necessary.

The headers on the expansion card are labeled P1 through P12. Each number corresponds with a channel (e.g., P1 corresponds with channel 1, while P10 with channel 10.) Each header has two parallel columns of five pins. Some pins are connected with jumpers. Changing these header settings converts a current channel to a voltage channel, and vice versa.

To configure a header as a **current channel (4-20mA)**, connect pins 1 and 3 with one jumper. Connect pins 2 and 4 with another jumper. Connect pins 7 and 8 with a third jumper.
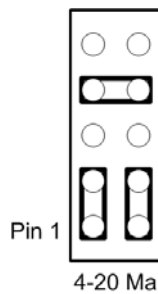
Figure A.8 Expansion Card Current Channel (4-20mA) Configuration

Note Expansion cards are shopped from the factory with all headers configured as current channels.

To configure a header as a **voltage channel (0-5V or 0-10V)**, connect pins 3 and 5 with one jumper. Connect pins 4 and 6 with another jumper. Connect pins 9 and 10 with a third jumper.
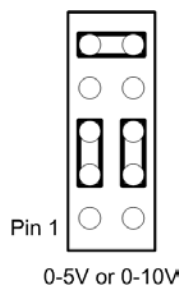
Figure A.9 Expansion Card Voltage Channel (0-5V or 0-10V) Configuration

A FMS Expansion Cards

ANALOG AVERAGING

B.1.   Analog Averaging Overview

Analog averaging allows the user to change the averaging method for analog inputs. Normally, the FMS samples analog points once a second while keeping track of high and low values for each analog point. After 60 seconds, the average of these readings and the high and low values for these points are recorded in the minute log.

B.2.   How Analog Averaging Affects Values

Analog averaging can be changed through either the Web interface or the EIA-232 interface. An example of how averaging is altered and how it impacts high and low recordings is shown here.

♦ Analog averaging value is set to 5.

♦ The analog point is a temperature sensor.

♦ Temperature readings are displayed for an eleven-second period.

<u>70, 70, 70, 71, 71</u>, 72, 72, 73, 73, 74, 74
   Average = 70, High Value = 70, Low Value = 70

70, <u>70, 70, 71, 71, 72</u>, 72, 73, 73, 74, 74
   Average = 70, High Value = 70, Low Value = 70

70, 70, <u>70, 71, 71, 72, 72</u>, 73, 73, 74, 74
   Average = 71, High Value = 71, Low Value = 70

70, 70, 70, <u>71, 71, 72, 72, 73</u>, 73, 74, 74
   Average = 71, High Value = 71, Low Value = 70

70, 70, 70, 71, <u>71, 72, 72, 73, 73</u>, 74, 74
   Average = 72, High Value = 72, Low Value = 70

70, 70, 70, 71, 71, <u>72, 72, 73, 73, 74</u>, 74
   Average = 72, High Value = 72, Low Value = 70

70, 70, 70, 71, 71, 72, <u>72, 73, 73, 74, 74</u>
Average = 73, High Value = 73, Low Value = 70

Under normal conditions, the average reading would equal 71, the high value would equal 74, and the low value would equal 70. By changing the averaging method, the average reading is 73, the high value at 73, and the low value for this example remains the same. In a sense, averaging slows down the sensor response and the rate of change.

ANALOG INPUT 4-20MA REFERENCE CHART

Analog 4-20Ma Gain/Offset Conversion Formula:

Gain = Sensor Range (High Value - Low Value) / 4
Offset = Sensor Low Value - Gain

Example: TH140 Humidity
Gain = (High Value (100) -Low Value (0)) / 4 = 25
Offset = (Sensor Low Value (0) - Gain (25)) = -25

RLE Product #	Transducer Type	Range	Gain	Offset
TEMPERATURE				
TH140	Temperature (Display in Deg F)	32°F - 120°F	22	10
	Temperature (Display in Deg C)	0°C - 48.8°C	12.2	-12.2
	Humidity	0% - 100% RH	25	-25
T120	Temperature (Display in Deg F)	32°F - 122°F	22	10
	Temperature (Display in Deg C)	0°C - 48.8°C	12.2	-12.2
CURRENT				
CT55	Current	0 - 5 Amps	1	-1
		0 - 55 Amps	13	-13
CT20	Current	0 - 30 Amps	7	-7
		0 - 60 Amps	15	-15
		0 - 120 Amps	30	-30
CT200	Current	0 - 20 Amps	5	-5
		0 - 200 Amps	50	-50

Table C.1   Analog Input 4-20mA Reference Chart

RLE Product #	Transducer Type	Range	Gain	Offset
CT300	Current	0 - 100 Amps	25	-25
		0 - 300 Amps	75	-75
VOLTAGE				
PT300	Voltage – Single Phase	0 - 300 VAC	75	-75
3PT300	Voltage – Three Phase	0 - 300 VAC	75	-75
PT600	Voltage – Single Phase	0 - 600 VAC	150	-150
3PT600	Voltage – Three Phase	0 - 600 VAC	150	-150
DISTANCE READ LEAK DETECTION				
LD5000	Leak Detection 4-20mA Output (Calc. in ft/m)	0 - 500 ft / 152m	143	-179
		0 - 1000 ft / 305m	286	-357
		0 - 1500 ft / 457m	429	-536
		0 - 2000 ft / 610m	571	-714
		0 - 2500 ft / 762m	714	-893
		0 - 3000 ft / 914m	857	-1071
		0 - 3500 ft / 1067m	1000	-1250
		0 - 4000 ft / 1219m	1143	-1429
		0 - 4500 ft / 1372m	1286	-1607
		0 - 5000 ft / 1524m	1429	-1786
LD5100	Leak Detection 4-20mA Output (Calculated in ft/m)	0 - 1000 ft / 305m	250	-250
		0 - 2500 ft / 762m	625	-625
		0 - 5000 ft / 1524m	1250	-1250

Table C.1 Analog Input 4-20mA Reference Chart (continued)

D

FMS ACCESSORIES WIRING

The following figures show the typical wiring between the FMS monitoring system and other products offered by RLE Technologies. A more detailed Falcon Integration Guide can be found online at http://rletech.com/resource/falcon-integration-guide/.
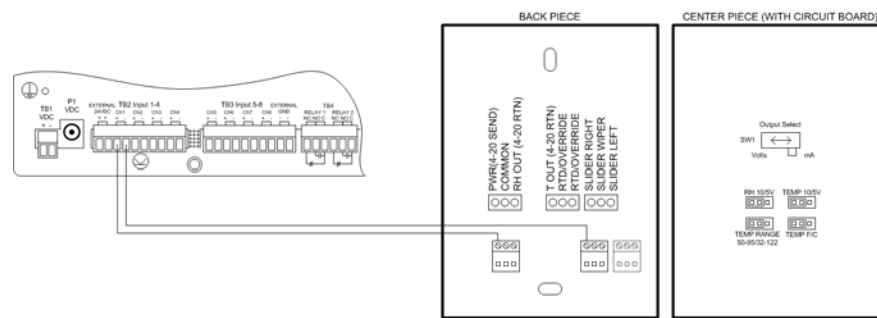
Figure D.1 T120 and T120D Temperature Sensors
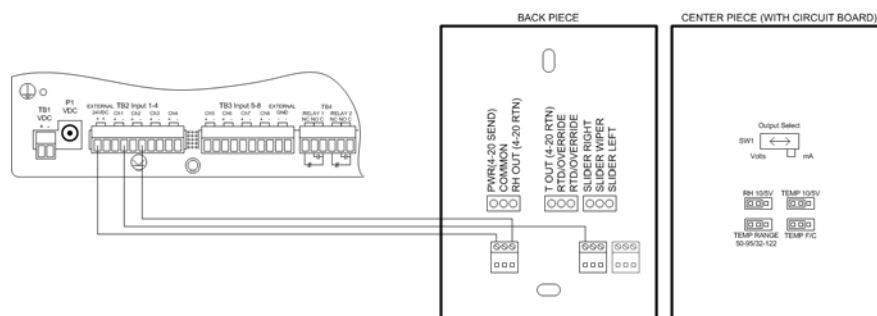
Figure D.2 TH140 and TH140D Temperature/Humidity Sensors
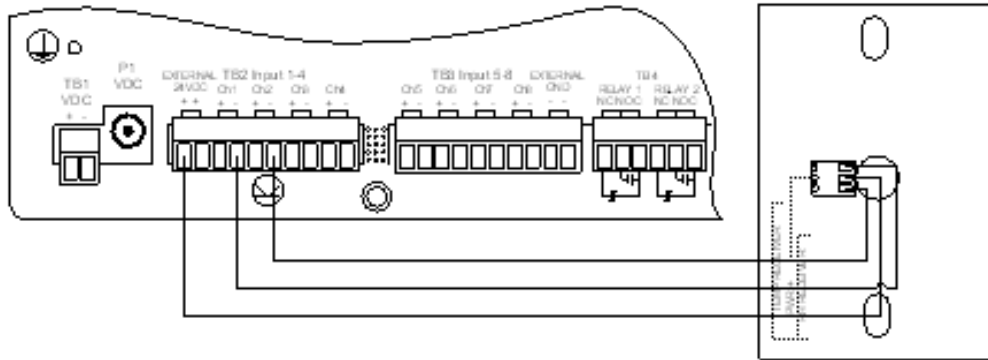
Figure D.3 Dwyer Temperature/Humidity Sensor
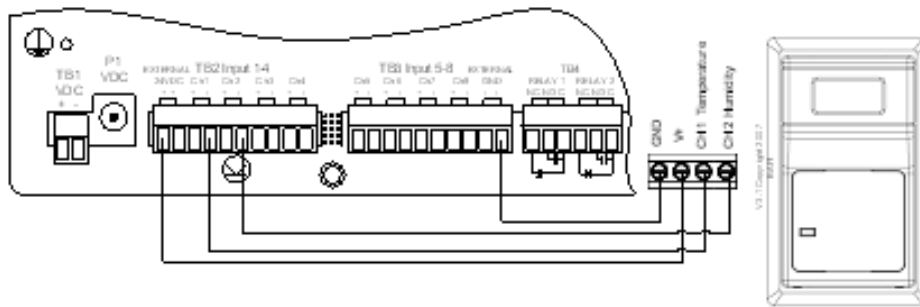
Figure D.4 BAPI Temperature/Humidity Sensor
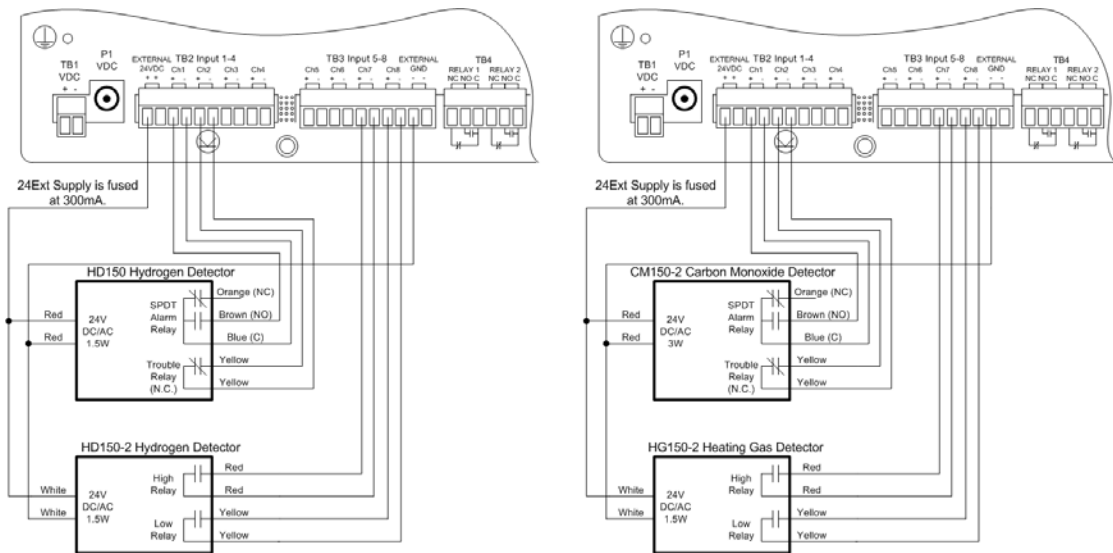
Figure D.5 HD150, HD150-2, CM150-2, and HG150-2 Gas Sensors
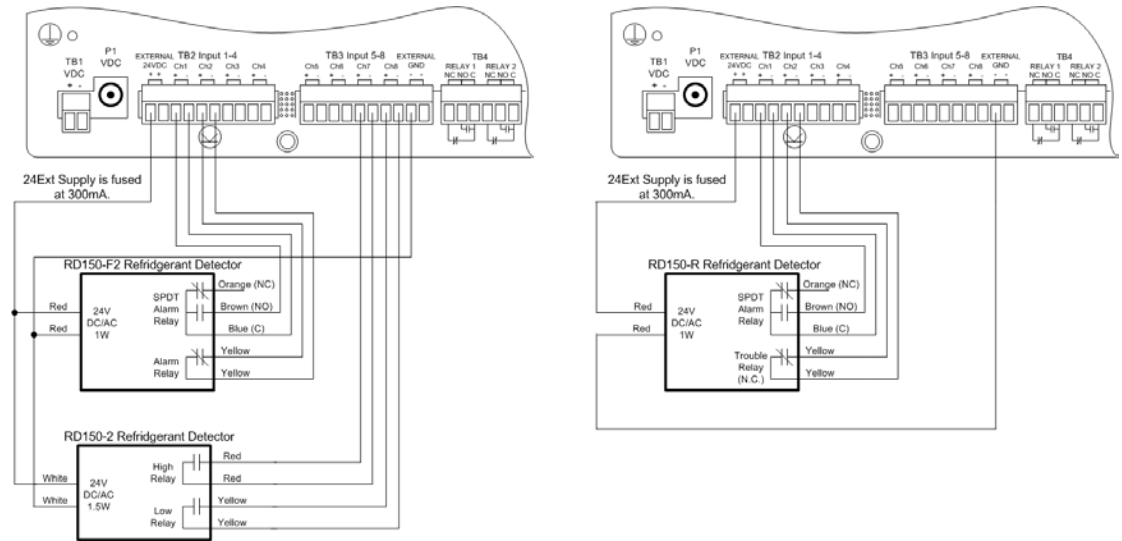
Figure D.6 RD150-F2, RD150-2 & RD150-R Refrigerant Detectors
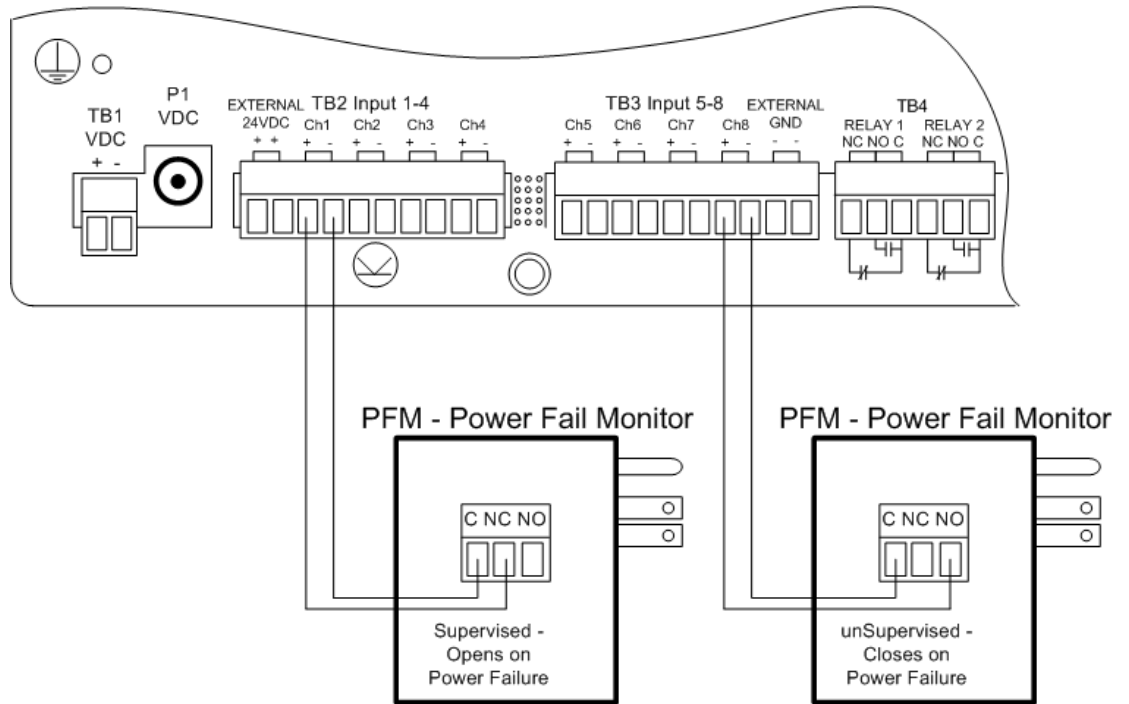
Figure D.7 PFM Power Fail Monitor
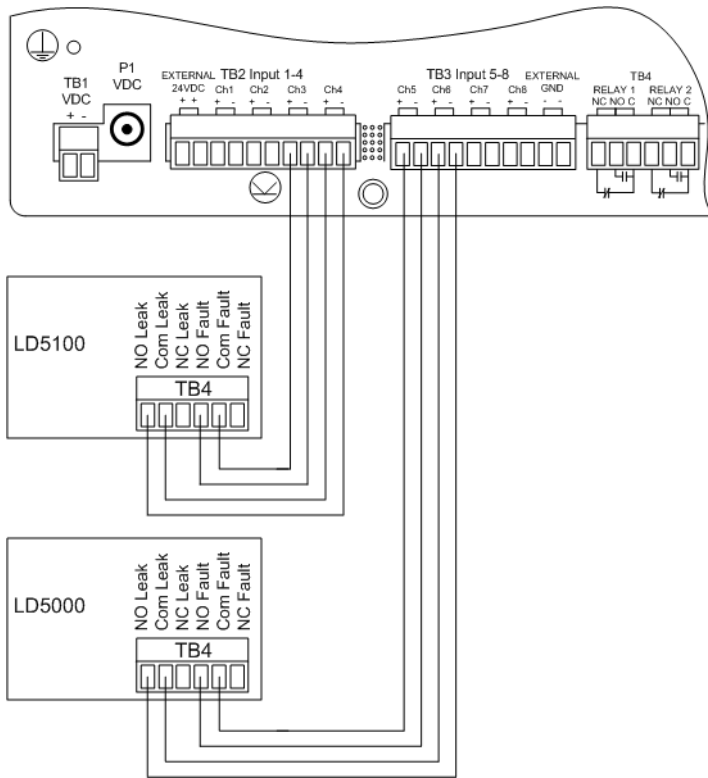
Figure D.8 SeaHawk LD5100 Distance Read Leak Detection System (Dry Contact)

D.1. Configuring a SeaHawk Device as an Analog Input

Users with legacy systems may find this information useful. The FMS averages/filters the analog inputs.Therefore, the alarm delay for RLE's SeaHawk LD5100 input must be set to a value equal to or greater than the averaging time set in the FMS. The LD5100 will output 4mA when there is no leak. The LD5100 will output a value between 4mA and 20mA when there is a water leak. The low range (4mA) will always correspond to zero feet. The high range (20mA) will always correspond to the LD5100's set 4-20mA Max Range (1000, 2500, or 5000 feet).
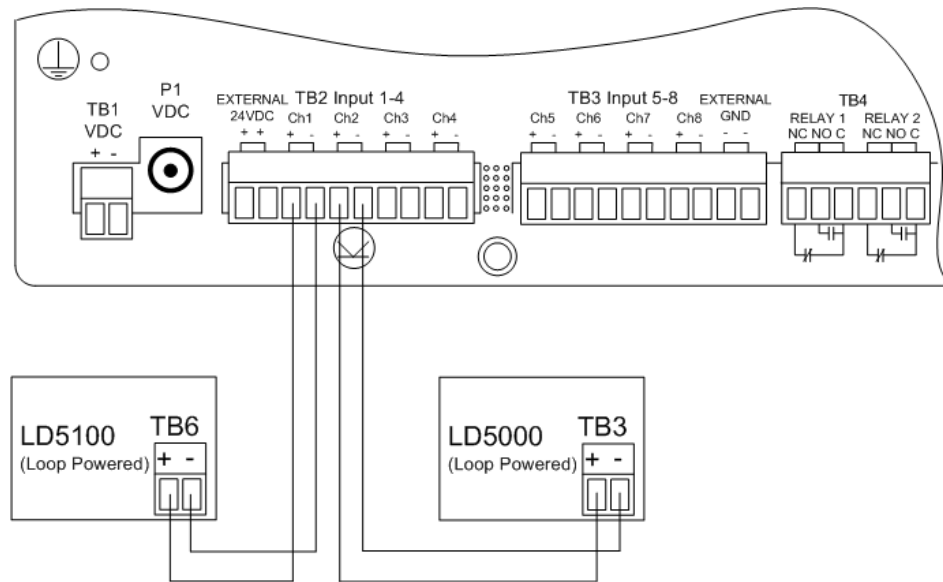
Figure D.9 SeaHawk LD5100 Distance Read Leak Detection System (4-20mA)
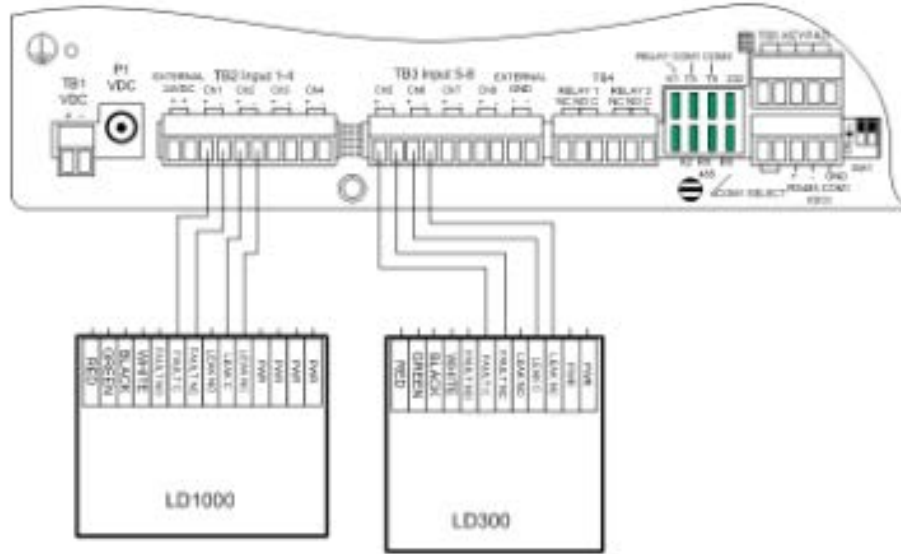
Figure D.10 SeaHawk LD1000, LD300 Leak Detection Systems
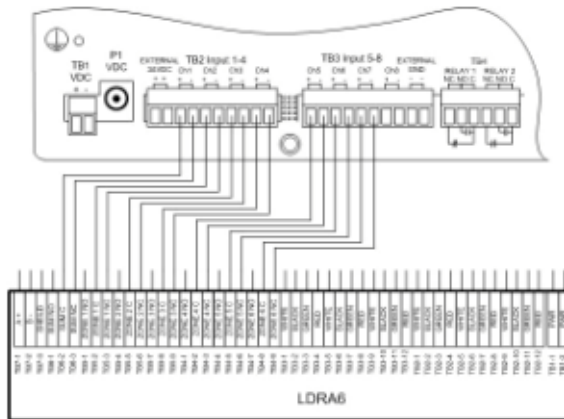
Figure D.11 SeaHawk LD1000, LD300, and LDRA6 Zone Leak Detection Systems

D.2. Wiring for Other Falcon FMS Accessories

For assistance wiring the following Falcon FMS Accessories also offered by RLE, contact Technical Support at (970) 484-6510:

♦ CT55 and CT200 Single Phase Current Sensor

♦ CT300 and CT800 Single Phase Current Sensor

♦ PT150 Single Phase Voltage Sensor

♦ PT300 Three Phase Voltage Sensor

♦ PT600 Three Phase Voltage Sensor

- MD3 Motion Sensor

- MDS Magnetic Door Sensor

- SMK Photoelectric Smoke Detector

- SeaHawk SD & SD-RO1 Spot Detectors

- PS-RC Relay Controlled Two Outlet Receptacle

E

ALARM ID REFERENCE TABLES

E.1.   Analog Tables

Analog Inputs 1 through 8					
Channel	**Condition**	**ID**	**Channel**	**Condition**	**ID**
1	High Limit 1	0011	5	High Limit 1	0051
1	Low Limit 1	0012	5	Low Limit 1	0052
1	High Limit 2	0013	5	High Limit 2	0053
1	Low Limit 2	0014	5	Low Limit 2	0054
2	High Limit 1	0021	6	High Limit 1	0061
2	Low Limit 1	0022	6	Low Limit 1	0062
2	High Limit 2	0023	6	High Limit 2	0063
2	Low Limit 2	0024	6	Low Limit 2	0064
3	High Limit 1	0031	7	High Limit 1	0071
3	Low Limit 1	0032	7	Low Limit 1	0072
3	High Limit 2	0033	7	High Limit 2	0073
3	Low Limit 2	0034	7	Low Limit 2	0074
4	High Limit 1	0041	8	High Limit 1	0081
4	Low Limit 1	0042	8	Low Limit 1	0082
4	High Limit 2	0043	8	High Limit 2	0083
4	Low Limit 2	0044	8	Low Limit 2	0084

Table E.1   Analog Alarm ID Reference Table – Inputs 1 through 8

Analog Input Slot 1				Analog Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	9	High Limit 1	1011	1	33	High Limit 1	2011
1	9	Low Limit 1	1012	1	33	Low Limit 1	2012
1	9	High Limit 2	1013	1	33	High Limit 2	2013
1	9	Low Limit 2	1014	1	33	Low Limit 2	2014
2	10	High Limit 1	1021	2	34	High Limit 1	2021
2	10	Low Limit 1	1022	2	34	Low Limit 1	2022
2	10	High Limit 2	1023	2	34	High Limit 2	2023
2	10	Low Limit 2	1024	2	34	Low Limit 2	2024
3	11	High Limit 1	1031	3	35	High Limit 1	2031
3	11	Low Limit 1	1032	3	35	Low Limit 1	2032
3	11	High Limit 2	1033	3	35	High Limit 2	2033
3	11	Low Limit 2	1034	3	35	Low Limit 2	2034
4	12	High Limit 1	1041	4	36	High Limit 1	2041
4	12	Low Limit 1	1042	4	36	Low Limit 1	2042
4	12	High Limit 2	1043	4	36	High Limit 2	2043
4	12	Low Limit 2	1044	4	36	Low Limit 2	2044
5	13	High Limit 1	1051	5	37	High Limit 1	2051
5	13	Low Limit 1	1052	5	37	Low Limit 1	2052
5	13	High Limit 2	1053	5	37	High Limit 2	2053
5	13	Low Limit 2	1054	5	37	Low Limit 2	2054
6	14	High Limit 1	1061	6	38	High Limit 1	2061
6	14	Low Limit 1	1062	6	38	Low Limit 1	2062
6	14	High Limit 2	1063	6	38	High Limit 2	2063
6	14	Low Limit 2	1064	6	38	Low Limit 2	2064
7	15	High Limit 1	1071	7	39	High Limit 1	2071
7	15	Low Limit 1	1072	7	39	Low Limit 1	2072
7	15	High Limit 2	1073	7	39	High Limit 2	2073
7	15	Low Limit 2	1074	7	39	Low Limit 2	2074
8	16	High Limit 1	1081	8	40	High Limit 1	2081
8	16	Low Limit 1	1082	8	40	Low Limit 1	2082
8	16	High Limit 2	1083	8	40	High Limit 2	2083
8	16	Low Limit 2	1084	8	40	Low Limit 2	2084
9	17	High Limit 1	1091	9	41	High Limit 1	2091

Table E.2 Analog Alarm Reference Table – Input Slots 1 and 2

Analog Input Slot 1				Analog Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
9	17	Low Limit 1	1092	9	41	Low Limit 1	2092
9	17	High Limit 2	1093	9	41	High Limit 2	2093
9	17	Low Limit 2	1094	9	41	Low Limit 2	2094
10	18	High Limit 1	1101	10	42	High Limit 1	2101
10	18	Low Limit 1	1102	10	42	Low Limit 1	2102
10	18	High Limit 2	1103	10	42	High Limit 2	2103
10	18	Low Limit 2	1104	10	42	Low Limit 2	2104
11	19	High Limit 1	1111	11	43	High Limit 1	2111
11	19	Low Limit 1	1112	11	43	Low Limit 1	2112
11	19	High Limit 2	1113	11	43	High Limit 2	2113
11	19	Low Limit 2	1114	11	43	Low Limit 2	2114
12	20	High Limit 1	1121	12	44	High Limit 1	2121
12	20	Low Limit 1	1122	12	44	Low Limit 1	2122
12	20	High Limit 2	1123	12	44	High Limit 2	2123
12	20	Low Limit 2	1124	12	44	Low Limit 2	2124

Table E.2   Analog Alarm Reference Table – Input Slots 1 and 2 (continued)

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	57	High Limit 1	3011	1	81	High Limit 1	4011
1	57	Low Limit 1	3012	1	81	Low Limit 1	4012
1	57	High Limit 2	3013	1	81	High Limit 2	4013
1	57	Low Limit 2	3014	1	81	Low Limit 2	4014
2	58	High Limit 1	3021	2	82	High Limit 1	4021
2	58	Low Limit 1	3022	2	82	Low Limit 1	4022
2	58	High Limit 2	3023	2	82	High Limit 2	4023
2	58	Low Limit 2	3024	2	82	Low Limit 2	4024
3	59	High Limit 1	3031	3	83	High Limit 1	4031
3	59	Low Limit 1	3032	3	83	Low Limit 1	4032
3	59	High Limit 2	3033	3	83	High Limit 2	4033
3	59	Low Limit 2	3034	3	83	Low Limit 2	4034
4	60	High Limit 1	3041	4	84	High Limit 1	4041
4	60	Low Limit 1	3042	4	84	Low Limit 1	4042

Table E.3   Analog Alarm Reference Table – Input Slots 3 and 4

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
4	60	High Limit 2	3043	4	84	High Limit 2	4043
4	60	Low Limit 2	3044	4	84	Low Limit 2	4044
5	61	High Limit 1	3051	5	85	High Limit 1	4051
5	61	Low Limit 1	3052	5	85	Low Limit 1	4052
5	61	High Limit 2	3053	5	85	High Limit 2	4053
5	61	Low Limit 2	3054	5	85	Low Limit 2	4054
6	62	High Limit 1	3061	6	86	High Limit 1	4061
6	62	Low Limit 1	3062	6	86	Low Limit 1	4062
6	62	High Limit 2	3063	6	86	High Limit 2	4063
6	62	Low Limit 2	3064	6	86	Low Limit 2	4064
7	63	High Limit 1	3071	7	87	High Limit 1	4071
7	63	Low Limit 1	3072	7	87	Low Limit 1	4072
7	63	High Limit 2	3073	7	87	High Limit 2	4073
7	63	Low Limit 2	3074	7	87	Low Limit 2	4074
8	64	High Limit 1	3081	8	88	High Limit 1	4081
8	64	Low Limit 1	3082	8	88	Low Limit 1	4082
8	64	High Limit 2	3083	8	88	High Limit 2	4083
8	64	Low Limit 2	3084	8	88	Low Limit 2	4084
9	65	High Limit 1	3091	9	89	High Limit 1	4091
9	65	Low Limit 1	3092	9	89	Low Limit 1	4092
9	65	High Limit 2	3093	9	89	High Limit 2	4093
9	65	Low Limit 2	3094	9	89	Low Limit 2	4094
10	66	High Limit 1	3101	10	90	High Limit 1	4101
10	66	Low Limit 1	3102	10	90	Low Limit 1	4102
10	66	High Limit 2	3103	10	90	High Limit 2	4103
10	66	Low Limit 2	3104	10	90	Low Limit 2	4104
11	67	High Limit 1	3111	11	91	High Limit 1	4111
11	67	Low Limit 1	3112	11	91	Low Limit 1	4112
11	67	High Limit 2	3113	11	91	High Limit 2	4113
11	67	Low Limit 2	3114	11	91	Low Limit 2	4114
12	68	High Limit 1	3121	12	92	High Limit 1	4121
12	68	Low Limit 1	3122	12	92	Low Limit 1	4122
12	68	High Limit 2	3123	12	92	High Limit 2	4123

Table E.3   Analog Alarm Reference Table – Input Slots 3 and 4 (continued)

Analog Input Slot 3				Analog Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
12	68	Low Limit 2	3124	12	92	Low Limit 2	4124

Table E.3   Analog Alarm Reference Table – Input Slots 3 and 4 (continued)

E.2.   Digital Tables

Channel	Condition	ID
1	On/Off	0010
2	On/Off	0020
3	On/Off	0030
4	On/Off	0040
5	On/Off	0050
6	On/Off	0060
7	On/Off	0070
8	On/Off	0080

Table E.4   Digital Alarm ID Reference Table – Digital Inputs 1 through 8

Digital Input Slot 1				Digital Input Slot 2			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	9	On/Off	1010	1	33	On/Off	2010
2	10	On/Off	1020	2	34	On/Off	2020
3	11	On/Off	1030	3	35	On/Off	2030
4	12	On/Off	1040	4	36	On/Off	2040
5	13	On/Off	1050	5	37	On/Off	2050
6	14	On/Off	1060	6	38	On/Off	2060
7	15	On/Off	1070	7	39	On/Off	2070
8	16	On/Off	1080	8	40	On/Off	2080
9	17	On/Off	1090	9	41	On/Off	2090
10	18	On/Off	1100	10	42	On/Off	2100
11	19	On/Off	1110	11	43	On/Off	2110
12	20	On/Off	1120	12	44	On/Off	2120
13	21	On/Off	1130	13	45	On/Off	2130
14	22	On/Off	1140	14	46	On/Off	2140
15	23	On/Off	1150	15	47	On/Off	2150
16	24	On/Off	1160	16	48	On/Off	2160
17	25	On/Off	1170	17	49	On/Off	2170
18	26	On/Off	1180	18	50	On/Off	2180
19	27	On/Off	1190	19	51	On/Off	2190
20	28	On/Off	1200	20	52	On/Off	2200
21	29	On/Off	1210	21	53	On/Off	2210
22	30	On/Off	1220	22	54	On/Off	2220
23	31	On/Off	1230	23	55	On/Off	2230
24	32	On/Off	1240	24	56	On/Off	2240

Table E.5   Digital Alarm ID Reference Table – Digital Input Slots 1 and 2

Digital Input Slot 3				Digital Input Slot 4			
Slot Chan	Number	Condition	ID	Slot Chan	Number	Condition	ID
1	57	On/Off	3010	1	81	On/Off	4010
2	58	On/Off	3020	2	82	On/Off	4020
3	59	On/Off	3030	3	83	On/Off	4030
4	60	On/Off	3040	4	84	On/Off	4040
5	61	On/Off	3050	5	85	On/Off	4050
6	62	On/Off	3060	6	86	On/Off	4060
7	3	On/Off	3070	7	87	On/Off	4070
8	64	On/Off	3080	8	88	On/Off	4080
9	65	On/Off	3090	9	89	On/Off	4090
10	66	On/Off	3100	10	90	On/Off	4100
11	67	On/Off	3110	11	91	On/Off	4110
12	68	On/Off	3120	12	92	On/Off	4120
13	69	On/Off	3130	13	93	On/Off	4130
14	70	On/Off	3140	14	94	On/Off	4140
15	71	On/Off	3150	15	95	On/Off	4150
16	72	On/Off	3160	16	96	On/Off	4160
17	73	On/Off	3170	17	97	On/Off	4170
18	74	On/Off	3180	18	98	On/Off	4180
19	75	On/Off	3190	19	99	On/Off	4190
20	76	On/Off	3200	20	100	On/Off	4200
21	77	On/Off	3210	21	101	On/Off	4210
22	78	On/Off	3220	22	102	On/Off	4220
23	79	On/Off	3230	23	103	On/Off	4230
24	80	On/Off	3240	24	104	On/Off	4240

Table E.6   Digital Alarm ID Reference Table – Digital Input Slots 3 and 4

F

FMS SLOT DESIGNATIONS

F.1.　Input Slot Designation Table

Alarm ID format:

♦ XYYZ - X is the Slot # 0-4

♦ YY is the CH # 1-24

♦ Z is the type: 0=digital, 1=HighLevel1, 2=LowLevel1, 3=HighLevel2, 4=LowLevel2

Slot0	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCC	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CAAA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCAA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-CCCA	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-Axxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAxx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAAx	8	1-8	0.1-0.8	0011-0084	0010-0080
FMS-AAAA	8	1-8	0.1-0.8	0011-0084	0010-0080
IntTempSensor	5.1			5011-5014	

Table F.1　Input Slot Designation Table – Slot 0

Slot0	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
IntHumidSensor	5.2			5021-5024	
LowBatteryAlarm				6010	
PagerAlarm				6020	

Table F.1 Input Slot Designation Table – Slot 0 (continued)

Slot1	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	24	9-32	1.1-1.24		1010-1240
FMS-CCxx	24	9-32	1.1-1.24		1010-1240
FMS-CCCx	24	9-32	1.1-1.24		1010-1240
FMS-CCCC	24	9-32	1.1-1.24		1010-1240
FMS-CAxx	24	9-32	1.1-1.24		1010-1240
FMS-CAAx	24	9-32	1.1-1.24		1010-1240
FMS-CAAA	24	9-32	1.1-1.24		1010-1240
FMS-CCAx	24	9-32	1.1-1.24		1010-1240
FMS-CCAA	24	9-32	1.1-1.24		1010-1240
FMS-CCCA	24	9-32	1.1-1.24		1010-1240
FMS-Axxx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAxx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAAx	12	9-20	1.1-1.12	1011-1124	1010-1120
FMS-AAAA	12	9-20	1.1-1.12	1011-1124	1010-1120

Table F.2 Input Slot Designation Table – Slot 1

Slot2	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	24	33-56	2.1-2.24		2010-2240
FMS-CCCx	24	33-56	2.1-2.24		2010-2240
FMS-CCCC	24	33-56	2.1-2.24		2010-2240
FMS-CAxx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CAAx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CAAA	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-CCAx	24	33-56	2.1-2.24		2010-2240
FMS-CCAA	24	33-56	2.1-2.24		2010-2240
FMS-CCCA	24	33-56	2.1-2.24		2010-2240
FMS-Axxx	0				
FMS-AAxx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-AAAx	12	33-44	2.1-2.12	2011-2124	2010-2120
FMS-AAAA	12	33-44	2.1-2.12	2011-2124	2010-2120

Table F.3 Input Slot Designation Table – Slot 2

Slot3	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	0				
FMS-CCCx	24	57-80	3.1-3.24		3010-3240
FMS-CCCC	24	57-80	3.1-3.24		3010-3240
FMS-CAxx	0				
FMS-CAAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CAAA	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCAA	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-CCCA	24	57-80	3.1-3.24		3010-3240
FMS-Axxx	0				
FMS-AAxx	0				
FMS-AAAx	12	57-68	3.1-3.12	3011-3124	3010-3120
FMS-AAAA	12	57-68	3.1-3.12	3011-3124	3010-3120

Table F.4 Input Slot Designation Table – Slot 3

Slot4	#	Port/CH	CH ID	Analog Alarm ID	Digital Alarm ID
FMS-Cxxx	0				
FMS-CCxx	0				
FMS-CCCx	0				
FMS-CCCC	24	81-104	4.1-4.24		4010-4240
FMS-CAxx	0				
FMS-CAAx	0				
FMS-CAAA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-CCAx	0				
FMS-CCAA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-CCCA	12	81-92	4.1-4.12	4011-4124	4010-4120
FMS-Axxx	0				
FMS-AAxx	0				
FMS-AAAx	0				
FMS-AAAA	12	81-92	4.1-4.12	4011-4124	4010-4120

Table F.5   Input Slot Designation Table – Slot 4

F.2. Output Slot Designation Table

#	Rly	Rly ID	#	Rly	Rly ID	#
FMS-Cxxx	2	1-2	0.1-0.2	0		
FMS-CCxx	2	1-2	0.1-0.2	0		
FMS-CCCx	2	1-2	0.1-0.2	0		
FMS-CCCC	2	1-2	0.1-0.2	0		
FMS-CAxx	2	1-2	0.1-0.2	0		
FMS-CAAx	2	1-2	0.1-0.2	0		
FMS-CAAA	2	1-2	0.1-0.2	0		
FMS-CCAx	2	1-2	0.1-0.2	0		
FMS-CCAA	2	1-2	0.1-0.2	0		
FMS-CCCA	2	1-2	0.1-0.2	0		
FMS-Axxx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAxx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAAx	2	1-2	0.1-0.2	8	2-10	1.1-1.8
FMS-AAAA	2	1-2	0.1-0.2	8	2-10	1.1-1.8

Table F.6 Output (Relays) Slot Designation Table – Slots 0 and 1

#	Rly	Rly ID	#	Rly	Rly ID	#
FMS-Cxxx	0			0		
FMS-CCxx	0			0		
FMS-CCCx	0			0		
FMS-CCCC	0			0		
FMS-CAxx	8	11-18	2.1-2.8	0		
FMS-CAAx	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-CAAA	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-CCAx	0			8	19-26	3.1-3.8
FMS-CCAA	0			8	19-26	3.1-3.8
FMS-CCCA	0			0		
FMS-Axxx	0			0		
FMS-AAxx	8	11-18	2.1-2.8	0		
FMS-AAAx	8	11-18	2.1-2.8	8	19-26	3.1-3.8
FMS-AAAA	8	11-18	2.1-2.8	8	19-26	3.1-3.8

Table F.7 Output (Relays) Slot Designation Table – Slots 2 and 3

#	Rly	Rly ID	#
FMS-Cxxx	0		
FMS-CCxx	0		
FMS-CCCx	0		
FMS-CCCC	0		
FMS-CAxx	0		
FMS-CAAx	0		
FMS-CAAA	8	27-34	4.1-4.8
FMS-CCAx	0		
FMS-CCAA	8	27-34	4.1-4.8
FMS-CCCA	8	27-34	4.1-4.8
FMS-Axxx	0		
FMS-AAxx	0		
FMS-AAAx	0		
FMS-AAAA	8	27-34	4.1-4.8

Table F.8   Output (Relays) Slot Designation Table – Slot 4

G

RELAY CONTROL LOGIC

G.1.   Falcon-EM Relay Logic

contains the FMS relay control logic diagram described in the following sections.

OR Gate 144 Input

The OR Gate can accept any of the High Level 2, Low Level 2 or digital alarms. This option is configured on each input configuration page.

AND Gate 4 Input

The AND Gate can accept up to 4 alarms. These 4 inputs can be any of the analog level 1 or 2 alarms or any digital alarm. This option is configured on each relay configuration page.

OR/AND Gate3

This gate uses the OR Gate and the AND Gate as the inputs. This gate may be either an OR or an AND gate and is configured on each relay configuration page.

On-Delay

This gate will delay the relay operation until the programmed time has expired. The time is configured on each relay configuration page.

On-Duration/Latch

This gate controls how long the relay will stay activated after a valid alarm combination. A positive number will allow the relay to stay on for a fixed number of seconds. A negative number will keep the relay activated for that time after the alarm condition has returned to normal. Zero will force the relay to stay active until the alarm returns to normal. The time is configured on each relay configuration page. This gate can also be set for latching-the relay will stay active until it is manually reset by a user.

Inverter Gate

This gate can invert the relay activation. This allows the relay to be used in a "supervised" mode. In this mode, if the FMS loses power, the relay will close. The gate is configured on each relay configuration page.

Schedule

Each relay can be activated by either of the two schedules in the FMS. During the scheduled time-of-day the relay is activated. The schedule option is configured on each relay configuration page.

Keypad

Each relay can be controlled by a 3x4 keypad instead of the alarm inputs. The keypad option is configured on each relay configuration page.

DTMF

Each relay that can be programmed to be controlled by the keypad can also be controlled from a DTMF signal received on the phone line.

Force On/Off

Each relay can be forced to ON or OFF. This will override any alarm or keypad control of that relay until the relay operation has been restored.

Falcon-FMS Relay Logic

Figure G.1 FMS Relay Control Logic Diagram

(1) Alarm ID 10-5024: For Analog Inputs only High Limit2/Low Limit2 alarms are configurable

(2) Alarm ID 10-5024: All alarm IDs are configurable

(3) Alarm-Delay is common per input. Digital inputs have one Alarm ID, Analog Inputs have 4 Alarm IDs

(4) Default is 0 – relay is active until alarm returns to normal (RTN)
   > 0 the number of seconds to activate relay upon alarm occurance
   < 0 the number of seconds to stay on after the alarm is removed

(5) Relay can be turned off from the alarm management screen in configuration by a HTML button

(6) A timed schedule can control the on time (activation) of a relay

(7) Relay can be activated by a Modbus Slave device (Summary Alarm)

(8) Relay can be activated by a HTML button located on the Relays page

TECHNICAL SPECIFICATIONS

Power		
	1U FMS	24VDC Model: 24VDC (±10%), 1A max. (power supply included); 48VDC Model: 36-72VDC, 0.5A max
	2U FMS	24VDC Model: 24VDC (±10%), 2.5A max. (power supply included); 48VDC Model: 36-72VDC, 1.25A max.
Inputs		
	Analog/Digital	8 Configurable as 4-20mA (12-bit A/D conversion) or Dry Contact NO/NC (<15mA)
	Optional Internal Temperature/ Humidity	±0.5ºF (@ 25ºC), ±4ºF (@ -40º to 185ºF); ±3%RH (@ 20% to 80%RH)
	Keypad	Standard 3x4; 3000VAC RMS optically isolated; 20 User Access Codes (also accessible via phone/DTMF through modem)
Outputs		
	Relay	2 Dry Contact, Form C, 1A @ 24VDC, 0.5A resistive @ 120VAC (controllable via user programmable logic)
	Sensor/Accessory Power	24VDC (±10%) @ 300mA max. (power for external sensors and/or devices)

Table H.1 Technical Specifications

Expansion Cards

	EXP-A-24 or EXP-A-48	1U accommodates 1 expansion card; 2U accommodates up to 4 expansion cards
		24V Falcon requires EXP-x-24 option cards; 48V Falcon requires EXP-x-48 option cards
		12 analog inputs (jumper selectable for 4-20mA, 0-5VDC or 0-10VDC) and digital inputs (non-isolated, individual ground only); 8 Form C Relay Outputs, 1A @ 24VDC, 0.5A resistive @ 120VAC
	EXP-C-24 or EXP-C-48	24 Digital Inputs, 3000VAC RMS optically isolated (common ground or individual ground)

Communications Ports

	Ethernet	10/100BaseT, RJ45 connector; 500VAC RMS isolation
	EIA-232	DB9 female connector; 9600 baud; 3000VAC RMS optically isolated; 15kV ESD protection
	EIA-485 (selectable as EIA-232)	Two-wire half duplex; terminal block (selecting EIA-232 switches to DB9 male connector); 1200, 2400, or 9600 baud configurable; 3000VAC RMS optically isolated
	Modem (RJ11 Telco) – Optional	V.34bis/33.6 kbps; DTMF capable; PPP-Enabled; FCC Part 68 approved; 1500VAC RMS isolation barrier; 2100V peak surge protection

Protocols

	TCP/IP, UDP/IP, ICMP/IP, FTP, NTP	IPv4
	HTTP/HTML, SNPP, Telnet	1.1/4.0; up to 10 URL links to other IP addressable cameras/devices; webpages comply with Rehabilitation Act of 1973, sections 504 and 508, US Dept of Education (website accessibility for computer users with disabilities)
	SNMP	V1: MIB-2 compliant; NMS Manageable with Get, Set, and Traps; V2c: Traps or Informs; V3
	SMTP (Email)	Supports Client Authentication (plain and login); compatible with ESMTP Servers
	Modbus	RTU transmission protocol; function codes: Slave - 03; Master - 01,02,03,04
	Modus/IP	Modbus Slave; TCP/IP transmission protocol
	BACnet/IP	Reads up to 106 instances and converts to SNMP and Modbus
	Terminal Emulation	VT100 compatible
	TAP (Pager)	Telocator Alphanumeric Protocol Ver1.8

Table H.1   Technical Specifications (continued)

Alarm Notification

	Pager (Modem)	15 Text, numeric, or alphanumeric pager numbers; each digital and analog alarm (HighLimit and LowLimit) can notify any 5 of the 15 pagers
	Email (Ethernet, Modem PPP)	8 Email recipients; email sent on Alarm and Return To Normal; each Alarm can notify any or all of the 8 email recipients
	SNMP Traps (Ethernet)	V1, V2c: 8 Community Strings; V3: 4 users, 4 Trap Destinations
	Escalation	Additional notification to 1 of the 15 pager numbers when the initial page results in a Failure To Acknowledge status
Health Check/Self Monitoring		Self resetting; captured in Event Log

Internal Hardware

	Real Time Clock	Battery backed; ±1.53 min/month accuracy
	Memory	16 MB RAM; 128K NVRAM; 16MB Flash

Logging Capabilities

	Alarm Log	Last 256 Alarms
	Event Log	Last 100 Events (e.g., Acknowledgment By Code, System Boot, Page Successful, etc.)
	Web User Access Log	Last 100 HTML Accesses (User, Date, and Time)
	Digital Status Log	Last 100 Digital Status entries
	Trending of Analog Inputs	244 Entries per time frame, per channel
	Minute	Every minute, high/low/avg for the last 65 minutes
	Hour	Every hour, high/low/avg for the last 25 hours
	Day	Every day, high/low/avg for the last 7 days
	Extended Trending of Analog Inputs	3,840 entries over 32 inputs either physical or Modbus; logging every 1 minute, 5 minute, 15 minute, 1 hour, 2 hour, 4 hour, 6 hour and 8 hour intervals.

Login Security

	Web Browser Access (Ethernet, Modem PPP)	1 Administrator plus 7 Users individually selectable for Read Only, Read/Write or Administrator
	Terminal Emulation Access (Modem)	1 Administrator (password for Modem access)

Front Panel Interface

	Switches	Power: 1 (on/off)
	LED Indicators	Power: 1 green (on/off); Status: 1 red (flashing = boot up, on = alarm, off = normal); Network Link: 1 bi-color (green = active, red = not active); Network Activity: 1 green; Modem: 3 green (transmit, receive, and off hook), 1 amber (carrier detect)

Table H.1   Technical Specifications (continued)

Operating Environment		
	Temperature	32° to 158°F (0° to 70°C)
	Humidity	5% to 95% RH, non-condensing
	Altitude	15,000ft (4,572m) max.
Storage Environment		-40º to 185ºF (-40º to 85ºC)
Dimensions		
	1U FMS	16.8"W x 1.8"H x 7.9"D (427mmW x 46mmH x 201mmD)
	2U FMS	16.8"W x 3.5"H x 7.9"D (427mmW x 89mmH x 201mmD)
Weight		
	1U FMS	6 lbs. (2.72kg)
	2U FMS	10 lbs. (4.54kg
Mounting		
	1U FMS	Rack mount, or wall mount (brackets required): WMB wall mount brackets (not included)
	2U FMS	Rack mount, or wall mount (brackets required): WMB2U wall mount brackets (not included)
Certifications		CE; ETL listed: conforms to UL STD 61010A-1, EN STD 61010; certified to CAN/CSA C22.2 STD NO. 1010.1; RoHS compliant

Table H.1   Technical Specifications (continued)