

Monitoring & Notification

F110 User Guide



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Revision History

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Note: As necessary, blank pages are added to make the page count even.

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

Access and submit Product Registration information from the F110 Configuration Menu.

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

Otherwise, please call us directly at: **(970) 484-6510**, and press “2” for technical support.

The following information is located on the bottom of each F110 unit. Please have this information available whenever a technical support call is placed:

Product Model Number

Product Serial Number

Product Manufacture Date

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SYSTEM OVERVIEW

1.1. Product Description

The F110 Monitoring System is a comprehensive system which provides equipment protection by monitoring critical operating parameters in enterprises, remote network facilities, communication rooms, and critical support systems. The F110 is a stand alone system. It operates via embedded “firmware” that handles all data collection, alarm reporting, and multiple concurrent communication mediums.

The F110 is designed specifically to monitor any combination of 3 digital temperature/humidity sensors or 3 digital temperature only sensors and up to 8 dry contact sensors (signal quality contacts) that can be distributed at locations spanning up to 100 feet (30m).

Additionally, the F110 allows alert notifications to be sent via email to devices like computers, phones, pagers and PDAs. Users can set up thresholds for temperatures and humidity as well as configure monitoring of Normally Open (N/O) or Normally Closed (N/C) inputs. Status of attached sensors for power, smoke/fire, motion, air flow and more is viewed in real-time. Because each F110 is SNMP enabled, it can easily be monitored by network management software. The F110 can easily be integrated with Building Management Systems (BMS) via the Modbus protocol.

1.2. Front Panel Indicators and Controls



Figure 1.1 F110 Front Panel Indicators and Controls

Power LED – Green (On) if power is on.

Network Link – Green (On) if a network connection is found.

Network Activity LED – Green (On) if network communication is occurring.

Front Panel	
Power	5VDC wall adapter input (center +)
Network	RJ45 1-/1--BaseT Ethernet connector
2	RJ11 External Environment Sensor input
3	RJ11 External Environment Sensor input
4	RJ11 External Environment Sensor input

1.3. Terminal Block Designations

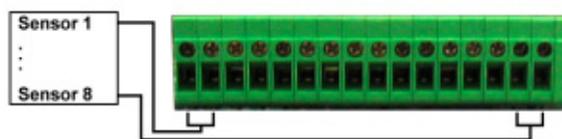


Figure 1.2 F110 Terminal Block Designations

Rear Panel	
Switch Sensor Port 1	Digital Input 1
Switch Sensor Port 2	Digital Input 2
Switch Sensor Port 3	Digital Input 3
Switch Sensor Port 4	Digital Input 4
Switch Sensor Port 5	Digital Input 5
Switch Sensor Port 6	Digital Input 6
Switch Sensor Port 7	Digital Input 7
Switch Sensor Port 8	Digital Input 8

Notes:

GETTING STARTED

2.1. Installation

The F110 comes in a 4.5”W x 1.25”H x 2.5”D desktop enclosure. Mount or place the unit in the desired location. A 19 inch (.48m) rack mount enclosure is available from RLE.

2.2. Communication

The F110 default is configured with a DHCP IP Address. The RLE Device Discovery Utility scans the network and locates all F110 devices connected to the network. This provides an efficient way to manage large numbers of F110 devices from a single host system.

Note The default DHCP name on the F110 is 'F110 -<5 digit number>'. This 5 digit number will be the serial number located on the bottom of the F110.

The Device Discovery Utility is available on your RLE Product User Guide CD, included with your F110. It is also available for download on the Documentation/Files section of the F110 webpage at www.rletech.com. Install and run the Device Discovery Utility.

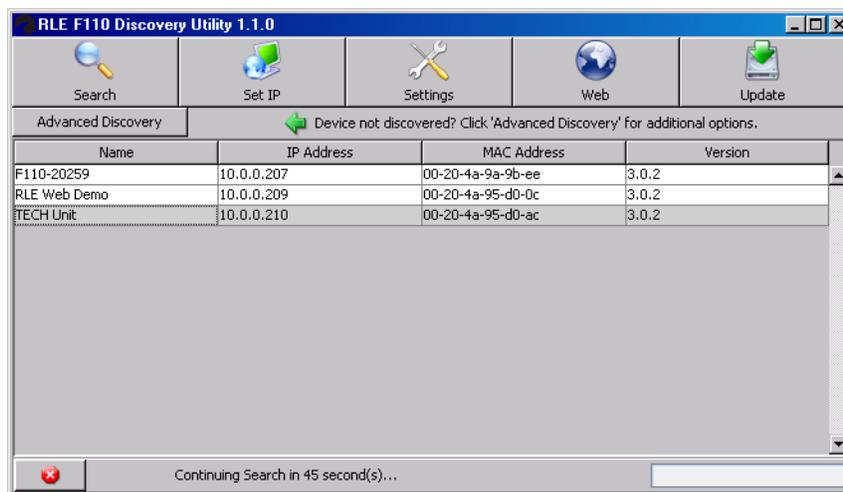


Figure 2.1 Device Discovery Utility

2.2.1 Search

Select the **Search** button to scan the network for the F110 hardware devices. If an F110 is physically attached to your network anywhere it will be located in this scan.

Note If the Device Discovery Utility can not find the F110, reset the unit by unplugging the power adapter and then plugging it back in. Also, make sure that UDP port “30718” is not restricted on your network by a router, switch, network firewall or software firewall.

2.2.2 Set IP

Select the **Set IP** button to enter a static IP address, gateway IP address and subnet mask for the selected F110. To configure a dynamic IP address, set the IP to **0.0.0.0**. When configured for a dynamic IP address, F110 will attempt to obtain an IP address automatically via DHCP.

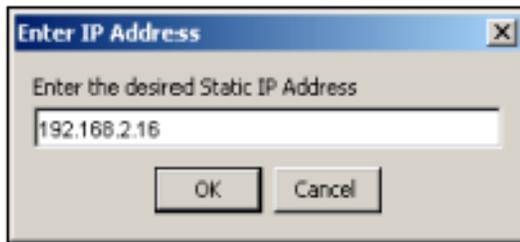


Figure 2.2 IP Pop-up Box

2.2.3 IP Address Assignment for Static Only Networks

If the network is not configured for DHCP, a static IP address will need to be set before the F110 can be accessed. After discovering the unit, it will be displayed with an IP address. Click the **Set IP** button to assign a static IP address only. After the F110 reboots (i.e., it takes about 4 seconds) with the new IP address, select the **Search** button on the Device Discovery Utility. Next, select the F110 that was just assigned a static IP and then select the **Set IP** button. Finally, fill in the gateway IP address and subnet mask for the selected ID Box.

2.2.4 Settings

Click the **Settings** button to open the Settings Applet on the web browser interface for the selected device. The Settings Applet can then be used to configure that specific F110.

2.2.5 Web

Click the **Web** button to open the web browser interface for the selected F110. This is useful for viewing the current sensor status.

2.2.6 Update

Click the **Update** button to update the firmware installed on the selected F110. Updated firmware files provided by RLE, add new features and enhance the web browser interface. These firmware updates are available from RLE if firmware replacement is necessary.

Note When obtaining the F110 Firmware Update file from the RLE Technologies website, be sure to save the file instead of opening it from a web browser. After receiving the file, right-click the F110 Firmware Update file and select “Properties.” If the F110 Firmware Update file has a “.zip” extension, replace “.zip” with “.upd” before uploading the file with the Device Discovery Utility.

2.3. F110 Wiring

RLE recommends an 18AWG stranded copper wire for connection from each monitored point to the terminal block (TB) connection on the F110 (8 Switched Sensors inputs only). RLE recommends no more than 200 feet (60.9m) of wire at this specification. If longer runs are needed, please contact RLE for application guidance.

2.3.1 Power Supply

Plug the wall adapter into the connection labeled **Power**. The wall adapter has a 6 foot (18.82m) power cord. RLE recommends powering the F110 from a UPS supply to allow the F110 to send alarm notification during a power outage.

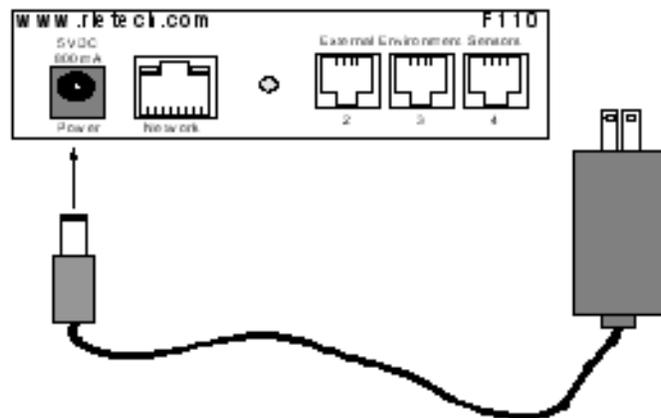


Figure 2.3 5VDC Power Supply Connection



WARNING

NEVER connect main power to the sensors or sensor cables.

2.3.2 RJ45 Ethernet Connection

The F110 has an internal 10/100BaseT Ethernet port used to configure and monitor the F110. The Ethernet port supports Web browser access, email (SMTP), Modbus, and SNMP. The following figures show the physical connection.

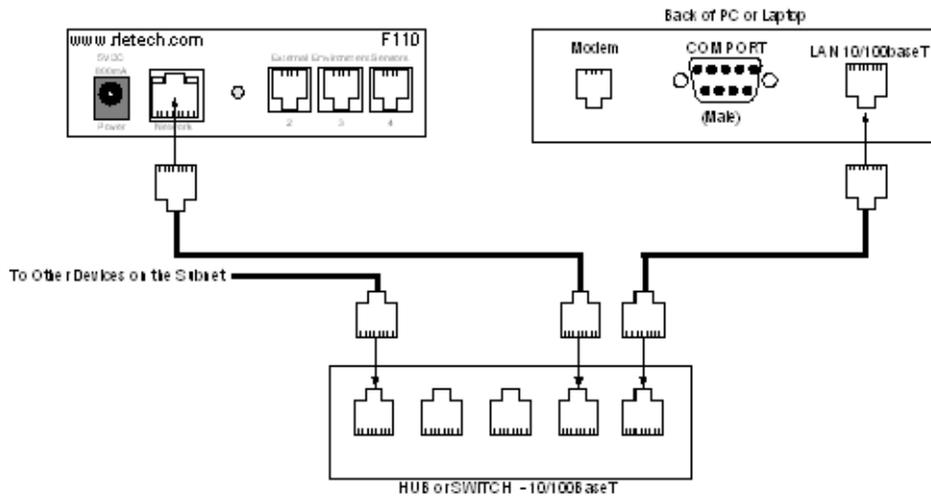


Figure 2.4 Physical Connection

Figure 2.5 shows a typical F110 connection on a subnet using a hub or switch and straight through Network Patch cables.

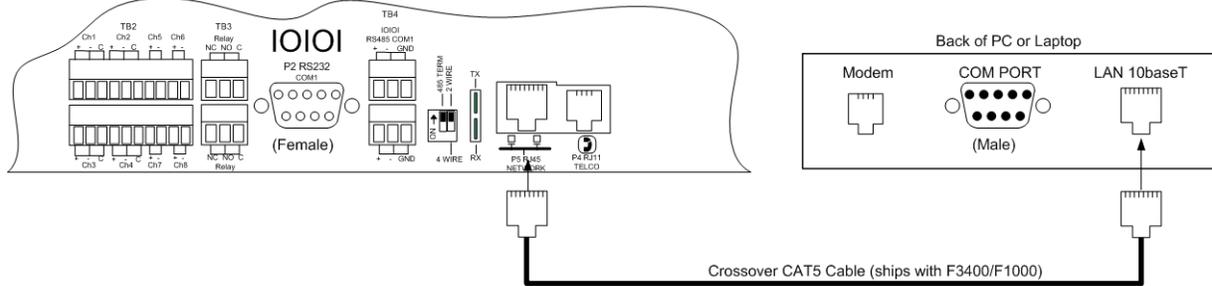


Figure 2.5 F110 Ethernet Connection to a PC on a Subnet

F110 WEB INTERFACE

3.1. F110 Web Interface Overview

The F110's Web interface provides a convenient way to check the F110's status and reconfigure basic settings from any internet enabled computer. Enter the IP address of the F110 into your web browser's address bar. The F110 Main Page will appear.

3.2. Status Screen

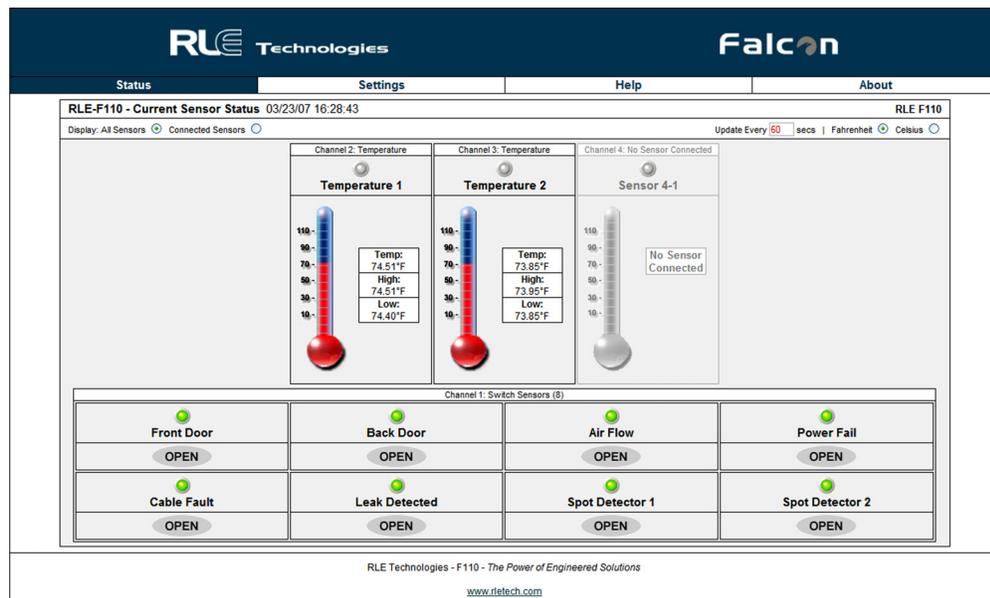


Figure 3.1 F110 Status Screen

The Falcon F110 Status Screen is available through the built-in web server and shows the current status of the attached sensors. If high and low alert thresholds are defined for the temperature or temperature/humidity sensors, the status icon above the sensor label changes

color based upon where the temperature or humidity is in relation to the established high and low thresholds.

If the temperature or humidity is between the high and low thresholds and more than five (5) degrees from either threshold, the status icon will be **green**. If it is within five (5) degrees of the high threshold, the status icon will be **yellow**. If it is within five (5) degrees of the low threshold, the status icon will be **blue**. If the high or low threshold is exceeded, the status icon will be **red**. If no thresholds are currently defined, the status icon will be **gray**.

The **Status** screen also displays the current status of any switch sensors connected to the F110. If the status icon above the switch sensor is **red**, then that switch sensor is currently in an alarm state. Below the status icon and switch sensor label, the current switch sensor state will be displayed. If you are unsure as to which state (i.e. open or closed) to set for the switch sensor alarm state and the switch sensor is not currently in an alarm state, set the alarm state to be the opposite of what is displayed here. Refer to the manual of each sensor for information on the normal state (open or closed) of the switch sensor in use.

Below the DHCP Name and time display are a number of radio buttons and form fields that allow the display of the F110 web server interface to be modified. Changing the **Display** radio buttons will toggle how inactive sensors are displayed, modifying the **Update Every** form field will adjust the refresh time of the F110 web server interface and selecting the **Celsius** radio button instead of the **Fahrenheit** radio button will display sensor values in Celsius.

3.3. Settings Screen

The F110 Settings Screen is used to modify the F110 configuration. Here users can configure Network, Email, SNMP, Alert Threshold, Security, and Advanced settings. When settings are modified and saved, the F110 will automatically reset and start with the new configuration.

Note After you make a field change, click on Accept Changes at the bottom of the screen, then click on Save Settings on the left hand column.

You will see an authentication security prompt appear once accessing the Settings Menu. Default from RLE, there is no USER name and NO password assigned to the unit. A password can be assign to the unit later during the configuration. There is no USER name assigned to the unit, at this time.

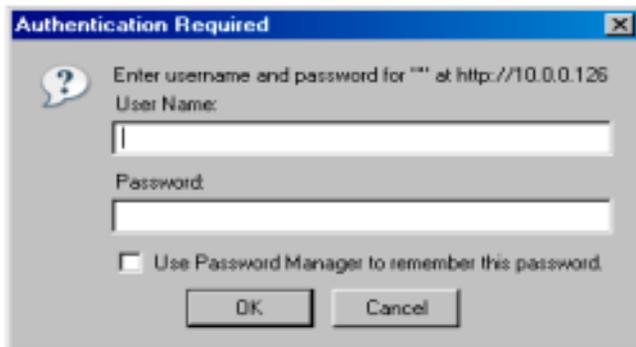


Figure 3.2 Authentication Security Prompt (no Username or Password)

Note There is no user name or no password from RLE. Password can be assigned to the unit later in the configuration menu. There is no user name that can be configured at this time.

3.3.1 Network

The Network tab stores settings to control how the F110 appears on the local network. Modifying the DHCP name will change how the F110 reports to the DHCP server when attempting to obtain a dynamic IP address. This label must be unique, so when assigning the DHCP Name ensure that duplicate labels do not appear on the network.

To set a static IP address, uncheck the **Use DHCP** checkbox and enter the Static IP, Gateway IP, and Subnet Mask.

If you wish to use a DNS name instead of an IP address for the **Mail Server Address** on the **Email** tab, enter the IP address of your DNS Server in the **DNS Server IP** field.

Note In most cases, the DNS Server IP address is the same as the IP address entered into the "Gateway IP" field. If this does not work, please contact your network administrator for assistance.

The screenshot displays the RLE Technologies web interface for the F110 device. At the top, there is a header with the RLE Technologies logo and a navigation bar with 'Status' and 'Settings' tabs. Below the navigation bar, the MAC Address is 00-20-4A-93-59-EE and the Version is V0.3.2.2. The main content area is titled 'Network Settings' and contains several sections:

- Device Name:** F110-20505
- IP Address Configuration:**
 - Obtain IP Address Automatically
 - Use The Following IP Configuration
- Auto Configuration Methods:**
 - BOOTP: Enable Disable
 - DHCP: Enable Disable
 - AutoIP: Enable Disable
- Static IP Configuration (under 'Use The Following IP Configuration'):**
 - IP Address: 10.0.0.200
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 10.0.0.1
 - DNS Server IP: 10.0.0.10
- Ethernet Configuration:**
 - MTU Size: 536
 - Auto Negotiate:
 - Speed: 100 Mbps 10 Mbps
 - Duplex: Full Half

An 'Accept Changes' button is located at the bottom of the form.

Figure 3.3 Network Settings

Note If using SNMP monitoring software to monitor the F110, it is recommended that a static IP address be assigned to the device to ensure that the software can find the unit. The IP address assigned must also be excluded from DHCP assignment to ensure that the IP address of the F110 is NOT given to another device on your network. Please contact your Network Administrator for assistance.

3.3.2 Email

The Email tab stores settings for the F110 to send Email Alert Notifications when alert thresholds are exceeded. In order to enable email alerting from the F110's web server interface, your mail server must have **SMTP Relay** enabled for either your network or the IP address of the F110. Contact your Email Administrator if you need assistance.

Enter the mail server address for the mail server you are using in the **Mail Server Address** field. The address can be entered as either the IP address or the DNS name of your mail server. If you wish to use a DNS name for the **Mail Server Address** field, you must assign a Static IP address, Gateway IP address, DNS Server IP address, and Subnet Mask on the **Network** tab.

In the **Email Recipients** fields, you can enter a single/regular email address, distribution list email address or mobile phone, pager or PDA email address (using Email-To-SMS) for email alert when alert thresholds are exceeded. **Only one address may be entered.**

The **Return Address (From)** field **MUST** contain an email address for an active account on the mail server specified in the **Mail Server Address** field. For example, if 'mail.rletech.com' is entered in the **Mail Server Address** field, the **Return Address (From)** field must contain an email address with the 'mail.rletech.com' domain. Contact your email administrator if you require additional assistance.

The F110 can also do authenticated SMTP (**ESMTP**). Enter your user name and password in the fields and select the check box for Enable Authentication. You **MUST** save your settings before sending a test email. Refer to xrefpg. X for Trace output, to view mail transfer information between the F110 and mail server for troubleshooting.

Note You must save your settings before sending a test email.

The screenshot shows the 'Email Settings' page in the F110 web interface. At the top, there's a header for 'RLE Technologies' and a navigation bar with 'Status' and 'Settings' tabs. Below the navigation bar, the MAC Address is '00-20-4A-93-59-EE' and the Version is 'V0.3.2.2'. The left sidebar contains a menu with 'SMTP Email' selected. The main content area is titled 'Email Settings' and includes the following fields and options:

- Email Enabled:**
- Email Footer Enabled:**
- Use SMS:**
- Mail Server Port:** 25
- Timeout:** 5
- Mail Server:** smtp.bizmail.yahoo.com * Domain Name or IP
- Return Address (From):** tfletcher@rletech.com
- Display URL:** 10.0.0.200
- Authentication (optional):**
 - Enable Authentication:**
 - Username:** tfletcher@rletech.com
 - Password:** [masked] * Max 11 Characters
- Email Recipients (Separated By Comma):**
 - Email Addresses:** tfletcher@rletech.com

At the bottom of the form, there are two buttons: 'Send Test Email' and 'Accept Changes'.

Figure 3.4 Email Settings

Note Many email servers block SMTP email by default. To use SMTP email with the F110, be sure the F110 IP address is added to the list of allowed SMTP relay hosts on the email server you are using for email.

Note After you make a field change, click on Accept Changes at the bottom of the screen, after verifying the settings are ok, click on the Save Settings tab located on the left hand column.

3.3.3 SNMP

The SNMP tab stores settings allowing the F110 to respond to SNMP Query requests from network monitoring applications. Enter the 'Community Name' to use for accessing the SNMP data via SNMP Query for the F110 sensors. If the SNMP feature of the F110 is used, F110 MIB files are available for download on the Documentation/Files section of the F110 webpage at www.rletech.com, or by contacting RLE via support@rletech.com.

The F110 can also send SNMP Traps in response to alerts. Enter up to three (3) IP addresses on the SNMP tab and F110 will send SNMP Traps to these systems for processing by network monitoring applications.

Figure 3.5 SNMP Settings

Note After you make a field change, click on Accept Changes at the bottom of the screen, after verifying the settings are ok, click on the Save Settings tab located on the left hand column.

3.3.4 Channel 2, Channel 3 and Channel 4

The Channel 2, Channel 3 and Channel 4 tabs are used to configure sensor labels and to set temperature thresholds, temperature/humidity thresholds and/or alarm states for the sensors connected to sensor channels 2, 3 and 4 on the front of the F110. Sensor labels can be up to 14 characters in length.

Depending on whether an external temperature / humidity sensor, external temperature sensor or any additional external sensor is plugged into the sensor channel, configuration of each specific channel may vary.

3.3.4.1 External Temperature/Humidity

High and low thresholds can be defined for each temperature/humidity sensor. If the current temperature and/or humidity rises above the high threshold or falls below the low threshold, an alert will be generated. When the temperature and/or humidity returns to a normal state, the alert will clear and a follow-up notification will be sent.

The temperature/humidity sensors can be calibrated, if necessary, by entering correction values in the **Adjust** field for each temperature/humidity sensor. Temperature corrections entered here can only be entered in degrees **Celsius** (i.e. $^{\circ}\text{Celsius} = [5/9]*[^{\circ}\text{Fahrenheit}-32]$). Humidity corrections are entered in percent (%) Relative Humidity. To adjust the temperature and/or humidity down, enter a minus (-) sign before the value (i.e. -5). All temperature alert thresholds **must** be entered in degrees Fahrenheit and all humidity alert thresholds must be entered in percent (%) Relative Humidity.

Field	Temperature Units
High	Fahrenheit
Low	Fahrenheit
Adjust	Celsius

RLE Technologies

Status	Settings
MAC Address: 00-20-4A-93-59-EE	Version: V0.3.2.2

- Network
- SMTP Email
- Sensors
- SNMP
- Modbus
- Security
- Advanced

- Save Settings
- Reset Defaults

Sensor Settings

General Alarm Configuration

Degrees Outside Of Threshold Before Alarm Is Triggered: (between 0.0 and 25.5)

Degrees Within Threshold Before Alarm Is Cleared: (between 0.1 and 25.5)

Alarm Thresholds

Sensor 2 Alarm Configuration Sensor Type: Temperature (Fahrenheit)

Sensor Label	Alarm On	High	Low	Adjust
<input type="text" value="Rack Top"/>	Temperature (°F)	75	50	5

Sensor 3 Alarm Configuration Sensor Type: Temp/Humidity (Fahrenheit)

Sensor Label	Alarm On	High	Low	Adjust
<input type="text" value="Rack Middle"/>	Temperature (°F)	75	50	0
<input type="checkbox"/> Monitor Heat Index	Humidity (%RH)	70	10	0

Sensor 4 Alarm Configuration Sensor Type: Temperature (Fahrenheit)

Sensor Label	Alarm On	High	Low	Adjust
<input type="text" value="Rack Botton"/>	Temperature (°F)	75	50	0

Switch Sensor Alarm Configuration Sensor Type: Switch

<input type="text" value="UPS ALARM"/>	Alarm On: <input type="text" value="Closed"/>	<input type="text" value="WATER ALARM"/>	Alarm On: <input type="text" value="Closed"/>
<input type="text" value="CRAC ALARM"/>	Alarm On: <input type="text" value="Closed"/>	<input type="text" value="CO2 ALARM"/>	Alarm On: <input type="text" value="Closed"/>

Figure 3.6 Sensor Settings

3.3.5 Switched Sensor Alarm Configuration

The Channel 1 tab is used to configure sensor labels and alarm states (normally open or closed) for the eight (8) switch sensor ports (dry contact inputs) on the back of the F110 unit. Sensor labels can be up to 15 characters in length.

Alert Thresholds for switch sensors connected to the eight (8) sensor ports on the back of the F110 are set by specifying either **CLOSED** or **OPEN**. Please refer to the documentation received with any sensor purchased to determine the 'normal' state (open or closed) for that specific sensor type. Next, select the opposite state (i.e. not normal) to configure the F110 for its alarm state, which will cause it to send an alert when the alarm condition exists.

3.3.6 Security

The **Security** tab is used to configure password security for access to the F110 Settings Screen. Passwords can **ONLY** contain the alphanumeric characters "0-9", "a-z" and "A-Z". Spaces, symbols, and punctuation are not supported. Be sure to record the password entered here in a secure location.

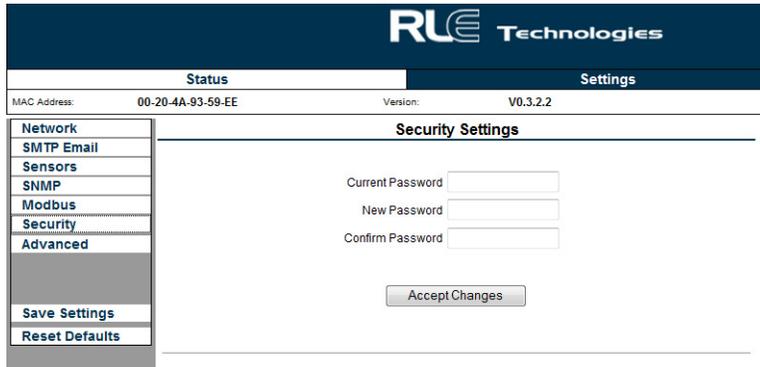


Figure 3.7 Security Settings

3.3.7 Advanced

The **Advanced** tab is used to configure the **Temperature Scale Configuration**, **Time & Date Configuration** by connecting to a NTP server and provides a **Trace Configuration** for diagnostics when communicating to other equipment. If you wish to modify the time display on the **Status** screen to the local time zone, use the drop down box to select your local time zone, check the **Daylight Savings Time** checkbox if applicable and click **Save Settings**. The **Time Server IP** field can be used to manually enter a specific time server to use for the time display if access to the Internet is restricted or not available and a time server is available for use on the local network.

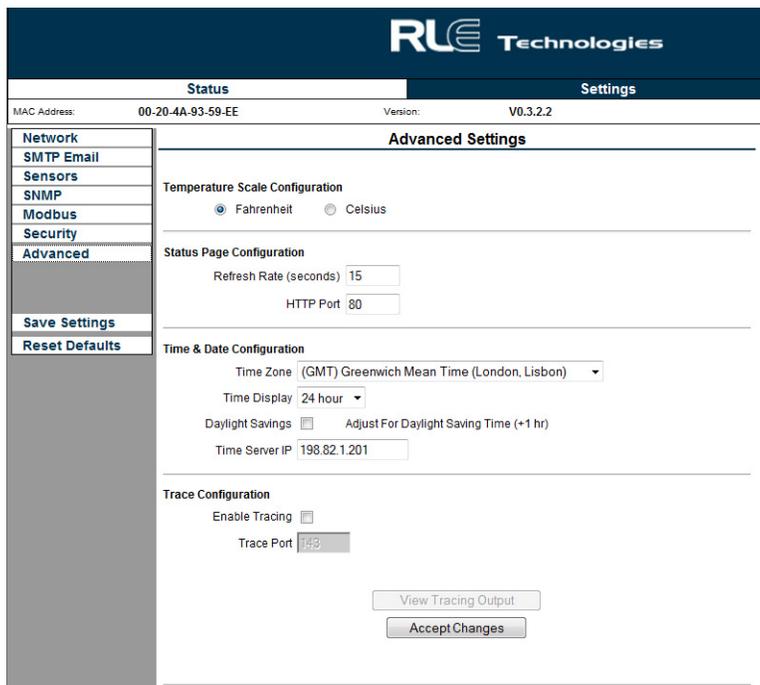


Figure 3.8 Advanced Settings

Temperature Scale Conversion: You can select how the F110 displays the Temperature output on the Status page, either being **Fahrenheit** or **Celsius**.

Time & Date Configuration: Enter an IP address of a NTP server for the F110 to synchronize with for displaying current date and time information.

Trace Configuration: This feature enable you to open a secondary window to view communication between the F110 and other devices, such as a Mail Server, Modus Master and SNMP manager. This feature aids in troubleshooting if communication is not being made. To use Tracing Output, click on the enable tracing box, save your settings. Go back to the Advanced screen after the changes have been made and left click the View Tracing Output button.

Note If Daylight Savings Time is used in your location, be sure to toggle the “Daylight Savings Time” checkbox when Daylight Savings Time is not being observed.

3.3.8 Reset Defaults

The Reset Factory Defaults button will reset the F110 to its default factory configuration, clearing any configuration changes made to the F110. Use this as a LAST resort if you are experiencing difficulties configuring the F110. You will have to rediscover the F110 once submitting. Write down the F110 MAC address before resetting to factory defaults.



Figure 3.9 Restore Defaults Prompt

3.3.9 Help Screen

The Help screen displays the current firmware on the F110 unit. There are hyperlinks available for contacting RLE Technologies, RLE Technical Support, and Web Site link for viewing other RLE products and information.

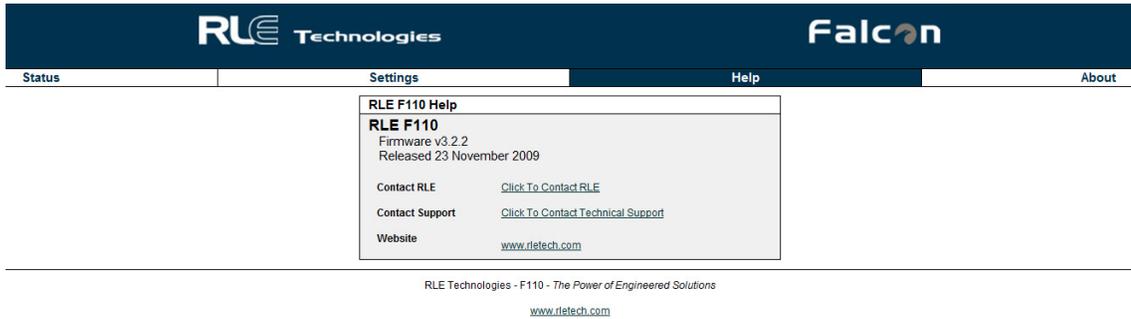


Figure 3.10 Help Screen

3.3.10 About Screen

The About screen also displays current information and provides links and information for contacting RLE Technologies.

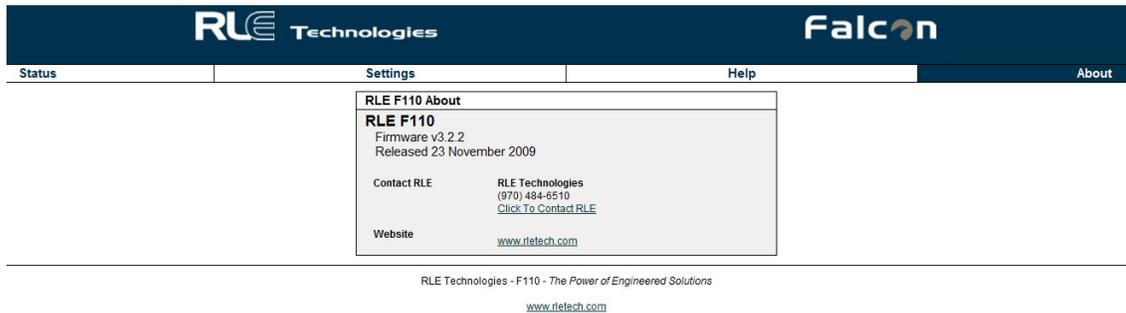


Figure 3.11 About Screen



MODBUS CONFIGURATION VIA TELNET

A.1. F110 Modbus Capabilities

By default, the F110 is enabled to listen on TCP port 502 for Modbus requests. The Modbus module can be enabled or disabled, the TCP port can be changed, and a list of IP addresses can be specified and used to either allow or deny Modbus requests.

A.2. Telnet Configuration

Modbus can be configured through the F110 Telnet interface. To open the Telnet interface, type the following on the command line being sure to replace <IP Address> with the IP address of the F110:

```
telnet <IP Address> 9999
```

Press **Enter** when prompted to enter Setup Mode. If **Enter** is not pressed within three (3) seconds, the connection will be closed automatically.

```
ca Telnet 192.168.2.119
*** F110 Telnet Server ***
MAC address 00204A8717BD
Software version 00.1.0.0 (070212) F110
Press Enter for Setup Mode

Change Setup:
1 Server configuration
2 SNMP/MODBUS Configuration
4 Reboot Unit
6 Reset Web Password
7 Reset Factory Defaults
8 Discard Changes And Exit
9 Save Changes And Exit

Your choice ? 2
  1 SNMP Configuration
  2 MODBUS Configuration

Your choice ? _
```

Figure A.1 Telnet Connection

Enter **2** and press **Enter** to select the **SNMP/MODBUS Configuration** option. At the next prompt, enter **2** and press **Enter** to select the **MODBUS Configuration** option. Follow the prompts below to configure Modbus on the F110.

Enable MODBUS? (N)?

Enter **Y** to enable Modbus and **N** to disable it. When Modbus is disabled, the F110 will not actively listen on the Modbus TCP port for Modbus requests.

MODBUS Port: (502)

By default, the F110 listens for Modbus requests on TCP port 502. This port can be changed to any valid TCP port number although it is recommended to leave it set for port 502 to ensure compatibility with other Modbus devices on the network.

Should IP List Allow or Deny Connections (0=Allow, 1=Deny):

The F110 is configured by default to deny connections from any IP addresses listed in the Modbus IP list. When all IP addresses in this list are set to default (0.0.0.0) the F110 will deny connections from no devices. In other words, by default the F110 allows connections from all IP addresses. This can be modified if desired so that the F110 will only allow connections from IP addresses appearing in the IP list. Selecting “0=Allow” will only allow connections from the IP addresses provided in the list and deny connections from all other addresses. Selecting “1=Deny” will deny connections from all address in the list but accept from all other addresses.

Enter IP addresses for MODBUS Security:

Up to three (3) IP addresses can be specified and added to the Modbus IP list. This list can be used to either allow or deny connections if the IP address that the request originated from matches an IP address in the list. To configure IP addresses, enter each IP address when prompted or enter **0.0.0.0** to leave blank.

Save Changes And Exit

When configuration changes are complete, press **9** and **Enter** to save the changes and exit. The F110 will reboot and apply the new settings.

B

MODBUS REGISTERS

Table B.1 Read Output Registers

Register	Name	Description	Units	Range
40002	FC	Family Code (8 Switch Sensors)	None	0-65535
40003	SS	Switch Status (8 Switch Sensors)	None	0-65535
40004	SC	Current Alarm Setting (8 Switch Sensors)	None	0-65535
40005	AS	Current Alarm State (8 Switch Sensors)	None	0-65535
40009	FC	Family Code (External Sensor 1)	None	0-65535
40010	TC	Current Temperature (External Sensor 1)	Celsius x100	0-65535
40011	TH	High Temperature (External Sensor 1)	Celsius x100	0-65535
40012	TL	Low Temperature (External Sensor 1)	Celsius x100	0-65535
40013	HC	Current Humidity (External Sensor 1)	% Relative Humidity	0-65535
40014	HH	High Humidity (External Sensor 1)	% Relative Humidity	0-65535
40015	HL	Low Humidity (External Sensor 1)	% Relative Humidity	0-65535
40016	FC	Family Code (External Sensor 2)	None	0-65535
40017	TC	Current Temperature (External Sensor 2)	Celsius x100	0-65535
40018	TH	High Temperature (External Sensor 2)	Celsius x100	0-65535
40019	TL	Low Temperature (External Sensor 2)	Celsius x100	0-65535
40020	HC	Current Humidity (External Sensor 2)	% Relative Humidity	0-65535
40021	HH	High Humidity (External Sensor 2)	% Relative Humidity	0-65535
40022	HL	Low Humidity (External Sensor 2)	% Relative Humidity	0-65535

Table B.1 Read Output Registers (continued)

Register	Name	Description	Units	Range
40023	FC	Family Code (External Sensor 3)	None	0-65535
40024	TC	Current Temperature (External Sensor 3)	Celsius x100	0-65535
40025	TH	High Temperature (External Sensor 3)	Celsius x100	0-65535
40026	TL	Low Temperature (External Sensor 3)	Celsius x100	0-65535
40027	HC	Current Humidity (External Sensor 3)	% Relative Humidity	0-65535
40028	HH	High Humidity (External Sensor 3)	% Relative Humidity	0-65535
40029	HL	Low Humidity (External Sensor 3)	% Relative Humidity	0-65535
40038	TC	Current Temperature (External Sensor 1)	Fahrenheit x100	0-65535
40039	TH	High Temperature (External Sensor 1)	Fahrenheit x100	0-65535
40040	TL	Low Temperature (External Sensor 1)	Fahrenheit x100	0-65535
40045	TC	Current Temperature (External Sensor 2)	Fahrenheit x100	0-65535
40046	TH	High Temperature (External Sensor 2)	Fahrenheit x100	0-65535
40047	TL	Low Temperature (External Sensor 2)	Fahrenheit x100	0-65535
40052	TC	Current Temperature (External Sensor 3)	Fahrenheit x100	0-65535
40053	TH	High Temperature (External Sensor 3)	Fahrenheit x100	0-65535
40054	TL	Low Temperature (External Sensor 3)	Fahrenheit x100	0-65535

Table B.2 Family Code (Register 40002, 40009, 40016, 40023: FC)

Hexadecimal Value	Decimal Value	Description
0x29	41	8 Switch Sensor
0x10	16	Temperature Sensor
0x26	38	Temperature and Humidity Sensor
0x00	00	No Sensor

Table B.3 Status Flags (Register 40003: SS)

Bit	Status Flag
00	Switch Sensor 1 Status; 1 = On, 0 = Off
01	Switch Sensor 2 Status; 1 = On, 0 = Off
02	Switch Sensor 3 Status; 1 = On, 0 = Off
03	Switch Sensor 4 Status; 1 = On, 0 = Off
04	Switch Sensor 5 Status; 1 = On, 0 = Off

Table B.3 Status Flags (Register 40003: SS) (continued)

Bit	Status Flag
05	Switch Sensor 6 Status; 1 = On, 0 = Off
06	Switch Sensor 7 Status; 1 = On, 0 = Off
07	Switch Sensor 8 Status; 1 = On, 0 = Off
08-15	Spare

Table B.4 Status Flags (Register 40004: SC)

Bit	Status Flag
00	Switch Sensor 1 Alarm On: 1 = Closed, 0 = Open
01	Switch Sensor 2 Alarm On: 1 = Closed, 0 = Open
02	Switch Sensor 3 Alarm On: 1 = Closed, 0 = Open
03	Switch Sensor 4 Alarm On: 1 = Closed, 0 = Open
04	Switch Sensor 5 Alarm On: 1 = Closed, 0 = Open
05	Switch Sensor 6 Alarm On: 1 = Closed, 0 = Open
06	Switch Sensor 7 Alarm On: 1 = Closed, 0 = Open
07	Switch Sensor 8 Alarm On: 1 = Closed, 0 = Open
08-15	Spare

Table B.5 Status Flags (Register 40005: AS)

Bit	Status Flag
00	Switch Sensor 1 Alarm State; 1 = Alarm, 0 = Normal
01	Switch Sensor 2 Alarm State; 1 = Alarm, 0 = Normal
02	Switch Sensor 3 Alarm State; 1 = Alarm, 0 = Normal
03	Switch Sensor 4 Alarm State; 1 = Alarm, 0 = Normal
04	Switch Sensor 5 Alarm State; 1 = Alarm, 0 = Normal
05	Switch Sensor 6 Alarm State; 1 = Alarm, 0 = Normal
06	Switch Sensor 7 Alarm State; 1 = Alarm, 0 = Normal
07	Switch Sensor 8 Alarm State; 1 = Alarm, 0 = Normal
08-15	Spare

Notes:



TECHNICAL SPECIFICATIONS

Table C.1 Technical Specifications

Power		5VDC @ 800mA max.; wall adaptor included
	Wall Adapter Input	110/240VAC 50/60Hz
Inputs		
	Temperature/Humidity	3 Digital temperature or digital temperature/humidity sensor inputs; plug-and-play; configurable alarm points
	Digital (Dry Contact)	8 Digital alarm points (configurable) / Dry contacts (gold/Au clad)
	Input Cable Length	25ft (7.62m) standard; maximum length up to 100ft (30.48m)
Communications Ports		
	Ethernet	10/100 BaseT, RJ45 connector; DHCP enabled (default); Static IP-addressable
Protocols		
	TCP/IP; NTP	IPv4.0
	HTTP/HTML; Telnet	1.1/4.0
	SNMP	V1; NMS manageable with Get, and Traps; V2c- Traps or Informs
	SMTP (Email)	Slave; RTU Mode; Supports function codes 03, 04, 06 and 16
	Modbus (TCP/IP)	Modbus slave; TCP/IP transmission protocol
Alarm Notification		
	Email	1 Email field (for one or multiple recipients); email sent on alarm; alarms notify email recipients; regular email, distribution list, or email-to-SMS accepted
	SNMP Traps	1 Community string with up to 3 manager IP addresses

Table C.1 Technical Specifications (continued)

Login Security		
	Web Browser Access	1 Universal web password for administrator access
Front Panel Interface		
	LED Indicators	Power: 1 green; Network Link: 1 green; Network Activity: 1 amber
Operating Environment		
	Temperature	-40°F to 185°F (-40°C to 85°C)
	Humidity	5% to 85% RH, non-condensing
	Altitude	15,000ft (4,572m) max.
Storage Environment		-40°F to 185°F (-40°C to 85°C)
Dimensions		
	Box Enclosure	4.56"W x 1.25"H x 2.25"D (115.8mmW x 31.75mmH x 57.15mmD)
	Rack Mount – Optional	19.0"W x 1.75"H x 3.75"D (482.6mmW x 44.45mmH x 95.25mmD)
Weight		
	Box Enclosure	10 oz. (283g)
	Rack Mount – Optional	20 oz. (567g)
Mounting		Rack mount (brackets required): F110-RMB rack mount brackets (not included)
Temperature Sensor – Optional		F110-TS (optional); includes 25ft (7.62m) leader cable with RJ-11 connector (100ft/30.48m distance max.) Range: -67°F to 127°F (-55°C to 52°C)
Temperature/Humidity Sensor – Optional		F110-THS (optional); includes 25ft (7.62m) leader cable with RJ-11 connector (100ft/30.48m distance max.) Range: -67°F to 127°F (-55°C to 52°C)
Certifications		CE; UL STD 17DU E248122; EN STD 5502; ICES-003 Issue 4; FCC 47 CFR Part 15; VCCI; AS/NZS CISPR 22; EN 61326