



ProtoAir FPA-C34 Start-up Guide

For Interfacing Chromalox Products

To Building Automation Systems and SMC Cloud:
BACnet MS/TP, BACnet/IP, Modbus TCP/IP, EtherNet/IP and Metasys N2

APPLICABILITY & EFFECTIVITY

Explains ProtoAir hardware and how to install it.
The instructions are effective for the above as of April 2019.

Technical Support

Thank you for purchasing the ProtoAir for Chromalox.

Please call Chromalox for technical support of the ProtoAir product.

Sierra Monitor Corporation does not provide direct support. If Chromalox needs to escalate the concern, they will contact Sierra Monitor Corporation for assistance.

Support Contact Information:

Chromalox
1347 Heil Quaker Blvd.
Laverne, TN 37086

Customer Service:
1-800-443-2640

Email: sales@chromalox.com

Website: www.chromalox.com

Quick Start Guide

1. Record the information about the unit. (**Section 3.1**)
2. Configure COM settings for the device to connect to the ProtoAir. (**Section 3.3**)
3. Option 1: Connect the ProtoAir 3 pin RS-485 port to the RS-485 network connected to the devices. (**Section 4.1**)
4. Option 2: Connect the ProtoAir 3 pin RS-485 port to the field protocol cabling. (**Section 4.2**)
5. Connect power to the ProtoAir 3 pin power port. (**Section 4.5**)
6. Connect a PC to the ProtoAir via Ethernet cable or by the ProtoAir's Wi-Fi Access Point. (**Section 5**)
7. Use a web browser to access the ProtoAir Web Configurator page to select the profile of the device attached to the ProtoAir and enter any necessary device information. Once the device is selected, the ProtoAir automatically builds and loads the appropriate configuration. (**Section 6**)

TABLE OF CONTENTS

- 1 Certification 7**
 - 1.1 BTL Mark – BACnet® Testing Laboratory..... 7
- 2 Introduction 8**
 - 2.1 ProtoAir Gateway..... 8
 - 2.2 Methods of Configuration 9
- 3 ProtoAir Setup..... 10**
 - 3.1 Record Identification Data 10
 - 3.2 Point Count Capacity and Registers per Device 10
 - 3.3 Configuring Modbus Device Communications 11
 - 3.3.1 Input COM Settings on Any Device Connected to the ProtoAir..... 11
 - 3.3.2 Set Node-ID for Any Device Attached to the ProtoAir..... 11
 - 3.3.3 Set IP Address for Any Ethernet Device Connected to the ProtoAir 11
 - 3.4 Attaching the Antenna 11
 - 3.5 Inserting the SIM Card..... 12
- 4 Interfacing ProtoAir to Devices 14**
 - 4.1 Option 1: Device Connections to ProtoAir 14
 - 4.2 Option 2: Wiring Field Port to RS-485 Serial Network..... 14
 - 4.3 Bias Resistors..... 15
 - 4.4 Termination Resistor..... 16
 - 4.5 Power-Up ProtoAir..... 17
- 5 Connect the PC to the ProtoAir 18**
 - 5.1 Connecting to the ProtoAir via Ethernet 18
 - 5.1.1 Enable Access Through the Local Browser 18
 - 5.1.1.1 Changing the Subnet of the Connected PC 18
 - 5.1.1.2 Changing the IP Address of the ProtoAir with FieldServer Toolbox 19
 - 5.2 Connecting to the ProtoAir Over Wi-Fi Access Point 20
- 6 Configure the ProtoAir 21**
 - 6.1 Accessing the ProtoAir Web Configurator 21
 - 6.2 Setting ProtoAir Configuration Parameters 23
 - 6.2.1 Verify Device Communications 24
 - 6.3 BACnet: Setting Node_Offset to Assign Specific Device Instances..... 25
 - 6.4 How to Start the Installation Over: Clearing Profiles 26
- 7 Network Settings..... 27**
 - 7.1 Navigate to the FS-GUI Network Settings 27
 - 7.2 Change the ProtoAir IP Address 29
 - 7.2.1 Update Wired Network Settings 30
 - 7.2.2 Update Wi-Fi Client Settings 31
 - 7.2.3 Common Settings..... 32
 - 7.2.4 Cellular 33
- 8 SMC Cloud User Setup, Registration and Login 34**
 - 8.1 User Setup..... 34
 - 8.2 Registration Process..... 36
 - 8.3 Login to SMC Cloud..... 40
- Appendix A Troubleshooting..... 42**
 - Appendix A.1 Lost or Incorrect IP Address 42
 - Appendix A.2 Viewing Diagnostic Information 43
 - Appendix A.3 Checking Wiring and Settings..... 44
 - Appendix A.4 LED Diagnostics for Communications Between ProtoAir and Devices 45
 - Appendix A.5 Taking a FieldServer Diagnostic Capture 46
 - Appendix A.5.1 Using the FieldServer Toolbox..... 46
 - Appendix A.5.2 Using FS-GUI..... 49
 - Appendix A.6 Wi-Fi and Cellular Signal Strength..... 50
 - Appendix A.7 Factory Reset Instructions 50

Appendix B Additional Information..... 51
Appendix B.1 Updating Firmware..... 51
Appendix B.2 BACnet: Setting Network_Number for More Than One ProtoAir on the Subnet 51
Appendix B.3 Securing ProtoAir with Passwords..... 52
Appendix B.4 Wi-Fi Access Point Network Settings 53
Appendix B.5 Mounting 54
Appendix B.6 Physical Dimension Drawing 55

Appendix C Vendor Information – Chromalox 56

Appendix D Reference..... 57
Appendix D.1 Specifications..... 57
Appendix D.1.1 Compliance with UL Regulations 57

Appendix E Limited 2 Year Warranty 58

LIST OF FIGURES

Figure 1: Method of Configuration per Device 9

Figure 2: ProtoAir Part Numbers..... 10

Figure 3: Supported Point Count Capacity 10

Figure 4: Registers per Device 10

Figure 5: COM Settings..... 11

Figure 6: Insert SIM Card into the Micro SIM Card Slot – Label Side View (Left) and Top Down View (Right)..... 12

Figure 7: Cellular Data Usage Examples 12

Figure 8: RS-485 Connections from Devices to the ProtoAir 14

Figure 9: Connection from ProtoAir to RS-485 Field Network 14

Figure 10: Bias Resistor DIP Switches 15

Figure 11: Termination Resistor DIP Switch 16

Figure 12: Required Current Draw for the ProtoAir..... 17

Figure 13: Power Connections..... 17

Figure 14: Ethernet Port Location 18

Figure 15: Web App Splash Page..... 21

Figure 16: Login Window 21

Figure 17: Web App Landing Page..... 22

Figure 18: Configure Tab 22

Figure 19: Web Configurator Showing no Active Profiles 23

Figure 20: Profile Selection Menu 24

Figure 21: Web Configurator Showing Active Profile Additions 24

Figure 22: Web Configurator Node Offset Field..... 25

Figure 23: Active Profiles 25

Figure 24: Web App Landing Page..... 27

Figure 25: Web Configurator Page – Diagnostics Button 27

Figure 26: FS-GUI Landing Page 28

Figure 27: Generic FS-GUI Navigation Panel – Network Settings 28

Figure 28: FS-GUI Ethernet Port Network Settings 30

Figure 29: FS-GUI Wi-Fi Client Network Settings..... 31

Figure 30: FS-GUI Common Network Settings..... 32

Figure 31: FS-GUI Cellular Network Settings 33

Figure 32: Welcome to SMC Cloud Email 34

Figure 33: Setting User Details 35

Figure 34: Web App Landing Page – SMC Cloud Tab 36

Figure 35: Registration Information Page 36

Figure 36: SMC Cloud Connection Problems Message 37

Figure 37: SMC Cloud Registration Page..... 38

Figure 38: Device Registered for SMC Cloud..... 39

Figure 39: SMC Cloud Login Page 40

Figure 40: SMC Cloud Privacy Policy 40

Figure 41: SMC Cloud Landing Page 41

Figure 42: Ethernet Port Location 42

Figure 43: Error Messages Screen 43

Figure 44: Diagnostic LEDs 45

Figure 45: Ethernet Port Location 46

Figure 46: Wi-Fi & Cellular Signal Strength Listing..... 50

Figure 47: Web Configurator – Network Number Field..... 51

Figure 48: FS-GUI Passwords Page..... 52

Figure 49: Password Recovery Page 52

Figure 50: FS-GUI Wi-Fi AP Network Settings 53

Figure 51: DIN Rail..... 54

Figure 52: ProtoAir FPA-C34 Dimensions 55

Figure 53: Specifications 57

1 CERTIFICATION

1.1 BTL Mark – BACnet^{®1} Testing Laboratory



BTL is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to requirements of ASHRAE Standard 133 is the responsibility of the BACnet International. BTL is a registered trademark of the BACnet International.

The BTL Mark on ProtoAir is a symbol that indicates that a product has passed a series of rigorous tests conducted by an independent laboratory which verifies that the product correctly implements the BACnet features claimed in the listing. The mark is a symbol of a high-quality BACnet product.

Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory. Click [here](#) for the BACnet PIC Statement.

¹ BACnet is a registered trademark of ASHRAE

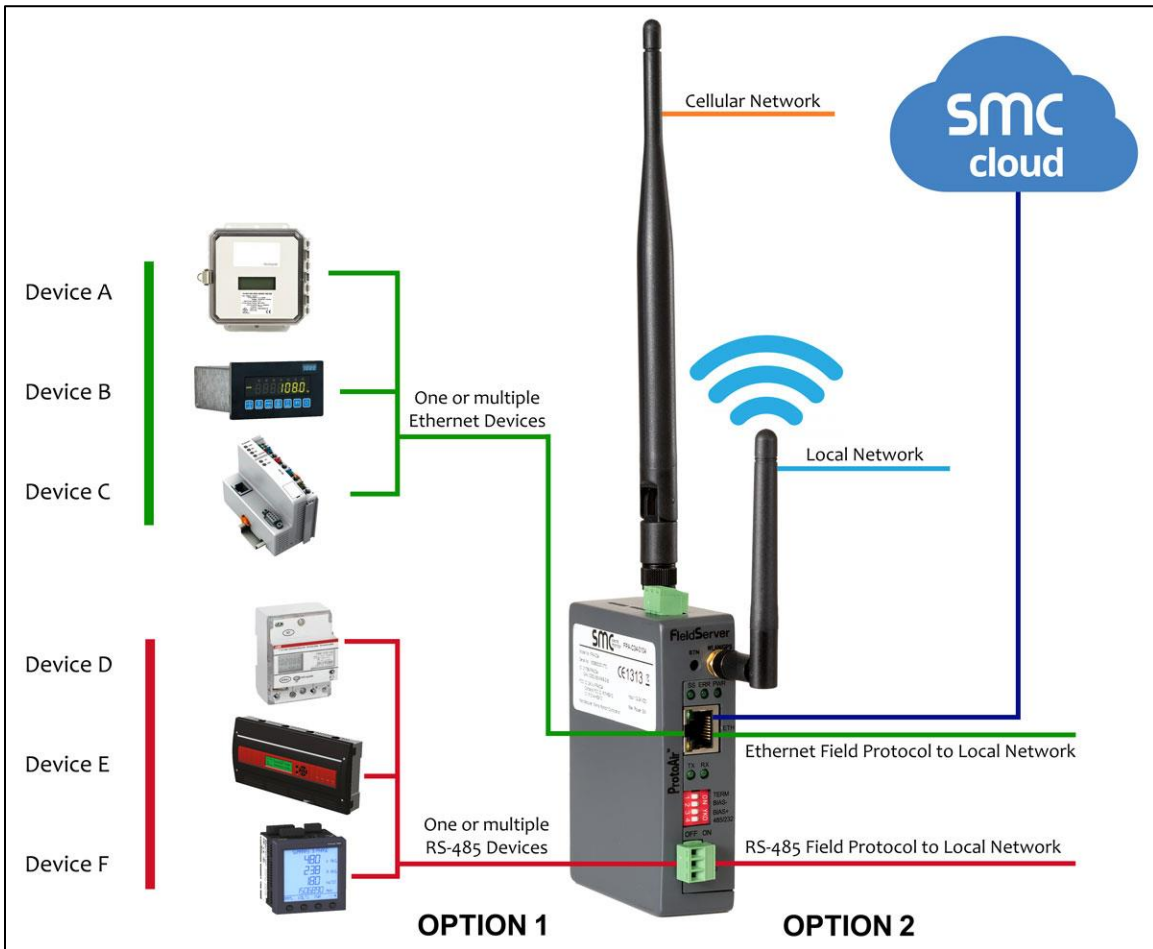
2 INTRODUCTION

2.1 ProtoAir Gateway

The ProtoAir wireless gateway is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Chromalox’s devices (hereafter simply called “device”) connected to the ProtoAir and automatically configures them for BACnet/IP, BACnet MS/TP, Modbus TCP/IP, EtherNet/IP and Metasys N2.

It is not necessary to download any configuration files to support the required applications. The ProtoAir is pre-loaded with tested profiles/configurations for the supported devices.

FPA-C34 Connectivity Diagram:



NOTE: The ProtoAir FPA-C34 can only support one serial connection at a time, Option 1 (serial in – Section 4.1) or Option 2 (serial out – Section 4.2).

The ProtoAir can connect with Sierra Monitor’s SMC Cloud. The SMC Cloud allows technicians, the OEM’s support team and Sierra Monitor’s support team to remotely connect to the ProtoAir. The SMC Cloud provides the following capabilities for any registered devices in the field:

- Remotely monitor and control devices.
- Collect device data and view it on the SMC Cloud Dashboard and the SMC Smart Phone App.
- Create user defined device notifications (alarm, trouble and warning) via SMS and/or Email.
- Generate diagnostic captures (as needed for troubleshooting) without going to the site.

For more information about the SMC Cloud, refer to the [SMC Cloud Start-up Guide](#).

2.2 Methods of Configuration

Devices	Communication
ITC1	Modbus RTU & Modbus TCP/IP
ITC2	Modbus RTU & Modbus TCP/IP
ITLS4	Modbus RTU & Modbus TCP/IP
ITLS6	Modbus RTU & Modbus TCP/IP
ITLS_2016	Modbus RTU & Modbus TCP/IP
CFW	Modbus RTU & Modbus TCP/IP
CFW_400_600A	Modbus RTU & Modbus TCP/IP
C4	Modbus RTU & Modbus TCP/IP
C4IR	Modbus RTU & Modbus TCP/IP
CTF	Modbus RTU & Modbus TCP/IP
MaxPac	Modbus RTU & Modbus TCP/IP
40 Series	Modbus RTU & Modbus TCP/IP
50 Series	Modbus RTU & Modbus TCP/IP
6060	Modbus RTU & Modbus TCP/IP
4081_4082	Modbus RTU & Modbus TCP/IP
3340	Modbus RTU & Modbus TCP/IP
3380	Modbus RTU & Modbus TCP/IP
6020	Modbus RTU & Modbus TCP/IP
1020	Modbus RTU & Modbus TCP/IP
1040	Modbus RTU & Modbus TCP/IP
WM30-WM40	Modbus RTU & Modbus TCP/IP
1030	Modbus RTU & Modbus TCP/IP

Figure 1: Method of Configuration per Device

3 PROTOAIR SETUP

3.1 Record Identification Data

Each ProtoAir has a unique part number located on the side or the back of the unit. This number should be recorded, as it may be required for technical support. The numbers are as follows:

Model	Part Number
ProtoAir	FPA-C34-1867

Figure 2: ProtoAir Part Numbers

- FPA-C34 units have the following 2 ports: RS-485 + Ethernet

3.2 Point Count Capacity and Registers per Device

The total number of registers presented the device(s) attached to the ProtoAir cannot exceed:

Part number	Total Registers
FPA-C34-1867	5,000

Figure 3: Supported Point Count Capacity

Devices	Registers Per Device
ITC1	32
ITC2	54
ITLS4	230
ITLS6 – ITLS72	152 – 1802
ITLS_2016	434
CFW	669
CFW_400_600A	542
C4	512
C4IR	584
CTF	174
MaxPac	79
40 Series	45
50 Series	27
6060	103
4081_4082	105
3340	133
3380	201
6020	84
1020	118
1040	310
WM30-WM40	33
1030	118

Figure 4: Registers per Device

3.3 Configuring Modbus Device Communications

3.3.1 Input COM Settings on Any Device Connected to the ProtoAir

- **Any connected serial device MUST have the same baud rate, data bits, stop bits, and parity settings as the ProtoAir.**
- **Figure 5** specifies the device serial port settings required to communicate with the ProtoAir.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	19200
Parity	Even
Data Bits	8
Stop Bits	1
Figure 5: COM Settings	

3.3.2 Set Node-ID for Any Device Attached to the ProtoAir

- Set Node-ID for the device attached to ProtoAir. The Node-ID needs to be uniquely assigned between 1 and 255.
- Document the Node-ID that is assigned. The Node-ID assigned is used for deriving the Device Instance for BACnet/IP (**Section 6.3**)

NOTE: The Modbus TCP/IP field protocol Node-IDs are automatically set to be the same value as the Node-ID of the device.

3.3.3 Set IP Address for Any Ethernet Device Connected to the ProtoAir

- **Ensure any device is set to Modbus TCP/IP to communicate with the ProtoAir.**
- The device needs to be on the same IP subnet as the ProtoAir and the configuration PC.
- Record the following device information to start the setup:
 - IP Address
 - IP port
 - Node-ID

NOTE: This information is required for Section 6.2.

3.4 Attaching the Antenna

Wi-Fi Antenna:

Screw in the Wi-Fi antenna to the front of the unit as shown in **Figure 52**.

NOTE: Using an external antenna is also an option. An external antenna can be plugged into the SMA connector. The best antenna for the job depends on the range, topography and obstacles between the two radios.

Cellular Antenna:

Screw in the long cellular antenna on the top of the unit as shown in **Figure 52**.

3.5 Inserting the SIM Card

NOTE: A micro 3G SIM card (data only for commercial products IMEI 357178070517852) must be purchased from an AT&T, Kore Telematics or Vodafone cellular provider to set up cellular functionality and create a data plan for the ProtoAir. SIM card vendor contact information is available at the end of the section.

Insert the SIM card into the Micro SIM card slot with the chip on the SIM card facing away from the cellular antenna as shown below.

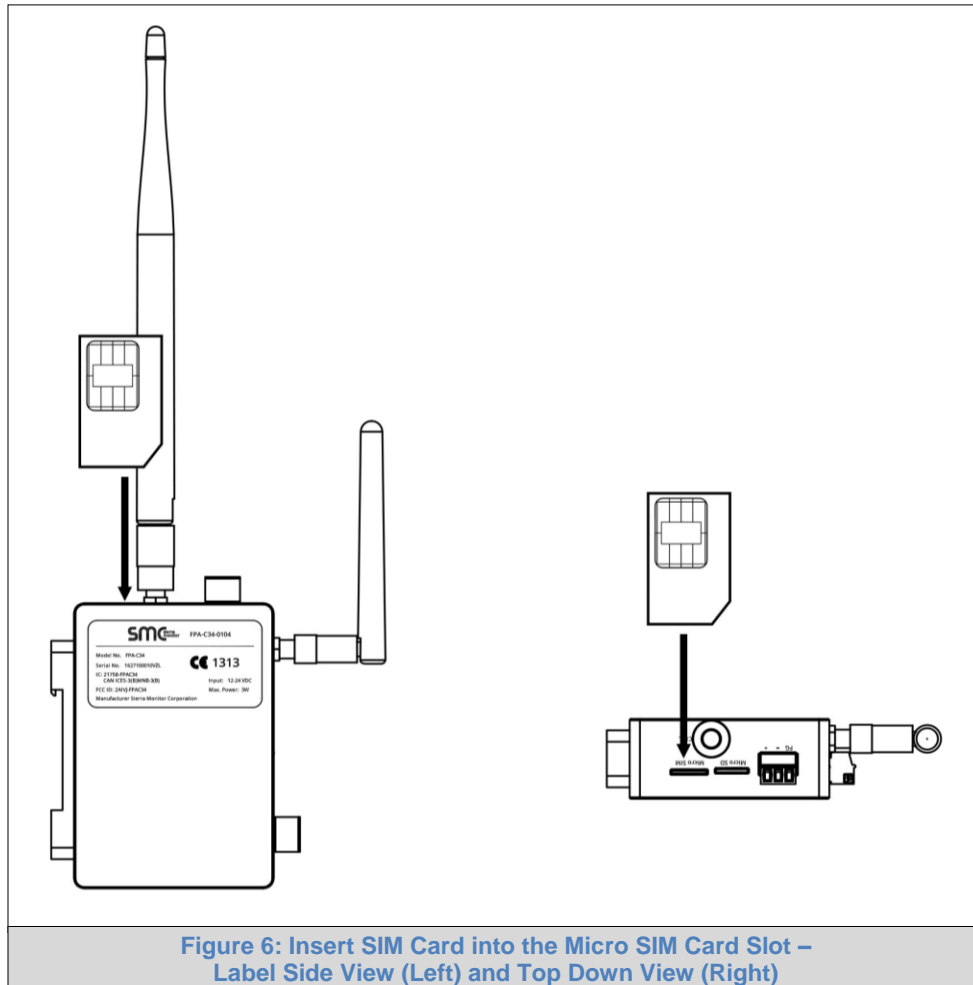


Figure 6: Insert SIM Card into the Micro SIM Card Slot – Label Side View (Left) and Top Down View (Right)

See **Section 7.2.4** to complete cellular setting configuration.

The table below shows cellular usage examples to forecast data usage on the chosen cellular plan.

Number of Data Points	Logging Frequency	Data Usage per Hour	Data Usage per Month
10	40 sec	0.75 Mb	547 Mb
10	900 sec	0.55 Mb	400 Mb
50	40 sec	1.24 Mb	900 Mb
50	900 sec	0.90 Mb	657 Mb
100	40 sec	3.00 Mb	2.2 Gb
100	900 sec	1.26 Mb	900 Mb
500	40 sec	10.86 Mb	7.8 Gb
500	900 sec	0.55 Mb	1.5 Gb

Figure 7: Cellular Data Usage Examples

SIM Card Vendor Contact Information:

Kore Telematics

Joao Freitas

KORE Wireless

Office: (669) 600-5360

jfreitas@korewireless.com

www.koretelematics.com

AT&T

Please call AT&T Customer Service at 800.331.0500 or find the nearest AT&T store.

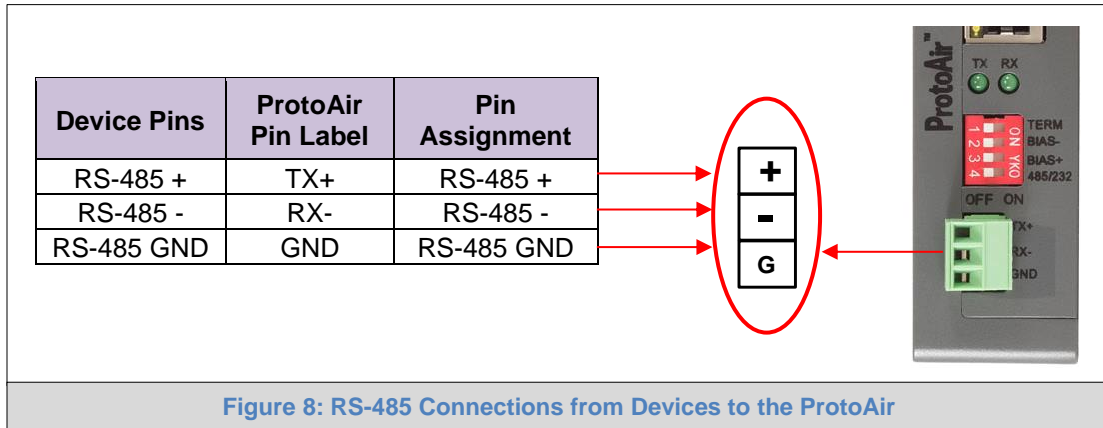
4 INTERFACING PROTOAIR TO DEVICES

The ProtoAir has one 3-pin Phoenix connector for connecting via RS-485.

Decide whether to support serial device connections, such as BACnet MS/TP, ([Section 4.1](#)) or serial network connections ([Section 4.2](#)).

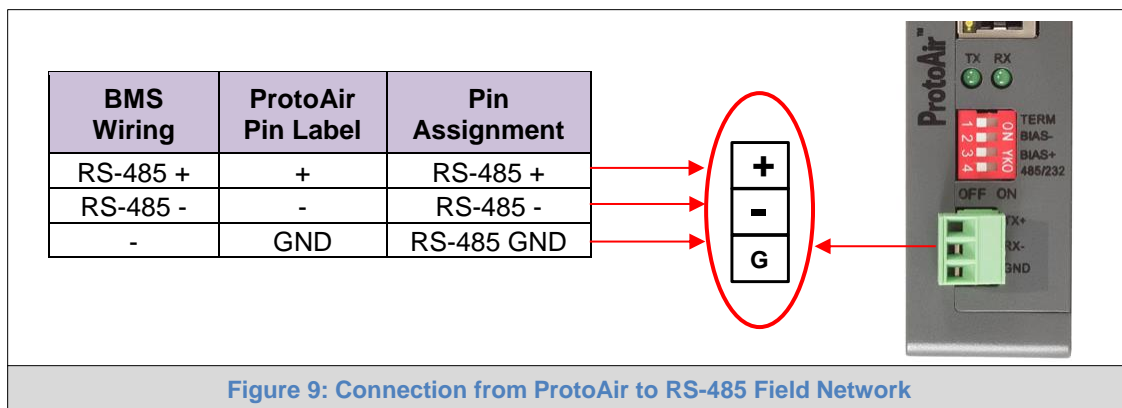
4.1 Option 1: Device Connections to ProtoAir

- Connect the RS-485 serial devices to the 3-pin RS-485 connector. ([Figure 8](#))
 - Use standard grounding principles for RS-485 GND.



4.2 Option 2: Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector. ([Figure 9](#))
 - Use standard grounding principles for RS-485 GND
- See [Section 5](#) for information on connecting to an Ethernet network.



4.3 Bias Resistors

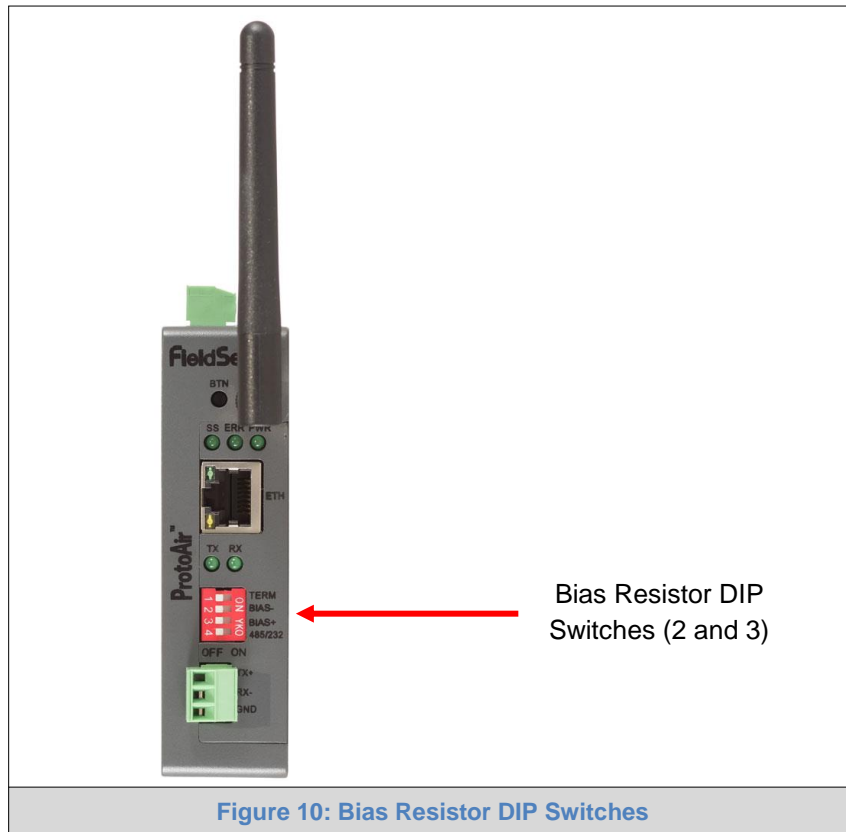


Figure 10: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 10.

The ProtoAir bias resistors are used to keep the RS-485 bus to a known state, when there is no transmission on the line (bus is idling), to help prevent false bits of data from being detected. The bias resistors typically pull one line high and the other low - far away from the decision point of the logic.

The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port were there are very weak bias resistors of 100k). Since there are no jumpers, many gateways can be put on the network without running into the bias resistor limit which is < 500 ohms.

NOTE: See www.ni.com/support/serial/resinfo.htm for additional pictures and notes.

NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.4 Termination Resistor

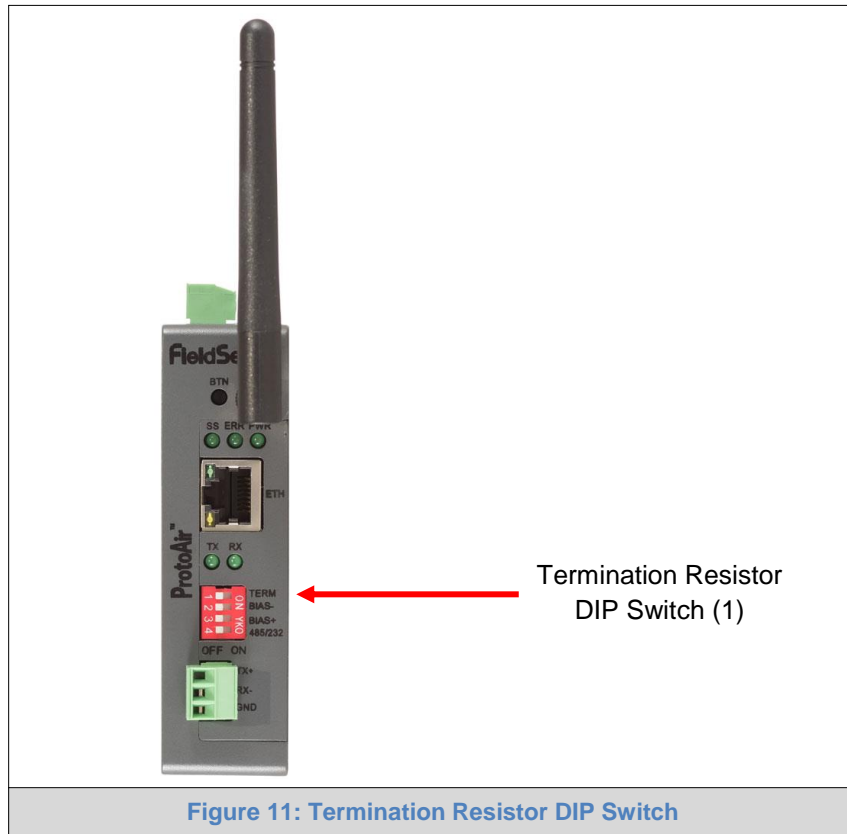


Figure 11: Termination Resistor DIP Switch

If the ProtoAir is the last device on the serial trunk, then the End-Of-Line Termination Switch needs to be enabled. **To enable the Termination Resistor, move the TERM dip switch to the right as shown in Figure 11.**

Termination resistor is also used to reduce noise. It pulls the two lines of an idle bus together. However, the resistor would override the effect of any bias resistors if connected.

NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.5 Power-Up ProtoAir

Check power requirements in the table below:

Power Requirement for ProtoAir External Gateway		
	Current Draw Type	
ProtoAir Family	12VDC	24V DC
FPA – C34 (Typical)	320mA	185mA
FPA – C34 (Maximum)	670mA	390mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.		
Figure 12: Required Current Draw for the ProtoAir		

Apply power to the ProtoAir as shown below in **Figure 13**. Ensure that the power supply used complies with the specifications provided in **Appendix D.1**.

- The ProtoAir accepts 12-24VDC on pins + and -.
- **Frame GND should be connected.**

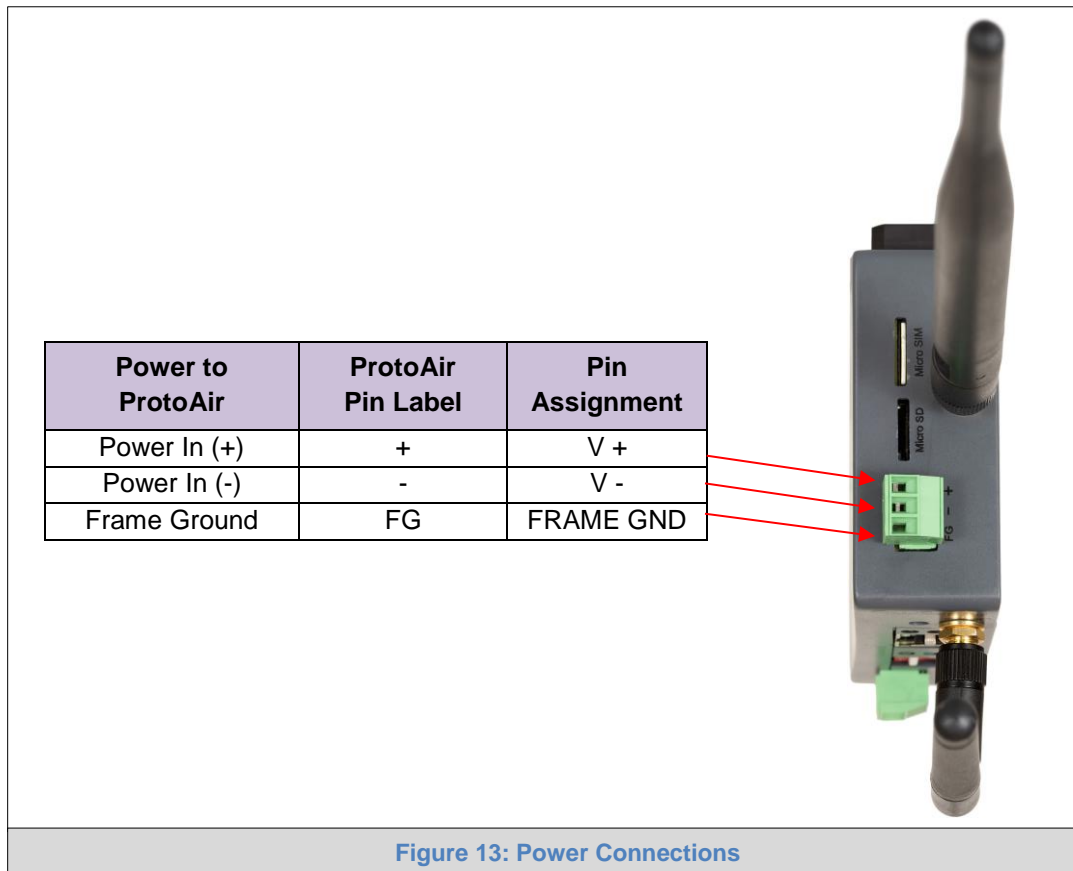


Figure 13: Power Connections

5 CONNECT THE PC TO THE PROTOAIR

There are two ways to connect the PC to the ProtoAir, either by **Ethernet cable (Section 5.1)** or **Wi-Fi Access Point (Section 5.2)**.

5.1 Connecting to the ProtoAir via Ethernet

First, connect a Cat-5 Ethernet cable (straight through or cross-over) between the local PC and ProtoAir.

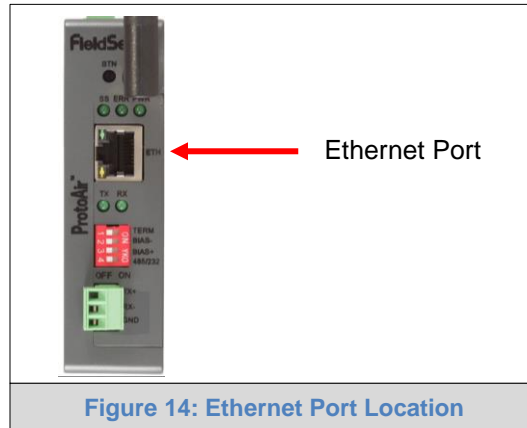


Figure 14: Ethernet Port Location

5.1.1 Enable Access Through the Local Browser



There are two methods to enable access to the ProtoAir in the local browser, either by changing the subnet of the connected PC (Section 5.1.1.1) or using the FieldServer Toolbox to change the IP Address of the ProtoAir (Section 5.1.1.2).

NOTE: Only perform one method or the other.

5.1.1.1 Changing the Subnet of the Connected PC

The default IP Address for the ProtoAir is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoAir are on different IP networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

For Windows 10:

- Find the search field in the local computer’s taskbar (usually to the right of the windows icon ) and type in “Control Panel”.
- Click “Control Panel”, click “Network and Internet” and then click “Network and Sharing Center”.
- Click “Change adapter settings” on the left side of the window.
- Right-click on “Local Area Connection” and select “Properties” from the dropdown menu.
- Highlight  **Internet Protocol Version 4 (TCP/IPv4)** and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:

Use the following IP address:

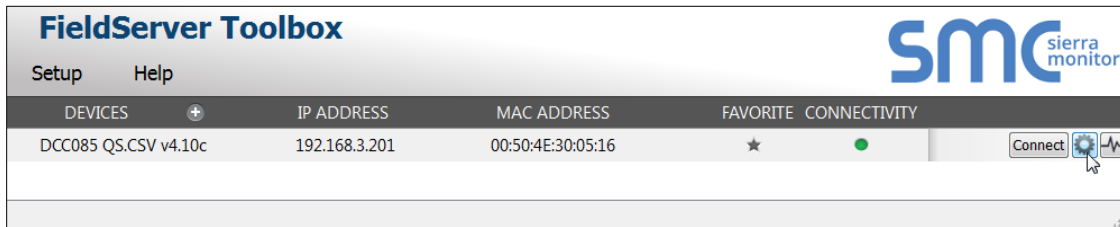
IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

- Click the Okay button to close the Internet Protocol window and the Close button to close the Ethernet Properties window.

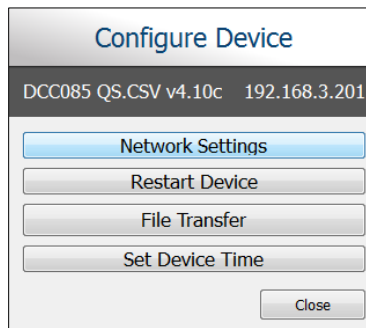
5.1.1.2 Changing the IP Address of the ProtoAir with FieldServer Toolbox

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website’s [Software Downloads](#).
- Extract the executable file and complete the installation.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Find the desired gateway and click the Configure Device button (gear icon) to the right of the gateway information.

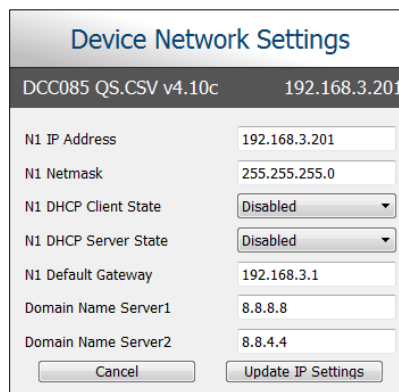
NOTE: If connectivity status is green, then the IP Address doesn’t need to be changed (the ProtoAir is already on the same subnet). Skip the rest of the section and go to Section 6.



- Select Network Settings in the Configure Device window.



- Modify the IP Address (N1 IP Address field) of the gateway Ethernet port.
 - Change additional fields as needed



NOTE: If the gateway is connected to a router, the Default Gateway field of the gateway should be set to the IP Address of the connected router.

NOTE: Do not change the DHCP Server State (N1 DHCP Server State field).


NOTE: If DNS settings are unknown, set DNS1 to “8.8.8.8” and DNS2 to “8.8.4.4”.

- Click Update IP Settings, then click the “Change and restart” button to reboot the Gateway and activate the new IP Address. See the [FieldServer Toolbox and GUI Manual](#) for more information.

5.2 Connecting to the ProtoAir Over Wi-Fi Access Point

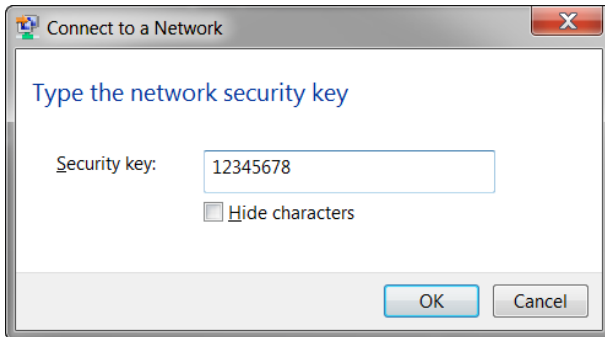
When the ProtoAir is first powered up, the Wi-Fi Access Point will be enabled allowing direct connection to the ProtoAir with Wi-Fi.

To connect to the ProtoAir Wi-Fi Access Point:

- Click the  icon (found in the bottom-right corner of the computer screen) to open the available Wireless Network Connections.
- Select the desired ProtoAir and click Connect.



- Enter the Security key. The **default is 12345678**.



The available Wireless Network Connection menu should now show that the computer is connected to the ProtoAir.



6 CONFIGURE THE PROTOAIR

6.1 Accessing the ProtoAir Web Configurator

- Navigate to the IP Address of the ProtoAir on the local PC using one of two methods:
 - Open a web browser and enter the IP Address of the ProtoAir; the default Ethernet address is 192.168.1.24, the default Wi-Fi Access Point address is 192.168.50.1
 - If using the FieldServer Toolbox (**Section 5.1.1.2**), click the Connect button

NOTE: If the IP Address of the ProtoAir has been changed, the IP Address can be discovered using the FS Toolbox utility. See Appendix A.1 for instructions.

- Once at the Web App splash page, click the Login button.

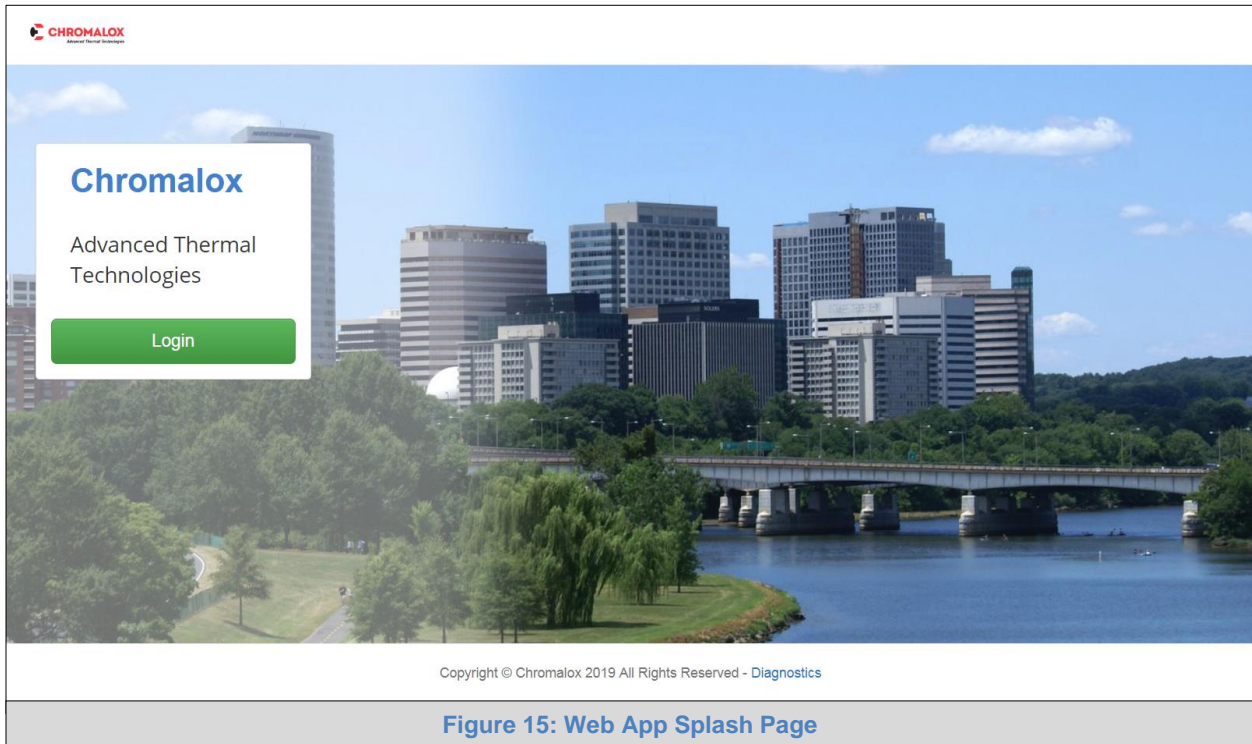


Figure 15: Web App Splash Page

- Enter the previously set up or default username and password.

NOTE: The default username is “admin”. The default password is “admin”.

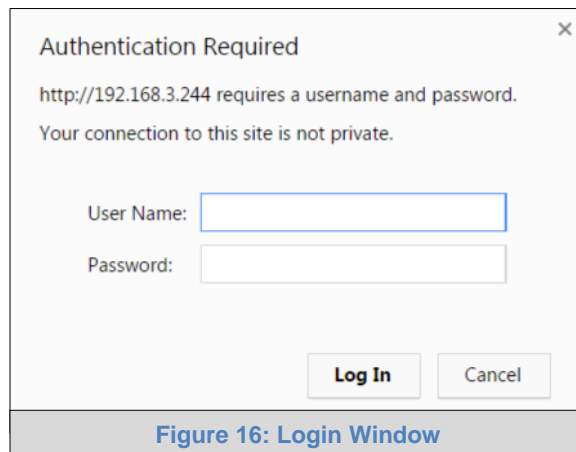


Figure 16: Login Window

- From the Web App landing page ([Figure 17](#)), click the Settings tab and then click Configuration.

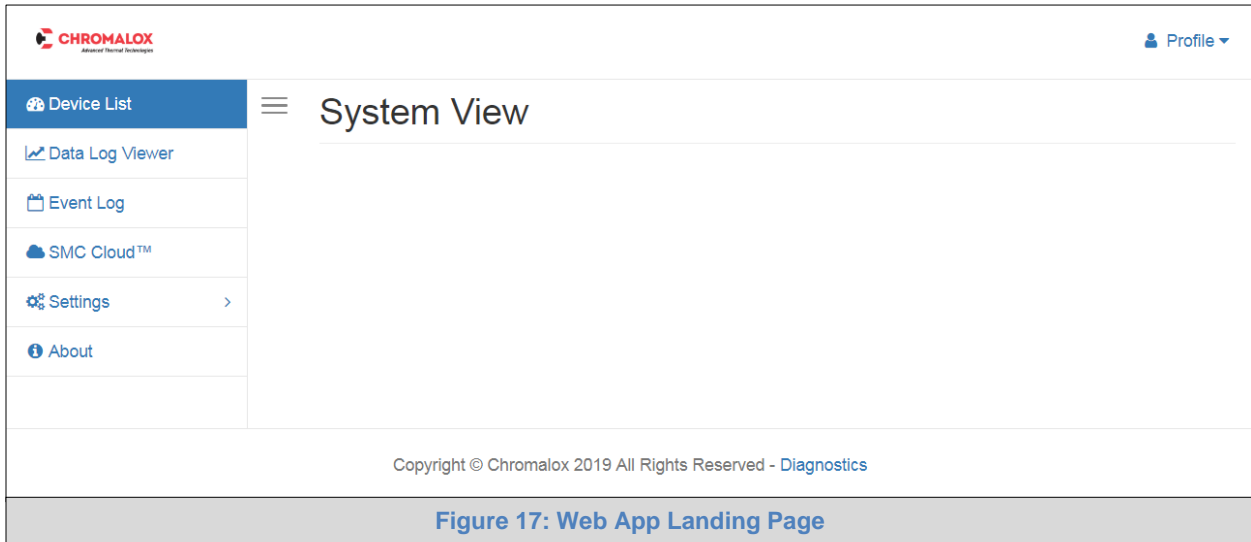


Figure 17: Web App Landing Page

- Then click the Profiles Configuration button to go to the Web Configurator page.

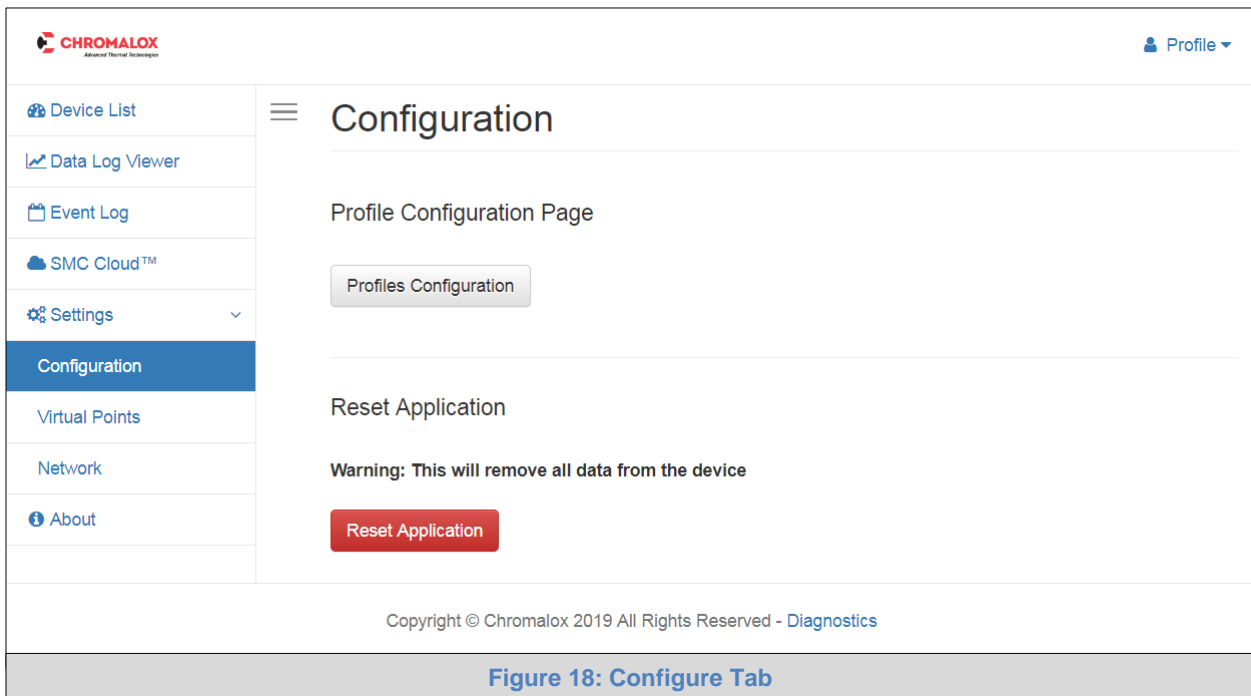



Figure 18: Configure Tab

NOTE: The SMC Cloud™ tab  (see [Figure 18](#)) allows users to connect to the SMC Cloud, Sierra Monitor’s device cloud solution for IIoT. The SMC Cloud enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the SMC Cloud, refer to the [SMC Cloud Start-up Guide](#).

NOTE: For Web App instructions to the System View, Historian, Event Logger and Virtual Points functions, see the [SMC Cloud Start-up Guide](#).

6.2 Setting ProtoAir Configuration Parameters

- Select the field protocol by entering the appropriate number into the Protocol Selector Value and clicking the Submit button. **Wait for the system to reset as the configuration is updated.**

NOTE: If Modbus TCP/IP is used for the field protocol, skip this section. Device profiles are NOT used for Modbus TCP/IP.

The screenshot shows the SMC Web Configurator interface. At the top left is the SMC Sierra Monitor logo. Below it is a header for "Configuration Parameters". The main area contains a table of configuration parameters, each with a description, a value input field, and a "Submit" button.

Parameter Name	Parameter Description	Value
protocol_select	Protocol Selector Set to 1 for Modbus RTU or Modbus TCP to BACnet IP Set to 2 for Modbus TCP to BACnet MSTP Set to 3 for Modbus TCP to Metasys N2 Set to 4 for Modbus TCP to BACnet MSTP (single node) Set to 5 for Modbus RTU or Modbus TCP to Ethernet IP	2 <input type="button" value="Submit"/>
network_nr	BACnet Network Number This sets the BACnet network number of the Gateway. (1 - 65535)	50 <input type="button" value="Submit"/>
node_offset	BACnet Node Offset This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. (0 - 4194303)	50000 <input type="button" value="Submit"/>
bac_mac_addr	BACnet MSTP Mac Address This sets the BACnet MSTP MAC address. (1 - 127)	127 <input type="button" value="Submit"/>
bac_baud_rate	BACnet MSTP Baud Rate This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	38400 <input type="button" value="Submit"/>
bac_max_master	BACnet MSTP Max Master This sets the BACnet MSTP max master. (1 - 127)	127 <input type="button" value="Submit"/>
bac_cov_option	BACnet COV This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable <input type="button" value="Submit"/>
bac_virt_nodes	BACnet Virtual Server Nodes Set to NO if the unit is only converting 1 device to BACnet. Set to YES if the unit is converting multiple devices. (No/Yes)	No <input type="button" value="Submit"/>

Below the configuration parameters is the "Active profiles" section, which is currently empty. It has a table header with columns: "Nr", "Node ID", "Current profile", and "Parameters". There is an "Add" button below the header.

At the bottom of the interface are several navigation buttons: "HELP (?)", "Network Settings", "Clear Profiles and Restart", "System Restart", and "Diagnostics & Debugging".

Figure 19: Web Configurator Showing no Active Profiles

- In the Web Configurator, the Active Profiles are shown below the configuration parameters. The Active Profiles section lists the currently active device profiles, including previous Web Configurator additions. This list is empty for new installations, or after clearing all configurations. (Figure 19)

- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a drop-down menu underneath the Current profile column.
- Once the Profile for the device has been selected from the drop-down list, enter the value of the device’s Node-ID which was assigned in **Section 3.3.2**.

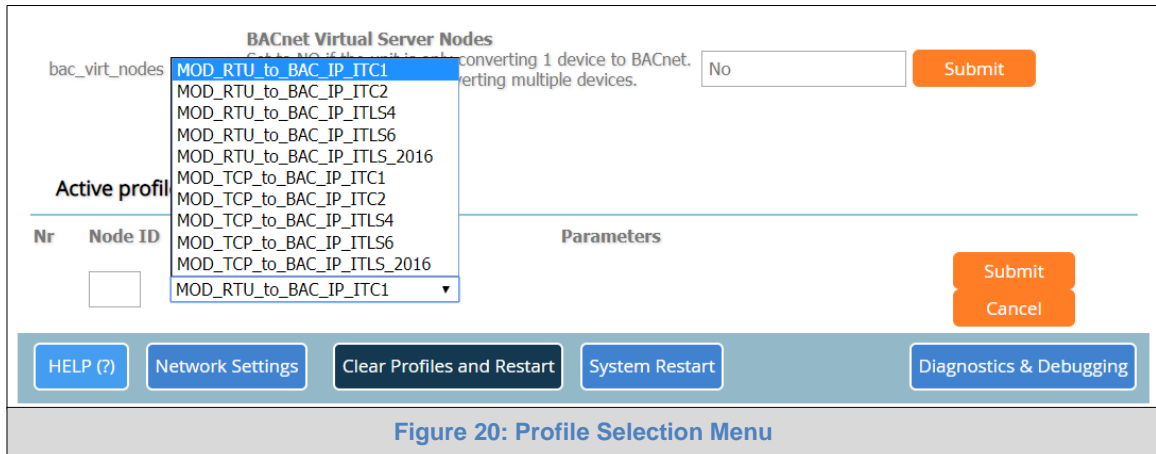


Figure 20: Profile Selection Menu

- Then press the “Submit” button to add the Profile to the list of devices to be configured.
- Repeat this process until all the devices have been added.
- Completed additions are listed under “Active profiles” as shown in **Figure 21**.

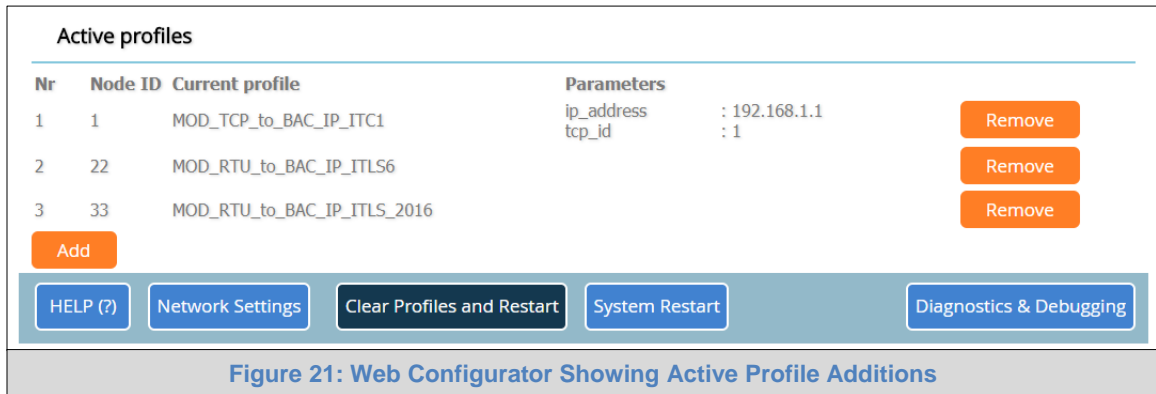


Figure 21: Web Configurator Showing Active Profile Additions

NOTE: If multiple devices are connected to the ProtoAir, set the BACnet Virtual Server Nodes field to “Yes”; otherwise leave the field on the default “No” setting.

6.2.1 Verify Device Communications

- If serial devices are connected, check that the port TX and RX LEDs are rapidly flashing. See **Appendix A.4** for additional information and images.
- Confirm the software shows communication without errors. Go to **Appendix A.2** for instructions.

6.3 BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in **Section 6.1** to access the ProtoAir Web Configurator.
- The Node_Offset field shows the current value (default = 50,000).
 - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the calculation below:

$$\text{Device Instance (desired)} = \text{Node_Offset} + \text{Node_ID}$$

For example, if the desired Device Instance for the device 1 is 50,001 and the following is true:

- Device 1 has a Node-ID of 1
- Device 2 has a Node-ID of 22
- Device 3 has a Node-ID of 33

Then plug the device 1's information into the formula to find the desired Node_Offset:

$$50,001 = \text{Node_Offset} + 1$$

➤ **50,000 = Node_Offset**

Once the Node_Offset value is input, it will be applied to all devices as shown below:

- Device 1 Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001
- Device 2 Instance = 50,000 + Node_ID = 50,000 + 22 = 50,022
- Device 3 Instance = 50,000 + Node_ID = 50,000 + 33 = 50,033

- Click "Submit" once the desired value is entered.

Figure 22: Web Configurator Node Offset Field

Active profiles					
Nr	Node ID	Current profile	Parameters		
1	1	MOD_TCP_to_BAC_IP_ITC1	ip_address : 192.168.1.1 tcp_id : 1		Remove
2	22	MOD_RTU_to_BAC_IP_ITLS6			Remove
3	33	MOD_RTU_to_BAC_IP_ITLS_2016			Remove
<div style="text-align: left; margin-bottom: 5px;"> Add </div> <div style="display: flex; justify-content: space-between; align-items: center; border: 1px solid #ccc; padding: 5px;"> HELP (?) Network Settings Clear Profiles and Restart System Restart Diagnostics & Debugging </div>					

Figure 23: Active Profiles

6.4 How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in **Section 6.1** to access the ProtoAir Web Configurator.
- At the bottom-left of the page, click the “Clear Profiles and Restart” button.
- Once restart is complete, all past profiles discovered and/or added via Web configurator are deleted. The unit can now be reinstalled.

7 NETWORK SETTINGS

7.1 Navigate to the FS-GUI Network Settings

- Open the FS-GUI page.
 - From the Web App landing page, click the word “Diagnostics” found in blue at the bottom of the screen

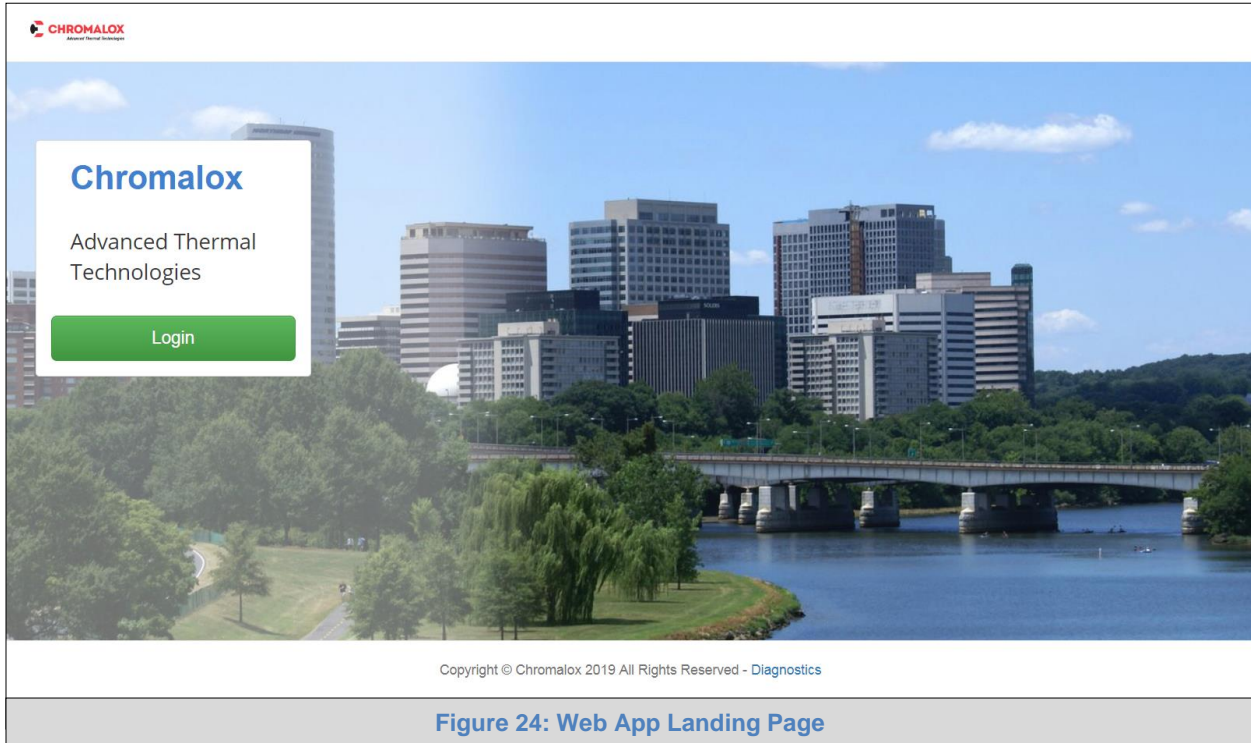


Figure 24: Web App Landing Page

- From the Web Configurator page, click on the blue “Diagnostics & Debugging” button in the bottom right corner of the screen

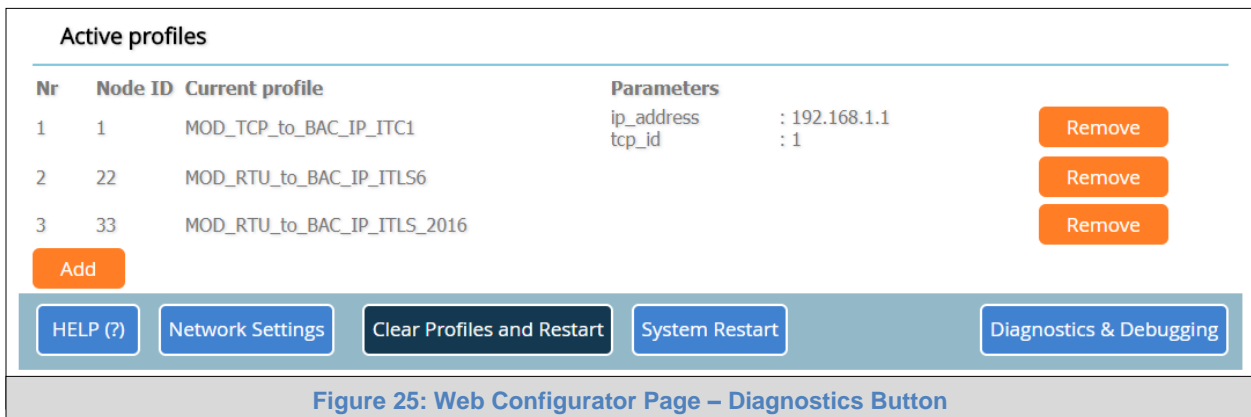


Figure 25: Web Configurator Page – Diagnostics Button

- Find the Navigation tree on the left side of the screen.

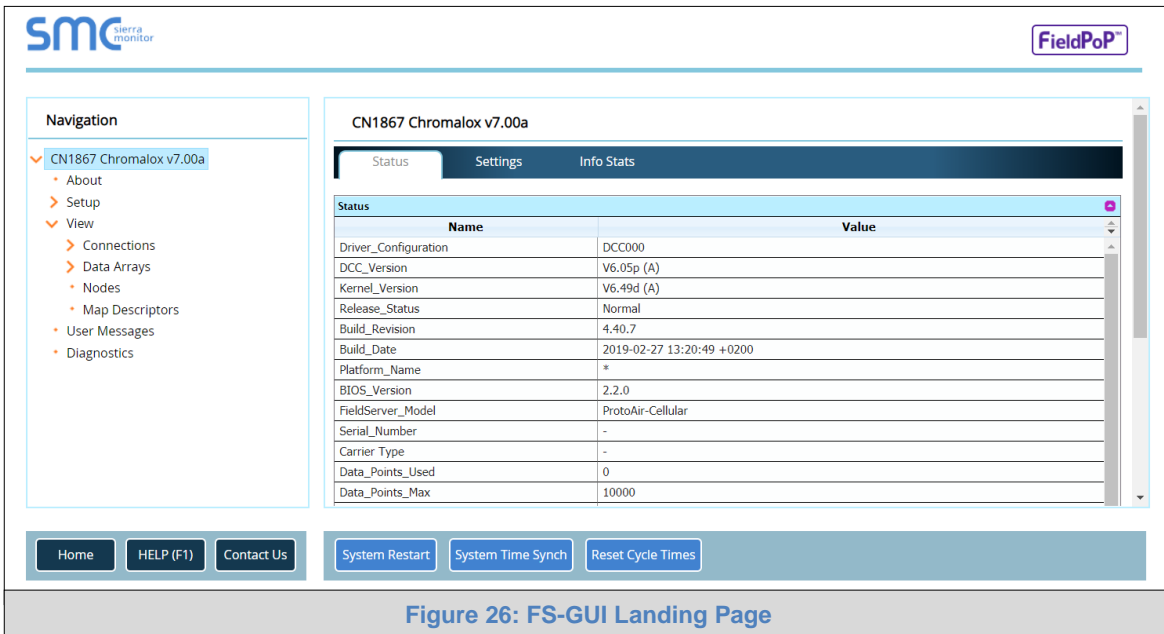


Figure 26: FS-GUI Landing Page

- Click the orange arrow next to the ProtoAir CN number and title to expand the tree.
- Click on the orange arrow next to Setup to expand the tree.
- Click on Network Settings.

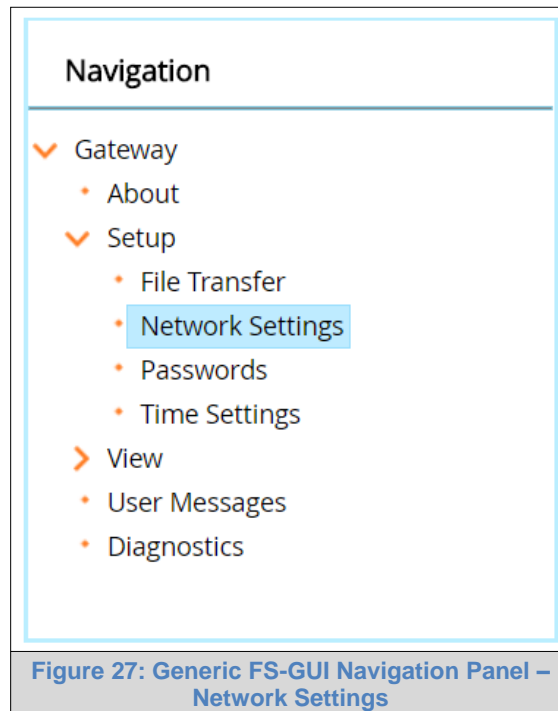


Figure 27: Generic FS-GUI Navigation Panel – Network Settings

7.2 Change the ProtoAir IP Address

Configure the IP settings of the ProtoAir in the following methods:

- When using the Ethernet port to connect to the local network (**Section 7.2.1**).
- When connecting the ProtoAir to a local wireless access point, configure the Wi-Fi Client Settings in the ProtoAir (**Section 7.2.2**).

NOTE: For Wi-Fi Access Point network information see [Appendix B.4](#).

7.2.1 Update Wired Network Settings

IP Settings tab is the landing page when selecting Network Settings on the navigation tree. To change the IP settings, follow these instructions:

- Enable DHCP Client State to automatically assign IP Settings or modify the settings manually as needed, via these fields: IP Address, Netmask, Default Gateway and Domain Name Server1/2.

NOTE: If connected to a router, set the Default Gateway to the same IP Address as the router.

- Click Update IP Settings, then click on System Restart to restart the Gateway and activate the new IP Address.
- Connect the ProtoAir to the local network or router.

NOTE: If the FS-GUI was open in a browser, the browser will need to be pointed to the new IP Address of the ProtoAir before the FS-GUI will be accessible again.

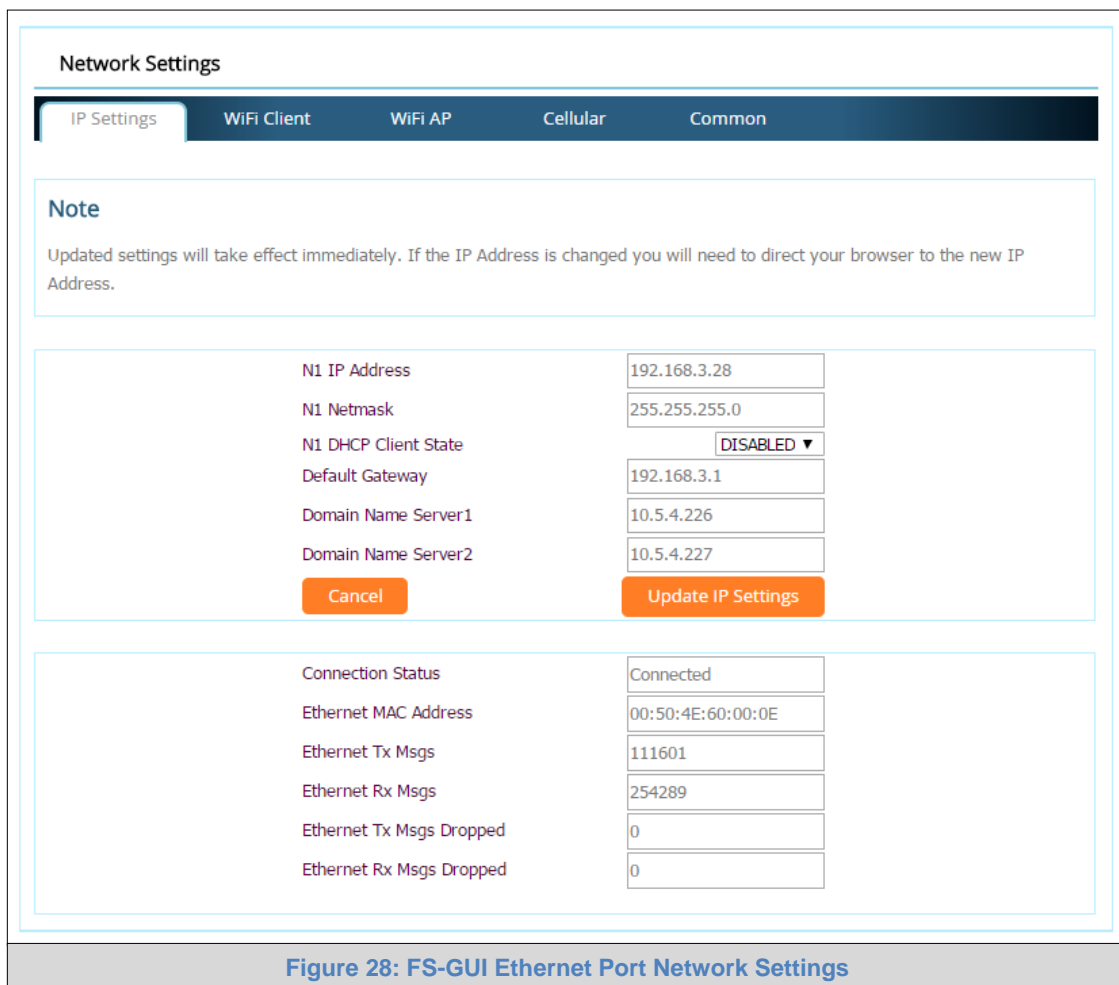


Figure 28: FS-GUI Ethernet Port Network Settings

IP Setting Fields	Definition
Connection Status	Status of connection
MAC Address	Ethernet MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

7.2.2 Update Wi-Fi Client Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi Client tab. To change the Wi-Fi client settings, follow these instructions:

- Set the Wi-Fi Status to ENABLED for the ProtoAir to communicate with other devices via Wi-Fi.
- Enter the Wi-Fi SSID and Wi-Fi Password for the local wireless access point.
- Enable DHCP to automatically assign all Wi-Fi Client network settings or manually modify the setting using the fields immediately below (IP Address, Network, etc.).

NOTE: If connected to a router, set the IP gateway to the same IP Address as the router.

- Click Update Wi-Fi Settings, then click on System Restart to restart the gateway and activate Wi-Fi Client settings.
- **Go to Common settings (Section 7.2.3) to set the Primary Connection to Wi-Fi Client.**

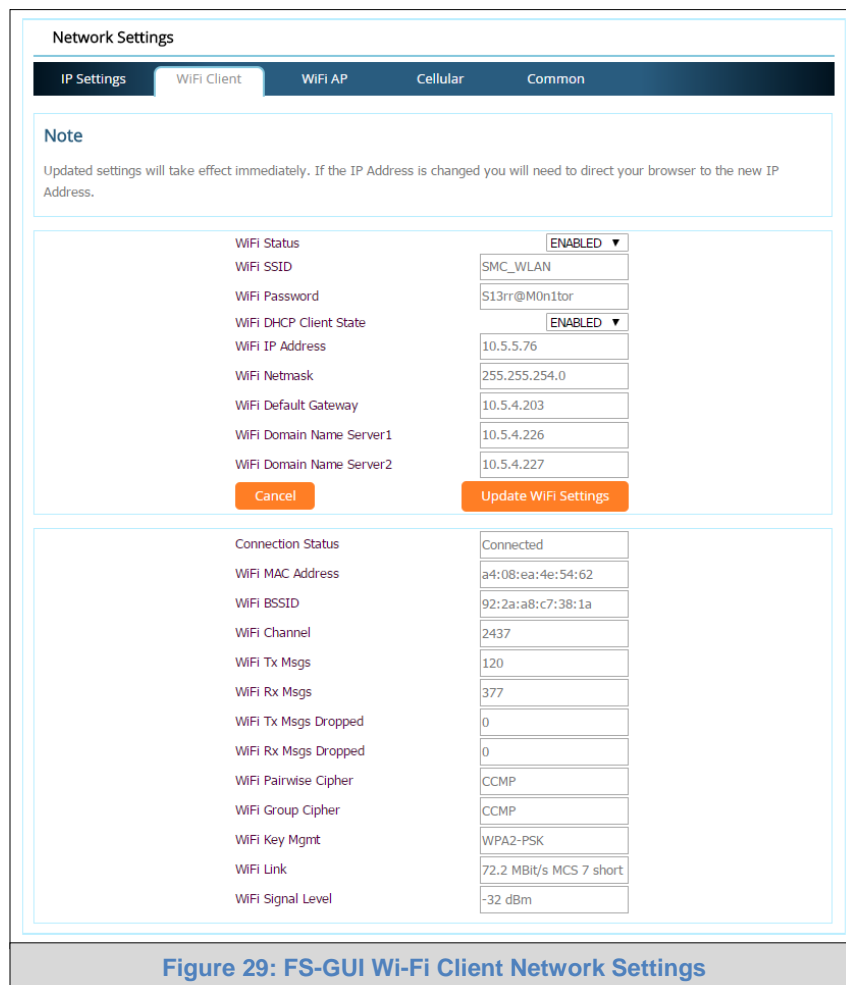


Figure 29: FS-GUI Wi-Fi Client Network Settings

Wi-Fi Client Fields	Definition
Connection Status	Status of connection
MAC Address, BSSID, Channel	Wi-Fi Client MAC Address, BSSID, and Channel
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages
Pairwise Cipher	Type of encryption used for unicast traffic
Group Cipher	Identifies the type of encryption used for multicast / broadcast traffic
Key Mgmt	Encryption type
Link	Connection speed
Signal Level	Signal level in dBm (see Appendix A.6)

7.2.3 Common Settings

The Common Settings make it possible to choose the primary connection when both Ethernet and Wi-Fi Client connections are available.

- From the FS-GUI Network Settings landing page, click on the Common tab.

NOTE: The default Primary Connection is Ethernet.

- Select the desired option from the drop-down menu on the right.
- Click Update Common Settings, then click on System Restart to restart the gateway and activate the new settings.

NOTE: If using Wi-Fi Client and not Ethernet, change Primary Connection to Wi-Fi.

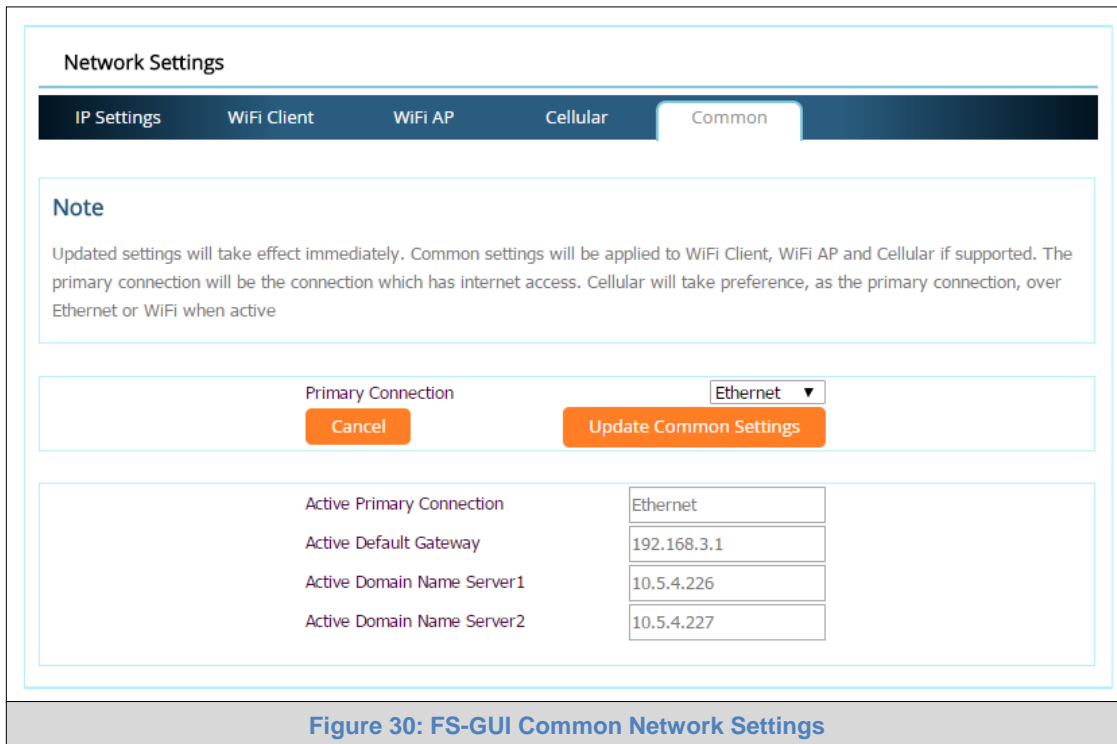


Figure 30: FS-GUI Common Network Settings

NOTE: The fields below the update button show the settings as they were set in the IP Settings or Wi-Fi Client pages. They are not editable on the Common page.

7.2.4 Cellular

From the FS-GUI Network Settings landing page, click on the Cellular tab.

To change the Cellular settings, follow these instructions:

- The Cellular Status Field must be set to ENABLED to allow connecting to the ProtoAir through SMC Cloud.
- Modify the Settings manually as needed, via these fields: Cellular APN, Cellular User Name, and Cellular Password.
- Once all settings are modified as needed, click Update Cellular Settings, then click on System Restart to restart the Gateway and activate the new settings.

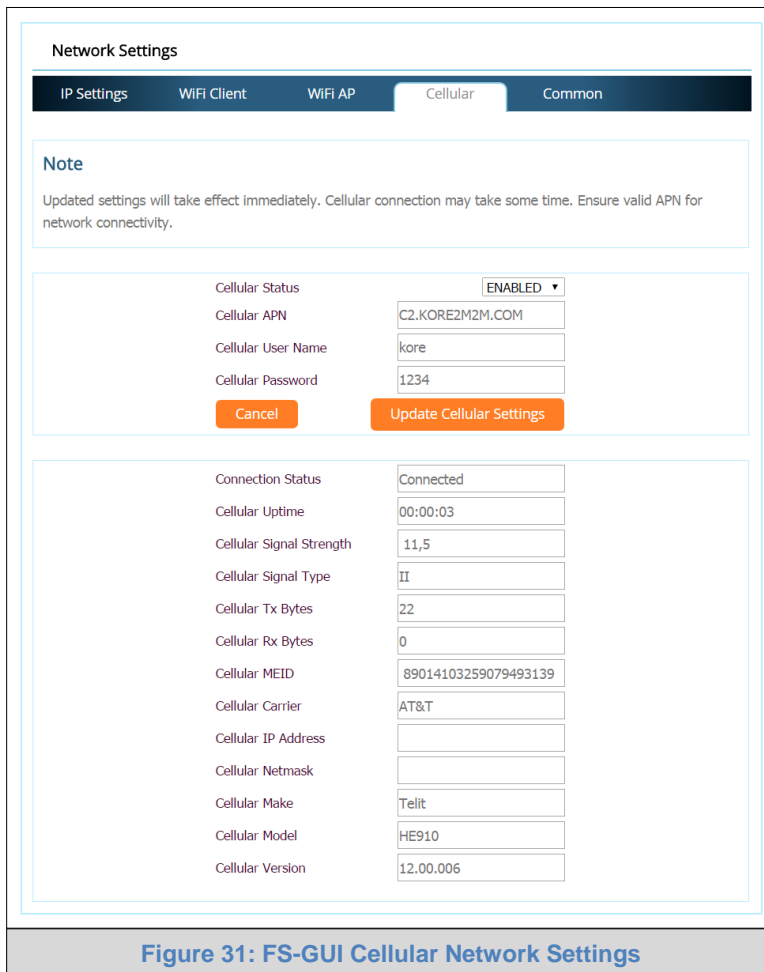


Figure 31: FS-GUI Cellular Network Settings

Cellular Fields	Definition
Connection Status	Status of connection
Uptime	Length of time connected
Signal Strength	Strength of signal in dBm (see Appendix A.6)
Signal Type	Type of Signal
Tx/Rx Bytes	Receive and transmit bytes
MEID	Mobile Equipment ID; unique id for a device
Carrier	Cellular carrier provider
IP Address/Netmask	IP Address and Netmask of the cellular connection
Make/Model/Version	Vendor, model and software version of the internal cellular chip

8 SMC CLOUD USER SETUP, REGISTRATION AND LOGIN

8.1 User Setup

Request an invitation to SMC Cloud from the manufacturer’s support team and follow the instructions below to set up login details:

- The “Welcome to SMC Cloud” email will appear as shown below.

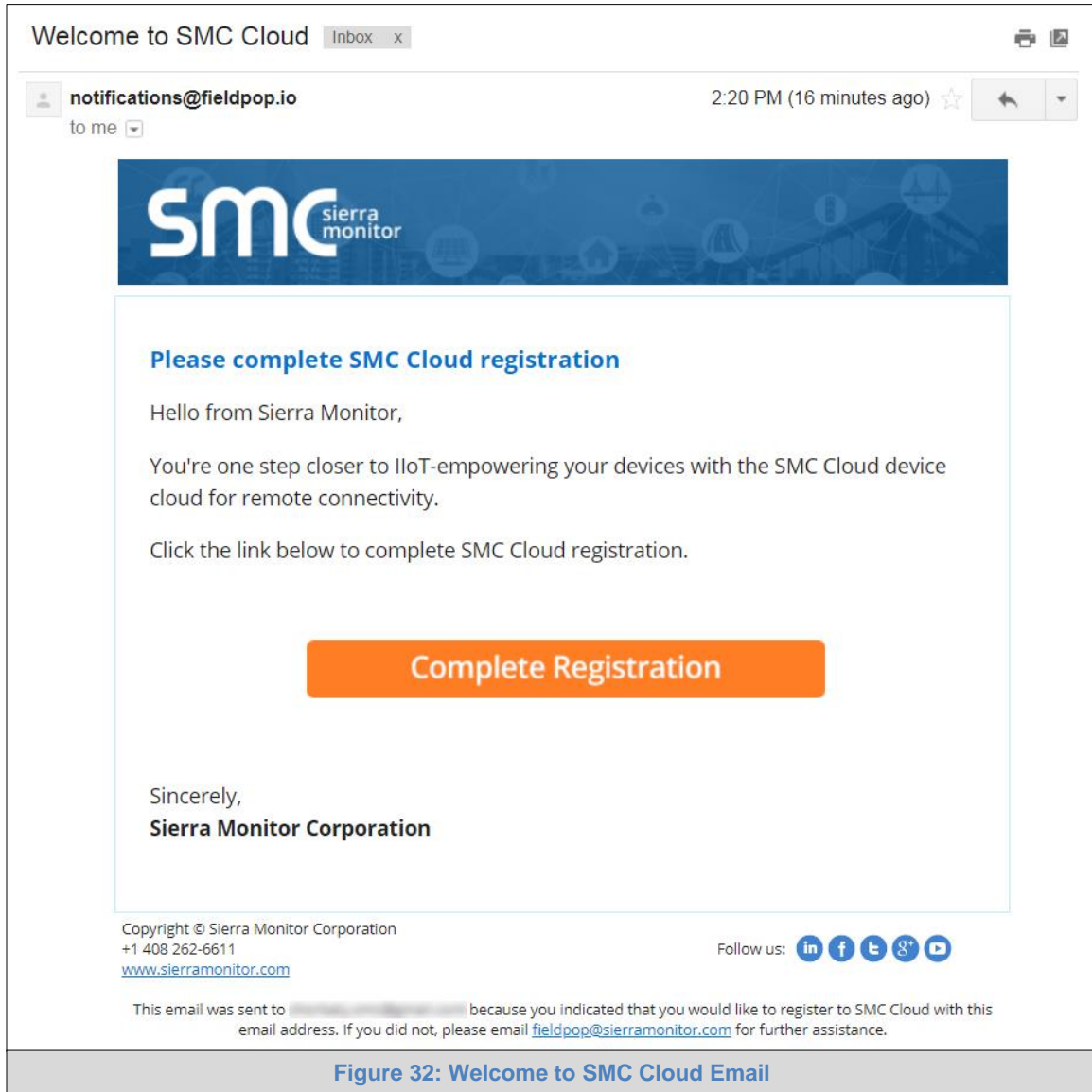
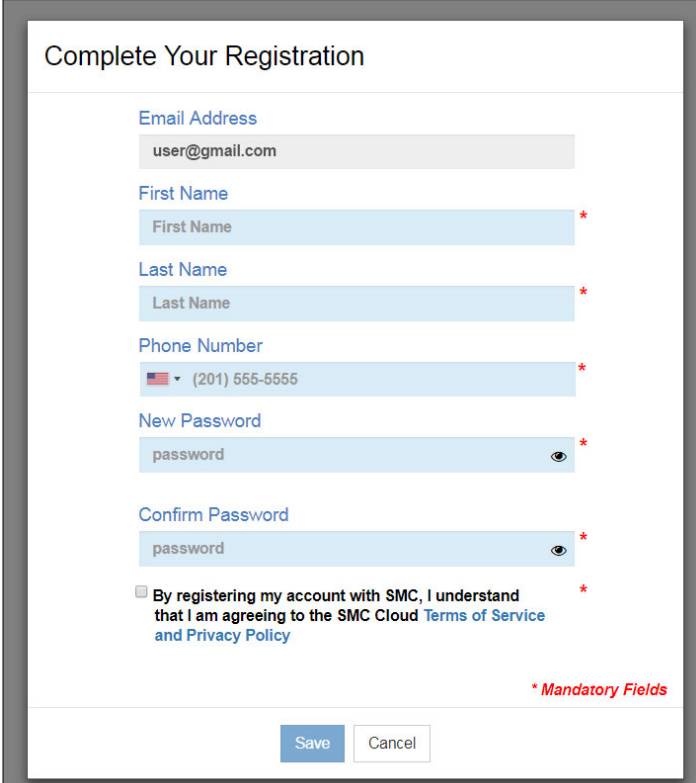


Figure 32: Welcome to SMC Cloud Email

NOTE: If no SMC Cloud email was received, check the spam/junk folder for an email from notification@fieldpop.io. Contact the manufacturer’s support team if the email cannot be found.

- Click the “Complete Registration” button and fill in user details accordingly.



Complete Your Registration

Email Address
user@gmail.com

First Name *

Last Name *

Phone Number *

(US) (201) 555-5555

New Password *

Confirm Password *

By registering my account with SMC, I understand that I am agreeing to the SMC Cloud [Terms of Service and Privacy Policy](#) *

** Mandatory Fields*

Save Cancel

Figure 33: Setting User Details

- Fill in the name, phone number, password fields and click the checkbox to agree to the privacy policy and terms of service.
- Click “Save” to save the user details.
- Click “OK” on when the Success message appears.
- Record the email account used and password for future use.

8.2 Registration Process

Once SMC Cloud user credentials have been generated, the ProtoAir can be registered onto the SMC Cloud server.

- Click on the SMC Cloud™ tab on the left-hand side of the screen.

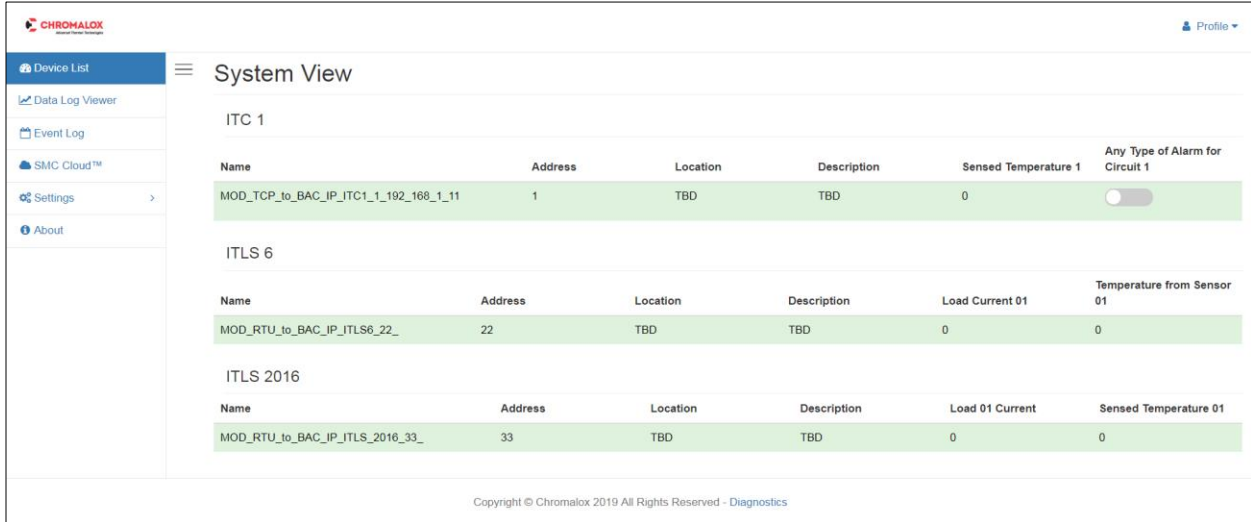


Figure 34: Web App Landing Page – SMC Cloud Tab

- The following informational splash page will appear, click Close to view the registration page.

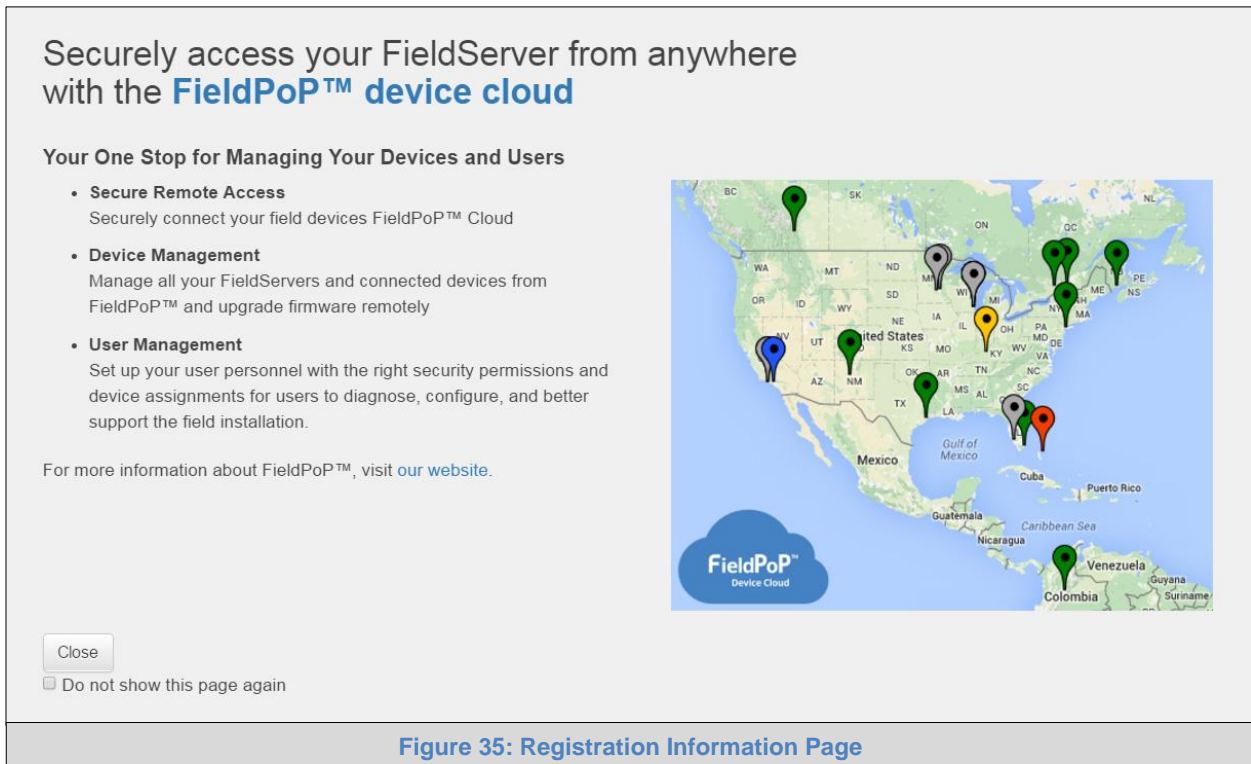


Figure 35: Registration Information Page

- If a warning message appears instead of the splash page, follow the suggestion that appears on screen.
- If the ProtoAir cannot reach the SMC Cloud server, the following message will appear.



- Follow the directions presented in the warning message and check that the DNS settings are set up with the following Domain Name Server (DNS) settings:
 DNS1=8.8.8.8
 DNS2=8.8.4.4
- Ensure that the ProtoAir is properly connected to the Internet

NOTE: If changes to the network settings are done, remember to click “Update IP Settings” and then power cycle the ProtoAir.

- On the registration page, fill in user credentials and all other device information fields for registration of each individual ProtoAir in the field.

Figure 37: SMC Cloud Registration Page

- To input the device location, do one of the following:
 - Enter the address in the address field
 - Click the “Get Current Location” button to auto-populate

NOTE: This button will only work if location services have been enabled on the local browser. If using the Chrome browser and connected via LAN, this method will not work.

- Drop a location directly on the Google map
- Enter the latitude and longitude manually
- Click Register Device.

- Once the device has successfully been registered, the following screen will appear listing the device details and additional information auto-populated by the ProtoAir.



Figure 38: Device Registered for SMC Cloud

8.3 Login to SMC Cloud

After the ProtoAir is registered, go to www.smccloud.net and type in the appropriate login information as per registration credentials.

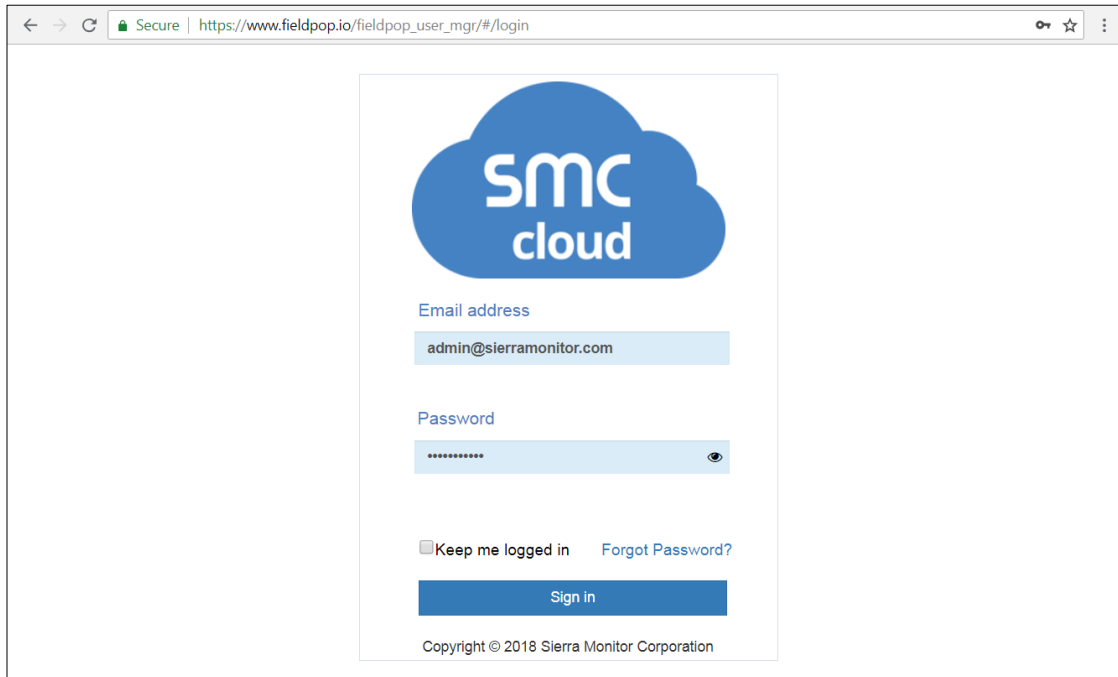


Figure 39: SMC Cloud Login Page

NOTE: If the login password is lost, see the [SMC Cloud Start-up Guide](#) for recovery instructions.

On first login, the Privacy Policy window will appear. Read the Terms of Service, click the checkbox to accept the terms and then click the Continue button to access SMC Cloud.

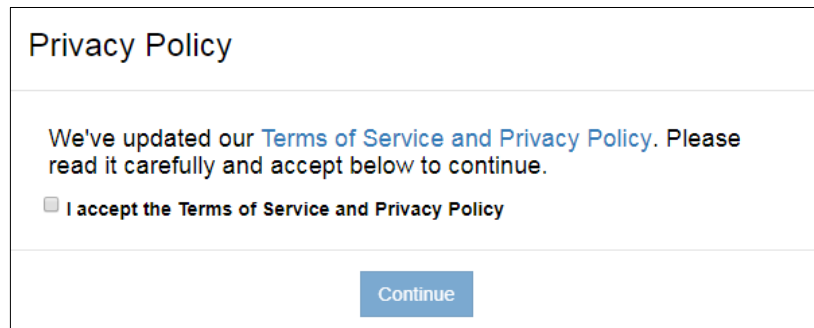


Figure 40: SMC Cloud Privacy Policy

NOTE: For additional SMC Cloud instructions see the [SMC Cloud Start-up Guide](#).



Figure 41: SMC Cloud Landing Page

Appendix A Troubleshooting

Appendix A.1 Lost or Incorrect IP Address

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's [Software Downloads](#).
- Extract the executable file and complete the installation.

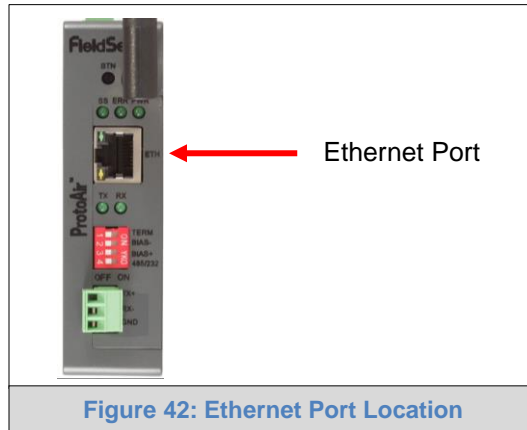
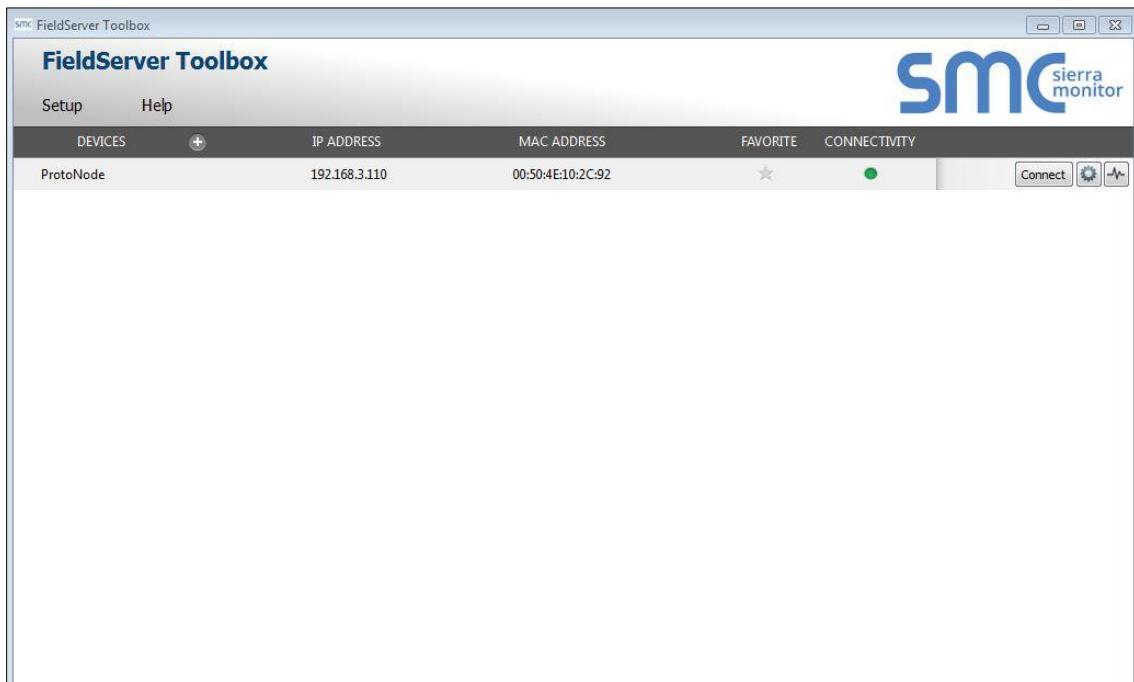



Figure 42: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoAir.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Check for the IP Address of the desired gateway.



- If correcting the IP Address of the gateway: click the settings icon  on the same row as the gateway, then click Network Settings, change the IP Address and click Update IP Settings to save.

Appendix A.2 Viewing Diagnostic Information

- Type the IP Address of the ProtoAir into the web browser or use the FieldServer Toolbox to connect to the ProtoAir.
- Click on Diagnostics Button, then click on view, and then on connections.
- If there are any errors showing on the Connections page, refer to [Appendix A.3](#) to check the wiring and settings.

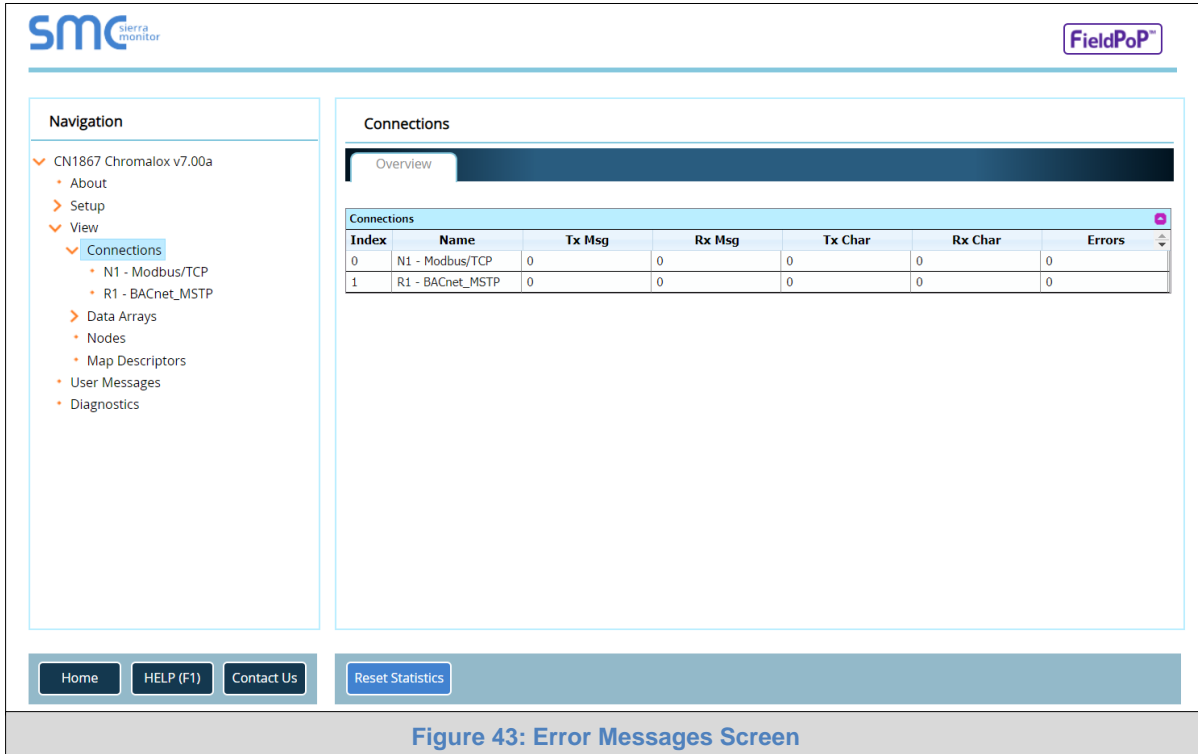


Figure 43: Error Messages Screen

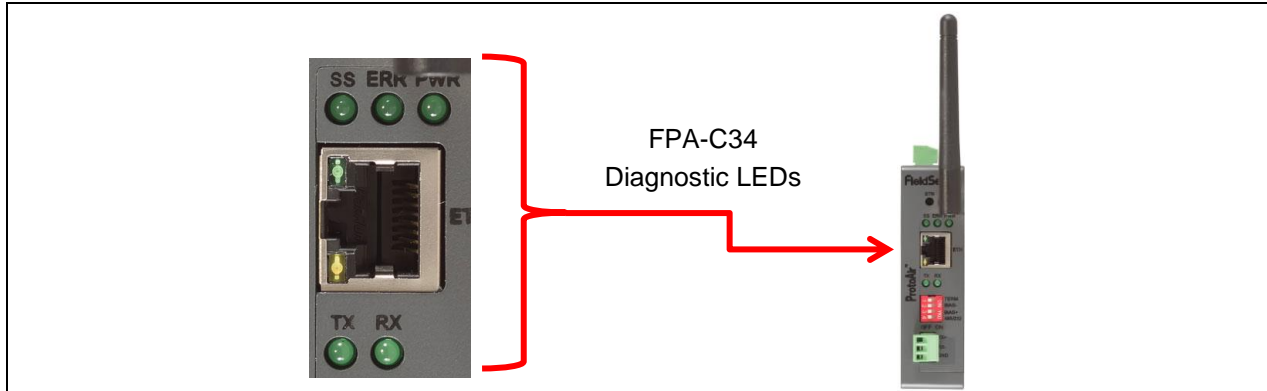
Appendix A.3 Checking Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
 - Visual observations of LEDs on ProtoAir ([Appendix A.4](#))
 - Check baud rate, parity, data bits, stop bits
 - Check Detector ID matches the correct device
 - Verify wiring
 - Verify the device was listed under the Web Configurator Active Profiles ([Section 6](#))
- Field COM problems:
 - Visual observations of LEDs on the ProtoAir ([Appendix A.4](#))
 - Verify IP Address setting
 - Verify wiring

NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to technical support. ([Appendix A.5](#))

Appendix A.4 LED Diagnostics for Communications Between ProtoAir and Devices

See the diagram below for ProtoAir FPA-C34 LED Locations.



Tag	Description
SS	The SS LED will light if the unit is not getting a response from one or more of the configured devices.
ERR	The SYS ERR LED will go on solid indicating there is a system error. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
PWR	This is the power light and should always show steady green when the unit is powered.
RX	The RX LED will flash when a message is received on the serial port on the 3-pin connector. If the serial port is not used, this LED is non-operational.
TX	The TX LED will flash when a message is sent on the serial port on the 3-pin connector. If the serial port is not used, this LED is non-operational.

Figure 44: Diagnostic LEDs

Appendix A.5 Taking a FieldServer Diagnostic Capture

When there is a problem on-site that cannot easily be resolved, perform a diagnostic capture before contacting support so that support can quickly solve the problem. There are two methods for taking diagnostic captures:

- FieldServer Toolbox:**
 This method requires installation of the FS Toolbox program. A FS Toolbox diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications on the serial ports over a specified period of time. If the problem occurs over an Ethernet connection, then take a Wire Shark capture.
- Gateway's FS-GUI Page:**
 This method doesn't require downloading software. The diagnostic capture utilities are embedded in the FS-GUI web interface. Starting a diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications over a specified period of time. This works for both serial and Ethernet connections.

NOTE: The information in the zipped files contains everything support needs to quickly resolve problems that occur on-site.

Appendix A.5.1 Using the FieldServer Toolbox

Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's [Software Downloads](#).
- Extract the executable file and complete the installation.

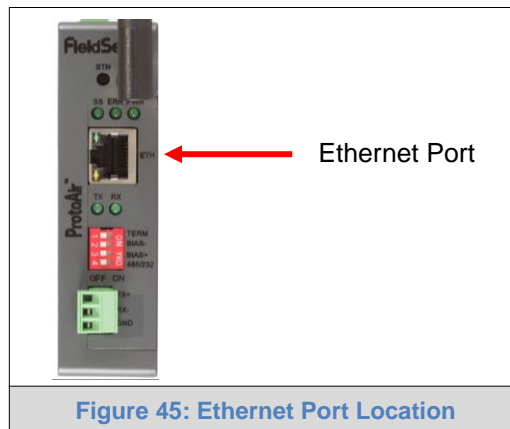
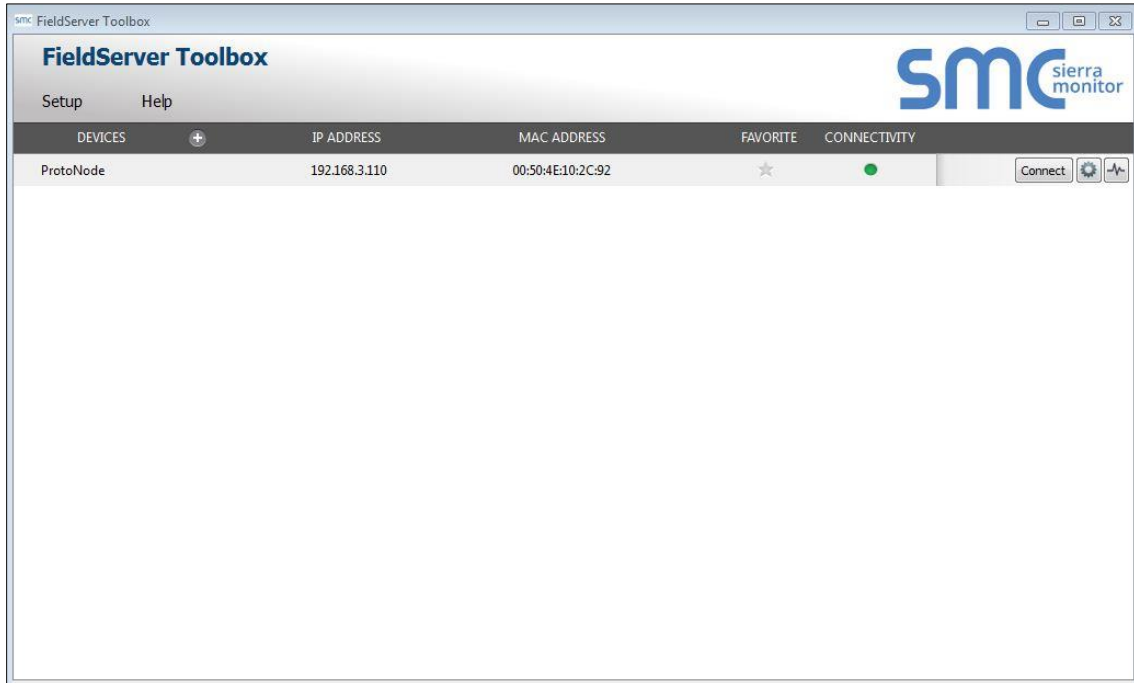


Figure 45: Ethernet Port Location

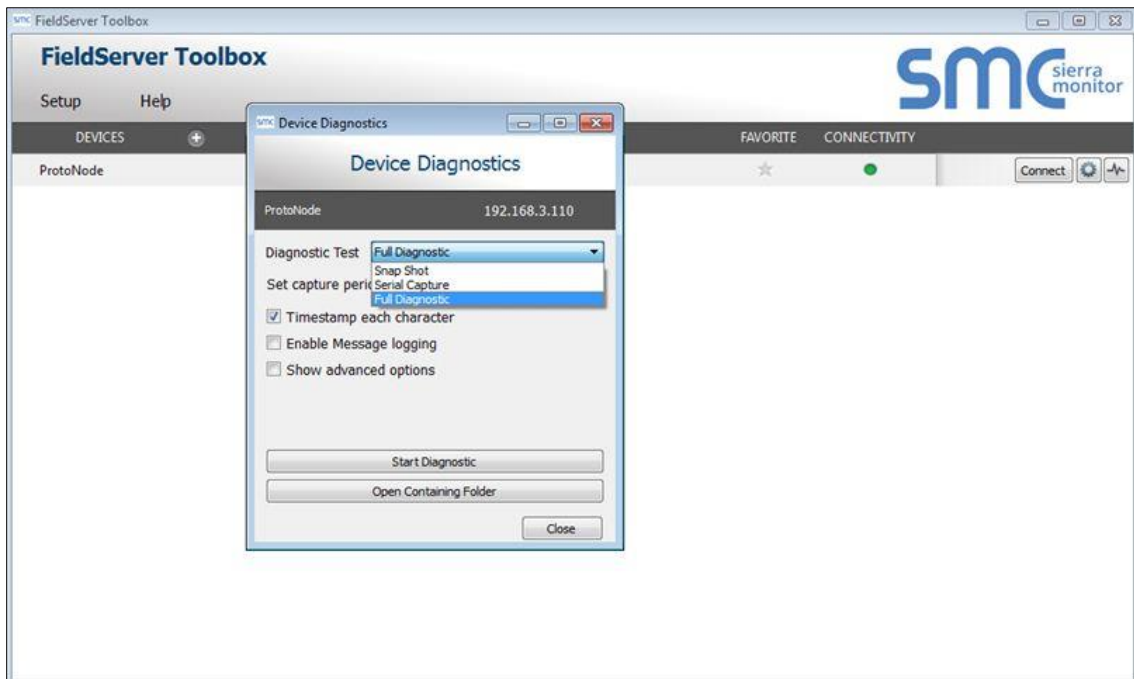
- Connect a standard Cat-5 Ethernet cable between the PC and ProtoAir.
- Double click on the FS Toolbox Utility.

- **Step 1: Take a Log**

- Click on the diagnose icon  of the desired device

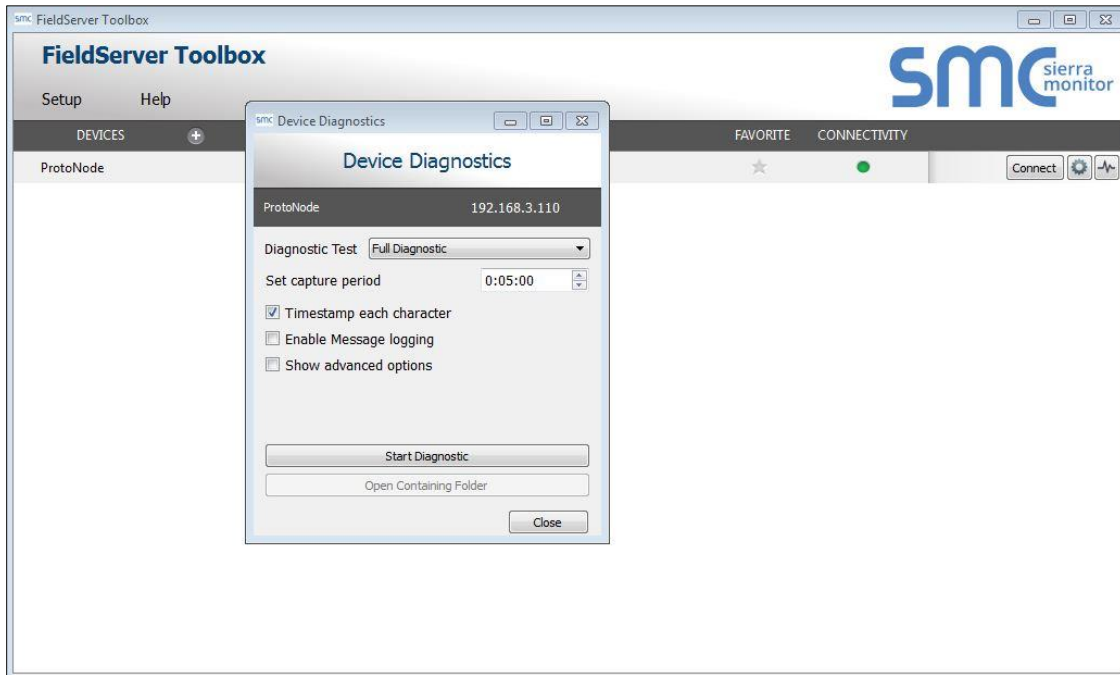


- Ensure "Full Diagnostic" is selected (this is the default)

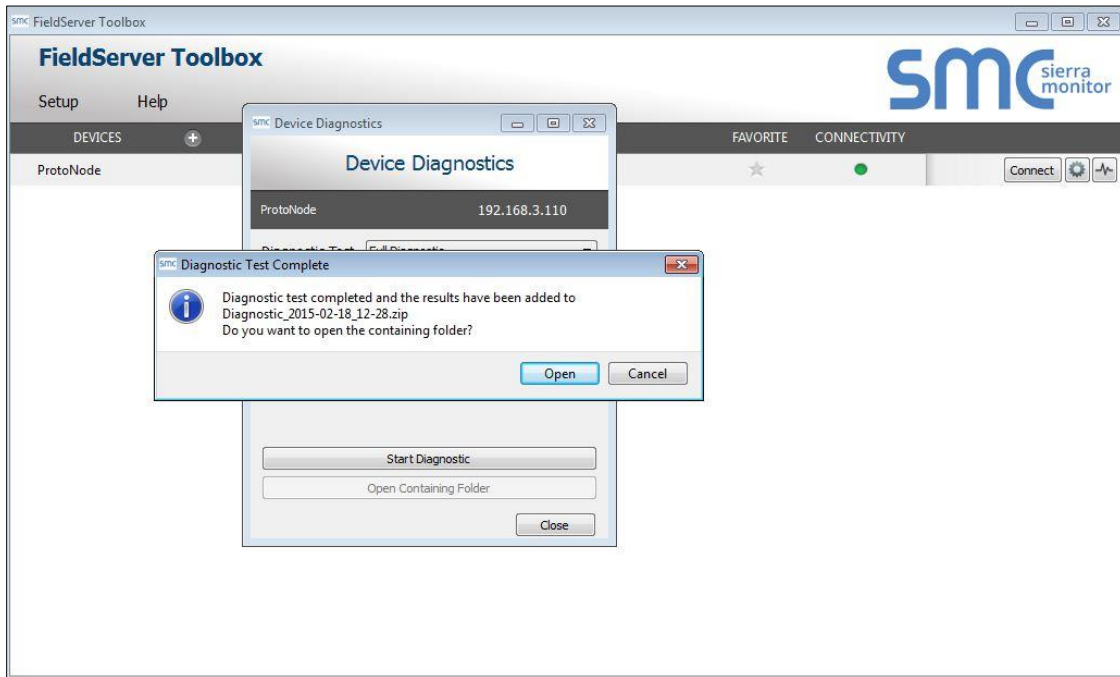


NOTE: If desired, the default capture period can be changed.

- Click on “Start Diagnostic”



- Wait for Capture period to finish, then the Diagnostic Test Complete window will appear
- **Step 2: Send Log**
 - Once the Diagnostic test is complete, a .zip file is saved on the PC



- Choose “Open” to launch explorer and have it point directly at the correct folder
- Send the Diagnostic zip file to technical support (sales@chromalox.com)

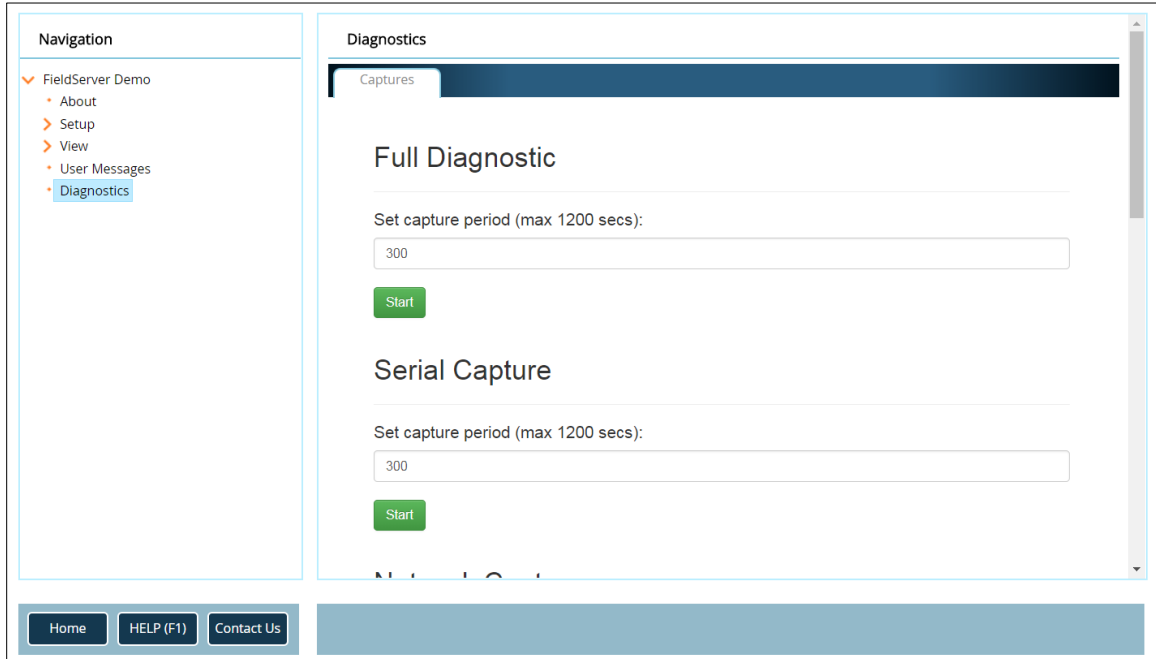


Appendix A.5.2 Using FS-GUI

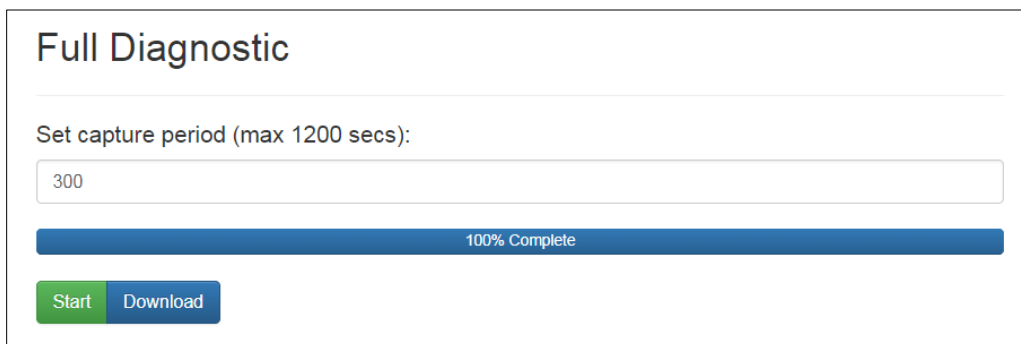
Diagnostic Capture via FS-GUI is only available on FieldServers with a bios updated/released on November 2017 or later. Completing a Diagnostic Capture through the FieldServer allows network connections (such as Ethernet and Wi-Fi) to be captured.

Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

- Open the FieldServer FS-GUI page.
- Click on Diagnostics in the Navigation panel.



- Go to Full Diagnostic and select the capture period.
- Click the Start button under the Full Diagnostic heading to start the capture.
 - When the capture period is finished, a Download button will appear next to the Start button



- Click Download for the capture to be downloaded to the local PC.
- Send the diagnostic zip file to technical support (sales@chromalox.com).

NOTE: Diagnostic captures of BACnet MS/TP communication are output in a “.PCAP” file extension which is compatible with Wireshark.

Appendix A.6 Wi-Fi and Cellular Signal Strength

Wi-Fi	Cellular
<60dBm – Excellent	< 60dBm – Excellent
<70dBm – Very good	<70dBm – Very good
<80dBm – Good	<80dBm – Good
>80dBm – Weak	<90dBm – Weak
	>90dBm – Spotty; not good for data
Figure 46: Wi-Fi & Cellular Signal Strength Listing	

NOTE: If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the ProtoAir position.

Appendix A.7 Factory Reset Instructions

For instructions on how to reset a FieldServer back to its factory released state, see [ENOTE - FieldServer Next Gen Recovery](#).

Appendix B Additional Information

Appendix B.1 Updating Firmware

To load a new version of the firmware, follow these instructions:

1. Extract and save the new file onto the local PC.
2. Open a web browser and type the IP Address of the FieldServer in the address bar.
 - o Default IP Address is 192.168.1.24
 - o Use the FS Toolbox utility if the IP Address is unknown ([Appendix A.1](#))
3. Click on the “Diagnostics & Debugging” button.
4. In the Navigation Tree on the left-hand side, do the following:
 - a. Click on “Setup”
 - b. Click on “File Transfer”
 - c. Click on the “General” tab
5. In the General tab, click on “Choose Files” and select the web.img file extracted in step 1.
6. Click on the orange “Submit” button.
7. When the download is complete, click on the “System Restart” button.

Appendix B.2 BACnet: Setting Network_Number for More Than One ProtoAir on the Subnet

For both BACnet MS/TP and BACnet/IP, if more than one ProtoAir is connected to the same subnet, they must be assigned unique Network_Number values.

On the main Web Configuration screen, update the BACnet Network Number field and click submit. The default value is 50.

network_nr	BACnet Network Number This sets the BACnet network number of the Gateway. (1 - 65535)	<input type="text" value="50"/>	<input type="button" value="Submit"/>
------------	--	---------------------------------	---------------------------------------

Figure 47: Web Configurator – Network Number Field

Appendix B.3 Securing ProtoAir with Passwords

Access to the ProtoAir can be restricted by enabling a password on the FS-GUI Passwords page – click Setup and then Passwords in the navigation panel. There are 2 access levels defined by 2 account names: Admin and User.

- The Admin account has unrestricted access to the ProtoAir.
- The User account can view any ProtoAir information but cannot make any changes or restart the ProtoAir.

The password needs to be a minimum of eight characters and **is case sensitive**.

If the password is lost, click cancel on the password authentication popup window, and email the password recovery token to technical support to receive a temporary password from the customer support team. Access the ProtoAir to set a new password.

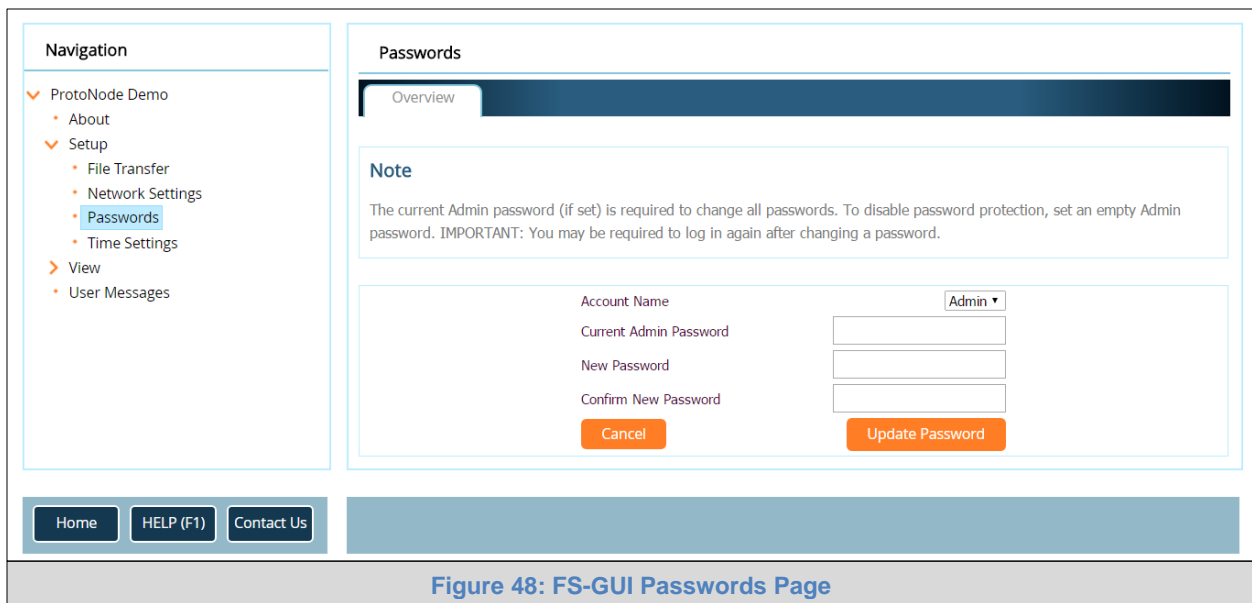


Figure 48: FS-GUI Passwords Page

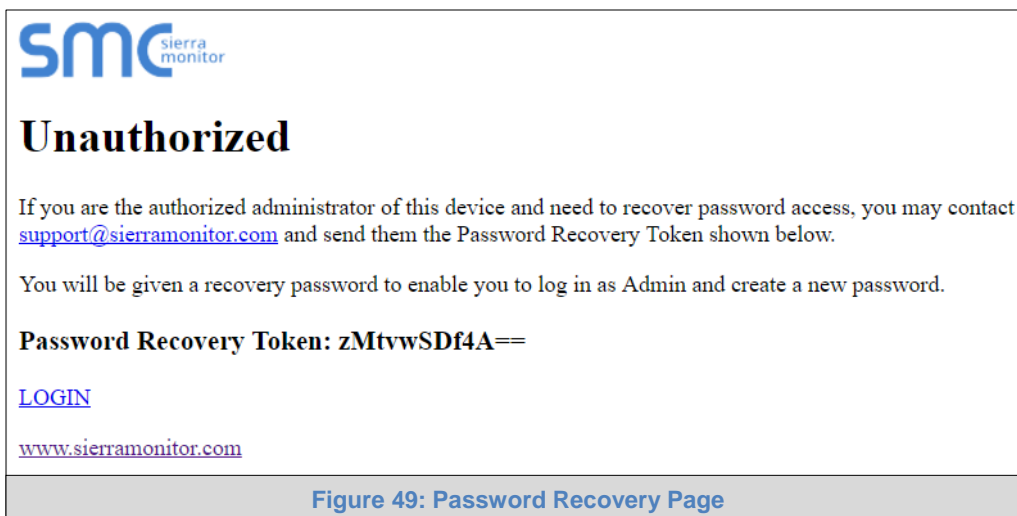


Figure 49: Password Recovery Page

Appendix B.4 Wi-Fi Access Point Network Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi AP tab. To change the Wi-Fi AP settings, follow these instructions:

- The Access Point Status Field must be ENABLED to allow connecting to the ProtoAir via Wi-Fi.
- Modify the Settings manually as needed, via these fields: Access Point SSID, Access Point Password, SSID Broadcast, and Channel.

NOTE: The default channel is 11.

- Click Update Wi-Fi Settings, then click on the System Restart to restart the Gateway and activate the Wi-Fi settings.

NOTE: If the FS-GUI was open in a browser via Wi-Fi, the browser will need to be updated with the new Wi-Fi details before the ProtoAir FS-GUI will be accessible again.

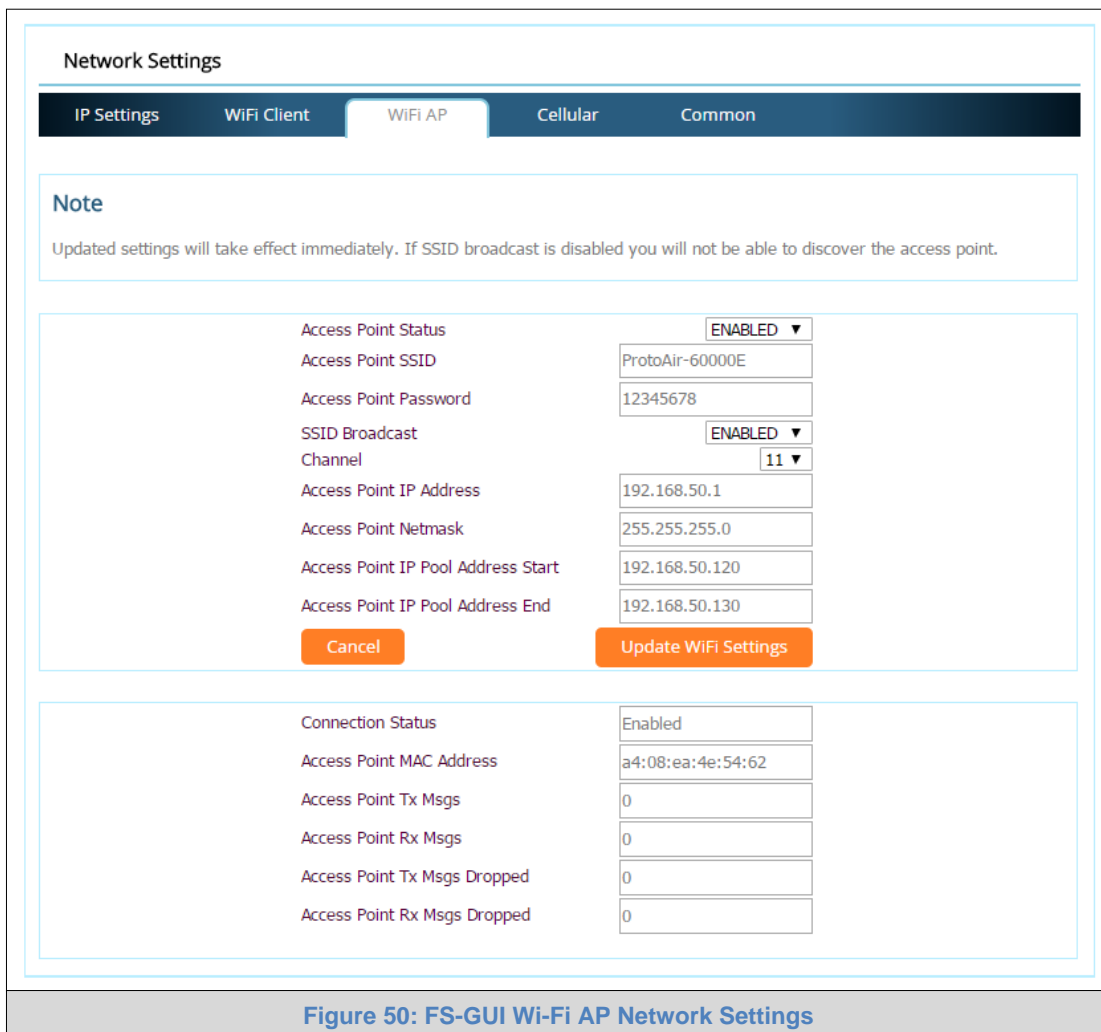


Figure 50: FS-GUI Wi-Fi AP Network Settings

Wi-Fi AP Fields	Definition
Connection Status	Status of connection
MAC Address	Access point's MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

Appendix B.5 Mounting

The ProtoAir can be mounted using the DIN rail mounting bracket on the back of the unit.

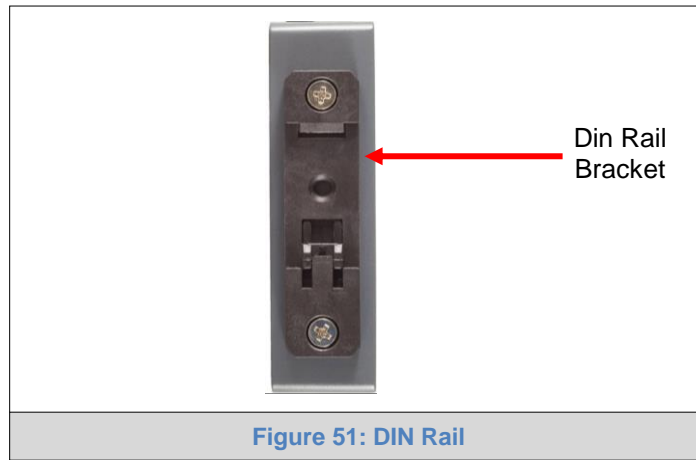


Figure 51: DIN Rail

Appendix B.6 Physical Dimension Drawing

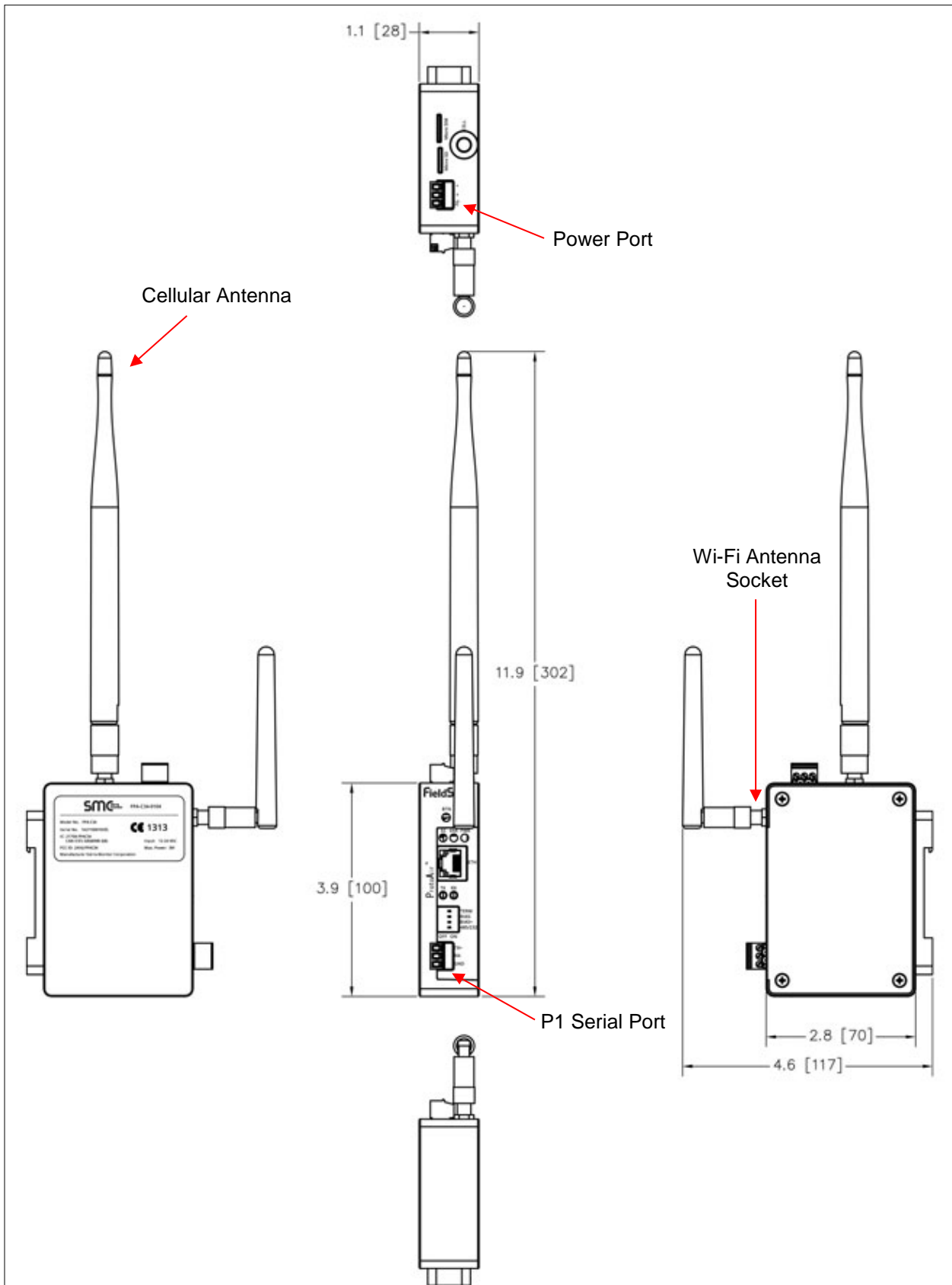


Figure 52: ProtoAir FPA-C34 Dimensions

Appendix C Vendor Information – Chromalox

See the document “Chromalox Vendor Mappings” for the complete point list for all the Chromalox devices referenced in this manual.

Appendix D Reference

Appendix D.1 Specifications



ProtoAir FPA-C34 ²	
Electrical Connections	One 3-pin Phoenix connector with: RS-485 port (TX+/RX-/gnd) One 3-pin Phoenix connector with: Power port (+/-/Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	<i>Input Voltage:</i> 12-24VDC <i>Current draw:</i> @ 12V, 670 mA <i>Power Rating:</i> 8 Watts
Approvals	CE and FCC Class B & C Part 15, TUV approved to UL 60950, WEEE Compliant, IC Canada, RoHS Compliant, PTCRB and CTIA
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
Weight	0.4 lbs (0.2 Kg)
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	<i>Frequency:</i> 2.4 GHz <i>Channels:</i> 1 to 11 (inclusive) <i>Antenna Type:</i> SMA <i>Encryption:</i> TKIP, WPA & AES
Cellular	<i>Features:</i> 3G & GPS <i>Antenna Type:</i> SMA <i>HSDPA:</i> Up to 21.0 Mbps <i>HSUPA:</i> Up to 5.76 Mbps

Figure 53: Specifications

Appendix D.1.1 Compliance with UL Regulations

For UL compliance, the following instructions must be met when operating ProtoAir.

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
 - Comply with local electrical code
 - Be suited to the expected operating temperature range
 - Meet the current and voltage rating for ProtoAir
- Furthermore, the interconnecting power cable shall:
 - Be of length not exceeding 3.05m (118.3")
 - Be constructed of materials rated VW-1, FT-1 or better
- If the unit is to be installed in an operating environment with a temperature above 65 °C, it should be installed in a Restricted Access Area requiring a key or a special tool to gain access.
- This device must not be connected to a LAN segment with outdoor wiring.

² Specifications subject to change without notice.

Appendix E Limited 2 Year Warranty

Sierra Monitor Corporation warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. Sierra Monitor Corporation will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by Sierra Monitor Corporation personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without Sierra Monitor Corporation's approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases Sierra Monitor Corporation's responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

Except for the express warranty stated above, Sierra Monitor Corporation disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of Sierra Monitor Corporation for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.