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.
Lavergne, 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)
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1 CERTIFICATION

1.1 BTL Mark – BACnet\textsuperscript{1} Testing Laboratory

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](http://www.BACnetInternational.net) for more information about the BACnet Testing Laboratory. Click [here](http://www.BACnetInternational.net) for the BACnet PIC Statement.

\textsuperscript{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

<table>
<thead>
<tr>
<th>Devices</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITC1</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>ITC2</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>ITLS4</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>ITLS6</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>ITLS_2016</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>CFW</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>CFW_400_600A</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>C4</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>C4IR</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>CTF</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>MaxPac</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>40 Series</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>50 Series</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>6060</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>4081_4082</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>3340</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>3380</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>6020</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>1020</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>1040</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>WM30-WM40</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
<tr>
<td>1030</td>
<td>Modbus RTU &amp; Modbus TCP/IP</td>
</tr>
</tbody>
</table>

*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:

<table>
<thead>
<tr>
<th>Model</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProtoAir</td>
<td>FPA-C34-1867</td>
</tr>
</tbody>
</table>

![Figure 2: ProtoAir Part Numbers](image)

- 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:

<table>
<thead>
<tr>
<th>Part number</th>
<th>Total Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPA-C34-1867</td>
<td>5,000</td>
</tr>
</tbody>
</table>

![Figure 3: Supported Point Count Capacity](image)

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

![Figure 4: Registers per Device](image)
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.

<table>
<thead>
<tr>
<th>Port Setting</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Modbus RTU</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>19200</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>Data Bits</td>
<td>8</td>
</tr>
<tr>
<td>Stop Bits</td>
<td>1</td>
</tr>
</tbody>
</table>

**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.

![SIM Card Insertion Diagram](image)

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.

<table>
<thead>
<tr>
<th>Number of Data Points</th>
<th>Logging Frequency</th>
<th>Data Usage per Hour</th>
<th>Data Usage per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>40 sec</td>
<td>0.75 Mb</td>
<td>547 Mb</td>
</tr>
<tr>
<td>10</td>
<td>900 sec</td>
<td>0.55 Mb</td>
<td>400 Mb</td>
</tr>
<tr>
<td>50</td>
<td>40 sec</td>
<td>1.24 Mb</td>
<td>900 Mb</td>
</tr>
<tr>
<td>50</td>
<td>900 sec</td>
<td>0.90 Mb</td>
<td>657 Mb</td>
</tr>
<tr>
<td>100</td>
<td>40 sec</td>
<td>3.00 Mb</td>
<td>2.2 Gb</td>
</tr>
<tr>
<td>100</td>
<td>900 sec</td>
<td>1.26 Mb</td>
<td>900 Mb</td>
</tr>
<tr>
<td>500</td>
<td>40 sec</td>
<td>10.86 Mb</td>
<td>7.8 Gb</td>
</tr>
<tr>
<td>500</td>
<td>900 sec</td>
<td>0.55 Mb</td>
<td>1.5 Gb</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Device Pins</th>
<th>ProtoAir Pin Label</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-485 +</td>
<td>TX+</td>
<td>RS-485 +</td>
</tr>
<tr>
<td>RS-485 -</td>
<td>RX-</td>
<td>RS-485 -</td>
</tr>
<tr>
<td>RS-485 GND</td>
<td>GND</td>
<td>RS-485 GND</td>
</tr>
</tbody>
</table>

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

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.

<table>
<thead>
<tr>
<th>BMS Wiring</th>
<th>ProtoAir Pin Label</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-485 +</td>
<td>+</td>
<td>RS-485 +</td>
</tr>
<tr>
<td>RS-485 -</td>
<td>-</td>
<td>RS-485 -</td>
</tr>
<tr>
<td>-</td>
<td>GND</td>
<td>RS-485 GND</td>
</tr>
</tbody>
</table>

Figure 9: Connection from ProtoAir to RS-485 Field Network
4.3 Bias Resistors

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

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:

<table>
<thead>
<tr>
<th>Power Requirement for ProtoAir External Gateway</th>
<th>Current Draw Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProtoAir Family</td>
<td>12VDC</td>
</tr>
<tr>
<td>FPA – C34 (Typical)</td>
<td>320mA</td>
</tr>
<tr>
<td>FPA – C34 (Maximum)</td>
<td>670mA</td>
</tr>
</tbody>
</table>

**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.

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.**

![ProtoAir Diagram](image-url)
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.

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:

| 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.

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

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

---

Figure 15: Web App Splash Page

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](image)

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

![Figure 18: Configure Tab](image)

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.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Description</th>
<th>Value</th>
<th>Submit</th>
</tr>
</thead>
<tbody>
<tr>
<td>protocol_select</td>
<td>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</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>network_nr</td>
<td>This sets the BACnet network number of the Gateway. (1 - 65535)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>node_offset</td>
<td>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)</td>
<td>50000</td>
<td></td>
</tr>
<tr>
<td>bac_mac_addr</td>
<td>This sets the BACnet MSTP MAC address. (1 - 127)</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>bac_baud_rate</td>
<td>This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)</td>
<td>38400</td>
<td></td>
</tr>
<tr>
<td>bac_max_master</td>
<td>This sets the BACnet MSTP max master. (1 - 127)</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>bac_cov_option</td>
<td>This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)</td>
<td>COV_Disable</td>
<td></td>
</tr>
<tr>
<td>bac_virt_nodes</td>
<td>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)</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

#### Active Profiles

<table>
<thead>
<tr>
<th>Nr</th>
<th>Node ID</th>
<th>Current profile</th>
<th>Parameters</th>
</tr>
</thead>
</table>

*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.

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.

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:

  \[
  50,001 = \text{Node\_Offset} + 1
  \newline
  \Rightarrow \,
  50,000 = \text{Node\_Offset}
  \]

  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.
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.
  - From the Web Configurator page, click on the blue "Diagnostics & Debugging" button in the bottom right corner of the screen.
• Find the Navigation tree on the left side of the screen.

![Generic FS-GUI Navigation Panel – Network Settings](image)

• 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.
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.

---

**IP Setting Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Status</td>
<td>Status of connection</td>
</tr>
<tr>
<td>MAC Address</td>
<td>Ethernet MAC Address</td>
</tr>
<tr>
<td>Tx/Rx Msgs</td>
<td>Number of transmitted and received messages</td>
</tr>
<tr>
<td>Tx/Rx Msgs Dropped</td>
<td>Number of unanswered Tx or Rx messages</td>
</tr>
</tbody>
</table>
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.

### Wi-Fi Client Fields

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

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

![Network Settings](image)

**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.

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

![Welcome to SMC Cloud Email](image)

**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](image)

**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.

![System View](image)

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

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

![Registration Information Page](image)

**Figure 35: Registration Information Page**

Securely access your FieldServer from anywhere with the **FieldPoP™ device cloud**

**Your One Stop for Managing Your Devices and Users**

- **Secure Remote Access**
  Securely connect your field devices FieldPoP™ Cloud

- **Device Management**
  Manage all your FieldServers and connected devices from FieldPoP™ and upgrade firmware remotely

- **User Management**
  Set up your user personnel with the right security permissions and device assignments for users to diagnose, configure, and better support the field installation.

For more information about FieldPoP™, visit our website.
• 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.

![FieldPoP™ Server Unreachable Message](image)

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.

![Register this FieldServer on FieldPoP™](image)

**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](image)
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.

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.
NOTE: For additional SMC Cloud instructions see the SMC Cloud Start-up Guide.
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.

- 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.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>The SS LED will light if the unit is not getting a response from one or more of the configured devices.</td>
</tr>
<tr>
<td>ERR</td>
<td>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.</td>
</tr>
<tr>
<td>PWR</td>
<td>This is the power light and should always show steady green when the unit is powered.</td>
</tr>
<tr>
<td>RX</td>
<td>The RX LED will flash when a message is received on the serial port on the 3-pin connector. <strong>If the serial port is not used, this LED is non-operational.</strong></td>
</tr>
<tr>
<td>TX</td>
<td>The TX LED will flash when a message is sent on the serial port on the 3-pin connector. <strong>If the serial port is not used, this LED is non-operational.</strong></td>
</tr>
</tbody>
</table>

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.

- Connect a standard Cat-5 Ethernet cable between the PC and ProtoAir.
- Double click on the FS Toolbox Utility.
• **Step 1: Take a Log**
  
  o Click on the diagnose icon 🏆 of the desired device

  ![FieldServer Toolbox](image)

  o Ensure “Full Diagnostic” is selected (this is the default)

  ![Device Diagnostics](image)

  **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.
  o 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

<table>
<thead>
<tr>
<th>Wi-Fi</th>
<th>Cellular</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60dBm – Excellent</td>
<td>&lt; 60dBm – Excellent</td>
</tr>
<tr>
<td>&lt;70dBm – Very good</td>
<td>&lt;70dBm – Very good</td>
</tr>
<tr>
<td>&lt;80dBm – Good</td>
<td>&lt;80dBm – Good</td>
</tr>
<tr>
<td>&gt;80dBm – Weak</td>
<td>&lt;90dBm – Weak</td>
</tr>
<tr>
<td></td>
<td>&gt;90dBm – Spotty; not good for data</td>
</tr>
</tbody>
</table>

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.
   - Default IP Address is 192.168.1.24
   - 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.

![Figure 47: Web Configurator – Network Number Field](image-url)
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**

Unauthorized

If you are the authorized administrator of this device and need to recover password access, you may contact support@sierramonitor.com and send them the Password Recovery Token shown below.

You will be given a recovery password to enable you to log in as Admin and create a new password.

Password Recovery Token: zMtwsDFs4A—

LOGIN

www.sierramonitor.com
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.

**Wi-Fi AP Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Status</td>
<td>Status of connection</td>
</tr>
<tr>
<td>Access Point MAC Address</td>
<td>Access point’s MAC Address</td>
</tr>
<tr>
<td>Tx/Rx Msgs</td>
<td>Number of transmitted and received messages</td>
</tr>
<tr>
<td>Tx/Rx Msgs Dropped</td>
<td>Number of unanswered Tx or Rx messages</td>
</tr>
</tbody>
</table>
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

- Power Port
- Cellular Antenna
- Wi-Fi Antenna Socket
- P1 Serial Port
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-C34² |  |
|------------------|--|---|---|---|
| **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** | Input Voltage: 12-24VDC | Current draw: @ 12V, 670 mA |
| **Power Rating** | 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** | Frequency: 2.4 GHz | Channels: 1 to 11 (inclusive) |
| Antenna Type: SMA | Encryption: TKIP, WPA & AES |
| **Cellular** | Features: 3G & GPS | Antenna Type: SMA |
| HSDPA: Up to 21.0 Mbps | HSUPA: Up to 5.76 Mbps |

### 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.