

# IBOX Mounting and Wiring Guide





## **Trademarks**

Lynxspring and the Lynxspring logo are U.S. trademarks of Lynxspring, Inc.

Other brands and product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

## **Copyright Notice**

Copyright © 2005, Lynxspring, Inc.

All rights reserved.

This document contains proprietary information which is protected by copyright. No part of this document may be copied, photocopied, reproduced, translated, or converted to any electronic or machine-readable form in whole or in part without prior written approval of Lynxspring, Inc.

JENESys is a register trademark of Lynxspring, Inc. All JENESys logos are property of Lynxspring, Inc.

## **Disclaimer**

**NO WARRANTY.** This technical documentation is being delivered to you AS-IS, and Lynxspring makes no warranty as to its accuracy or use. Any use of the technical documentation or the information contained therein is at the risk of the user. Documentation may include technical or other inaccuracies or typographical errors. Lynxspring reserves the right to make changes in this document without prior notice, and the reader should in all cases consult Lynxspring to determine whether any such changes have been made. The information in this publication does not represent a commitment on the part of Lynxspring.

Lynxspring shall not be liable for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

This guide contains links and references to third-party websites that are not under the control of Lynxspring, and Lynxspring is not responsible for the content of any reference material or linked websites. If you access a third party website mentioned in this guide, then you do so at your own risk. Lynxspring provides these links only as a convenience, and the inclusion of the link does not imply that Lynxspring endorses or accepts any responsibility for the content on those third-party sites.

(Revision 2.1 – Second Edition: April 2006)

Lynxspring, Inc.  
8900 State Line Road  
Suite 220  
Leawood, KS 66206  
<http://www.lynxspring.com>

# Table of Contents

<b>1 GETTING STARTED</b>	<b>6</b>
1.1 GENERAL	6
1.2 THIS MANUAL	6
<b>2 INSTALLATION PREPARATION</b>	<b>7</b>
2.1 INITIAL PREPARATION	7
2.2 INCLUDED IN THIS PACKAGE	7
2.3 MATERIALS AND TOOLS REQUIRED	7
<b>3 INSTALLATION PRECAUTIONS</b>	<b>8</b>
3.1 SAFETY PRECAUTIONS	8
3.1 STATIC DISCHARGE PRECAUTIONS	8
<b>4 MOUNTING INSTRUCTIONS</b>	<b>9</b>
4.1 MOUNTING	9
4.2 ENVIRONMENTAL REQUIREMENTS	9
4.3 PHYSICAL MOUNTING	9
4.4 REMOVING AND REPLACING THE COVER	10
<b>5 BOARD LAYOUT</b>	<b>11</b>
5.1 DETAILS	11
<b>6 LON OPTION MODULES</b>	<b>12</b>
6.1 ABOUT OPTION MODULES	12
6.2 MOUNTING OPTION MODULES	12
<b>7 BACNET MS/TP RS-232 TO RS-484 CONVERTER</b>	<b>13</b>
7.1 ABOUT RS-232 TO RS-484 CONVERTER	13
7.2 SPECIFICATIONS FOR THE RS-232 TO RS-485	13
<b>8 WIRING THE IBOX CONTROLLER</b>	<b>14</b>
8.1 WIRING DETAILS	14
8.2 GROUNDING	14

<b>8.3 POWER WIRING</b>	<b>14</b>
<b>8.4 COMMUNICATIONS WIRING</b>	<b>15</b>
<b>8.5 AIRFIXTURE NETWORK WIRING</b>	<b>16</b>
<b>9 POWER UP AND INITIAL CHECKOUT</b>	<b>19</b>
<hr/>	
<b>9.1 CHECKOUT</b>	<b>19</b>
<b>9.2 CONNECT THE BATTERY BACKUP</b>	<b>19</b>
<b>9.3 APPLY POWER</b>	<b>19</b>
<b>9.4 CHECK THE STATUS LED'S</b>	<b>19</b>
<b>9.5 ABOUT THE BATTERY</b>	<b>20</b>
<b>10 USING STATUS LED'S</b>	<b>21</b>
<hr/>	
<b>10.1 LED'S</b>	<b>21</b>
<b>10.2 ETHERNET PORTS</b>	<b>21</b>
<b>10.3 HEARTBEAT</b>	<b>21</b>
<b>10.4 SYSTEM</b>	<b>21</b>
<b>10.5 SERIAL PORTS</b>	<b>21</b>
<b>11 MAINTAINING THE IBOX</b>	<b>23</b>
<hr/>	
<b>11.1 BASIC MAINTENANCE</b>	<b>23</b>
<b>11.2 CLEANING</b>	<b>23</b>
<b>11.3 REPLACING THE IBOX BASE ASSEMBLY</b>	<b>23</b>
<b>11.4 REQUIRED BATTERY MAINTENANCE</b>	<b>23</b>
<b>11.5 REPLACING THE BATTERY</b>	<b>24</b>
<b>NOTES:</b>	<b>25</b>
<hr/>	

# 1 Getting Started

## 1.1 General

This document covers the mounting and wiring of the AirFixture IBOX series controller. It assumes that you are an engineer, technician, or service person who is performing building automation system installation. Instructions in this document apply to the following products:



<b>Models</b>	<b>Description</b>
JENE-PC1000	<b>IBOX</b> AirFixture Integration Controller
JPWR-WWPM-120	<b>External</b> AC power adapter, 115 VAC, 60 HZ (US installations)
JPWR-WWPM -230	<b>External</b> AC power adapter, 230 VAC, 50 HZ (EU installations)
JPWR-BATT	<b>NiMH</b> Battery Pack

*Please note!*

Not covered in this document are configuration and set up procedures for the IBOX controller. Refer to the ***IBOX User's Guide for BACnet or LON.***

## 1.2 This manual

The mounting and wiring guide has the following contents:

**Section 2**

Discusses the preparation required for installing the IBOX.

**Section 3**

Discusses the precautions that should be taken.

**Section 4**

Discusses the mounting instructions.

**Section 5**

Details the IBOX controllers board layout.

**Section 6**

Details using the IBOX expansion modules for LON and BACnet MS/TP.

**Section 7**

Discusses wiring details for connecting to the IBOX controller.

**Section 8**

Discusses properly powering up and the initial checkout of the controller.

**Section 9**

Discusses using the status LED lights to monitor the controllers operation.

**Section 10**

Discusses maintaining the IBOX controller for proper operation.

## 2 Installation Preparation

### 2.1 Initial Preparation

Unpack the IBOX controller available in (IBOX-MSTP, IBOX-IP, IBOX-LON, & IBOX-SA) and power module (JPWR-WWPM-120 or JPWR-WWPM-230) and inspect the contents of the packages for damaged or missing components. If damaged, notify the appropriate carrier at once and return any damaged components for immediate repair or replacement. See [“Replacing the IBOX Base Assembly”](#) later in this document.

### 2.2 Included in this Package

Included in this package you will find the following items:

- Based upon job criteria you will receive an IBOX-MSTP, IBOX-IP, IBOX-LON, & IBOX-SA base controller.
  - IBOX-MSTP – supports BACnet MSTP integration
  - IBOX-IP – supports BACnet I/P or BACnet Ethernet Integration
  - IBOX-LON – supports LonWorks integration
  - IBOX-SA – is a Stand Alone version of the IBOX with no integration to a 3<sup>rd</sup> party building automation system
- The *IBOX Mounting and Wiring Guide* and *IBOX User’s Guide*.
- A packing slip detailing the contents included with the package.
- A power module (JPWR-WWPM-120 or JPWR-WWPM-230), that is required for operation.

### 2.3 Materials and Tools Required

The following tools and materials may be required for installation:

- DIN rail, type NS35/7.5 (35mm x 7.5mm)
- Suitable screws and screwdriver for mounting DIN rail, or if DIN rail not used, for mounting the base of the IBOX controller.
- #2 Phillips screwdriver: used to install and remove optional communications modules.
- Small flat-blade screwdriver: used for RS-485 connector, and optional LON and I/O connectors.

## 3 Installation Precautions

### 3.1 Safety Precautions



The following items are warnings of a general nature relating to the installation and start-up of the IBOX controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

- Remove power to the IBOX controller prior to installation or servicing of the device.
- Make all connections in accordance with national and local electrical codes. Use copper conductors only.
- To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.
- This device is only intended for use as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.

### 3.1 Static Discharge Precautions

Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within an IBOX controller are sensitive to static discharge. Follow these precautions when installing, servicing, or operating the system:

- Work in a static-free area.
- Discharge any static electricity you may have accumulated. Discharge static electricity by touching a known, securely-grounded object.
- Do not handle the printed circuit board (PCB) without proper protection against static discharge. Use a wrist strap when handling PCBs. The wrist strap clamp must be secured to earth ground.

## 4 Mounting Instructions

### 4.1 Mounting

Mount the IBOX controller in a location that allows clearance for wiring, servicing, and module removal. Additional mounting information applies, as follows:

- Environmental requirements
- Physical mounting

### 4.2 Environmental Requirements

Note the following requirements for the IBOX mounting location:

- This product is intended for indoor use only. Do not expose the unit to ambient conditions outside of the range of 0°C (32° F) to 50°C (122° F) and relative humidity outside the range 5% to 95% non-condensing (pollution degree 1).
- If mounting inside an enclosure, that enclosure should be designed to keep the unit within its required operating range considering a 20-watt dissipation by the controller. This is especially important if the controller is mounted inside an enclosure with other heat producing equipment.
- Do not mount the unit:
  - In an area where excessive moisture, corrosive fumes, or explosive vapors are present.
  - Where vibration or shock is likely to occur.
  - In a location subject to electrical noise. This includes the proximity of large electrical contractors, variable frequency drives, electrical machinery, welding equipment, spark igniters, and any high voltage producing equipment.

### 4.3 Physical Mounting

The following information applies to physically mounting the controller:

- You can mount the IBOX in any orientation. It is not necessary to remove the cover before mounting.
- Mounting on a 35mm wide DIN rail is recommended. The IBOX unit base has a molded DIN rail slot and locking clip.
- If DIN rail mounting is impractical, you can use screws in mounting tabs on the IBOX.

The following procedure provides step-by-step DIN rail mounting instructions for the IBOX.

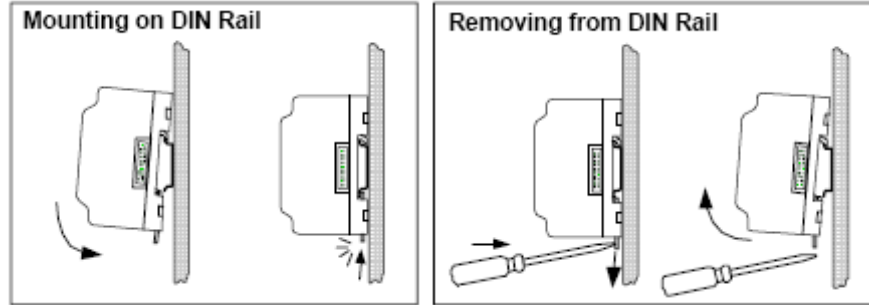
**Step 1** Securely install the DIN rail using at least two screws, near both ends of the rail.

**Step 2** Position the IBOX on the rail, tilting to hook DIN rail tabs over one edge of the DIN rail ([Figure 4.1](#)).

**Step 3** Push down and in to force the DIN rail clip to snap over the other edge of the DIN rail.

**Step 4** To prevent the IBOX from sliding on the DIN rail, secure with clips provided by the DIN rail vendor, or place a screw in one of the four mounting tabs in the base of the IBOX.

**Figure 4.1 Din Rail Mounting**



#### ***4.4 Removing and Replacing the Cover***

You must remove the IBOX cover to install any option boards. Prior to removing the cover remove power from the IBOX controller. The cover snaps onto the base with four plastic tabs (two on each end). To remove the cover, press in the four tabs on both ends of the unit, and lift the cover off.

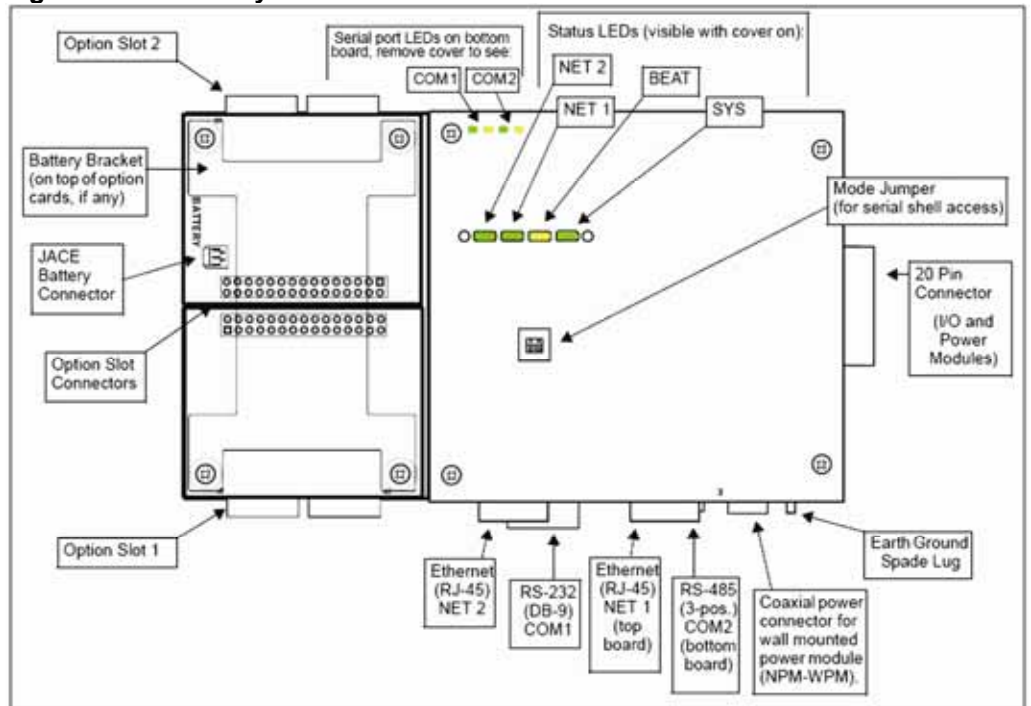
To replace the cover, orient it so the cutout area for communications ports are correct, and then push inwards to snap in place.

# 5 Board Layout

## 5.1 Details

Figure 5.1 shows the location of LEDs, option slots, and other features of the IBOX with cover removed. For a side view of communications ports and other features, see Figure 7.1 on page 15.

Figure 5.1 Board Layout



## 6 LON Option Modules

### 6.1 About Option Modules



The IBOX has two (2) option slots for custom option cards designed for use with the IBOX. Each slot has a 30-pin connector on the IBOX base board. See [Figure 5.1](#) on page 11. The option modules will be installed in the factory prior to shipping. This section of the Mounting and Wiring Guide is provided for reference purposes only.

***Please note!***

Power to the IBOX must be OFF when installing or removing option cards or damage will occur! Also, you must be very careful to plug an option card into its connector properly (pins aligned).

Option cards typically provide additional communications features, such as the following available models (with others still in development) listed in [Table 6.1](#).

**Table 6.1**

Model	Description	Notes
JCOM-1LON	FTT-10A LON (LonWorks) adapter with a 2-position removable screw-terminal connector plug.	Up to 2 LON option cards may be installed <ul style="list-style-type: none"><li>• If one LON option, it operates as LON1, regardless of slot.</li><li>• If two LON options, LON1 is Option slot 1, LON2 is Option slot 2.</li></ul>

### 6.2 Mounting Option Modules

The following procedure provides step-by-step instructions for connecting IBOX option modules. **Note** this section is provided for reference purposes only or in the event an option module needs to be added or replaced.

**Step 1** Remove power from the IBOX.

**Step 2** Remove the cover. See [“Removing and Replacing the Cover,”](#) page 10.

**Step 3** Remove the blanking plate for the slot you are installing the option card into. (Retain the blanking plate in case the option card must be removed at a later date.)

**Step 4** Carefully insert the pins of the option card into the socket of the appropriate option card slot. The mounting holes on the option board should line up with the standoffs on the base board. If they do not, the connector is not properly aligned. Press until the option card is completely seated.

**Step 5** Place the blanking plate that came with the option card over the connector(s) of the option card.

**Step 6** Place the four screws through the battery bracket, option cards blanking plates, and into the standoffs on the IBOX base board. Hand tighten these screws.

**Step 7** Replace the cover.

## 7 BACnet MS/TP RS-232 to RS-484 Converter

### 7.1 About RS-232 to RS-484 Converter



When using the IBOX for BACnet MS/TP integration a RS-232 to RS-485 converter is supplied. The converter is port powered and is used for the Air Fixture network communication. The RS-232 comport is used for this communication and is labeled COM1, reference [Figure 5.1](#) for board and comport details.

***Please note!***

If the BACnet MS/TP network is connected to comport 1 the system will not function.

### 7.2 Specifications for the RS-232 to RS-485

The 485SD9TB is a port-powered two-channel RS-232 to RS-485 converter. It converts the TD and RD RS-232 lines to balanced half-duplex RS-485 signals. The unit is powered from the RS-232 data and handshake lines whether the lines are high or low. An external power supply can be connected to two terminals on the RS-485 connector if no handshake lines are available. The 485SD9TB has a DB-9 female connector on the RS-232 side and a terminal block connector on the RS-485 side.

**RS-232 Side:**

Connector: DB-9 Female.

Signals: Passes through pins 3 (TD) and 2 (RD).

Pins 7 (RTS) and 8 (CTS) are tied together.

Pins 4 (DTR), 6 (DSR), and 1 (CD) are tied together.

**RS-485 Side:**

Connector: Terminal Block

Signals: Half-duplex two-wire operation only.

Automatic control circuit enables driver only when transmitting.

Receiver is disabled when transmitting to prevent echo back to RS-232 device.

Can transmit up to 4000 feet at 115.2k baud.

## 8 Wiring the IBOX Controller

### 8.1 Wiring Details

See [Figure 5.1](#) on page 11 to locate connectors and other components on the IBOX controller.

Make connections to the IBOX in the following order.

1. Connect earth grounding wires (with spade connector) from the earth ground lug on the IBOX to a nearby earth grounding point. See [“Grounding”](#) for details.
2. Option Modules are installed in the factory. In the event that an option module is damaged install applicable option boards (LON or RS-485) in option slots 1 and 2. See [“Mounting Option Modules,”](#) for mounting procedures.
3. Prepare power wiring (leave the unit powered off). See [“Power Wiring”](#) for details.
4. Connect communications cables. See [“Communications Wiring,”](#) page 15 for ports available on the IBOX base unit.
5. Apply power to the unit. See [“Power Up and Initial Checkout,”](#) page 18.

### 8.2 Grounding

An earth ground spade lug (0.187") is provided on the base of the IBOX for connection to earth ground. For maximum protection from electrostatic discharge or other forms of EMI, you should connect this to earth ground using a #16 AWG or larger wire. Keep this wire as short as possible.

### 8.3 Power Wiring

The IBOX must be powered by an approved 15 Vdc power source. This is provided by an external wall mount AC adapter. The IBOX controller does not include an on/off switch. To apply power, you plug in the power connector to the IBOX.

#### **JPWR-WWPM-120**

The JPWR-WWPM-120 model wall power module is a self-contained switching power supply designed to plug into a standard building power receptacle with a voltage of 120 VAC at 60 Hz. To supply power to the IBOX, you simply plug the coaxial connector from the JPWR-WWPM-120 into the coaxial power connector on the IBOX base board (see [Figure 7.2](#)).

#### **JPWR-WWPM-230**

The JPWR-WWPM-230 model of wall power module is a self-contained switching power supply designed to plug into a standard building power receptacle with a voltage of 230 VAC at 50 Hz. To supply power to the IBOX, you simply plug the coaxial connector from the JPWR-WWPM-230 into the coaxial power connector on the IBOX base board (see [Figure 7.2](#)).

## 8.4 Communications Wiring

Connect communications wiring to the IBOX using ports on the bottom of the unit (Figure 8.1), which include:

- Ethernet
- Serial RS-485
- Serial RS-232

Figure 8.1 IBOX Communications Ports

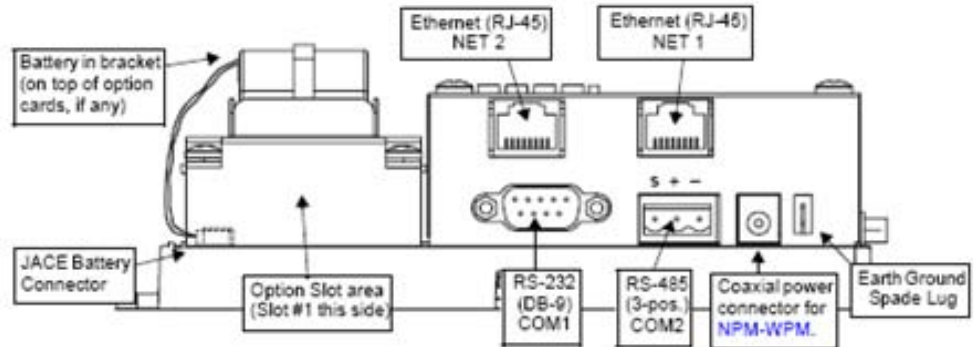
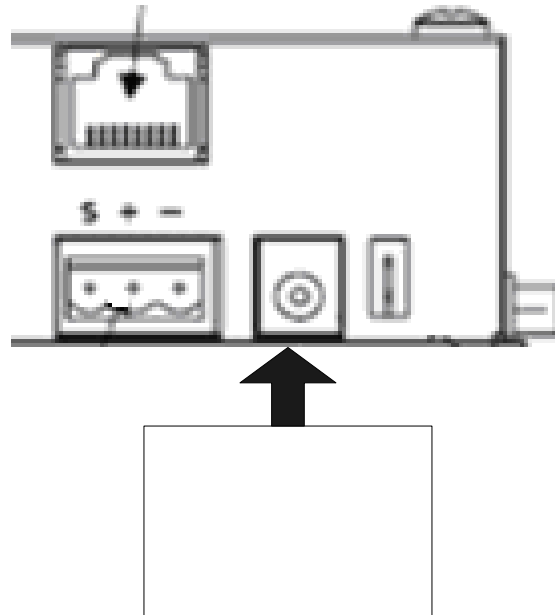


Figure 8.2 IBOX Power Connection



### Ethernet

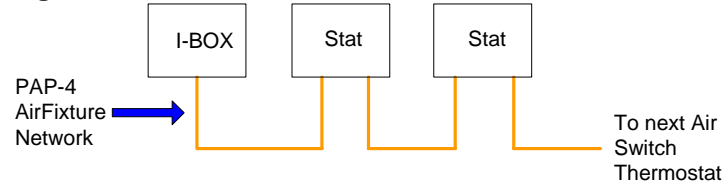
Two, female 10/100-Mbit Ethernet connections are provided on the IBOX. These are RJ-45 connectors labeled NET1 and NET2. Use a standard Ethernet patch cable for connecting to a hub or Ethernet switch. An activity LED for each Ethernet port is visible, and labeled “NET2” and “NET1” on the cover.

**Serial RS-485**—An RS-485 optically isolated port uses a 3-position, screw terminal connector and always operates as COM2. Wire to this connector with shielded 18-22AWG wiring (refer to the TIA/EIA-485 standard). The screw terminals (from left-to-right) are shield, plus (+), and minus (-).

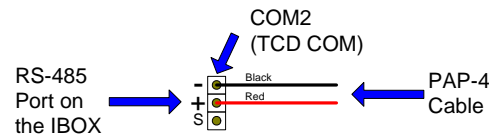
## 8.5 AirFixture Network Wiring

The AirFixture network is an RS-485 communication which is designed to extract information from and send information to the AirFixture network and feed the information to a building automation system using either standard control protocol of BACnet or LonWorks. For details on the IBOX and AirFixture network reference [Figure 8.3](#). For details on wiring the AirFixture AirSwitch network onto COM #2 of the IBOX reference [Figure 8.4](#). Reference YORK **Form 130.16-EG1 “FlexSys Engineering Guide”** for additional configuration and connection information for the Air Fixture network.

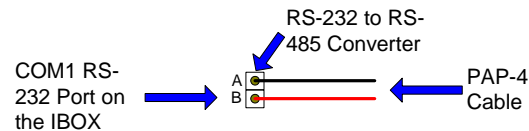
**Figure 8.3 IBOX/AirFixture Network**



**Figure 8.4 Connecting the AirFixture Network to the IBOX (for IBOX-LON & IBOX-IP)**



**Figure 8.4.1 Connecting the AirFixture Network to the IBOX (for IBOX-MSTP)**



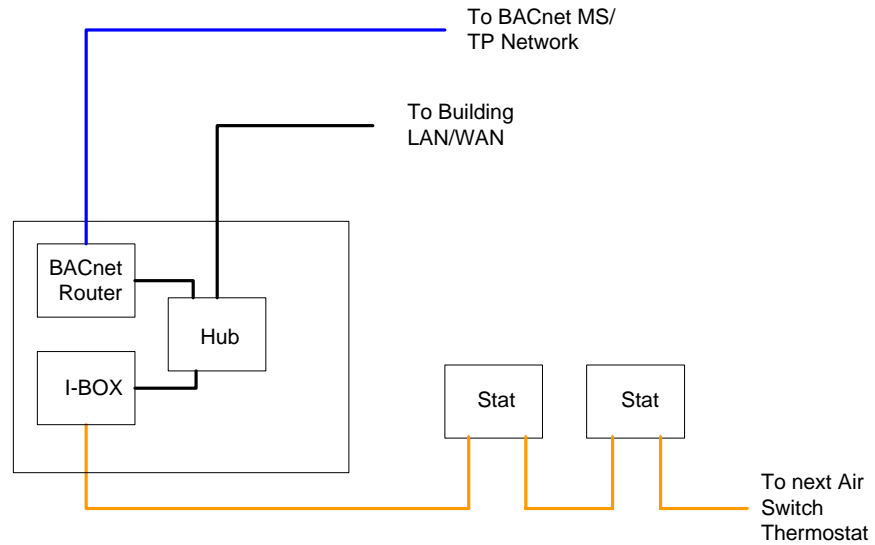
There are three separate ways with which the IBOX can connect to a 3<sup>rd</sup> party building automation system they include:

- BACnet I/P and BACnet Ethernet
- BACnet MS/TP
- LonWorks

### BACnet I/P

The BACnet I/P integration connects to the IBOX via Ethernet, represented in [Figure 8.5](#). These two Ethernet-based solutions connect to the IBOX with a standard Ethernet patch cable into Ethernet port #1.

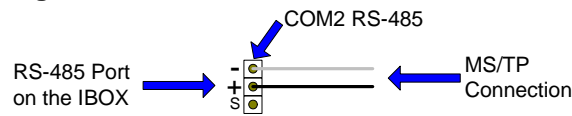
**Figure 8.5 BACnet I/P and BACnet Ethernet Architecture**



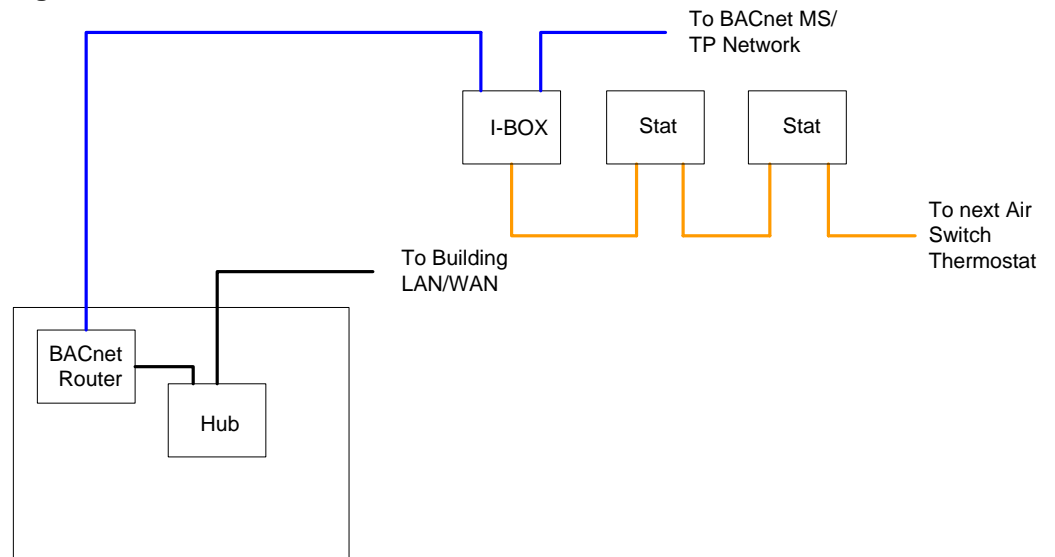
**BACnet MS/TP**

The BACnet MS/TP integration connects to the IBOX on the RS-485 Option Module, which is represented in [Figure 8.6](#). To connect the IBOX to your BACnet MS/TP network reference [Figure 8.7](#).

**Figure 8.6 BACnet MS/TP Connection at the IBOX**



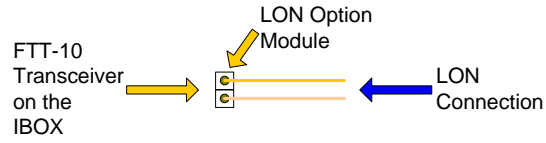
**Figure 8.7 BACnet MS/TP Architecture**



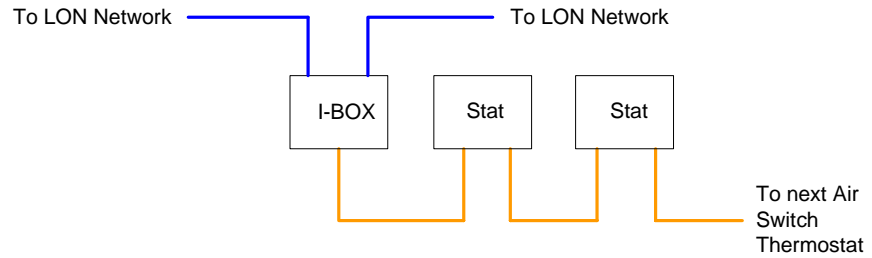
## LonWorks

The LonWorks integration connects to the IBOX on the LonWorks FTT-10A Transceiver Option Module, which is represented in [Figure 8.8](#). To connect the IBOX to your LON network reference [Figure 8.9](#).

**Figure 8.8 LonWorks Connection at the IBOX**



**Figure 8.9 LonWorks Architecture**



## 9 Power Up and Initial Checkout

### 9.1 Checkout

Ensure power wiring to the IBOX is ready—see the [“Power Wiring”](#) section on page 14. Refer to [Figure 5.1](#) on page 11 for the locations of the status LEDs and coaxial power connector for JPWR-WWPM-120 or JPWR-WWPM-230.

Following all mounting and wiring, perform the following:

**Step 1** [Apply power](#) to the IBOX.

**Step 2** [Check the status LED's](#).

### 9.2 Connect the Battery Backup

With the cover removed from the IBOX (see [“Removing and Replacing the Cover”](#)), locate the red and black wires coming from the backup battery, with 2-position connector plug. Plug the connector into the battery connector on the bottom board (below option slot 2 area). The connector is keyed—you cannot insert it incorrectly. The red (positive) connection should be the furthest from the two 30-pin option modules connectors. For more details on the backup battery, see [“About the Battery.”](#)

### 9.3 Apply Power

Apply power to the IBOX by plugging in the power plug into the IBOX from the JPWR-WWPM-120 or JPWR-WWPM-230. For more details on applying power to the IBOX Refer to [Figure 8.2](#) for connection details.

### 9.4 Check the Status LED's

When power is applied, the green LED labeled “SYS” will light. Once the IBOX boots, the yellow “BEAT” (heartbeat) LED will begin blinking, with a typical rate of about 1 Hz (once per second). Boot time should begin within 30 seconds after power is applied. Note that the boot time is the time with which it takes for the IBOX's platform services to be available. Connection the IBOX database will be approximately 2-minutes after the boot time has expired.

The blink pattern of the heartbeat LED under normal operation will differ for each installation (depending on station activity). But, in general, the LED should blink about once per second. The rate will be slower when the control engine is executing the station database, and as more objects are added.

After applying power, if the heartbeat LED comes on (steady) and stays lit longer than two minutes, contact York for technical assistance. Also see [“Using Status LEDs”](#) section 10.0.

## 9.5 About the Battery

The IBOX is provided with a custom 10-cell NiMH battery pack mounted to the unit (under the cover). This battery allows the IBOX to continue operation through very short power bumps (a few seconds in duration). If a longer power outage occurs, the battery provides enough run time for the IBOX to backup data and then shut down. Typically, this is one minute. Shutdown occurs automatically, after data is backed up to on-board flash memory.

The battery is trickle-charged by the IBOX during normal operation. Following an extended power outage, the battery is charged at a faster rate. The power and battery circuitry is monitored by a station running on the IBOX (via the PowerMonitorService). Station alarms are generated when primary power is lost, or if the battery is uncharged or unable to hold a sufficient charge.

The battery should be replaced approximately every three years, or more often if the unit is in a high temperature environment.



### *Please note!*

A NiMH battery characteristic is to lose charge if not left in charge mode (trickle charge). Leaving the battery unconnected, or in the unit powered off will cause the battery to fully discharge in a matter of weeks. Note that in the case of a new IBOX, it ships from the factory with a completely discharged battery. Therefore, allow at least 18 hours for the battery to charge if it has not been in a powered unit. **Note:** The battery should be disposed of as a hazardous material.

For more information on the use and replacement of the battery, refer to the ["Required Battery Maintenance"](#) section.

# 10 Using Status LED's

## 10.1 LED's

The IBOX controller includes several LEDs that can help determine the status of the unit. They are located in two places: the top of the controller (visible through the cover), and for serial ports, on the bottom board (only with cover removed). From left-to-right these LEDs include:

- Ethernet Ports
- Heartbeat
- System
- Serial Ports

Refer to [Figure 5.1](#) for the exact locations of status LEDs on the IBOX controller.

## 10.2 Ethernet Ports

Each Ethernet port ("NET1", "NET2") has one green LED, visible on the top cover. A "NETx" LED indicates activity on that port as follows:

- **Off**—No Ethernet link is made
- **On**—Ethernet link is present, but no activity on the LAN
- **Blinking**—Ethernet link is present with data activity on the LAN.

## 10.3 Heartbeat

The "BEAT" LED is located to the right of the Ethernet status LEDs, and is yellow. Under normal operation, this LED should blink about once per second. Blink patterns differ as station activity varies, but any pulse rate from blink per second to 10 blinks per minute usually indicates normal operation. If the heartbeat LED stays *on constantly*, *does not light*, or blinks *very fast* (more than once per second), contact York for technical support.

## 10.4 System

The "SYS" LED is located to the right of the heartbeat ("BEAT") LED, and is green. This LED provides a CPU machine status check, and should remain lit whenever the IBOX is powered. If the SYS LED *does not light* while power is applied, contact York for technical support.

## 10.5 Serial Ports

Status LEDs for the two serial ports are located on the IBOX's *bottom* board, on the *opposite side* of the RS-232 and RS-485 ports. They are marked COM1 and COM2 and correspond to the software configuration of the COM ports. They show transmit and receive information for the serial ports and optional modem.

**Note:** in order to view the status LED's the cover must be removed see ["Removing and Replacing the Cover"](#).

- The **yellow** transmit LED indicates that the IBOX is *sending* data out the serial port over a communications line to a connected device.
- The **green** receive LED indicates that the IBOX is *receiving* data from a connected device.

These LEDs provide a fixed on-time when data is detected on the port. If these LEDs are on constantly, this indicates a problem with the communications channel, such as a shorted wire or reversed wiring.

# 11 Maintaining the IBOX

## 11.1 Basic Maintenance

This section provides information on the following topics:

- [Cleaning](#)
- [Replacing the IBOX base assembly](#)

## 11.2 Cleaning

No cleaning inside the unit is required. However, if the cover becomes dirty, you can wipe it with a damp cloth and mild detergent.

## 11.3 Replacing the IBOX Base Assembly

To replace the IBOX base assembly in the field, proceed as follows:

**Step 1** Remove power to the IBOX and wait ten seconds. The unit will power down automatically.

**Step 2** Note positions of all communications and other wiring cables going to the IBOX, as well as all installed option modules. If necessary, label connectors and option modules to avoid miss-connection later (after the IBOX is replaced).

**Note:** The software that runs on the unit expects the terminal positions to be the same to collect data from or to control the attached devices.

**Step 3** Unplug all Ethernet, serial, and LON connectors from the IBOX and any installed option modules, if applicable.

**Step 4** Unplug the earth ground wire to the IBOX grounding lug.

**Step 5** Remove any screws or DIN rail clips securing the IBOX, removing it from its mounting.

**Step 6** Remove the cover from the old IBOX (see [“Removing and Replacing the Cover”](#)). Note the position of installed option modules, if any. You must transfer them to the replacement IBOX.

**Step 7** Remove the option boards from the old IBOX and install them into the replacement IBOX, if applicable. See [“Mounting Option Modules”](#) for more details.

**Step 8** Replace the cover on the replacement IBOX.

**Step 9** Mount the replacement IBOX as it was previously, using the same DIN rail location and/or screws.

**Step 10** Reconnect the earth ground wire to the IBOX grounding lug.

**Step 11** Reconnect any Ethernet and serial to the IBOX.

**Step 12** Restore power to the IBOX. It should boot up as a new unit (see [“Check the Status LEDs”](#)).

## 11.4 Required Battery Maintenance

Battery life expectancy is a function of its discharge cycles (the number of discharges and their depth) and the ambient temperature of the battery during normal operation. In most applications, the battery should see relatively few discharges. Therefore, ambient temperature has more to do with determining the life expectancy of the battery. If the IBOX is installed in a conditioned space, the battery should provide dependable service for approximately three years (average). In an environment where the operating temperature is higher (that is, 50°C or 122°F), you should expect the battery to last approximately one year.

The NiMH battery in the IBOX controller is fully discharged when factory shipped. Additionally, NiMH batteries lose charge over time if not kept trickle-charged (for more details, see [“About the Battery”](#)). Therefore, even a new unit (or replacement battery) will require up to 18 hours of powered operation before it can provide reliable backup power (is at full charge).

The IBOX monitors the battery and periodically loads the battery to test its ability to maintain battery-backed functions. You should investigate any battery trouble message. Check the battery connections to the unit. Replace the battery as required.

## 11.5 Replacing the Battery



A replacement battery is a complete battery assembly, which is a battery pack pre-attached to a battery bracket.

### *Please note!*

Use only battery packs approved for use with the IBOX. Dispose of used batteries appropriately. **Note:** The battery should be disposed of as a hazardous material.

- Step 1** Remove power to the IBOX. The unit should power down automatically.
- Step 2** Remove the cover. See [“Removing and Replacing the Cover.”](#)
- Step 3** Remove the old battery and bracket assembly by taking out the four screws holding it in place, setting the screws aside for later. Unplug the battery from the connector on the IBOX.
- Step 4** Plug the battery connector plug of the *replacement battery* into the battery connector on the IBOX.
- Step 5** Set the replacement battery/bracket assembly back over the option card slots, with the mounting holes aligned with the standoffs.
- Step 6** Place the four screws through the battery bracket, option cards blanking plates, and into the standoffs on the IBOX base board. Hand tighten these screws.
- Step 7** Replace the cover.
- Step 8** Restore power to the IBOX and verify normal operation.



