

## 1 Overview

The Cypress EnviroSystems Wireless Pneumatic Thermostat (WPT) retrofits an existing pneumatic thermostat to provide Direct Digital Control (DDC) like zone control functionality at a fraction of the time and cost without disturbing occupants.

The WPT system enables remote monitoring of zone temperature, branch pressure, remote control of setpoints, and programmable setback or setup of the pneumatic HVAC systems. It also enables integration with utility Demand Response programs.

The WPT can function either as a standalone system or can be integrated with an existing Building Management System via BACnet/IP. As a result, the WPT helps a building owner and tenants save energy by implementing indoor temperature policies, improve comfort, and reduce the maintenance cost of the legacy pneumatic HVAC systems.

### 1.1 System Components

The WPT-80x Series system includes the following components:

- Wireless thermostat (WPT-80x thermostat)
- Wireless repeaters (WPT-800-RWAL, WPT-800-RWAL24V or WPT-810-RPT)
- Wireless hub (WPT-800-HUSB)
- Green Box Controller (GBC-800 or GBC-810 series)

### 1.2 Referenced Manuals

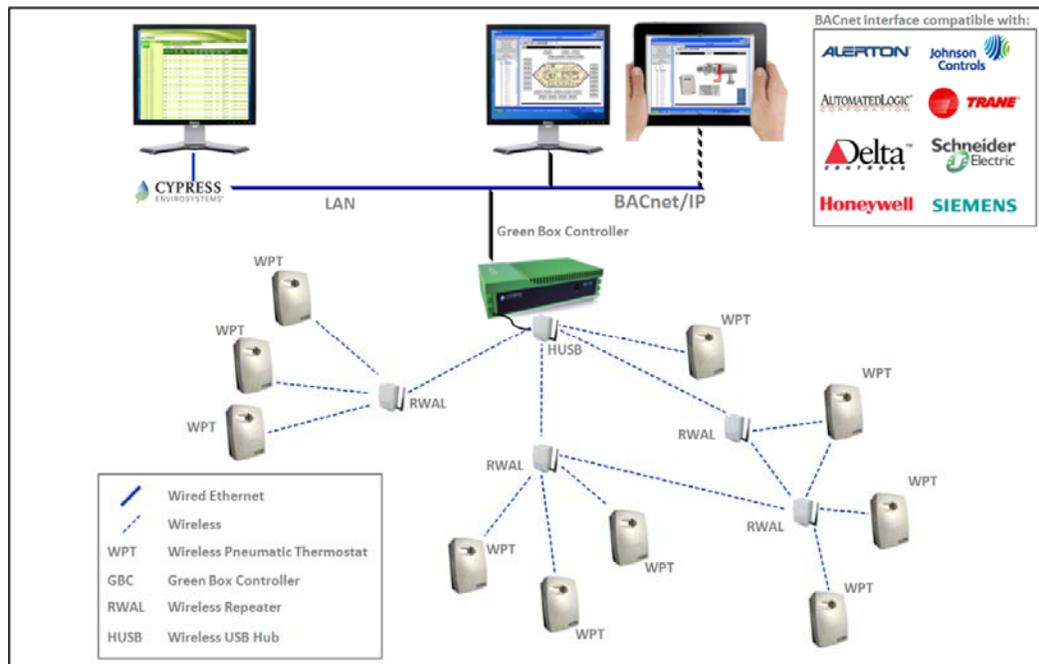
For additional resources, please refer to the following documents. This manual will refer to these when appropriate.

- 910-00005-01: WPT Installation Manual
- 910:00002-01: RWAL Installation Manual
- 910-00013-01: RWAL-24V Installation Manual
- 910-00027-01: RPT Installation Manual
- 910-00003-01: HUSB Installation Manual
- 910-00019-01: GBC Installation Manual
- 910-00026-01: WMM Installation Manual
- 910-00008-01: WPT BACnet PICS

Manuals for the WPT Green Box, HUSB, and repeaters can be found at <http://www.cypressenvirosystems.com/Portal/usermanuals.php>. For portal assistance, please contact Cypress EnviroSystems Support. Contact information is found in Section 7 of this manual.

## 2 System Operation

The WPT system is comprised of WPTs, repeaters, hub and GBC.



WPT: Wireless Pneumatic Thermostat, replaces existing pneumatic thermostats

RPT, RWAL: Wireless Repeaters, extends wireless range of WPTs back to the HUSB/GBC

HUSB: Wireless Hub, receives data from WPTs and sends commands out to WPTs

GBC: Green Box Controller, collects WPT data through HUSB. Stores data locally in database. Provides web application server for basic HMI and BACnet/IP server to send/receive data from BAS via BACnet/IP.

The WPTs will periodically “wake-up” and send setpoint, branch pressure and zone temperature readings back to the GBC via a mesh network of repeaters and the hub. The GBC then takes the readings and stores them into its local database. From the local database, the information is then available using the Cypress Web Application or via BACnet/IP.

Commands can also be sent to the WPTs from either the GBC or customer BAS (using BACnet/IP). These commands are queued and sent to the WPT back through the network of repeaters.

### 3 System Installation

The recommended steps for installing the WPT system (thermostats, repeaters, hub and server) are as follows. For specific instructions for each system component, please refer to the individual product installation manuals. The product documents are listed in Section 1.2.

#### 3.1 Step 1: Identify Repeater and GBC/HUB locations via a wireless survey

##### 3.1.1 Required equipment:

1. WPT-800-RKIT: Wireless Range Test Kit

- 3.2 Step 2: Install and configure Repeaters and GBC/HUB at locations defined by wireless survey**
- 3.3 Step 3: Install, configure and initial calibrate the WPTs.**
- 3.4 Step 4: Setup the GBC by entering the WPT and Repeater information**
- 3.5 Step 5: If not connecting to a BAS, setup node groups and schedules**
- 3.6 Step 6: If connecting to a BAS, discover WPT objects in your BAS system through BACnet/IP**
- 3.6.1 Reference document: 910-00008-01, WPT BACnet PICS**

## **4 System Usage**

### **4.1 Resources**

The section below will provide basic information. Please refer to the specific product manuals or the GBC web application manual for details. These documents are listed under Section 1.2.

### **4.2 At the thermostat**

#### **4.2.1 View the current zone temperature**

1. The current zone temperature is shown on the WPT display. While the WPT continually monitors and adjusts for changes in temperature, the display will only be updated every 5-15 minutes (depending on the sample rate of the WPT).

#### **4.2.2 View or change the current setpoint (single setpoint)**

1. Press the up or down button at the thermostat. You will then see a number start to flash with the thermometer icon on the left. The thermometer icon indicates this is the setpoint. The flashing number is the current setpoint.
2. Once the number is flashing, press up or down to raise or lower the setpoint. Press the center button to save and exit the setpoint menu.

#### **4.2.3 View or change the current setpoint (deadband thermostat)**

1. Press the up or down button at the thermostat. You will then see two numbers alternating on the display with thermometer icon on the left. The thermometer icon indicates these are the setpoints. The higher number is the cool above setpoint and the lower number is the heat below setpoint. When the zone temperature is in between these two numbers, the thermostat will adjust to a neutral pressure. When the zone temperature is higher than the cool above setpoint, the thermostat will switch to cooling. Likewise, if the zone temperature is lower than the heat below setpoint, the thermostat will call for heating.
2. Once the numbers are flashing, press up or down to raise or lower the setpoints. The deadband span will remain the same. For example, if the current deadband setpoints are 74 and 70 and you press up once to raise the setpoints, the new setpoints will be 75 and 71 with the same 4 degree deadband. Press the center button to save and exit the setpoint menu.

#### **4.2.4 Check the battery**

1. The battery level is displayed on the WPT LCD in the bottom left corner. There is a battery icon with 4 bars.

#### **4.2.5 Lock or unlock the WPT buttons**

1. To lock the buttons on the WPT, the keypad lock command can be sent using the GBC or at the WPT. To lock the keypad at the WPT, press the up and down buttons at the same time. You will temporarily see “LC” on the display to indicate the keys are locked.
2. To unlock the keypad on the WPT, press the up and down buttons at the same time. You will temporarily see “UC” on the display to indicate the keys are now unlocked.

### **4.3 From the Cypress EnviroSystems web application**

#### **4.3.1 Change the setpoint for a single WPT or group of WPTs**

1. Open the Cypress WPT web application. You will see the main Zone Monitor.
2. On the second row of tabs you will see “Change Setpoint”. Click on the tab to open.
3. From the node list on the left, click to select the individual WPT or node group you wish to change.
4. You should then see the current setpoint on the right. Enter the new setpoint you want and then click on “Update”. You should see a confirmation window pop-up afterwards.

#### **4.3.2 Add or remove a WPT to/from an existing group**

1. From the web application, click on “Setup” on the top row of tabs (next to “Zone Monitor”).
2. From the second row of tabs, click on “Node Group”
3. The available node groups are listed in the table on the bottom. Select the node group you wish to edit by clicking on “Edit” next to the “NodeGroupName”.
4. Once you click on “Edit”, you will notice the group name becomes bold. Secondly, the nodes in that group will be populated in the “Selected Nodes” section. The “Available Nodes” lists which nodes can be added to the group. Select the nodes you wish to add (from the “Available Nodes” list) or remove (from the “Selected Nodes” list) and click the corresponding arrow. The right arrow adds nodes while the left arrow removes nodes. You can hold down “Control” or Shift” to select multiple nodes.
5. Click “Update” when you are done to save.

#### **4.3.3 Create a new WPT group**

1. Open the web application and click on “Setup”. Navigate to the secondary tab “Node Group”.
2. Under the “Node Group Name”, enter the name you wish to give to the new WPT group.
3. Under the “Remarks”, enter a short description or reason for the group.

4. Select the nodes you wish to add to the new group from the "Available Nodes" list and click the right arrow to move them to the "Selected Nodes" list.
5. Click "Add" to save the group.

## 5 System Management

This section covers how to add or remove devices from the network as well as how to add or remove users from the GBC web application.

### 5.1 Adding or removing a WPT from the system

#### 5.1.1 At the thermostat

To add a new WPT, please follow the instructions in the WPT installation manual. To remove a WPT, simply remove it from the wall. It is recommended that you take the batteries out as well so it no longer transmits.

#### 5.1.2 At the GBC

To add a new WPT, go to "Setup"->"Node". Enter the new WPT information and click "Add". To remove a WPT from the system, go to "Setup"->"Node" and click "Edit" next to the WPT you wish to remove. Once it's selected, click "Delete" to remove the device from the GBC database.

### 5.2 Adding or removing a user from the system

From the GBC web application, navigate to "Setup"->"Users". Note, you must be logged in at an administrator level account to make user changes. To add a new user, enter the new user information and select the permission level you wish to assign. To remove a user from the system, select "Edit" next to the user you wish to delete and then click on "Delete". This will remove the user from the database.

## 6 System Maintenance

The following system maintenance steps are recommended.

### 6.1 Weekly

#### 6.1.1 BACnet

Verify current data is reporting into the BAS via BACnet.

### 6.2 Monthly

#### 6.2.1 One-Click (GBC Admin Tool)

Run the GBC Administration Tool from the GBC desktop and review the results. Optionally, you can also save the results via the "Report" tab. This tool will highlight if devices are not reporting in, if there are weak wireless paths and many other system diagnostics.

### **6.3 Quarterly**

#### **6.3.1 Database Backup**

Using the GBC Administration Tool from the GBC desktop, back the existing database and keep a copy off-disk. If your GBC has a compact flash card option (from the factory), you can copy the latest weekly backup from the D: drive.

#### **6.3.2 Service the compressor and verify the air quality**

Ensure your compressors are running properly and also verify the dryers and filters are cleaned. It is important to keep the air dry and contaminant free for all the HVAC components in your system, not just the thermostat.

### **6.4 Semi-annually**

#### **6.4.1 Battery check**

Check the battery levels to see if any need to be replaced. The battery levels are available via BACnet object or using the GBC web application. The WPTs use two (2) CR-123A lithium batteries.

### **6.5 Annually**

#### **6.5.1 Calibration verification (using the GBC Admin Tool)**

Using the GBC Administration Tool, verify the thermostats are in calibration. If there are any that require recalibration, manually recalibrate or send an auto-calibration command from the GBC.

### **6.6 As required**

#### **6.6.1 Tenant/Service calls**

Log any changes made to the WPT as required by tenant or service calls.

#### **6.6.2 Wireless check if any interior changes are made**

If any walls or thermostats are added or moved, reconfirm the wireless operation using the GBC Administration Tool.

#### **6.6.3 Replacing a thermostat**

If a WPT gets damaged or contaminated, you can simply replace the WPT. The replacement WPT should be given the same network ID and node ID as the unit you are replacing. There are no changes needed at the GBC web application.

## **7 Troubleshooting and Available Support**

This section covers recommended troubleshooting steps. Additionally, the following resources are available for additional support

- Online service portal (password protected)
  - The portal is located at [www.CypressEnvirosystems.com/Portal](http://www.CypressEnvirosystems.com/Portal)
  - For access, contact Cypress Envirosystems
- Toll-free support phone number: (888) 987-3210

- This line is directly connected to our service team. The hours of operation are from 5am to 5pm Pacific Time Zone.
- Online training videos
  - Online short videos that provides product, installation, service and usage information.
  - <https://cysystems.smugmug.com/Training-Videos/n-3kqzbK>

## **7.1 Troubleshooting**

### **7.1.1 A single WPT has stopped reporting**

#### 7.1.1.1 Potential cause 1: The Network or Node ID has been accidentally changed.

1. At the thermostat, verify the network ID or node ID has not accidentally been changed.

#### 7.1.1.2 Potential cause 2: Low or dead batteries

1. Replace the batteries and do a manual Force Discovery. Then check the server to see if the WPT has reported in.

### **7.1.2 A group of or several WPT have stopped reporting**

#### 7.1.2.1 Potential cause: A repeater went down, had its setting changed, or its antenna moved.

1. Identify the closest repeater in common with all the nodes.
2. At the repeater, make sure it is still powered on and the configuration settings look correct. Also verify the antenna is pointed vertically and not horizontally.

### **7.1.3 The web page does not load properly or continuously loads the error page**

#### 7.1.3.1 Potential cause 1: The database is has been corrupted.

#### 7.1.3.2 Potential cause 2: The CPU or memory usage is too high.

1. Contact Cypress EnviroSystems support via email or phone. Contact information is listed above in Section 7.

### **7.1.4 The WPT is no longer building or bleeding pressure**

#### 7.1.4.1 Potential cause 1: There is a kink in the main pressure line.

1. Remove the WPT from the wall and verify that the tubes are not kinked.
2. Verify there is sufficient main air coming into the WPT.

#### 7.1.4.2 Potential cause 2: There is contamination in the air line which is causing the bimetallic strip to stick.

#### 7.1.4.3 Potential cause 3: There is a mechanical problem with the WPT.

1. Contact Cypress EnviroSystems Support for additional help with potential causes 2 and 3. Contact information is listed above in Section 7.

## 7.2 Product Error Codes

### 7.2.1 WPT

Code	Cause	Possible Solution
dy	Indicates that the WPT is performing a discovery operation and it should not be disturbed.	This indication disappears automatically after a few seconds.
dt	Indicates that the WPT is performing a diagnostic operation.	This indication disappears automatically after a few seconds.
Fd	Indicates that the WPT is performing a forced discovery operation.	This indication disappears automatically after a few seconds.
UL	Indicates that the buttons are unlocked by the user.	This indication disappears automatically after a few seconds.
LC	Indicates that the buttons are locked.	This indication disappears automatically after a few seconds.
E0	Discovery error – Not able to connect to nearest repeater or HUSB	Retry discovery by pressing any button. Check if repeater or HUSB is working. Try resetting the repeater. Try with a different position of the repeater/ HUSB if feasible.
E1	Time synchronization error – Not able to synchronize the WPT time with the wireless network	If this error occurs after successful commissioning of the system, the WPT will recover from this error within a couple of refresh cycles.
E2	Radio error – Not able to send/receive data	Restart the unit with removing and inserting the battery. If the error continues, the device requires replacement. Contact the distributor.
E4	Optical Sensor Error – Not able to properly position motor/cam	This error is an indication of a defective device. The unit should be replaced.

**7.2.2 Repeater**

Code	Reason	Solution
dy	<u>Discovery Status:</u> This code indicates that the RWAL is performing a discovery operation and it should not be disturbed.	<ul style="list-style-type: none"> <li>This display goes off automatically after a few seconds.</li> </ul>
E0	<u>Discovery Error:</u> Not able to connect to the nearest RWAL or HUSB.	<ul style="list-style-type: none"> <li>Perform Force Discovery to retry (see Figure 2).</li> <li>Verify the Network ID has been properly configured in the RWAL.</li> <li>Verify the HUSB is connected and working properly.</li> <li>If the error persists, the RWAL must be relocated. If this is not feasible, an additional RWAL must be installed.</li> </ul>
E1	<u>Time Synchronization Error:</u> Not able to synchronize the RWAL time with the wireless network.	<ul style="list-style-type: none"> <li>This error code will flash on and off the LCD while the RWAL attempts to correct the problem. Do not disturb the RWAL during this process.</li> <li>The RWAL automatically recovers from this error after a few refresh cycles.</li> </ul>
E2	<u>Radio Error:</u> Not able to send/receive data.	<ul style="list-style-type: none"> <li>If the error persists, contact the original distributor for replacement.</li> </ul>
E3	<u>Ping Error:</u> Not able to locate a free RF channel to use due to an excess number of nearby RWALs or RF interference.	<ul style="list-style-type: none"> <li>This error code will flash on and off the LCD while the RWAL attempts to correct the problem. Do not disturb the RWAL during this process.</li> <li>The RWAL automatically recovers from this error after a few refresh cycles.</li> </ul>
E4	<u>Wireless Communication Error:</u> Not able to reliability communication with the nearest HUSB or RWAL.	<ul style="list-style-type: none"> <li>The RWAL will attempt to automatically recover from this error after a few refresh cycles.</li> <li>If the error persists, the RWAL must be relocated. If this is not feasible, an additional RWAL must be installed.</li> </ul>
E5	<u>Signal Quality Error:</u> Not able to discovery a reliable path to the HUSB. All available paths have either a weak RF signal or excessive hops.	<ul style="list-style-type: none"> <li>Perform Force Discovery to retry (see Figure 2).</li> <li>If the error persists, the RWAL must be relocated. If this is not feasible, an additional RWAL must be installed.</li> </ul>

**7.2.3 Hub**

<b>Code</b>	<b>Reason</b>	<b>Solution</b>
E2	<u>Radio Error:</u> Not able to send/receive data.	<ul style="list-style-type: none"> <li>If the error persists, contact the original distributor for replacement.</li> </ul>
E3	<u>Ping Error:</u> Not able to locate a free RF channel to use due to an excess number of nearby RWALs or RF interference.	<ul style="list-style-type: none"> <li>This error code will flash on and off the LCD while the HUSB attempts to correct the problem. Do not disturb the HUSB during this process.</li> <li>The HUSB automatically recovers from this error after a few refresh cycles.</li> </ul>
E4	<u>Wireless Communication Error:</u> Not able to reliability communication with the nearest RWAL.	<ul style="list-style-type: none"> <li>The HUSB will attempt to automatically recover from this error after a few refresh cycles.</li> <li>If the error persists, the HUSB or nearby RWALs must be relocated. If this is not feasible, an additional RWAL must be installed.</li> </ul>

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