

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 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 Wireless Pneumatic Thermostat repeater (RPT) is one of the components of WPT wireless network. The RPT is used to extend the wireless range of the WPT network by allowing more WPTs to be connected in each wireless network. When the WPT USB Hub (HUSB) is located out of RF range of the WPT, multiple RPTs can be used to extend the range. For more details, refer to WPT Wireless Network Planning Guide.

1.1. Components

The WPT-810-RPT kit includes the following components:

- Wireless repeater
- Universal wall bracket
- Mounting screws, #6 x 1" self-tapping (x2)

1.2. Prerequisites for Installation

The WPT system relies on a wireless network for communication. The following tasks must be completed before proceeding to RPT installation:

- Wireless survey performed using the WPT-800-RKIT
- Installation of the WPT Green Box
- Installation of the HUSB
- Assignment of network IDs and RPT IDs
- Assignment of RPT locations
- Run low voltage power to the RPT location

Manuals for the WPT, WPT Green Box, HUSB and other manuals related to the WPT system can be found at <http://www.cypressenvirosystems.com>.

1.3. Tools Required for Installation

- Phillips-head screw driver
- 1/16" hex Allen wrench

2. RPT Basics

2.1. Turning on the RPT

Connect a low voltage power supply (not included) to the 2-position connector inside the RPT. There is a connector for 12-24VAC power and another connector for 5-40VDC power. The AC connector is non-polarity sensitive. The DC connector is polarity sensitive. Simply insert the wire into the connector and gently tug to verify the wire is secure. To release the wire, press the button above the wire receptacle and pull the wire out.

NOTE: ONLY CONNECT POWER TO ONE CONNECTOR. DO NOT APPLY POWER TO BOTH CONNECTORS AT THE SAME TIME.

The RPT will turn on and perform initialization. During initialization and every time the RPT starts a discovery process, a “dy” symbol is displayed on the LCD for a few seconds. During this period the RPT is attempting to discover its nearest RPTs and HUSB. This process should not be disturbed. The operator must wait for the “dy” to disappear from the LCD before commencing any operation.

After initialization, the LCD displays either the RPT ID or “E0” if a network is not found. E0 is acceptable in this case until the network is fully configured.

2.2. RPT Display

The various indicators and characters displayed on the LCD are shown in Figure 1. The LCD display is normally concealed by a front cover. The cover must be removed to gain access to the display and buttons.



Figure 1. RPT LCD Display

2.3. RPT Menu

2.3.1. Diagnostic Menu

Diagnostic Menu allows the installer to initiate a discovery process, view the firmware version number, and path information. Refer to Figure 2 for the menu structure.

2.3.2. Programming Menu

Programming Menu allows the installer to configure the network and RPT ID. Refer to Figure 2 for the menu structure.

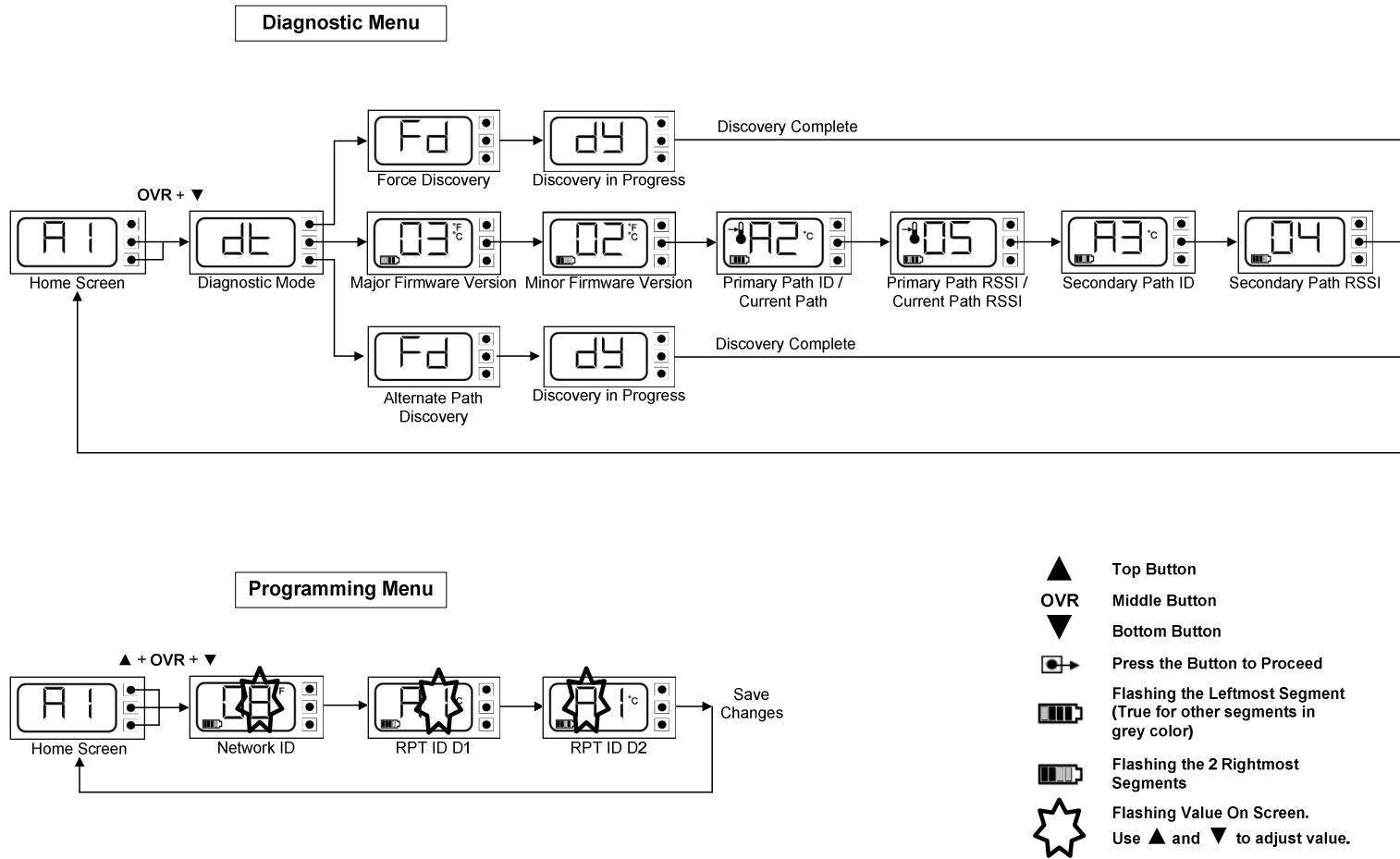


Figure 2. RPT Menu Structure

3. RPT Installation

The overall RPT installation procedure includes:

- Wire runs
- Mounting the RPT
- Configuring the RPT

ESD Handling Precautions

Warning!



- The RPT contains ESD sensitive circuit cards and components, shown in Figure 3.
- Great care must be exercised while handling RPT with the cover open.
- Do not touch any of the circuit boards with fingers or any part of the body.
- Touching the circuit boards may cause the unit to fail due to electrostatic discharge.
- Hold and handle the unit using the external bottom plastic cover as the support.

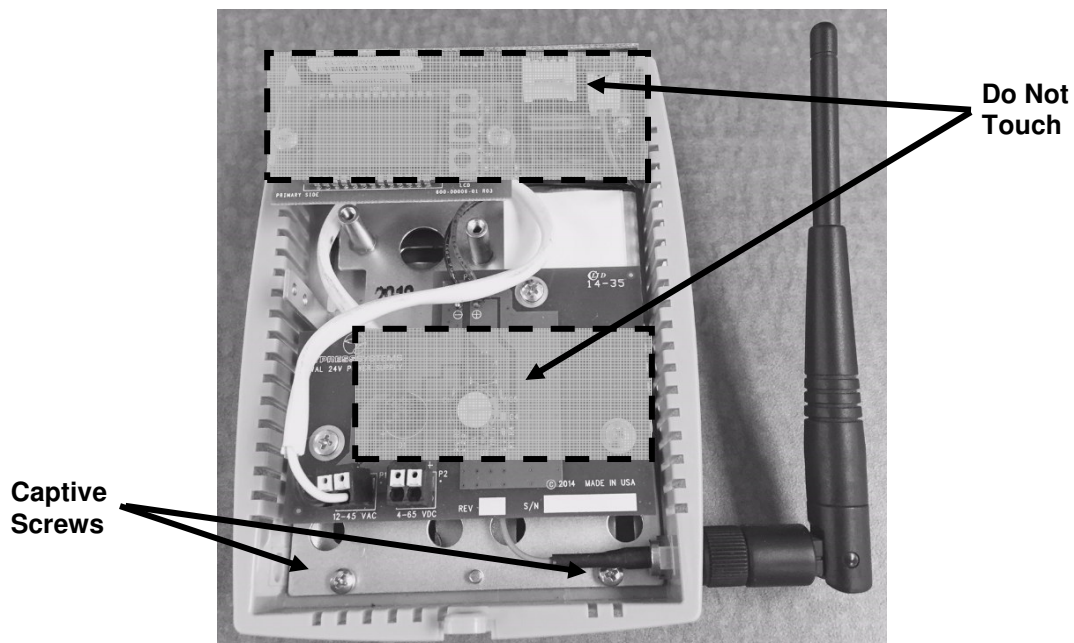


Figure 3. Handling the RPT

3.1. Wire runs

Cabling used to supply power should be a jacketed Class-2 type with a 20AWG minimum. Refer to Table 1 for recommended wire gauges based on cable lengths.

Wire Length	AWG
Up to 50'	20
50' to 200'	18
over 200'	16

Table 1. Recommended Wire Gauges

For multi-drop systems when more than 3 repeaters are connected to the same 24VAC supply, it is recommended that 18AWG or larger be used. As a rule of thumb, the supply transformer should be increased by 5VA for each 24VAC RPT on a multi-drop system.

Insure all wiring meets the NEC Article 300, Section 725.3 for Class-2 and wiring. For wiring in ducts, plenums, and other spaces related to the air handler, NEC 300.22 should be followed. Type CL2P cabling should be used were appropriate.

Additionally, DC power may be supplied using an AC/DC wall wart (Cypress Envirosystems part number: WPT-810-DCPS). This part plugs into a standard 120VAC outlet and supplies 5VDC for the RPT.

3.2. Mounting the RPT

1. Mount the universal wall bracket, shown in Figure 4, using the two screws provided. It is recommended to install the mounting bracket over the low voltage power wires, running the wires through the bottom center hole of the mounting bracket.

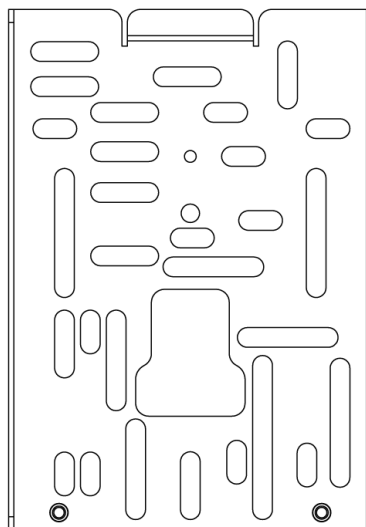


Figure 4. Universal Wall Bracket

2. Mount the RPT on the universal wall bracket using the captive screws. It is recommended to run the low voltage power wires through the large hole in the center of the repeater base plate. The wire should be strain relieved to prevent stress or fatiguing at the terminal strip connection points. See Figure 5 below.

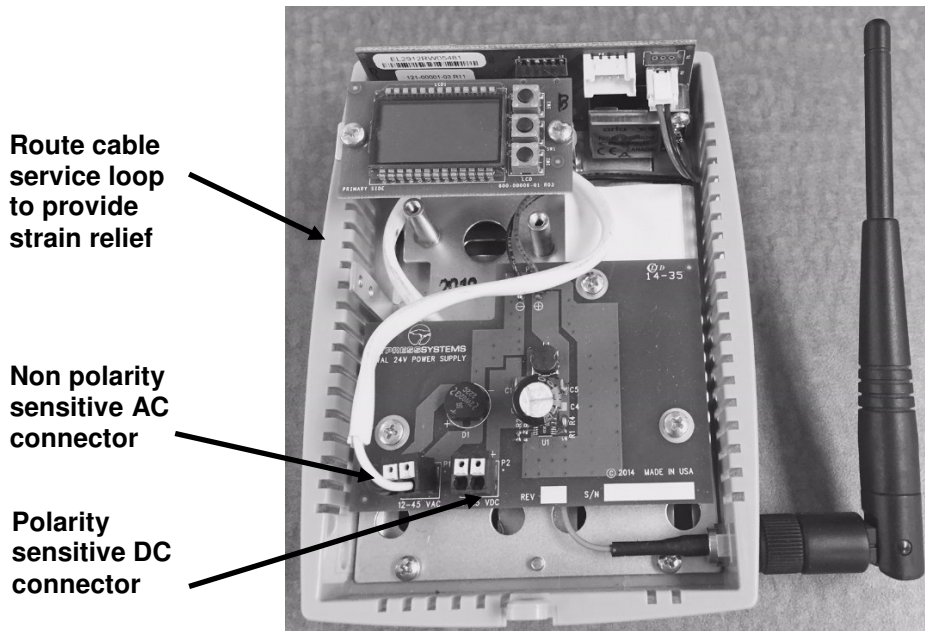


Figure 5. Internal Cable Routing Recommendation



Figure 6. Wall Bracket Cable Routing Recommendation

3. Connect the low voltage power wiring to the appropriate push-connector inside the repeater. The AC connector is non-polarity sensitive. The DC connector is polarity sensitive.

NOTE: ONLY ONE POWER SOURCE (AC OR DC) SHOULD BE WIRED. DO NOT WIRE BOTH CONNECTORS. To release the wire from the connector, press the button right above the wire receptacle and pull the wire out.

4. Close the top cover.

3.3. Configuring the RPT

The RPT must be configured with a valid network ID and RPT ID in order to be functional in a WPT network.

Note: The RPT has a blank front cover to prevent accidental changes to the configuration settings. The front cover must be removed to gain access to the display and buttons.

Note: The network ID is a single digit number, and cannot have a "0" value.

Note: The RPT ID is a two digit number, "D2 D1" (see Figure 7). Acceptable values for D2 are 1 to 9 and the letter A. Acceptable values for D1 are 1 to 9 and the letters A to E.

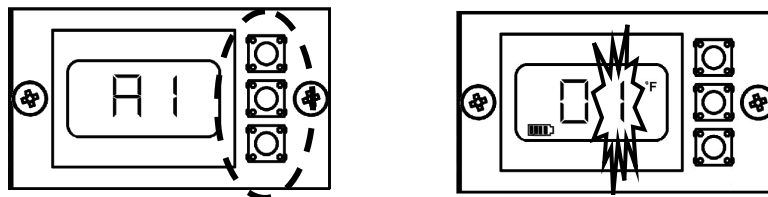


Figure 7. RPT ID Digits

To configure the network ID and the RPT ID, perform the following:

1. Press and release all three buttons simultaneously to enter the Programming Menu. The RPT will display the current or default network ID and the first digit starts flashing (see Figure 8).

The °F icon is displayed, indicating that the network ID is being programmed.



Press and release all three buttons simultaneously to enter the Programming Menu

Digit will flash when configuring the Network ID

Figure 8. Configuring the Network ID

2. Press the top or bottom button to change the network ID to the required value.

The network ID cannot have a “0” value.

3. Press the middle button to confirm the network ID. This completes the programming of the network ID and the LCD display starts flashing the first digit, D1, of the RPT ID.

The °C icon is displayed, indicating that the RPT ID is being programmed.

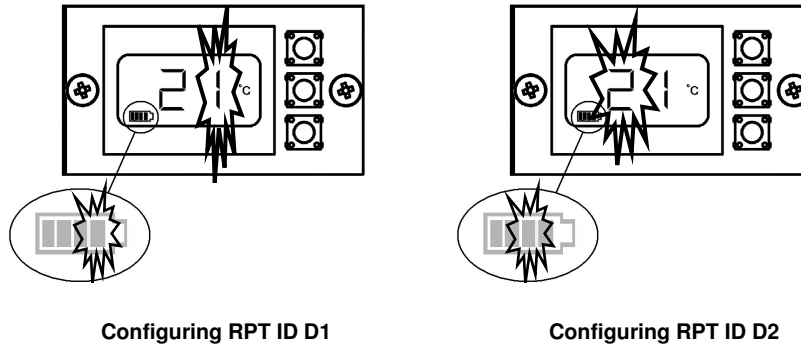


Figure 9. Configuring RPT ID

4. Press the top or bottom button to change D1 to the required value.
RPT ID D1 cannot have an “F” value.
5. Press middle button to confirm D1.

The first digit stops flashing and the second digit starts flashing.

6. Repeat steps 4 and 5 to configure D2 of the RPT ID.

While the RPT ID is being configured, the corresponding bar of the battery indicator also flashes (see Figure 9).

7. After D2 is configured and confirmed, RPT will exit the Programming Menu and return back to the Home Screen.

The RPT will automatically exit the Programming Menu if no key is pressed for 75 seconds.

Anytime the network or RPT ID change, a discovery process is initiated. A “dy” symbol is displayed on the LCD for a few seconds. The operator must wait for the “dy” to disappear from the LCD before commencing any operation.

8. After programming the RPT, replace the front cover.

The network and RPT IDs can be changed any time by following the steps above. When the RPT is working normally, the current RPT ID will be displayed.

4. Troubleshooting

The RPT is designed with the following diagnostic functions to detect and diagnose faults.

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

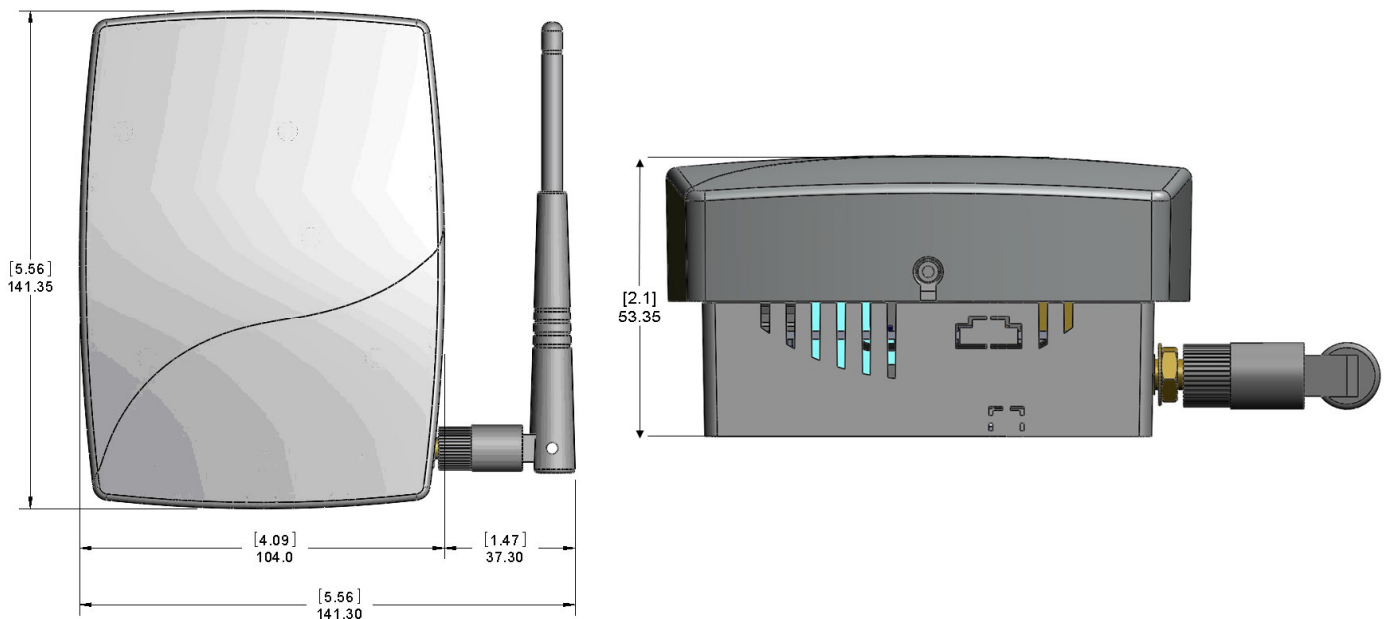
5. **Repair**

The RPT does not have any replacement or repairable parts. Contact the original distributor of the unit for repair or warranty service.

Note: Care should be taken to keep the unit dust-free during installation.

6. Technical Specification

Power Supply Requirements	AC: Class 2, 12-24VAC, 5VA DC: Class 2, LPS, 5-40VDC, 3W
Antenna	External rubber dipole, 4dBi gain, omni-directional, 2.4 to 2.5 GHz
Operating Frequency Band	2.4 GHz ISM Band
Operating Conditions	32 to 122°F (0 to 50°C) 95% RH Max, Noncondensing
Storage Conditions	-40 to 122°F (-40 to 50°C) 95% RH Max, Noncondensing
Dimensions	Length: 5.56 inches (141 mm) Width (including antenna): 5.56inches (141 mm) Depth: 2.1 inches (53 mm)



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