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 24VAC powered repeater (RWAL) is one of the components of WPT wireless network. The RWAL is used to extend the wireless range of the WPT network by allowing more WPTs to be connected in each wireless network. When the USB Hub (HUSB) is located out of RF range of the WPT, multiple RWALs (wall powered or 24VAC) can be used to extend the range. For more details, refer to WPT Wireless Network Planning Guide.

1.1. Components

The WPT-800-RWAL-24V kit includes the following components:

- 24VAC powered 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 RWAL installation:

- Installation of the WPT Green Box
- Installation of the HUSB
- Assignment of network IDs and RWAL IDs
- Assignment of RWAL locations
- Run wires from the 24VAC 5VA power source to the RWAL 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/wpt-downloads.php.

1.3. Tools Required for Installation

- Phillips-head screw driver
- 1/16” hex Allen wrench
- 1/8” slotted screw driver to connect 24VAC wiring to RWAL

2. RWAL Basics

2.1. Turning on the RWAL

Connect a 24VAC 5VA power supply (not included) to the non polarity 2-position terminals inside the RWAL. The RWAL will turn on and perform initialization. During initialization and every time the RWAL starts a discovery process, a “dy” symbol is displayed on the LCD for a few seconds. During this period the RWAL is attempting to discover its nearest RWALs 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 RWAL ID or “E0” if a network is not found. E0 is acceptable in this case until the network is fully configured.

2.2. RWAL 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. RWAL LCD Display

2.3. RWAL 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 RWAL ID. Refer to Figure 2 for the menu structure.

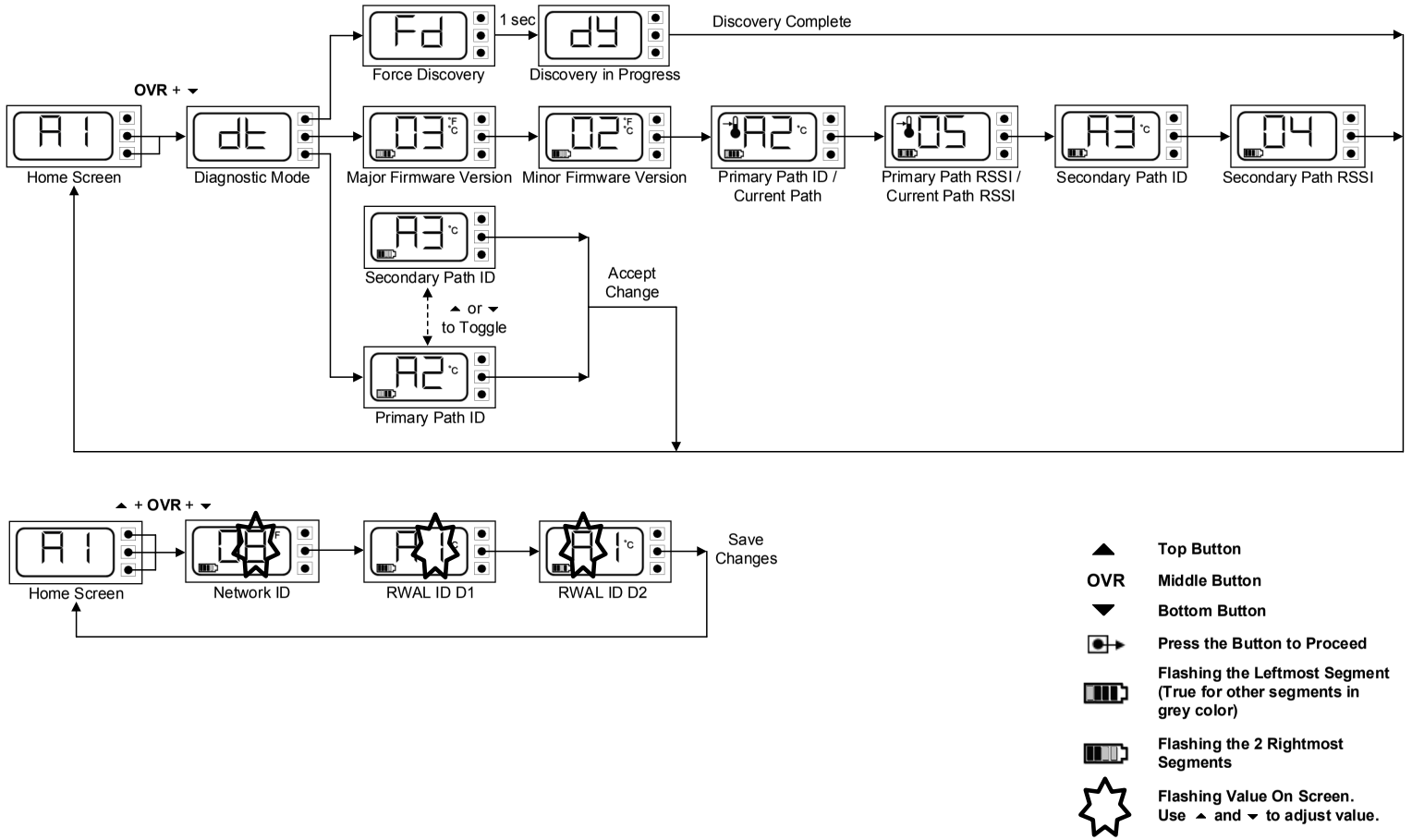


Figure 2. RWAL Menu Structure

3. RWAL Installation

The overall RWAL installation procedure includes:

- Wire runs
- Mounting the RWAL
- Configuring the RWAL

ESD Handling Precautions

Warning!

- The RWAL contains ESD sensitive circuit cards and components, shown in Figure 3.
- Great care must be exercised while handling RWAL 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.

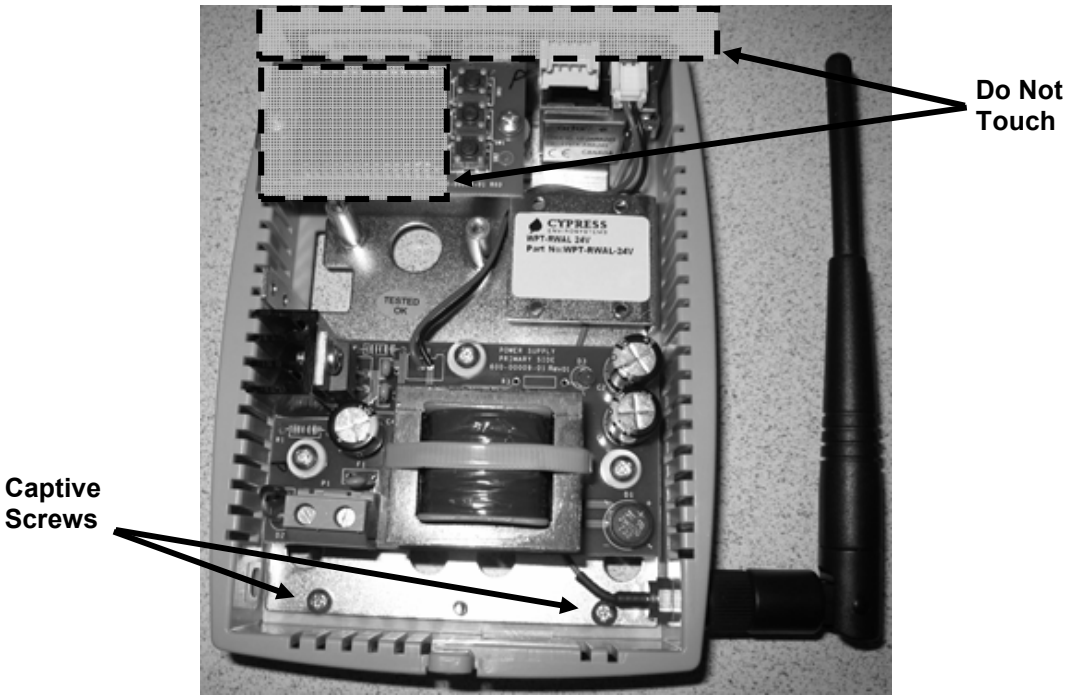


Figure 3. Handling the RWAL

3.1. Wire runs

Cabling used to supply power to the 24VAC RWAL 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 RWAL 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.

3.2. Mounting the RWAL

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 24VAC wire, running the wire through the bottom center hole of the mounting bracket.

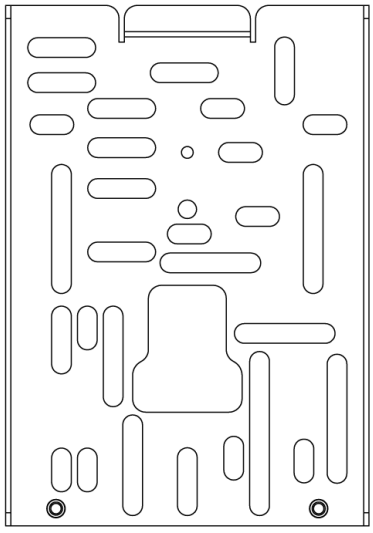


Figure 4. Universal Wall Bracket

2. Mount the RWAL on the universal wall bracket using the captive screws, shown in Figure 5. It is recommended to run the 24VAC wire 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 6 below.

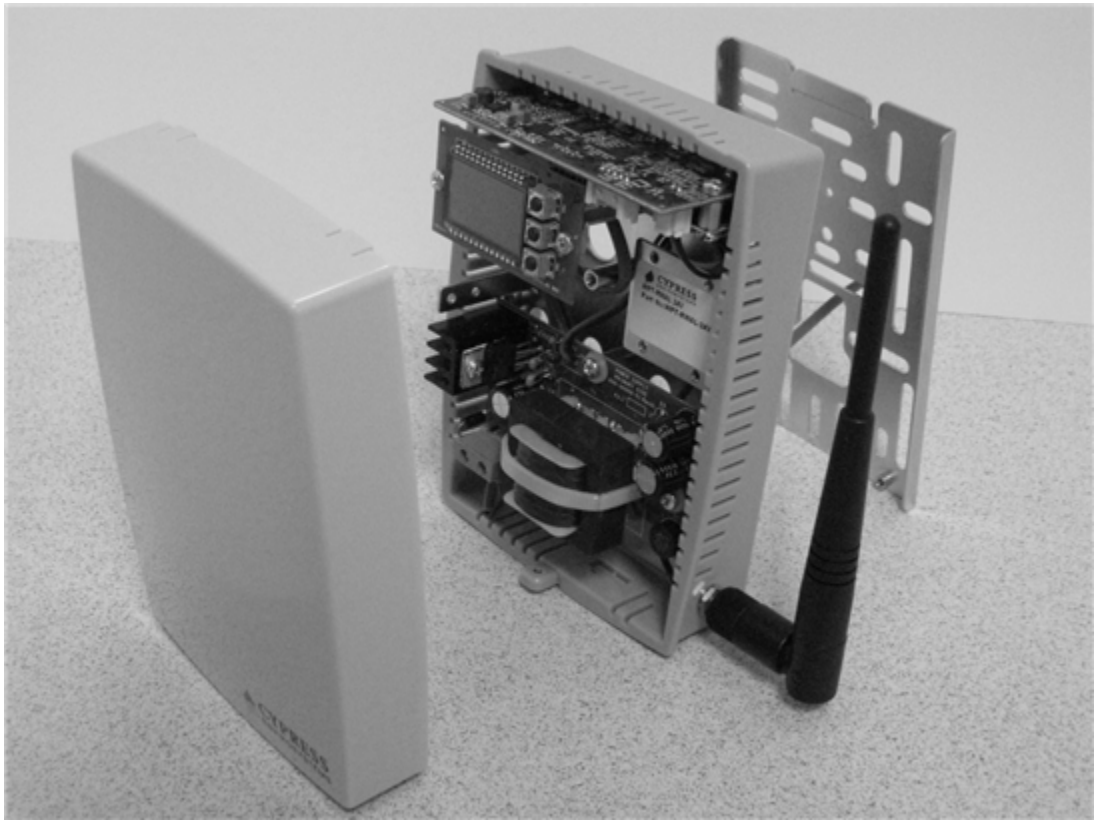


Figure 5. Mounting RWAL onto the Universal Wall Bracket

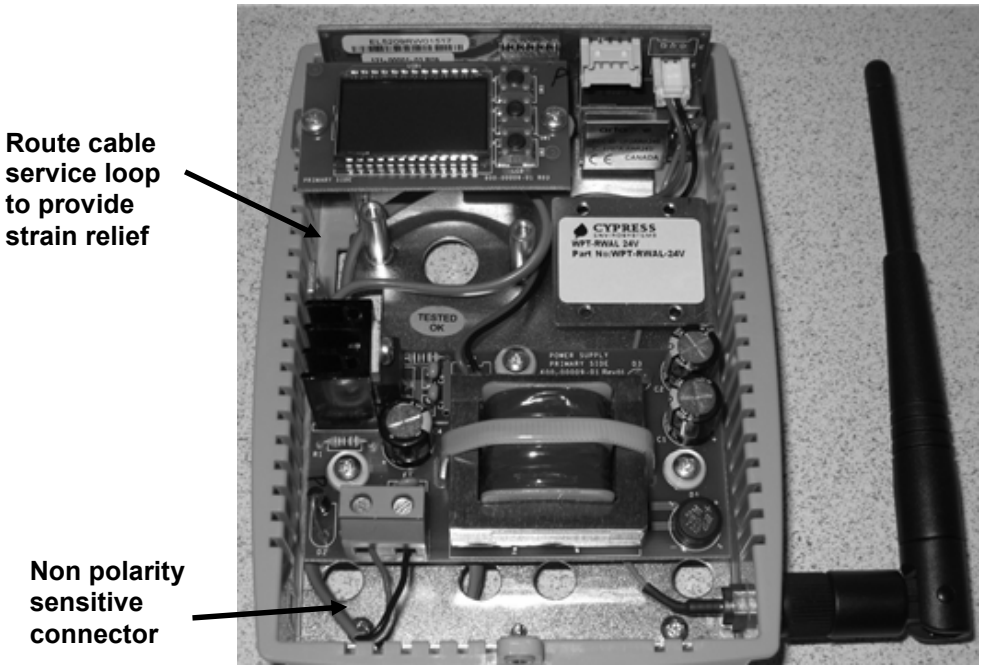


Figure 6. Internal Cable Routing Recommendation

Figure 7. Wall Bracket Cable Routing Recommendation

3. Connect the 24VAC wiring to the terminal strip inside the repeater. Note that the connection is not polarity sensitive.
4. Close the top cover.

3.3. Configuring the RWAL

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

Note: The RWAL 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.

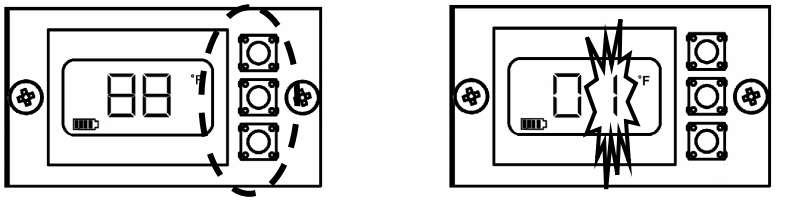
Note: The RWAL ID is a two digit number, "D2 D1" (see Figure 8). Acceptable values for D2 are 1 to A. Acceptable values for D1 are 1 to E.

Figure 8. RWAL ID Digits

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

1. Press and release all three buttons simultaneously to enter Programming Mode. The RWAL will display the current or default network ID and the first digit starts flashing (see Figure 9).

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



Press and release all three buttons simultaneously to enter Programming Mode

Digit will flash when configuring the Network ID

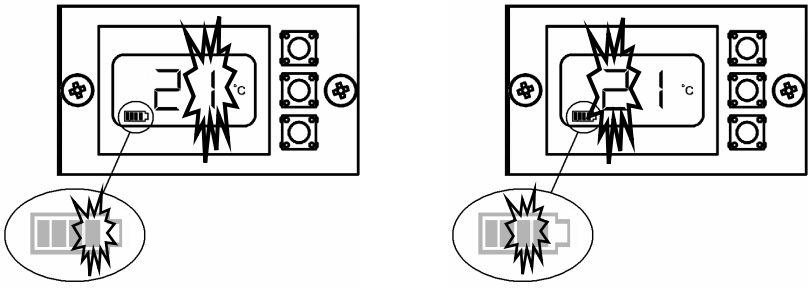
Figure 9. Configuring the Network ID

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 RWAL ID. See Figure 10.

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



Configuring RWAL ID D1 Configuring RWAL ID D2

Figure 10. Configuring RWAL ID

4. Press the top or bottom button to change D1 to the required value.

   RWAL 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 RWAL ID.

   While the RWAL ID is being configured, the corresponding bar of the battery indicator also flashes.

7. After D2 is configured and confirmed, RWAL will exit from programming mode and return back to the Home Screen.

   The RWAL will automatically exit the programming mode if no key is pressed for one minute.

   Anytime the network or RWAL 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 RWAL, replace the front cover.

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

4. Troubleshooting

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

Code	Reason	Solution
dy	This code indicates that the RWAL is performing a discovery operation and it should not be disturbed.	This display goes off automatically after a few seconds.
E0	Discovery error – Not able to connect to nearest RWAL or HUSB	Press any key to retry discovery. Check if RWAL or HUSB is working. Reset the RWAL. Place the RWAL or HUSB in a different position, if feasible.
E1	Time synchronization error – Not able to synchronize the RWAL time with the wireless network	The RWAL recovers from this error within a few refresh cycles, if this error occurs after successful commissioning of the system.
E2	Radio error – Not able to send/receive data	Restart the unit. If the error persists, contact the original distributor for replacement.
E3	Ping Error – Not able to locate a free RF channel to use due to high RF interference	Change the position of the RWAL.
E4	Connect error – Not able to connect to the nearest HUSB or RWAL	The RWAL auto recovers after a few refresh cycles, if this error occurs after successful installation. Consider adding a RWAL in the zone if the error persists.

5. Repair

The RWAL 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	24VAC, 5VA
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 122ºF (0 to 50ºC) 95% RH Max, Noncondensing
Storage Conditions	-40 to 122ºF (-40 to 50ºC) 95% RH Max, Noncondensing
Dimensions	Length: 5.6 inches (141 mm) Width: 1.2 inches (28.5 mm) Depth: 4.1 inches (103.5 mm)

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