CYPRESS
ENVIROSYSTEMS

Industrial Products Wireless Survey Tool

User Manual

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1.0 Introduction

Thank you for purchasing the Industrial Products Wireless Survey Tool, IND-WST. Please read this guide thoroughly before using the IND-WST.

2.0 Safety Precautions

- Do not immerse the IND-WST in water.
- Do not try to repair yourself as it contains no user-serviceable parts. Contact a qualified service technician for repairs. See Section 10.0, Support, for details.

3.0 Description of the IND-WST

The Cypress Envirosystems Industrial Products Wireless Survey Tool (IND-WST) is used to help setup the wireless network during installation as well as test the signal strength of Cypress Envirosystems field devices. It should be used before an installation to determine the best spot for the Blue Box Server (BBS) and Wireless Range Extenders (WREs), should any be needed.

Figure 1. Industrial Products Wireless Survey Tool

The IND-WST is comprised of two main components – a hardware survey tool and application software, CYHID. The survey tool connects to your laptop via USB and is used to collect Cypress Envirosystems wireless transmissions. As wireless transmissions are received, the data can be viewed and analyzed using CYHID.

3.1 CYHID Application

The CYHID Application, shown in Figure 2, is used to display the wireless messages received from the Wireless Survey Tool, and to display the signal strength. The top window will display the last message received for each node, and the bottom window will display each message as it is received from the Wireless Survey Tool.

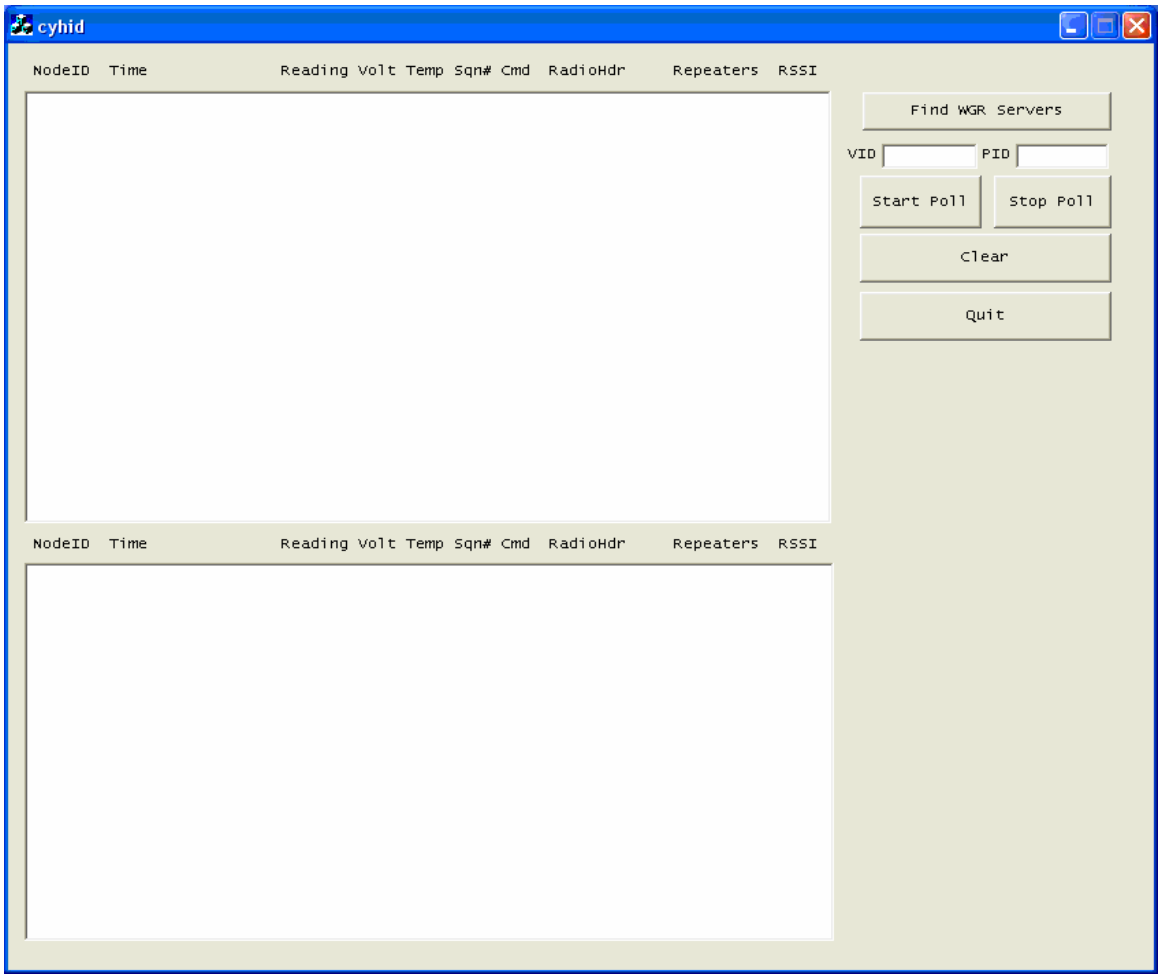


Figure 2. CYHID

To start listening for signals coming in, simply press the "Start Poll" button. All new signals coming in will be shown on the bottom window. The top window will contain the last reading for each unique Node ID.

4.0 Setup

4.1 Components

IND-WST

Industrial Wireless Survey Tool Software

USB Cable

4.2 Installation

Copy the CYHID executable file from the Industrial Wireless Survey Tool software disc to any directory on your laptop.

Connect the Wireless Survey Tool to your laptop using the USB cable provided. The USB cable will provide enough power to the IND-WST, so no additional power is required.

Launch the CYHID application.

5.0 Operation

5.1 CYHID Buttons

Find WGR Servers This button will test the connection between the laptop and IND-WST.

Start Poll This button will start recording field device data as it is received by the IND-WST.

Stop Poll This button will stop recording data, but the IND-WST will continue to receive data.

Clear This button will clear all the data on the CYHID program.

Quit This button will close the CYHID program. It has the same function as clicking the X on the top right of the window.

5.2 CYHID Columns

Node ID Shows which field device is communicating. Each field device must have a unique node ID.

Timestamp Shows the last time a signal was received from each of these nodes.

Reading Contains the raw data sent by the node.

Volt Shows the raw voltage sent from a field device. The voltage is calculated as part of the health packet message. In order to save on battery life, the health packet message is not sent out with every reading. . See Table 1 for health packet update rates.

Temp Shows a raw value associated with the ambient temperature of the field device. This 16 bit Number can be converted to degC value. The temperature is calculated as part of the health packet message. In order to save on battery life, the health packet message is not sent out with every reading. . See Table 1 for health packet update rates.

Sqn# (Sequence number) A number given to each message. Every time a field device sends a new message, it will increment the sequence number. This can be useful to see if any messages were missed.

Cmd (Command) Type of message sent from a field device. Different field devices will send different commands. This is useful for the Blue Box Server to know how to parse the data.

RadioHdr Specific message info used by the Cypress Envirosystems application on the Blue Box Server to know how to parse the data.

Repeaters Contains the list of range extenders used to get the message from the field device to the IND-WST.

RSSI (Received Signal Strength Indictor) A unit-less number between 0 and 31 which represents the signal strength, 31 being the strongest. The stronger the signal, the less chance data will be lost. Signal strength is considered adequate if the RSSI value is 10 or greater. If the signal strength is less than 10, a WRE may need to be added or existing WREs may need to be relocated.

Product	Normal Sample Rate (seconds)	Other	Health Packet Rate			
			Normal	Fast	Medium / Wireless Survey	Button Press
WGR1.0 WMR1.0	< 1200	NA	20 – 40 min	5s – 4500s	30s – 27000s	Every 2nd – 900th time
	< 1800	NA	20 – 40 min	5s	30s	Every Time
	> 1800	NA	Same as Normal Sample Rate	5s	30s	Every Time
	Any	Error	Same as Normal Sample Rate	Same as Normal Sample Rate	Same as Normal Sample Rate	Every Time
WTR WFM WSTM	< 1200	NA	30 – 45 min	30 – 45 min	30 – 45 min	30 – 45 min
	>1200	NA	Same as Normal Sample Rate	Same as Normal Sample Rate	Same as Normal Sample Rate	Every Time
	Any	Thermocouple Exists	Same as Normal Sample Rate	Same as Normal Sample Rate	Same as Normal Sample Rate	Every Time

Table 1. Health Packet Update Rate

5.3 CYHID Examples

Figure 3 shows an example of messages received by the CYHID program. The data shown in the Repeaters column have a number on the left and a semicolon separated number set. The number on the left is the last WRE used to repeat the signal before the diagnostic tool received the signal. The semicolon separated number set indicates the range extender path used to transmit the signal. If there are no numbers within the brackets, then the signal did not go through any WREs.

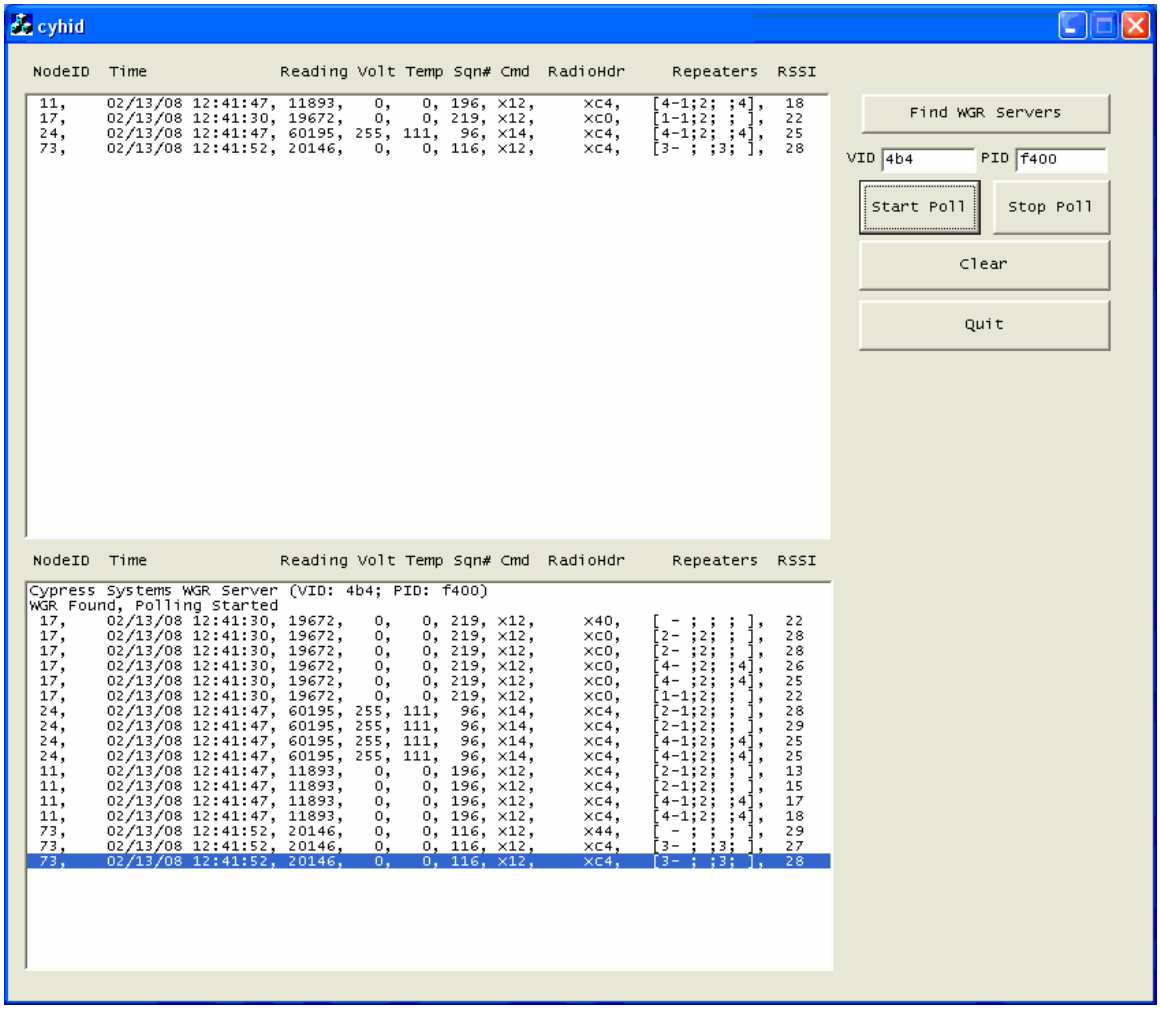


Figure 3. CYHID with messages received

Message examples:

Data under "Repeaters" Column	Interpretation
[- ; ; ;]	Data was received directly from the field device without any range extenders in the signal path.
[3- ; ;3;]	Signal was received via range extender 3. No other range extenders were in the path.
[4-1;2; ;4]	The signal went through range extenders 1, 2 and 4. The last range extender seen was range extender 4. The corresponding RSSI shown is from range extender 4.

In Figure 3, there are two additional items to note.

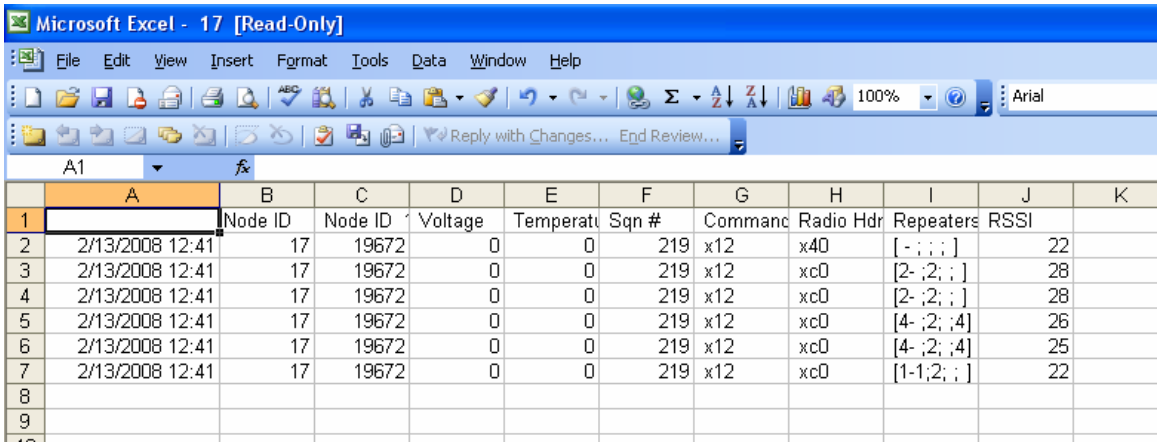
- There are 4 entries for Node ID 11 in the lower window of Figure 3. Two of the entries are identical because the range extender transmits the signal twice just in case packets are dropped. This is normal behavior.

- For Node ID 11, there are two different Repeaters column data, [4-1;2; ;4] and [2-1;2; ;]. The first data set, [4-1;2; ;4], shows that the signal was received from range extender 4, and that the signal traveled through range extenders 1, 2 and 4. The second data set, [2-1;2; ;], indicates that the survey tool

received data from Node ID 11 with just range extenders 1 and 2. It is advantageous for the signal (data) to be received through multiple paths for redundancy. They each have a unique sequence number so the data will only be logged once.

5.4 Exporting Data to Excel

To see the entire history of signal strength for one particular Node ID, double click the Node ID in the top window, and the data will be sent to Excel. See Figure 4 below.



	A	B	C	D	E	F	G	H	I	J	K
1		Node ID	Node ID	Voltage	Temperatu	Sqn #	Commanc	Radio Hdr	Repeaters	RSSI	
2	2/13/2008 12:41	17	19672	0	0	219	x12	x40	[- ; ; ;]	22	
3	2/13/2008 12:41	17	19672	0	0	219	x12	xc0	[2- ;2; ;]	28	
4	2/13/2008 12:41	17	19672	0	0	219	x12	xc0	[2- ;2; ;]	28	
5	2/13/2008 12:41	17	19672	0	0	219	x12	xc0	[4- ;2; ;4]	26	
6	2/13/2008 12:41	17	19672	0	0	219	x12	xc0	[4- ;2; ;4]	25	
7	2/13/2008 12:41	17	19672	0	0	219	x12	xc0	[1-1;2; ;]	22	
8											
9											

Figure 4. Example of data exported to Excel

Multiple lines with the same sqn# may be exported. This means the Wireless Survey Tool has received the same message from different sources (directly from the field device or through different range extenders). The Blue Box Server will only store one of the multiple messages, and ignore the others. Make sure the sqn# increments properly and no numbers are missed. If there are missing sequence numbers, then a message from a field device was missed completely.

5.5 Best Practices

- When conducting a wireless survey, it is best to check the signal strength at each range extender location.
- Be aware of signal paths are expected during a wireless survey. Double check range extender firmware if data is not received as expected from a particular range extender.
- Ensure that the range extender is plugged into an active power source; lights will flash on the side when a signal is received.
- Make sure the Cypress Envirosystems field devices are either in “Survey” mode or set to the medium or fast update rate. The faster update rate will speed up the data collection.

6.0 Care and Maintenance

There is no routine maintenance required for the Wireless Survey Tool. Please contact your service representative if you have any questions. The contact information is provided in Section 10.0, Support.

7.0 Troubleshooting

The IND-WST is not receiving messages from field devices.
Make sure your IND-WST has the same frequency channel set as the field devices. The channel set can be found on the bottom of the IND-WST.

If you have additional problems, please contact us. See Section 10, Support, for contact information.

8.0 Technical Specifications

Wireless Frequency:	2.4GHz Direct Sequence Spread Spectrum, 100mW peak output
Wireless Range:	Up to 1600 ft (488 m) line-of-sight, extendable with repeaters
Wireless Protocol:	Cypress Semiconductor's highly optimized industrial DSSS radio and protocol. Integrates robust security, antenna and frequency diversity, optional encryption and minimal interference with existing wireless systems (for additional details, please see FAQ at www.cypressenvirosystems.com)
Approvals:	FCC Class B Compliant, RoHS, ETSI Compliant
Power Supply:	5VDC provided by the USB connection to the laptop
Operating Temperature:	-20°C to 70°C
Storage Temperature:	-40°C to +85°C
Enclosure:	Rugged extruded aluminum industrial chassis
Dimensions:	5.7” x 2.2” x 1.6” (145mm x 57mm x 42mm)
Weight:	0.51 lbs (230g)

9.0 Product Disposal

The IND-WST is recycled by Cypress Envirosystems. Contact a service technician or Cypress Envirosystems headquarters to recycle the IND-WST. See Section 10, Support, for contact information.

10.0 Support

For additional support, please contact us.

Cypress Envirosystems
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San Jose, CA 95134
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11.0 Warranty Information

Every product comes with a full one-year parts and labor warranty. Cypress Envirosystems monitoring of battery status, product status, and potential communications packets are included during this period, so that proactive service can be provided to our customers.