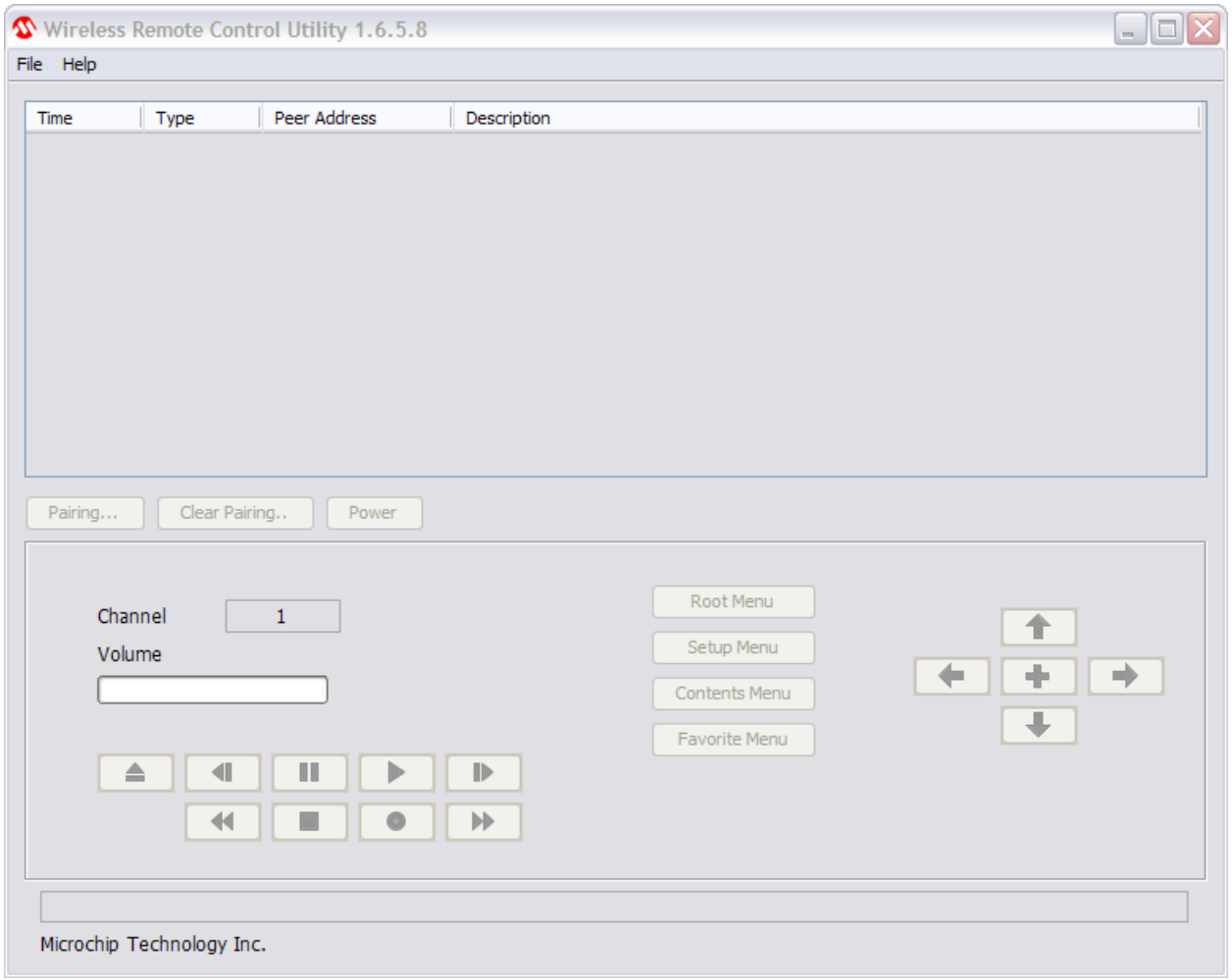
Wireless Remote Control Utility Help File



INTRODUCTION

The Wireless Remote Control Utility (*WRCU*) is a multiplatform PC utility. The *WRCU* is used to display messages received from a remote device. The *WRCU* is written in JAVA and requires that a JRE version 6 be installed to properly work. The user can obtain a copy of the JRE to install from Oracle (http://www.oracle.com/technetwork/java/javase/downloads/index.html). The *WRCU* uses the ZENA™ Wireless Adapter 2.4 GHz MRF24J40 for the wireless communication, available from Microchip Direct. The ZENA Wireless Adapter does not need any pre-loaded software, as the *WRCU* will upload the firmware as part of the configuration. Please note that after the *WRCU* performs a firmware upload, the original software will not be able to be recovered by the *WRCU* and will need to be re-upload by another utility such as, but not limited to, Microchip's Wireless Development Studio.

TERMS

The sections will describe common terms that are address throughout the help documentation. Any shorthand names for these terms will be introduced here and when used throughout the documentation will be *italics.*

Wireless Remote Control Utility (*WRCU*) – the JAVA based application that displays messages that are received by the ZENA Wireless Adapter.

ZENA Wireless Adapter (*Adapter*) – the USB device that receives wireless communication using a 2.4 GHz radio.

Radio Frequency for Consumer Electronics (*RF4CE*) – a standard for radio frequency remote controls.

Target – another name for the ZENA Wireless Adapter with the Wireless Remote Control Utility's firmware uploaded.

Remote – The device that will send messages to the target. The device will need to be paired with the target for messages to be received. Remotes that are compatible with the *WRCU* support the *RF4CE* protocol.

RELEASE NOTES

Version 1.6.5.8

This is the first version of the *WRCU*.

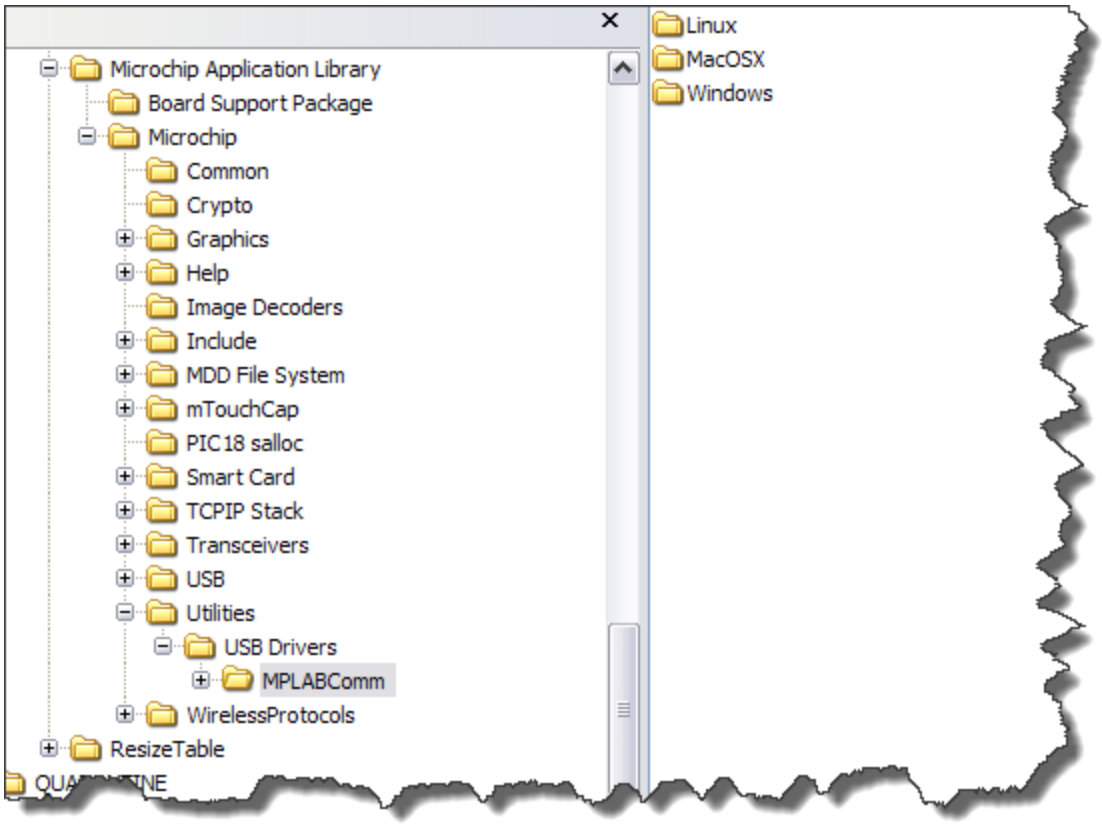
INSTALLATION

This section describes how to install the *Adapter's* USB drivers.

ZENA Wireless Adapter

When plugging any new USB device into a computer, the computer may need to install and associate USB drivers with the device. Before running the *WRCU*, the *Adapter*'s USB drivers must be installed and associated. If not, the *WRCU* will be unable to communicate with it. All of the drivers that are associated with the *Adapter* are included as part of the Microchip Application Libraries.

The location of the USB drivers in the Microchip Application Library is `<installation directory>/Microchip/Utilities/USB Drivers/MPLABComm`. Under the `MPLABComm` directory, there are sub-folders for each of the supported operating systems.

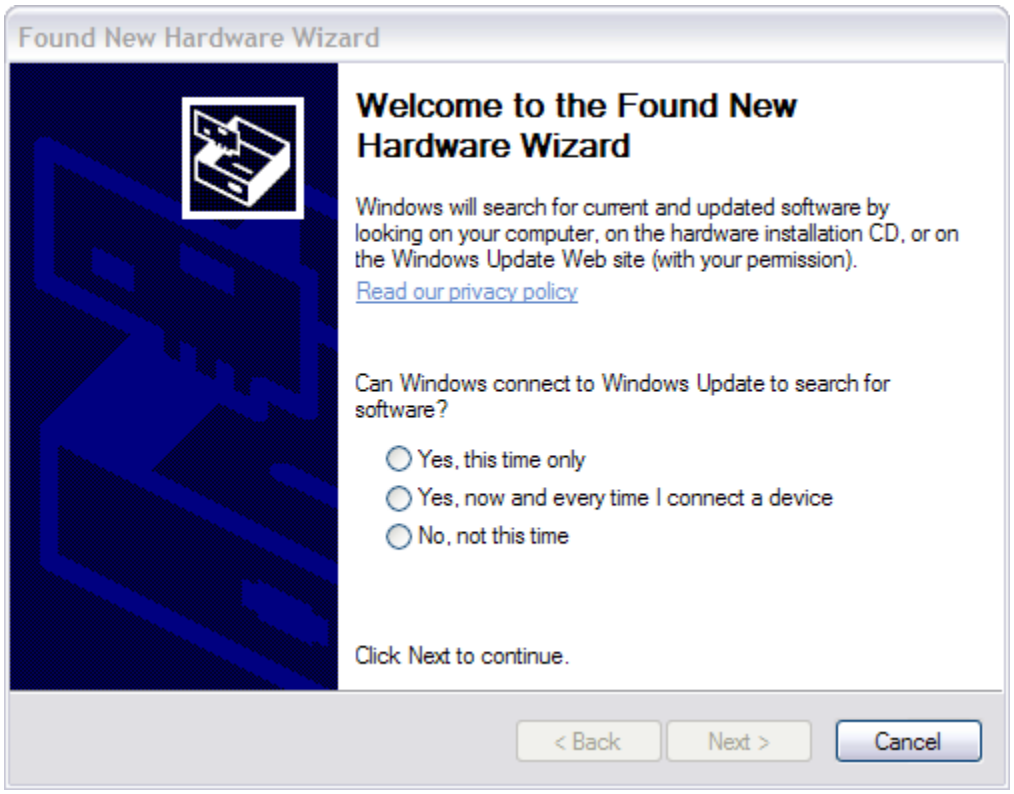


Windows

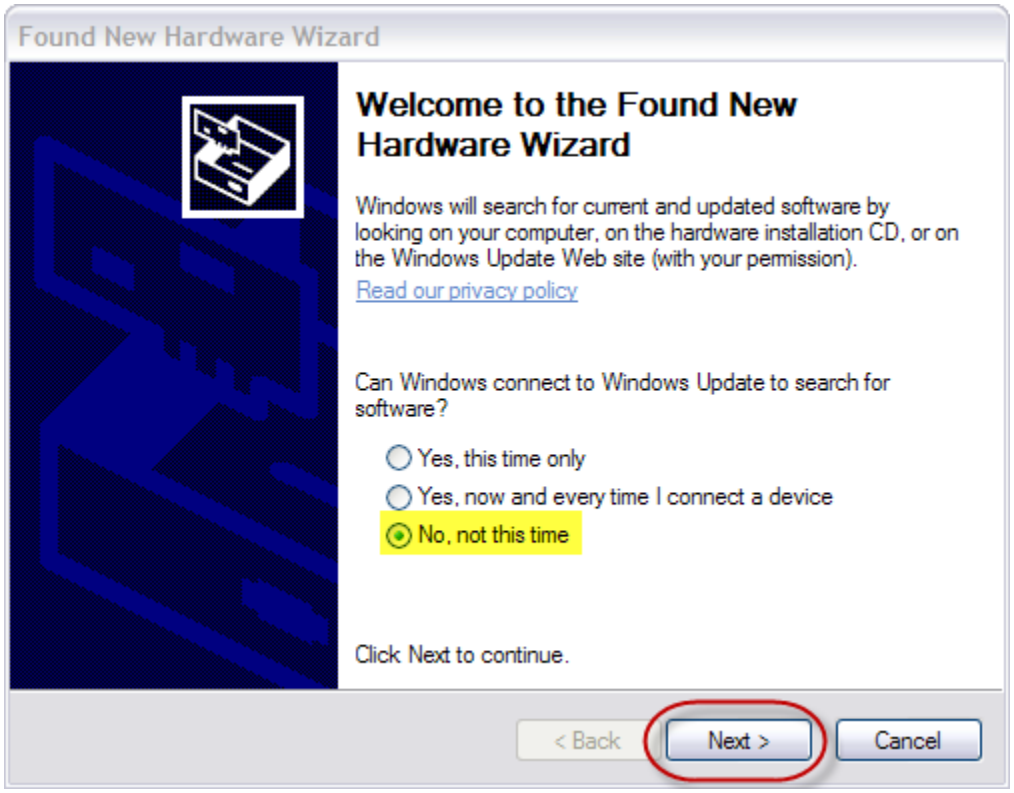
The location of the INF file needed to properly install the USB drivers is: `<installation directory>/Microchip/Utilities/USB Drivers/MPLABComm/Windows`. Please use this path when prompted by the USB driver installation wizard.

The following section describes how to install the USB drivers under a Windows operating system.

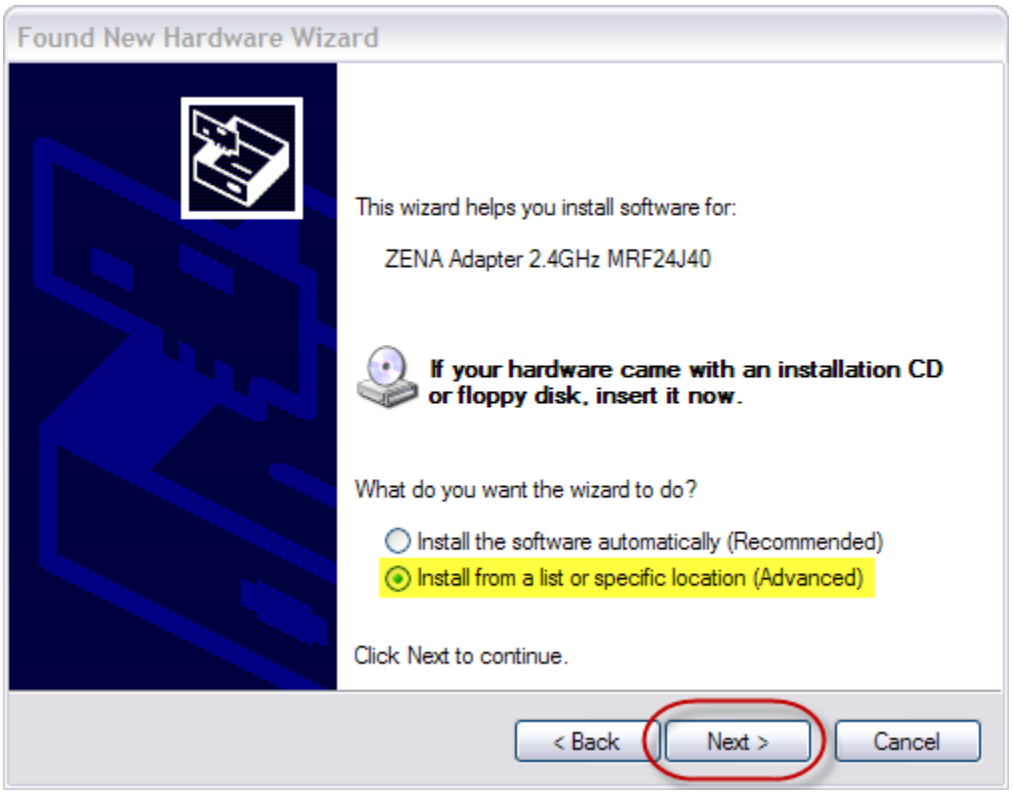
1. When plugging in a new *Adapter*, Windows will display a Found New Hardware Wizard.



2. The wizard asks **"Can Windows connect to Windows Update to search for software?"** answer this will **"No, not this time."** The **NEXT** button will enable, select it.

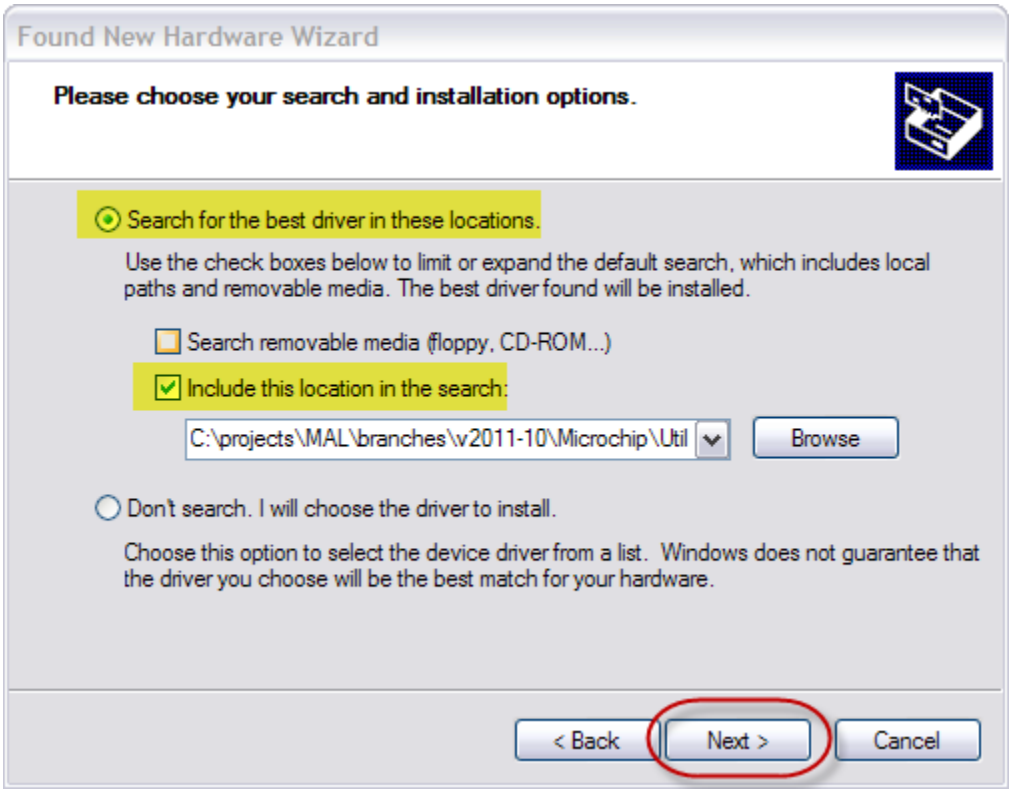


3. The next screen will ask **"What do you want the wizard to do?"** Since the location of the USB driver and INF files are known, select **"Install from a list or specific location (Advanced)."** Select **NEXT**.

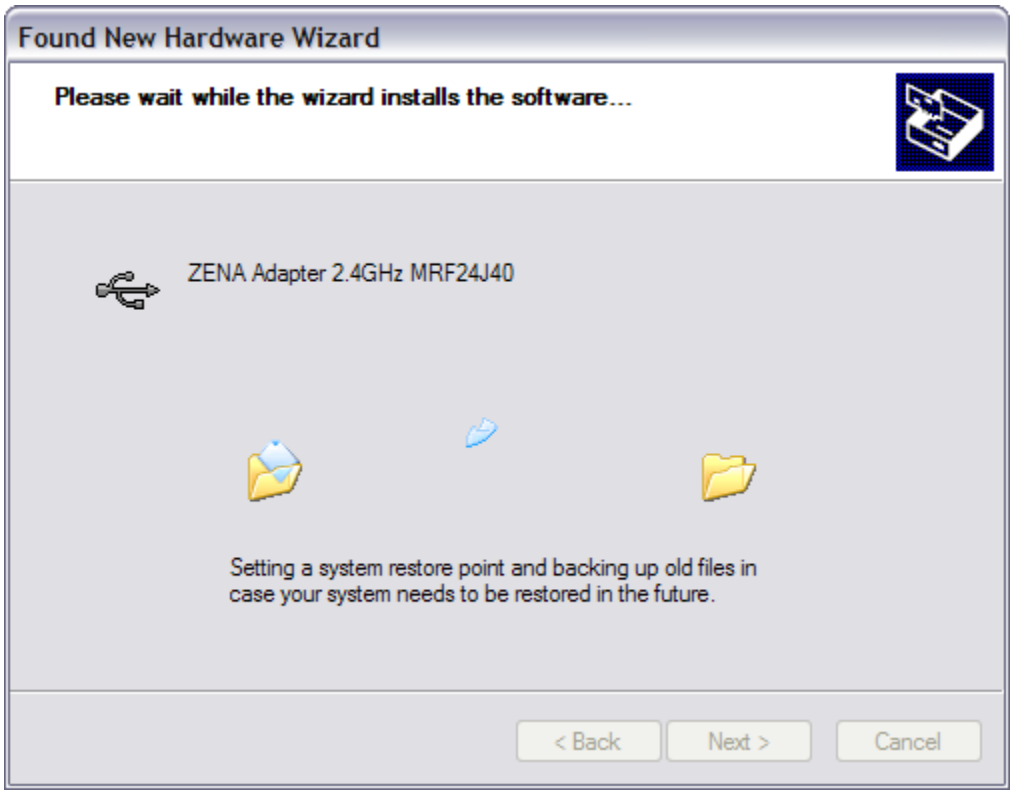


4. The next screen is for locating the drivers that will be used. Select the **"Search for the best driver in these locations."** Under that option uncheck "**Search removable media floppy, CD_ROM….)"** and check **"Include the location in the search."** The **BROWSE** button will be enabled and use that to locate the directory with the INF file. After selecting the directory

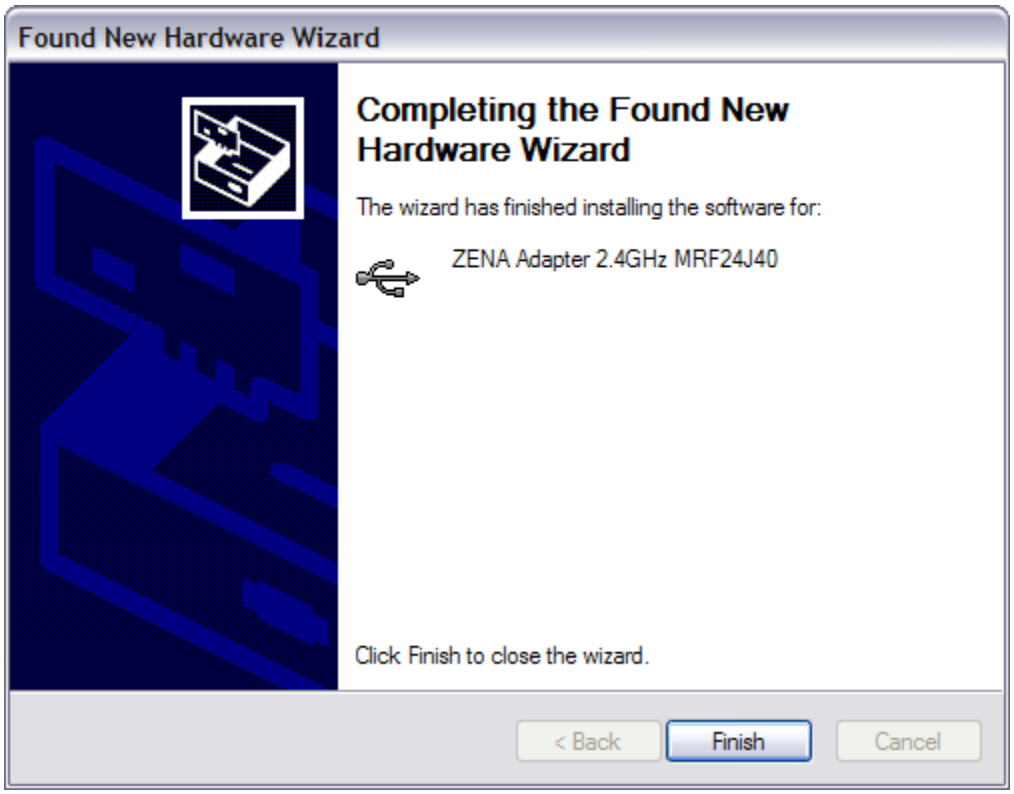
location, select **NEXT**.



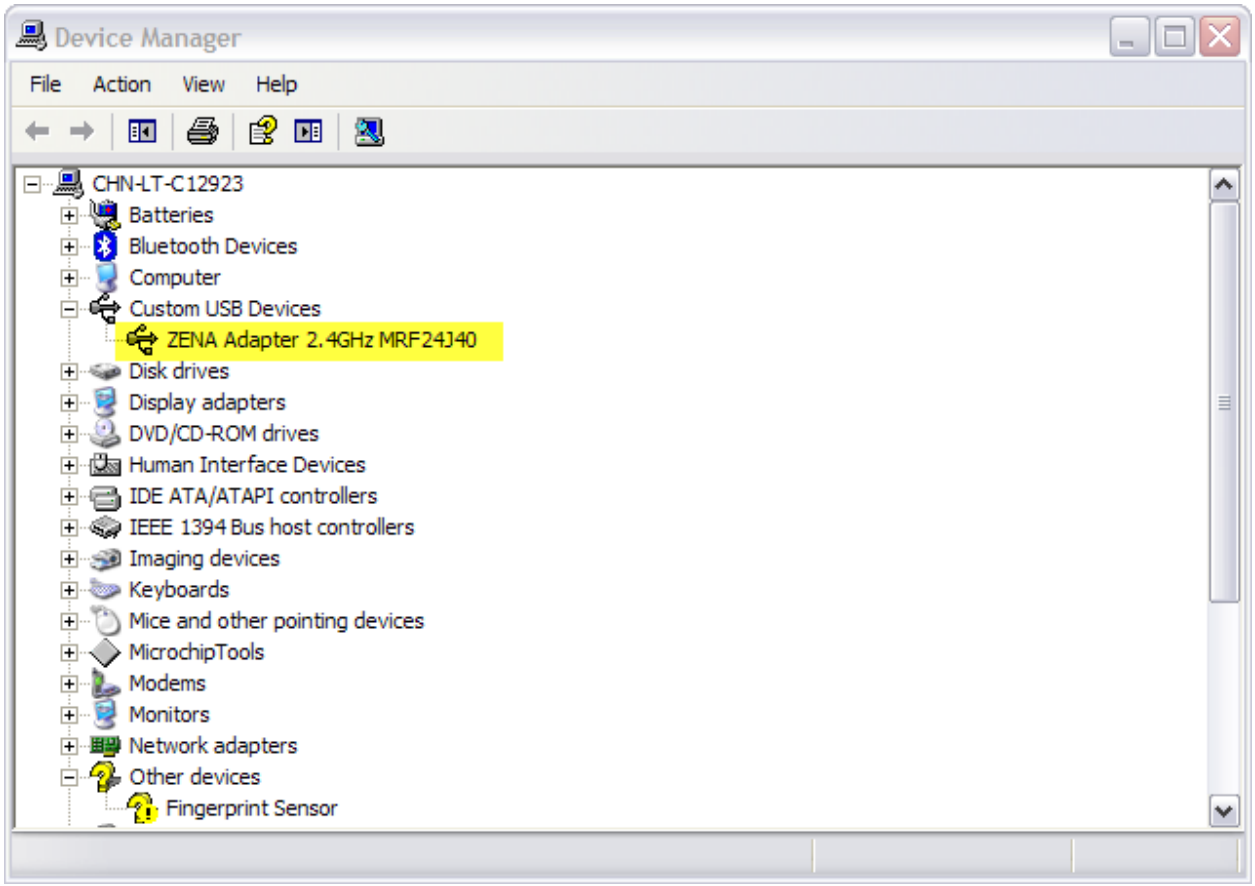
5. The wizard will start installing the USB drivers needed for the *Adapter*.



6. The wizard will show a completion page. Select the **FINISH** button.



The proper USB drivers have been installed for the *Adapter*.

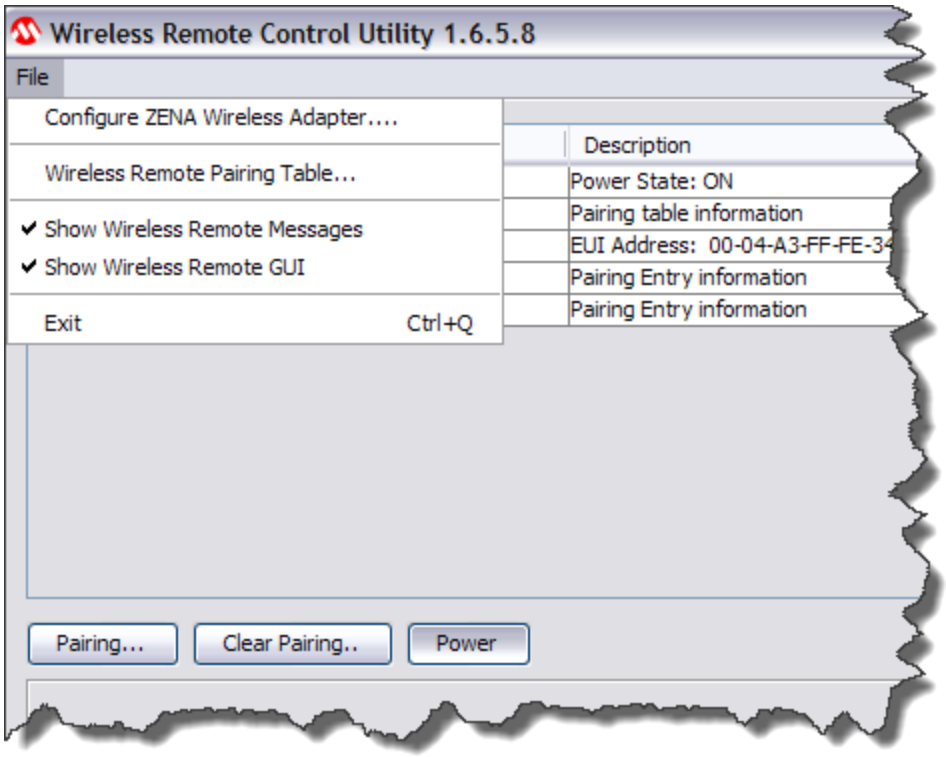


EXPLORING THE UTITLITY

This section describes all of the *WRCU* menu items, dialog boxes and graphical interfaces.

File

The file menu item allows the user to Configure an *Adapter*, view the Wireless Remote Pairing Table… dialog, Show Wireless Remote Messages, Show Wireless Remote GUI and Exit the utility.



Configure the ZENA Wireless Adapter

Before the *WRCU* can receive or send any data from or to the *Adapter*, the *Adapter* needs to be configured by the *WRCU*. When the user selects this menu option, the USB Configuration Dialog will be displayed. Using this dialog, the user can select the particular *Adapter* for the *WRCU* to use.

Wireless Remote Pairing Table…

The *Adapter* may have valid pairing entries stored in non-volatile memory. After proper configuration, the *WRCU* queries the *Adapter* for the pairing table size, number of valid entries and valid pairing entry information. This menu option displays the Wireless Pairing Table Entries Dialog which displays the valid entry information.

Show Wireless Remote Messages

This menu option displays or hides the Wireless Remote Message Table. If the menu option is checked, the Wireless Remote Message Table is displayed and hidden if not checked. Selecting the menu item will toggle if the remote message table is displayed or hidden. This may be a desirable option when only wanting to display the Wireless Remote Graphical User Interface.

Show Wireless Remote GUI

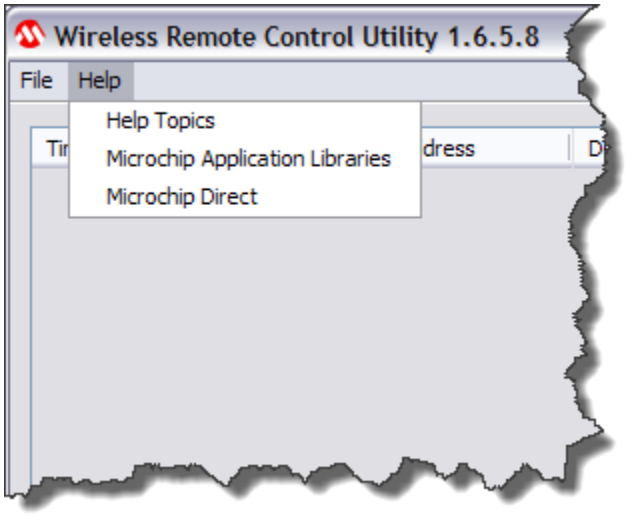
This menu option displays or hides the Wireless Remote Graphical User Interface. If the menu option is checked, the Wireless Remote Graphical User Interface is displayed and hidden if not checked. Selecting the menu item will toggle if the remote message graphical interface is displayed or hidden. This may be a desirable option when only wanting to display the remote message table.

Exit

This menu option exits the *WRCU*. All communication with the *Adapter* will cease.

Help

The help menu item allows the user to view Help Topics, go to the Microchip Application Libraries' web site and to go Microchip Direct.



Help Topics

This document can be opened by the WRCU by selecting the Help Topics menu item. The document will be opened using the default PDF viewer.

Microchip Application Libraries

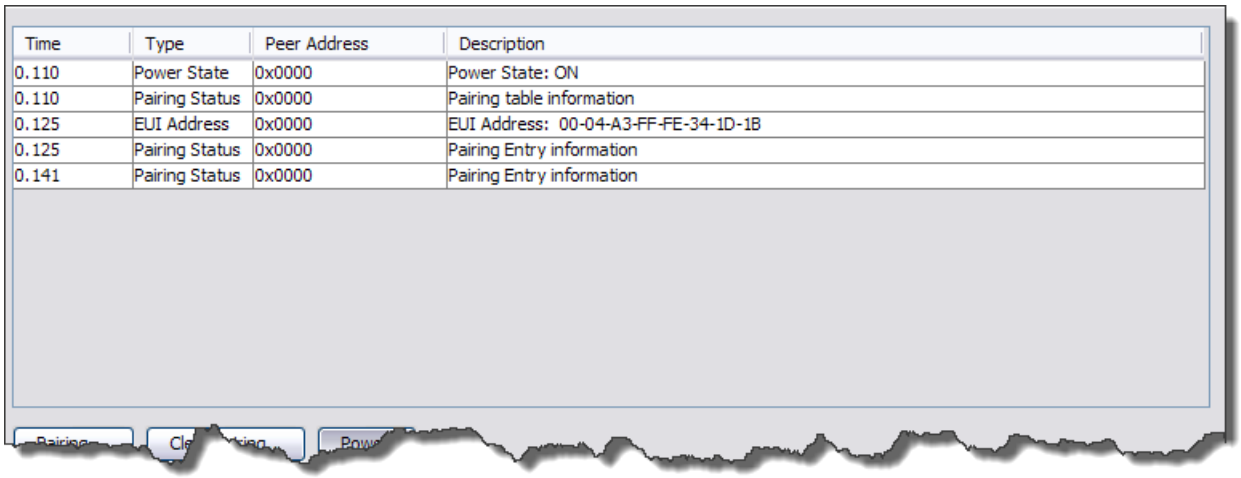
Microchip Application Libraries are a collection of libraries and demo applications that are provide by Microchip free of charge.

Microchip Direct

Microchip Direct can be used purchase tools provided by Microchip.

Wireless Remote Message Table

The *WRCU* displays the sent and received USB packets as messages. These messages are displayed in the Wireless Remote Message Table (located at the top of the utility). The wireless remote message can be displayed or hidden by using the Show Wireless Remote Messages menu item. By double clicking a message, the Message Packet Information Dialog will appear.



Time	Type	Peer Address	Description
0.110	Power State	0x0000	Power State: ON
0.110	Pairing Status	0x0000	Pairing table information
0.125	EUI Address	0x0000	EUI Address: 00-04-A3-FF-FE-34-1D-1B
0.125	Pairing Status	0x0000	Pairing Entry information
0.141	Pairing Status	0x0000	Pairing Entry information

The table layout is as follows:

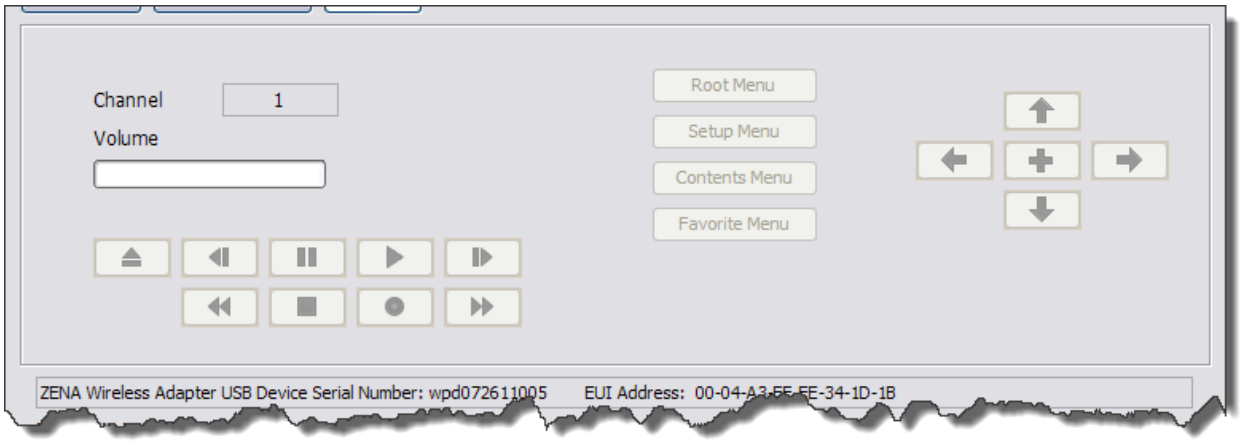
- Time: This is the seconds since the *Adapter* has been configured.
- Type: This is the message type.
    - Command – this can be a message from the *Adapter* to the utility or from the utility to the *Adapter*. If the message is from the utility, no time will be displayed and the Peer Address will be "Application."
    - Status – this is a message from the *Adapter* that convenes the pairing status.
    - Power State – the power state of the *target* power. The power state will also be reflected by the Power button.
    - Pairing Status – the wireless pairing table information. This information may be the number pairing table entries, number of valid pairing table entries and valid pairing table entry information.
    - Extended Unique Identifier (EUI-64) Address – the 64-bit EUI address of the *Adapter*.
- Peer Address – When a command message is sent from the *Adapter*, the peer address associated with the message is displayed. For other messages, either "Application" or "0x000" will be displayed and should not be used to validate the peer address.
- Description – an overview of the packet information that is being sent or received.

Wireless Remote Graphical User Interface

The *WRCU* uses a graphical interface to give feedback to the user when receiving messages from the *remote*. The Wireless Remote Graphical User Interface can be displayed or hidden by using the Show Wireless Remote GUI menu item. When items are enabled by *remote* commands, they are enabled for two seconds before returning to a disabled state.

This is an example of how the graphics interface will provide feedback to the user, if a *remote* is properly paired with the *Adapter* and the Up-Arrow button is pressed on the *remote*, the Up-Arrow button on the graphical interface will become enabled for two seconds. This provides feedback that the *target* received the Up-Arrow command. The user can also view the Wireless Remote Table to see the Up-

Arrow command entry as well.



The graphical interface layout is as follows:

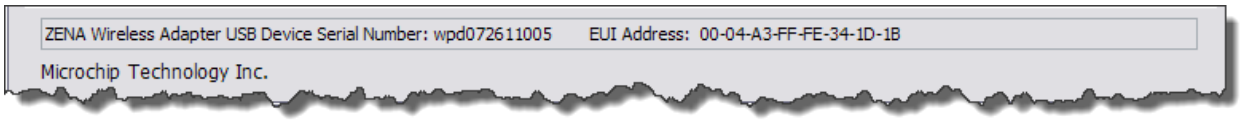
- Channel – The channel graphical interface consists of the "Channel" label, text box and icon field. The icon field may not always be present. When a command is received for this interface, the channel label will be bolded and a change to the text box will be seen. An optional icon may be displayed as part of the feedback. The interface provides feedback for the following *remote* commands:
    - Numbers 0-9 – This will result in a change to the text box field
    - Channel Up/Down – This will result in a change to the text box field along with an icon display to represent the up/down command.
    - Enter/Select – This will result to a confirmation of the number entered in the text box.
    - Valid channel numbers are 1 – 9999.
- Volume – The volume graphical interface consists of the "Volume" label, a progress bar and icon field. When a command is received for this interface, the volume label will be bolded and a change in the progress bar will be seen. An icon will be displayed as part of the feedback. The interface provides feedback for the following *remote* commands:
    - Volume Up/Down – This will result in a change to the progress bar. The progress bar shows the current volume level. An icon will appear to indicate volume direction.
    - Mute – If the volume has not already been muted, the progress bar will be cleared to indicate no volume and an icon will be displayed for represent volume muting (the icon will not be cleared after two seconds and will persist). If the volume has been muted, the progress bar will show the previous volume state and the icon will be cleared.
- Playback – The playback graphical interface consists of the following buttons: eject, back, pause, play, forward, rewind, stop, record, and fast forward. When a playback command is received, the corresponding button will be enabled, background color changed for two seconds. After two seconds, the button will return to the disabled state.
- Menu Items – The menu items graphical interface consists of the following buttons: Root Menu, Setup Menu, Contents Menu and Favorite Menu. When a menu item command is received, the

corresponding button will be enabled, background color changed for two seconds. After two seconds, the button will return to the disabled state.

- Navigation – The navigation graphical interface consists of the following buttons: Up, Down, Left, Right and Select. When a navigation command is received, the corresponding button will be enabled, background color changed for two seconds. After two seconds, the button will return to the disabled state.

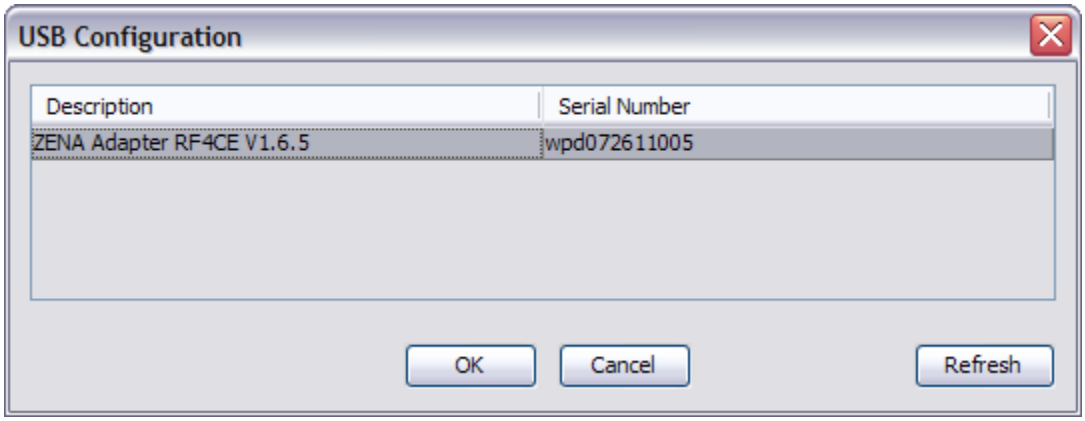
ZENA Wireless Adapter Information

The bottom of the *WRCU* contains a text field which provides *Adapter* information. After the *Adapter* is properly configured, the USB serial number and EUI Address (64-bit) is displayed.



USB Configuration Dialog

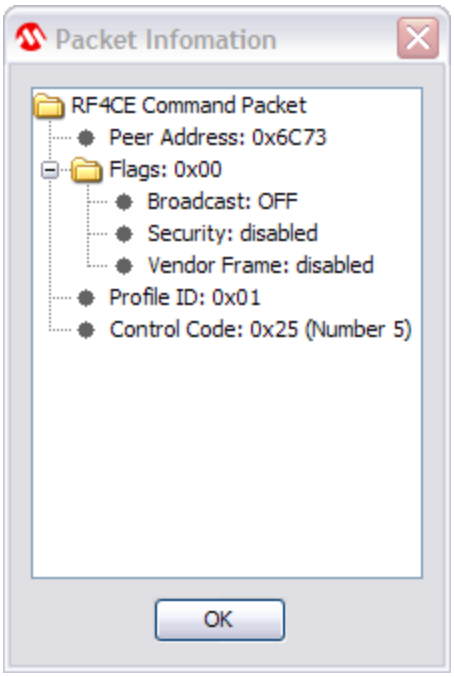
After the Configure the *Adapter* menu item has been selected, the USB Configuration Dialog will be displayed. This dialog allows the user to choose the *Adapter* for the *WRCU* to connect to.



The dialog displays a table of valid *Adapter*s to choose from with the description and serial number of the adapter. By default, if no adapter is selected the **OK** button will be disabled. The user is also able to update the table by pressing the **REFRESH** button.

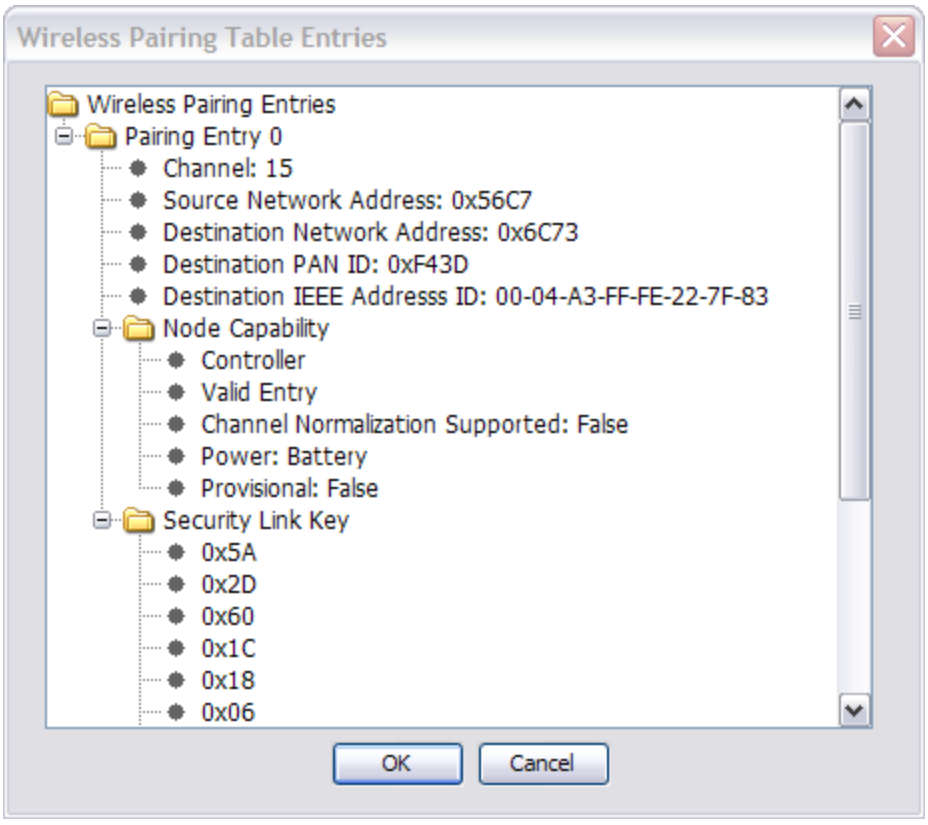
Message Packet Information Dialog

By double clicking on a message entry in the Wireless Remote Message Table, the message packet information dialog will appear. This dialog can be used to see a detail break down of the message. While all messages are able to be double clicked to bring up the message packet information dialog, the Status and Command message types received from the *Adapter*, contains a valid peer address, provide the best message details.



Wireless Pairing Table Entries Dialog

After the Wireless Remote Pairing Table… menu item has been selected, the Wireless Pairing Table Entries dialog will appear. This dialog shows the pairing table entry information stored in the non-volatile memory on the *Adapter*. The dialog will only show valid pairing table entries. The pairing entries are part of a tree and can be expanded to show the entry details.

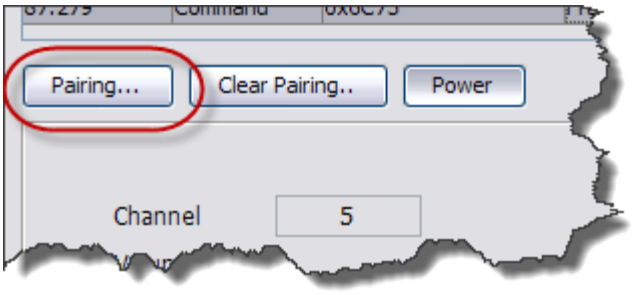


The pairing entry tree nodes are as follows:

- Channel – This is the current channel that is assigned to the pairing table entry.
- Source Network Address – The 16-bit source address.
- Destination Network Address – The 16-bit destination address.
- Destination PAN ID – The 16-bit PAN ID.
- Destination IEEE Address ID (EUI – 64) – The 64-bit long destination address.
- Node Capability – Entry description.
    - Controller/Target
    - Valid Entry
    - Channel Normalization Support
    - Power source
    - Provisional
- Security Key – This is optional

Pairing Button

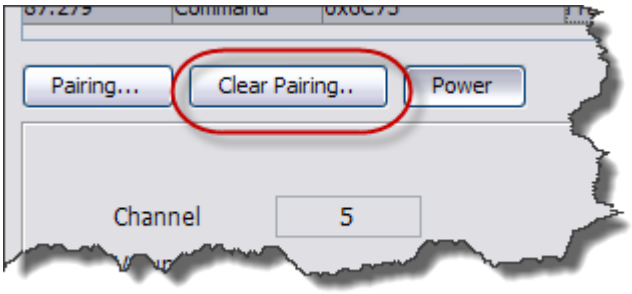
After an *Adapter* has been chosen and configured, the *target* needs to be paired with the *remote* (if not already done). If the Pairing button is enabled, the user can started the target's pairing process by pressing it. The *remote* may also need to have its pairing process started as well.



If the pairing button is disabled, the *Adapter* may not be properly configured or the pairing table does not have any available entries.

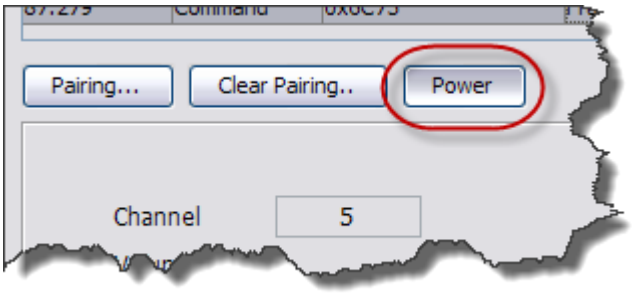
Clear Pairing Button

After an *Adapter* has been chosen and configured, the user can clear the pairing table. This can be done because the user wishes to re-pair a *remote*, there are no more available pairing table entries or a fresh pairing table is desired. If the button is disabled, the pairing table does not contain any valid entries and thus does not need to be cleared.



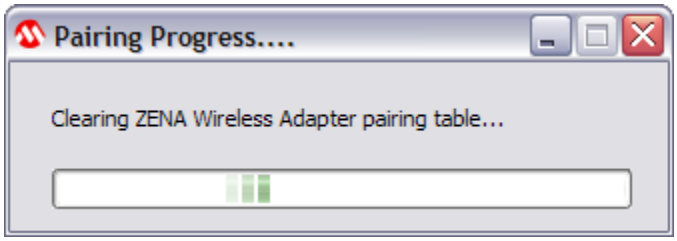
Power Toggle Button

After an *Adapter* has been chosen and configured, the power button will reflect the power state of the *target*. The user can change the power state by toggling the button. It should be noted that if the *target* power is OFF, it may not pass *remote* commands (the power should be then turned ON either by the *WRCU* or *remote* to *target* power).



Pairing/Clear Pairing Status Dialog

After pressing the pairing or clear paring button, the Pairing/Clear Pairing Status Dialog will appear. This dialog will stay open until the requested actions have completed or a timeout occurs. The user is unable to close this dialog.



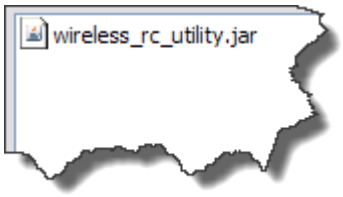
USING THE UTILITY

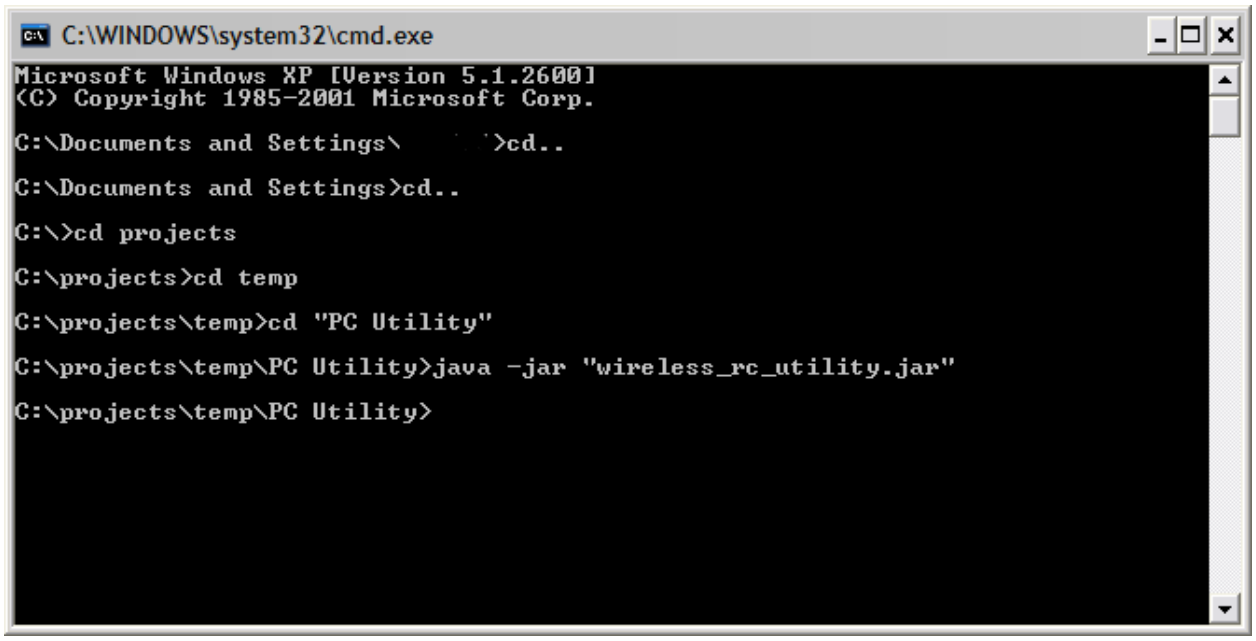
This section describes how to use the *WRCU*. The sub sections describe a particular event and how to accomplish it using the menu items and/or dialog boxes outlined in EXPLORING THE UTILITY section.

Running the Utility

The *WRCU* is a JAVA based application and requires a JAVA Runtime Environment (JRE) to be installed on the operating system. The version of the JRE required is JRE 6. If the operation system which will be running the *WRCU* does not have JRE 6 installed, go to Oracle (http://www.oracle.com/technetwork/java/javase/downloads/index.html) and install it.

The *WRCU* is an executable JAVA library, JAR, file. The user can launch the application by either double clicking the wireless_rc_utility.jar or from the command line (java –jar "wireless_rc_utility.jar").



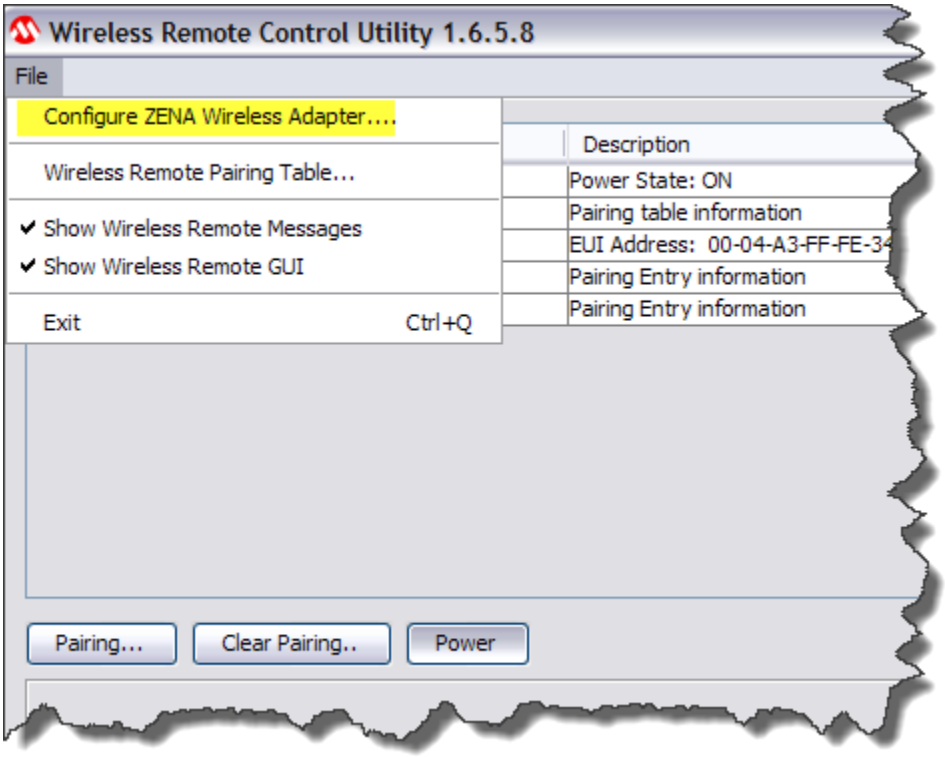


Configuring the ZENA Wireless Adapter

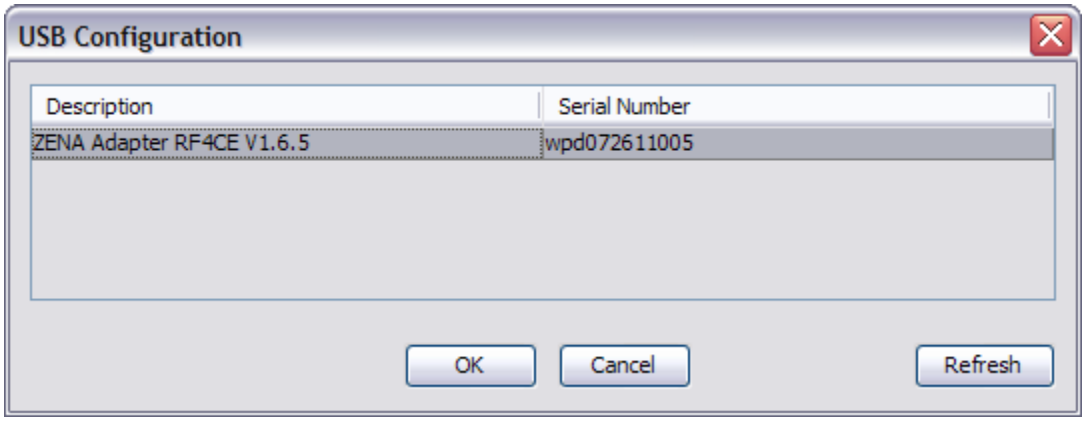
To configure the *Adapter* follow these steps

1. Plug the *Adapter* into a USB port.
    a. Wait for the USB device to enumerate with the PC.
    b. If the USB device is new to the PC, go through the USB driver installation.
2. If not already running, launch the *WRCU*.
3. Go to File->Configure ZENA Wireless Adapter

a. If the *WRCU* is already configured, the user will be prompted if they would like to end the current session.

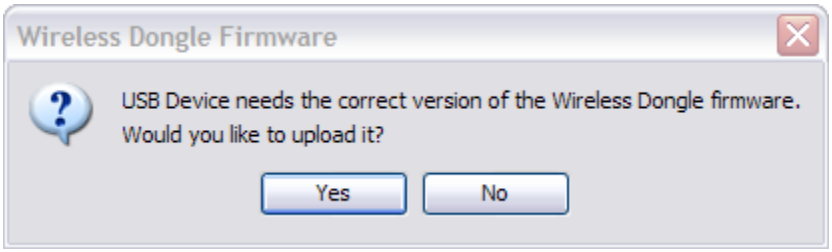


4. The USB Configuration Dialog will appear and will contain the available devices.
   a. If the *Adapter* is not seen, select refresh.
5. Find the *Adapter* in the configuration table using the serial number.
6. Select OK.



7. If the firmware on the *Adapter* does not match the expected firmware, the user will be asked if they would like to upload new firmware.

a. If the user selects no, the selected *Adapter* will not be configured for use and the session will not start.



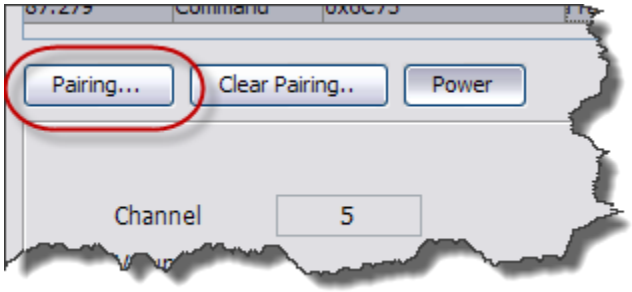
8. If the firmware has to be uploaded, a progress window will be displayed.
    a. After the firmware is uploaded, the *WRCU* session will start.
9. *WRCU* is ready to send and receive packets.

Pairing With a Wireless Remote

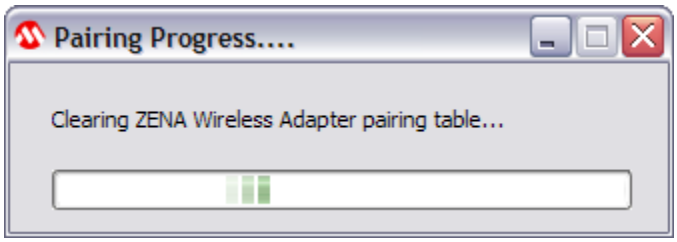
To receive commands from the *remote* to display on the *WRCU*, the *target* will need to be paired to the *remote*. Both the *remote* and the *target* will need to have an available pairing table entry. If there is not an available pairing table entry on either the *target* or *remote*, the pairing table will need to be cleared for a successful pairing.

To pair a *target* and *remote* follow these steps

1. Make sure that the *target* and *remote* have an available paring table entry
2. Place the *remote* and *target* less than 2 feet (~60 cm) from one another.
3. Start the *target* pairing process by pressing the Pairing button.

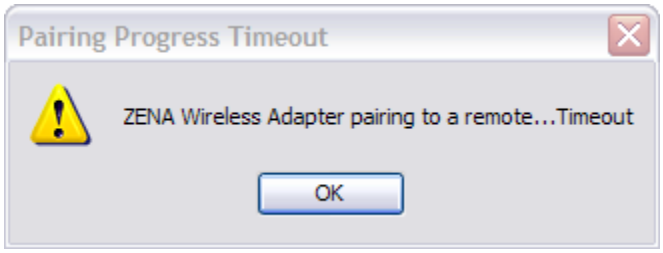


    a. If the Pairing button is disabled, the *Adapter* is not configured properly.
4. Start the *remote* paring process.
5. The Pairing/Clear Pairing Status Dialog will appear.

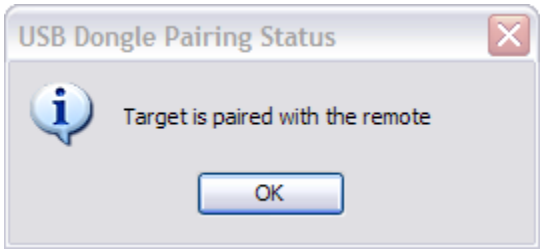


6. When the result of the pairing is done, pass or fail, a message box will appear to indicate the result.

7. If the result is failure, check the *target* and remote for any errors and repeat.



8. If the result is success, the *WRCU* is ready to receive command packets from the *remote*.



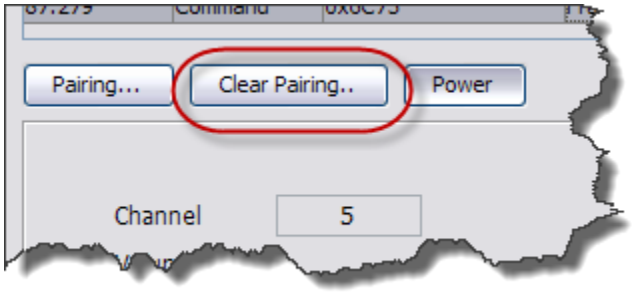
Clearing the ZENA Wireless Adapter's Pairing Table

Clearing the pairing table entries on the *Adapter*, will clear all of the entries, this effectively "un-pairs" all entries. Any *remotes* that have been paired to the *target*, after clearing the *target's* pairing table, will have to pair to that *target* again.

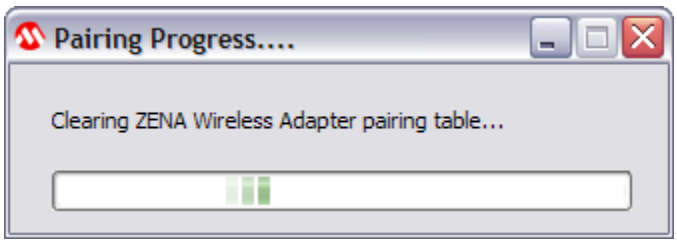
If the Clear Pairing button is disabled, this indicates that all of the pairing table entries are available and clearing is not needed.

To clear the *target's* pairing table follow these steps

1. Start the clearing of the pairing table by pressing the Clear Pairing button



2. The Pairing/Clear Pairing Status Dialog will appear.



3. When the result of the pairing is done, pass or fail, a message box will appear to indicate the result.

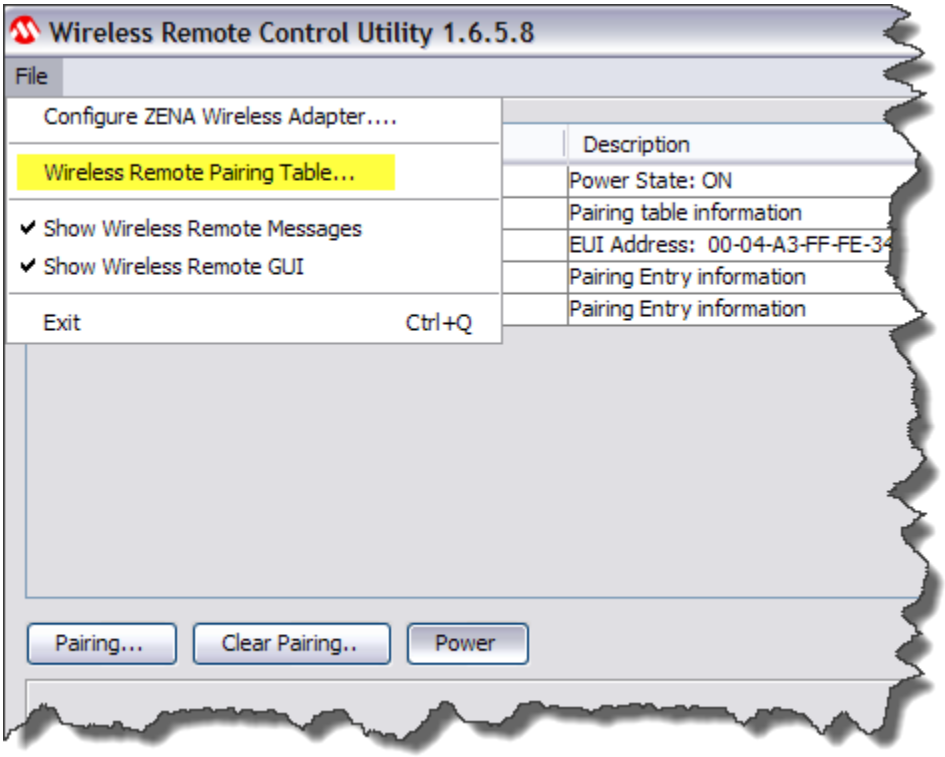
4. If the result is failure, check the *target* for any errors and repeat.
5. If the result is success, the *target* has a cleared pairing table with all pairing entries available.

Viewing Pairing Table Entries

After the *Adapter* is been configured by the *WRCU*, it may contain valid pairing entries. These pairing entries can be viewed by the Pairing Table Entries dialog. The pairing table information is updated by configuring the *Adapter*, pairing a *remote*, or clearing the pairing table.

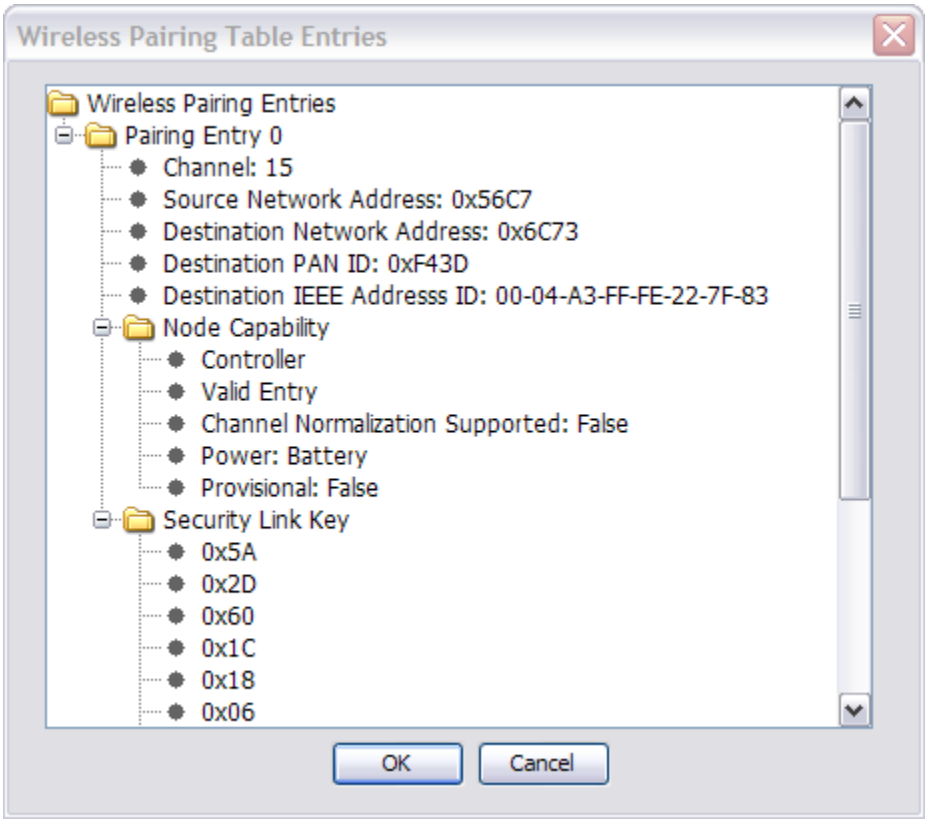
To view the valid pairing table entries follow these steps

1. Open the dialog by going to File->Wireless Remote Pairing Table…
   a. If there are no valid pairing table entries, a message box will appear indicating so.



2. Under the Pairing Entries root, there will be pairing entry nodes

a. To expand the nodes, either click on the expanding box or double click on the node.

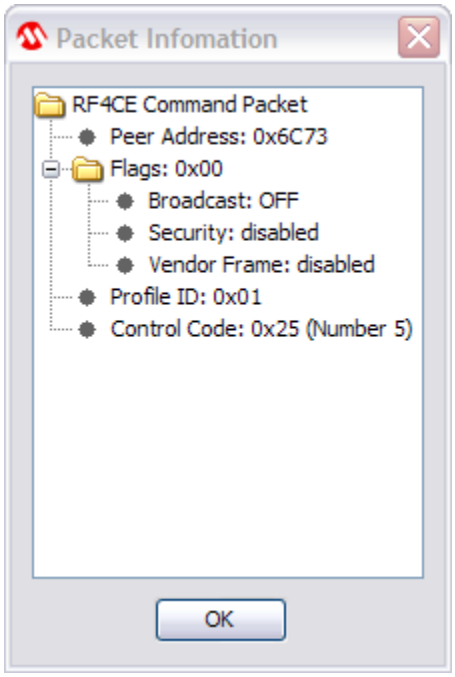


3. Pairing entry data will be displayed.

Viewing Messages

Messages from the *remote* are displayed in the Wireless Remote Message Table. For a more detailed view of the message, the user can double click the message. This brings up a Packet Information dialog. The dialog contains a detail break down of the message. While all messages can be double clicked to display the Packet Information, most information can be obtained from double clicked message from

the *remote* (valid peer address and command or status message type).



TROUBLESHOOTING

When I go to configure the *Adapter*, the *WRCU* does not list it on the configuration table?

- Make sure that the *Adapter*'s drivers have been properly installed.
- Make sure that the *Adapter* has been enumerated.
    - Pressing the refresh button may fix this problem.
- Make sure that the drivers used by the application have been installed
    - This should have been taken care of in the initialization of the application. If you have uninstalled MPLAB X IDE, you may need to re-install the application to make sure the drivers were not deleted as part of the MPLAB X uninstaller.

I am unable to successfully pair the *remote* to the *target*.

- Make sure that the *remote* has the proper firmware loaded.
- Make sure that BOTH the *target* and *remote* has an available pairing entry available.
- Make sure that they are close enough to establish pairing discovery.

I have stopped receiving remote messages.

- Make sure that the *target* is pairing to the *remote*.
    - The valid pairing entries should have a the *remote* entry information
- Try re-pairing the *target* and *remote*.
- Make sure that the *Adapter* is plugged and configured properly

I get the message box titled “USB Error” and the message is “In Packet type invalid: 0x00.”

- The *Adapter* has been un-enumerated or un-plugged.
    - Re-plugging the *Adapter* will re-establish the connection.