

# Realtek/Intel UWB Dongle Demo Board User's Guide

Revision A

## Table of Contents

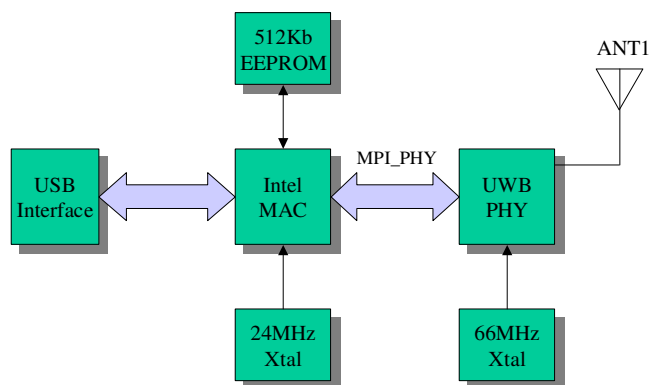
1	Introduction .....	3
2	System Description .....	3
2.1	UWB PHY .....	3
2.2	Intel MAC .....	4
2.3	EEPROM .....	4
3	Software.....	4
3.1	Driver/Application Installation .....	4
3.1.1	Setup .....	4
3.1.2	Driver Installation.....	7
3.1.2.1	USB Dongle .....	7
3.1.2.1.1	DFU Driver.....	7
3.1.2.1.2	Control Driver .....	10
3.1.2.1.3	HWA(Host Wire Adapter) Driver .....	14
3.1.2.1.4	WiNet Driver .....	19
3.1.3	Application Operation.....	23
4	Hardware Interfaces .....	26
4.1	USB Interface.....	26
5	Instruction to The User.....	26
6	Document History .....	27

## 1 Introduction

This document describes the operations, interfaces, and software installation of the Realtek/Intel UWB USB Dongle Demo Board.

## 2 System Description

Figure 1 shows the system block diagram of the Realtek/Intel UWB USB Dongle Demo Board.



**Figure 1 System Block Diagram**

The demo system mainly consists of two main chips – (i) UWB PHY, (ii) Intel MAC. A serial EEPROM is required to store proper data/commands for the PHY chip and MAC chip. To make the system work properly, the EEPROM should be loaded with proper content by using proper EEPROM writing equipment through I2C interface. Two basic clock frequencies are used in the system – 24MHz for MAC and 66MHz for PHY. Some more details of the components are shown in the following sections.

### 2.1 UWB PHY

This chip integrates the RF and baseband functions of a UWB PHY defined by the standard. This version of PHY chip is packaged in 48-pin QFN form factor. The analog/RF section requires 1.65V and 3.3V to operate. The digital core operates with 1.4V and the I/O voltage can support a range of 1.8V~3.3V.

## 2.2 Intel MAC

This MAC chip(Rhondda-M, 144-pin BGA) is from Intel which has a standard MPI interface to communicate with a standard UWB PHY, as well as a standard USB 2.0 interface to connect directly to a PC. This chip requires voltages of 1.5V and 3.3V.

## 2.3 EEPROM

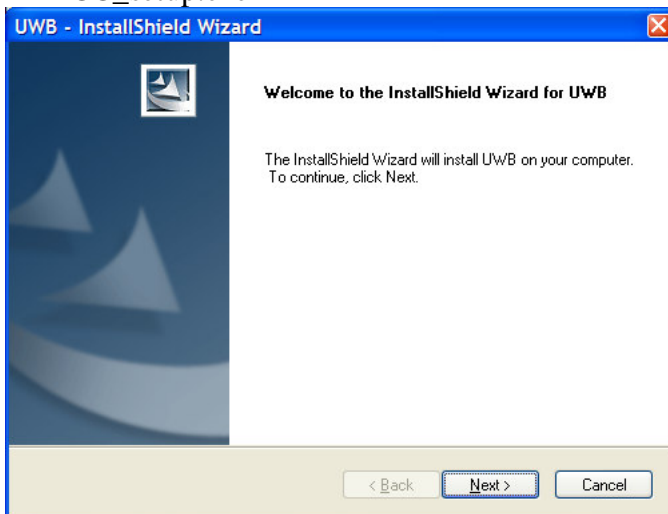
This chip is a serial EEPROM from Atmel with a capacity of 512Kb. It is used by the MAC to store the initialization data and command sequence required by the MAC and PHY on start up. This chip requires 2.7V~5V. On the application circuit, it's powered by 3.3V.

# 3 Software

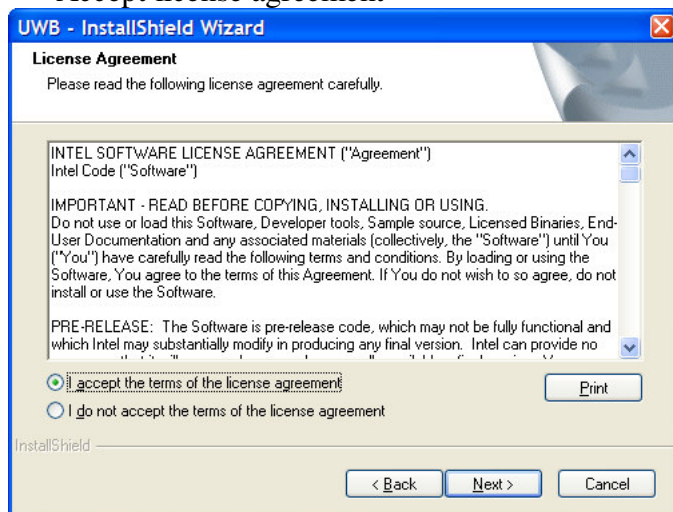
## 3.1 Driver/Application Installation

### 3.1.1 Setup

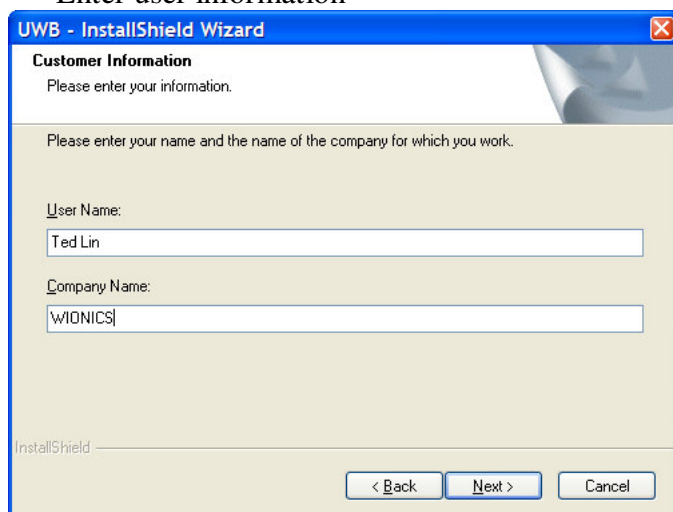
- Microsoft .NET Frame 2.0 should be installed before installing the software. Please download it from Microsoft web site.
- Make sure the HWA USB dongle is not connected to the PC/Laptop. Execute FCC\_setup.exe



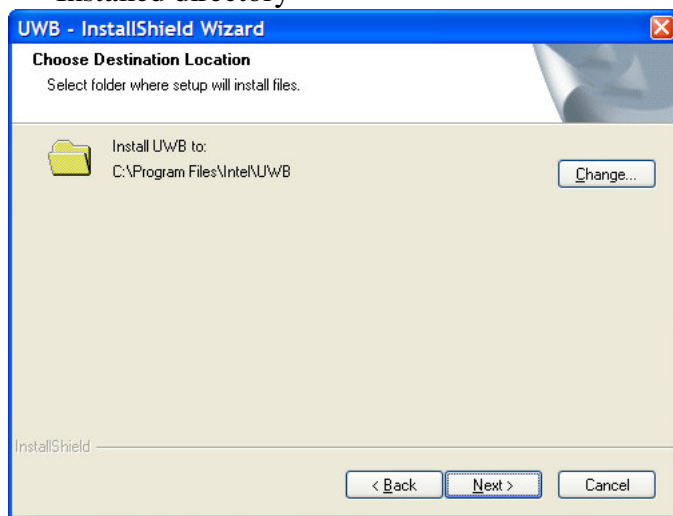
- Accept license agreement



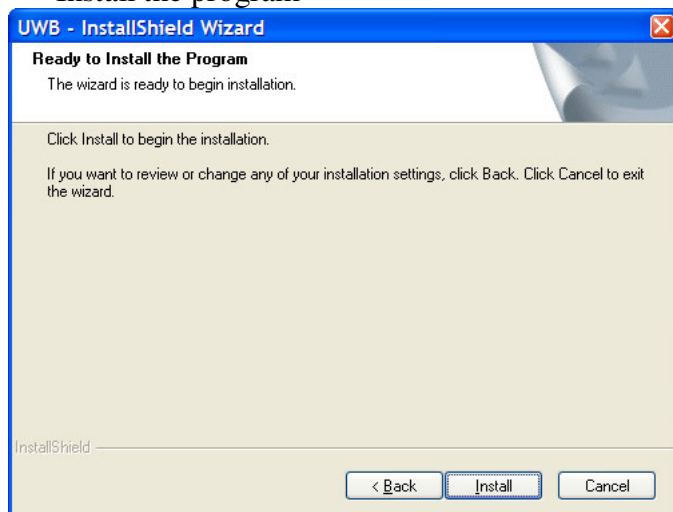
- Enter user information



- Installed directory

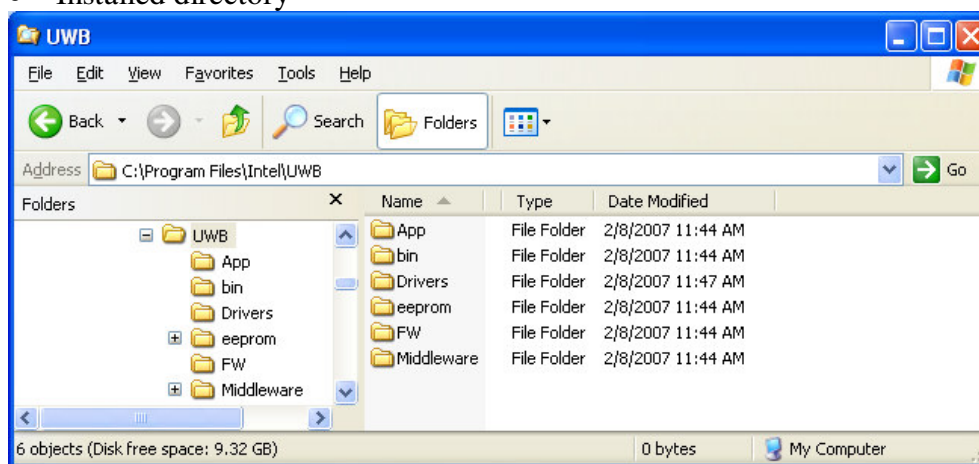


- Install the program



- The programs and drivers are install in the directory C:\Program Files\Intel\UWB

- Installed directory



- **Copy all files in the Drivers directory of the software package into the installed directory and overwrite every files, i.e., C:\Program Files\Intel\UWB\Drivers.**
- **Copy all files in the App directory of the software package into the installed directory and overwrite all files, i.e., C:\Program Files\Intel\UWB\AppData.**

## 3.1.2 Driver Installation

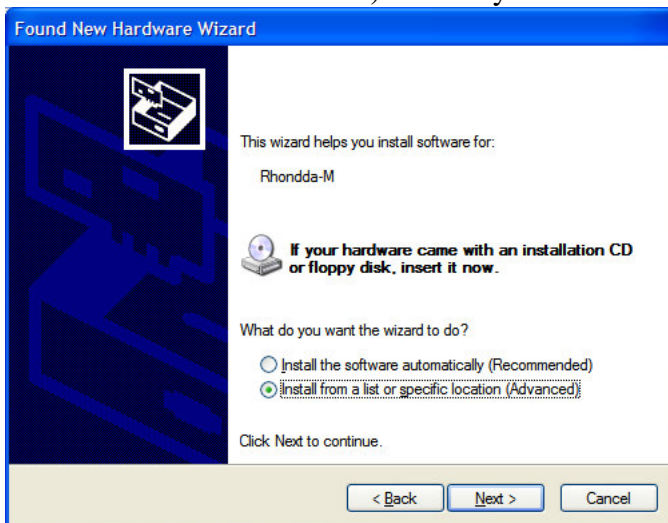
### 3.1.2.1 USB Dongle

#### 3.1.2.1.1 DFU Driver

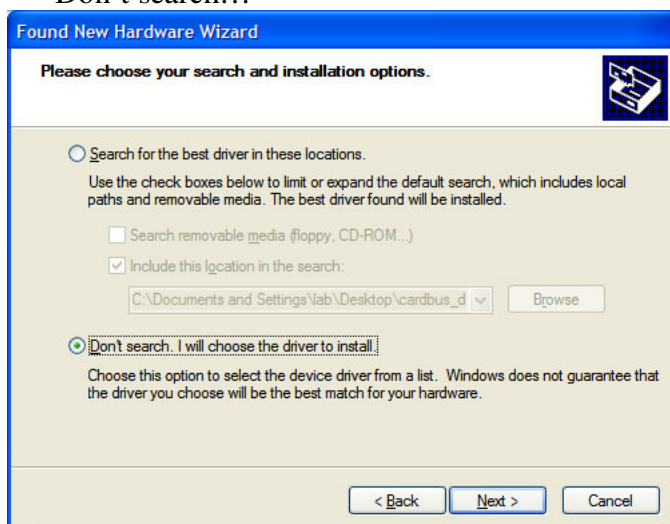
- Plug in the dongle, wait for the following dialog



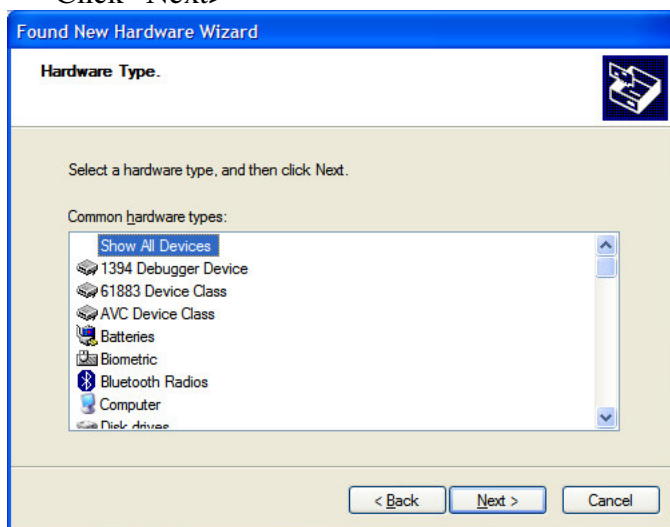
- Install the drivers from the specified location(C:\Program Files\Intel\UWB\Drivers) manually



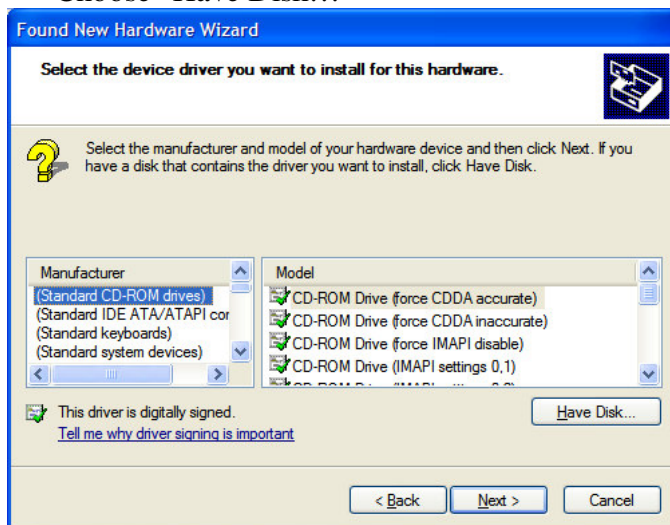
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- Click "Next>"

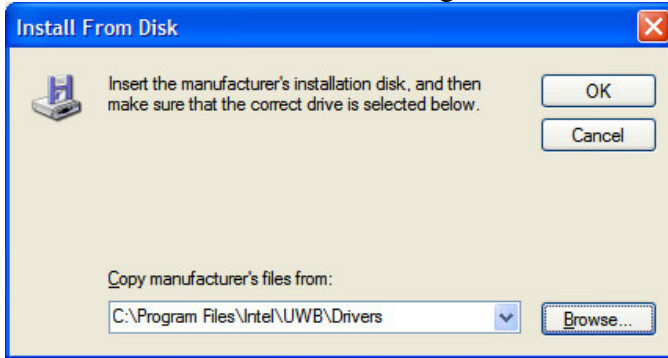


- Choose "Have Disk..."

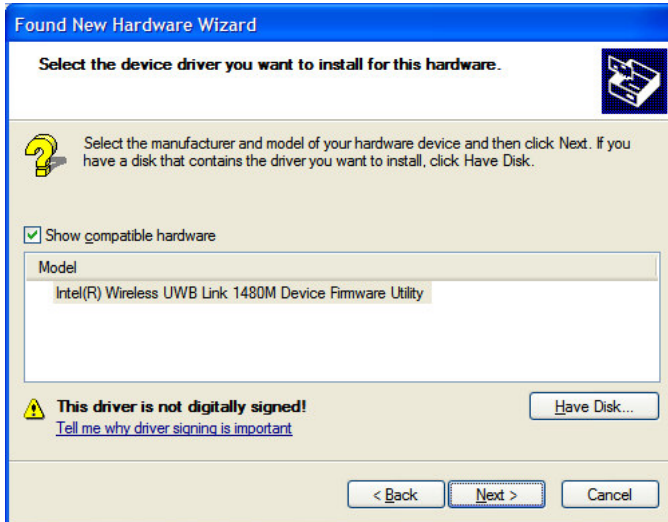




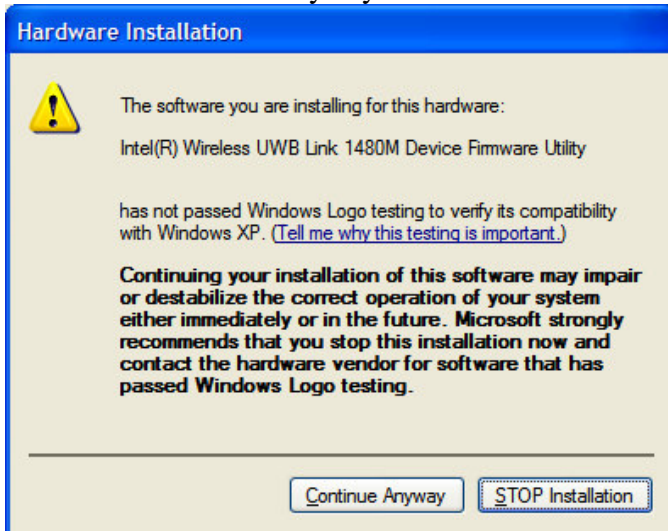
- Install the drivers from C:\Program Files\Intel\UWB\Drivers



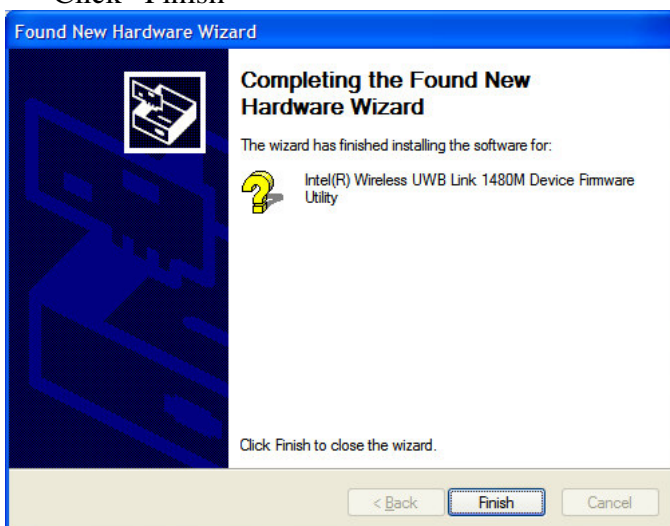
- Click “Next>”



- Click “Continue Anyway”



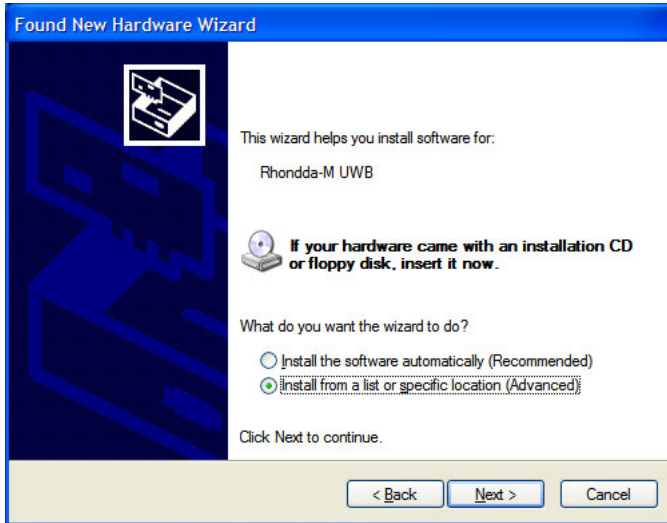
- Click “Finish”



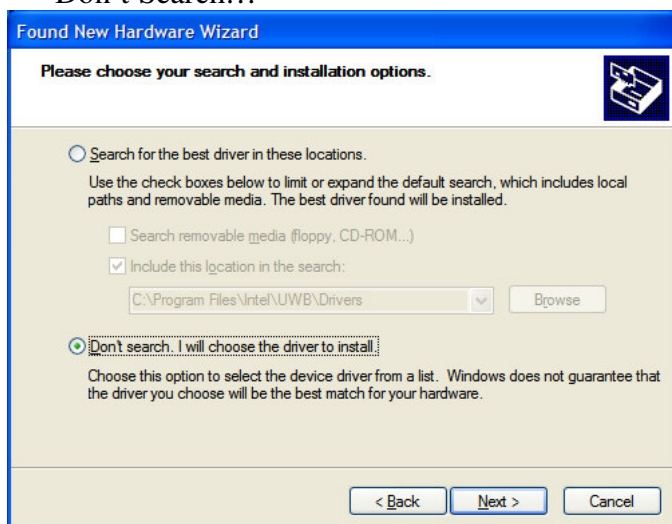
### 3.1.2.1.2 Control Driver



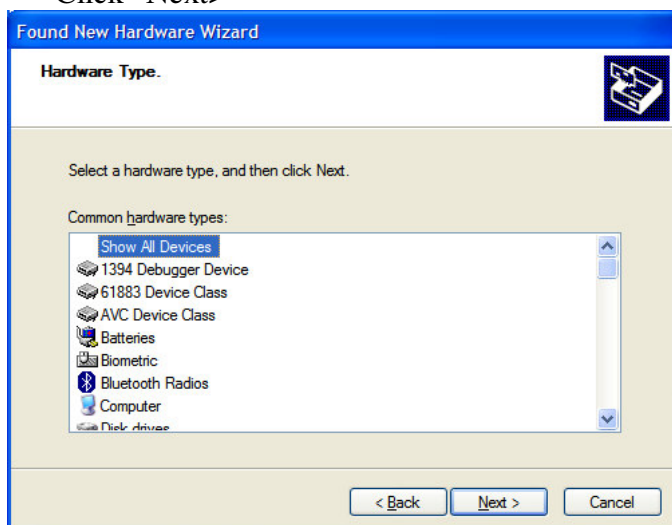
- Install the drivers from the specified location(C:\Program Files\Intel\UWB\Drivers) manually



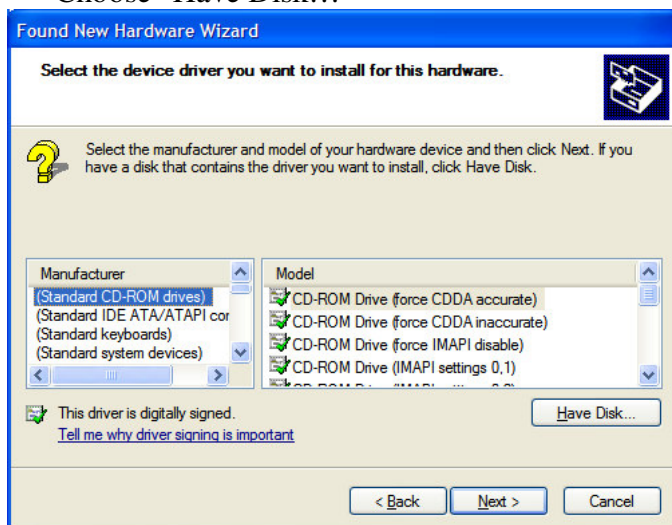
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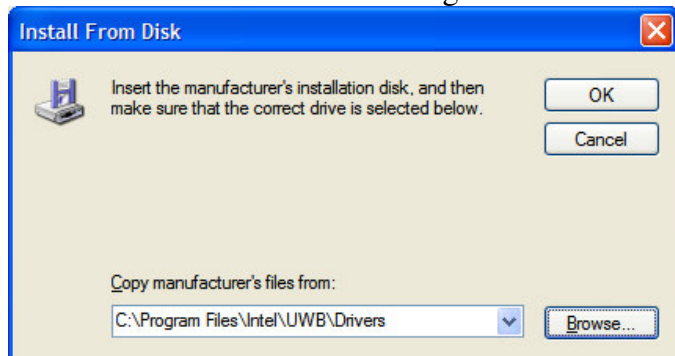
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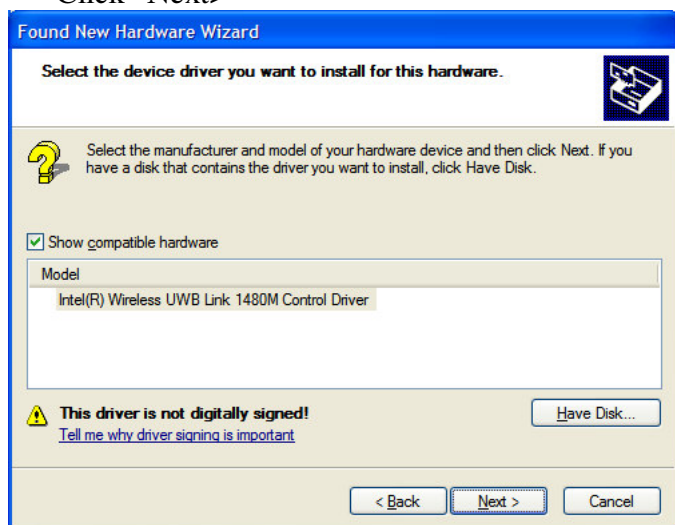
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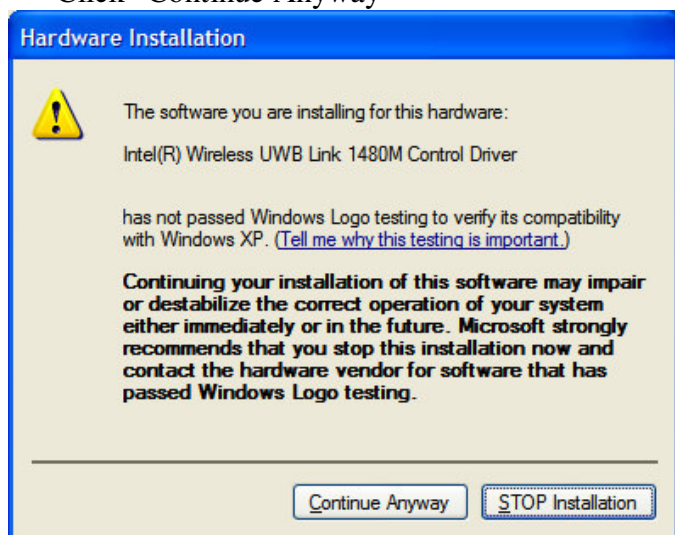
- Install the drivers from C:\Program Files\Intel\UWB\Drivers



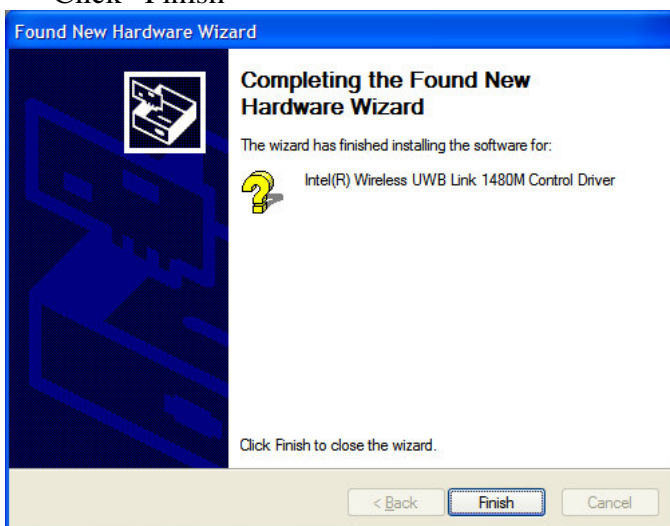
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- Click “Continue Anyway”



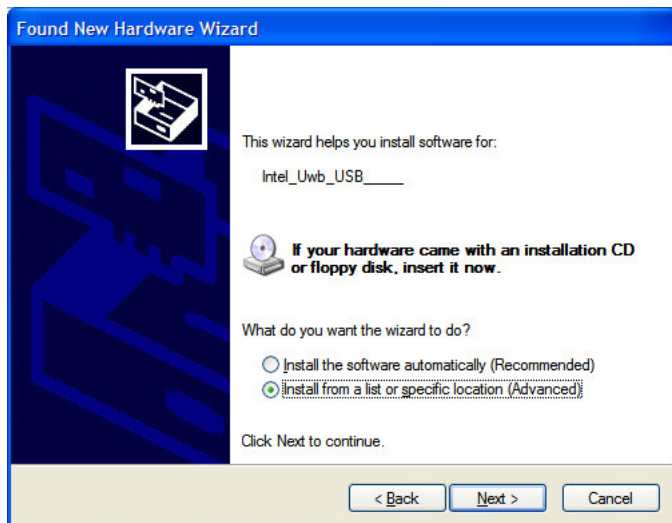
- Click “Finish”



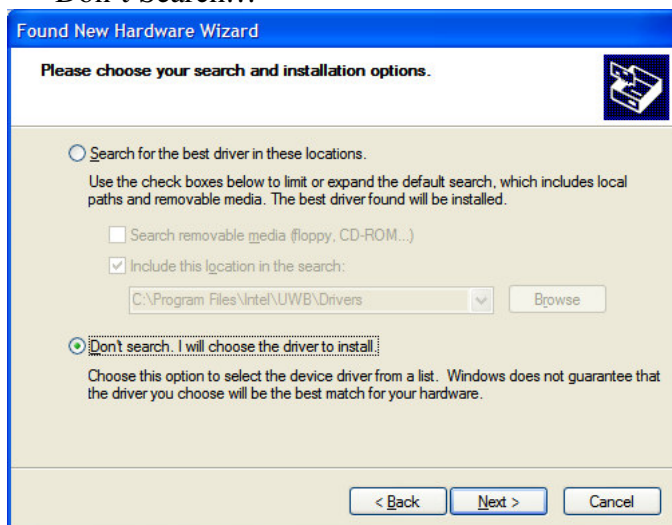
### 3.1.2.1.3 HWA(Host Wire Adapter) Driver



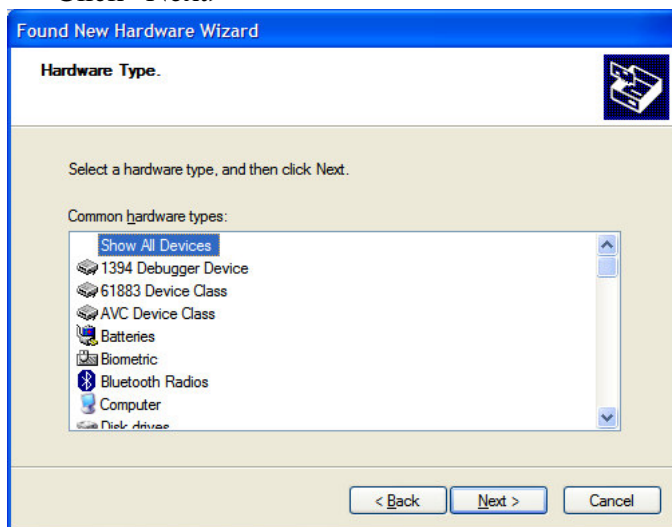
- Install the drivers from the specified location(C:\Program Files\Intel\UWB\Drivers) manually



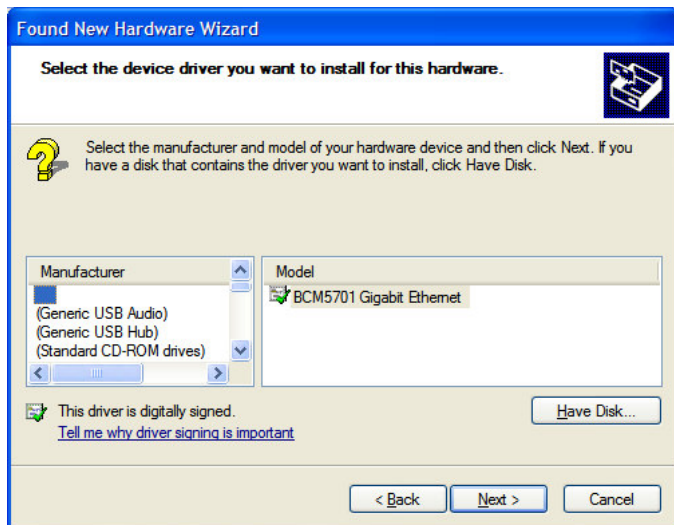
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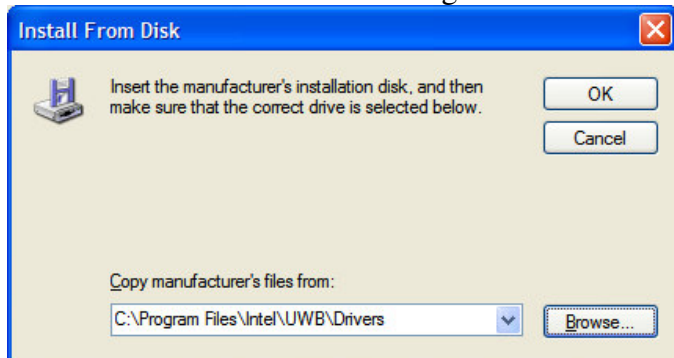
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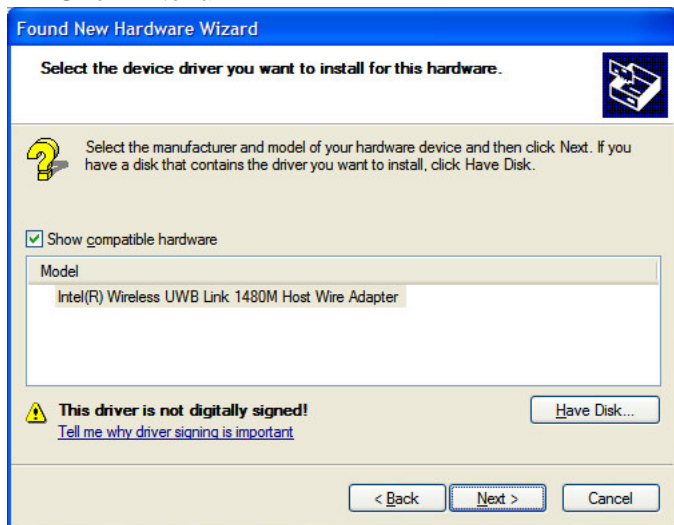
- Click "Have Disk..."



- Install the drivers from C:\Program Files\Intel\UWB\Drivers



- Click "Next>"

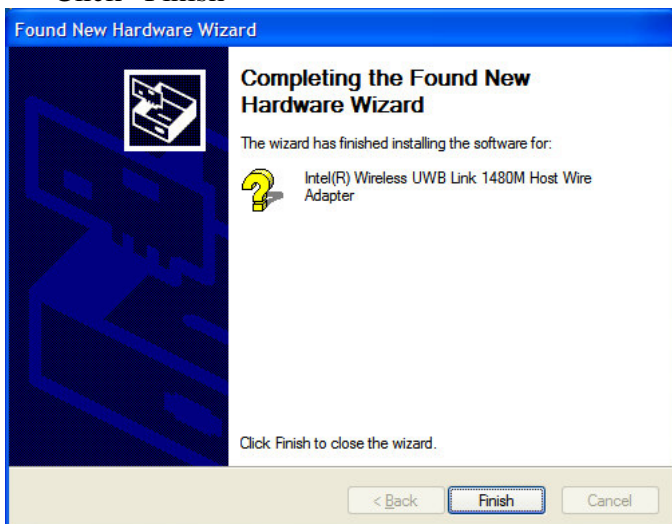


- Click "Continue Anyway"

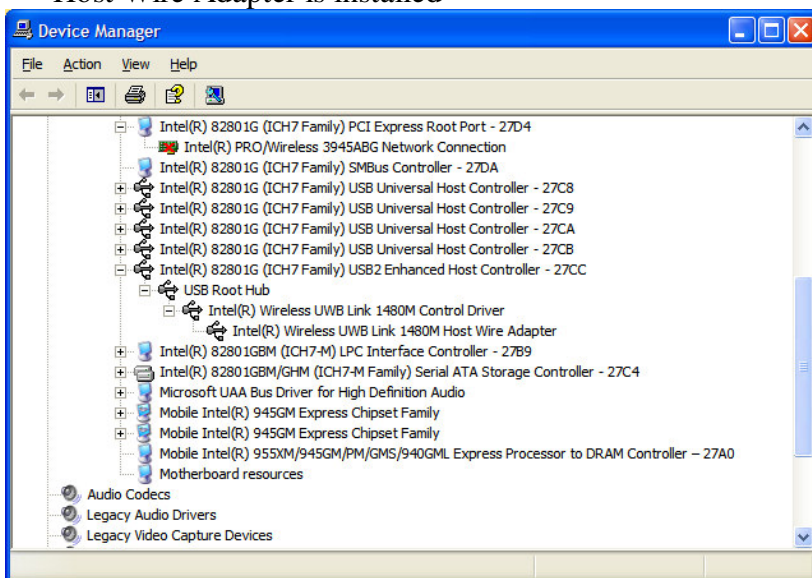




- Click “Finish”



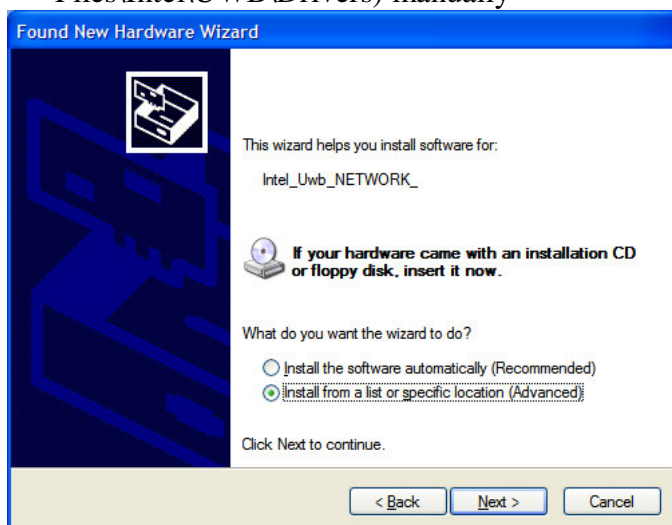
- Host Wire Adapter is installed



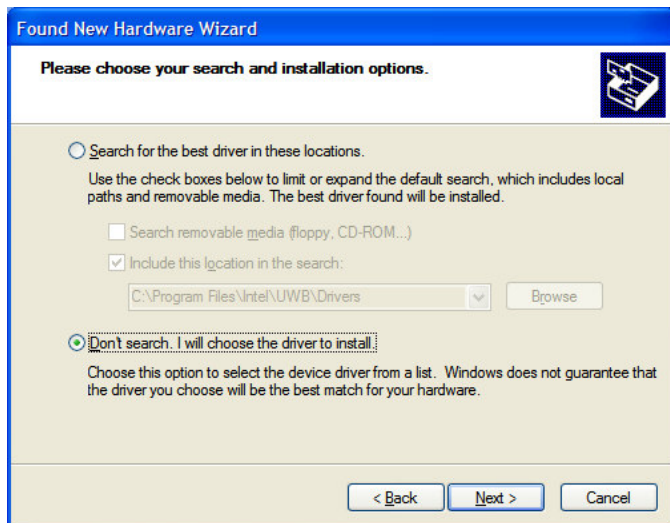
### 3.1.2.1.4 WiNet Driver



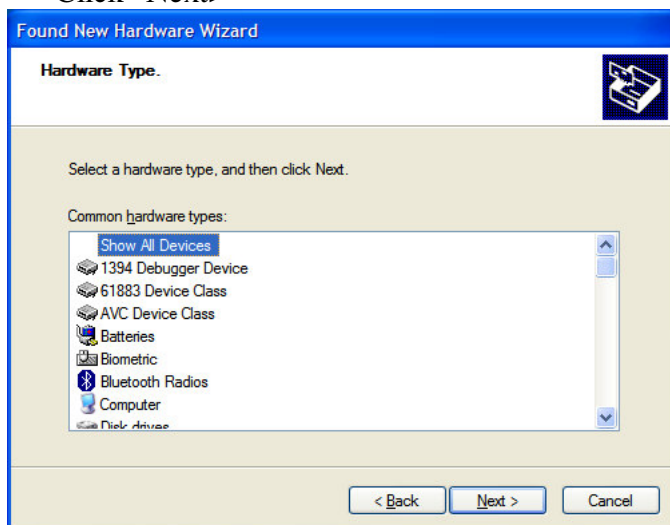
- Install the drivers from the specified location(C:\Program Files\Intel\UWB\Drivers) manually



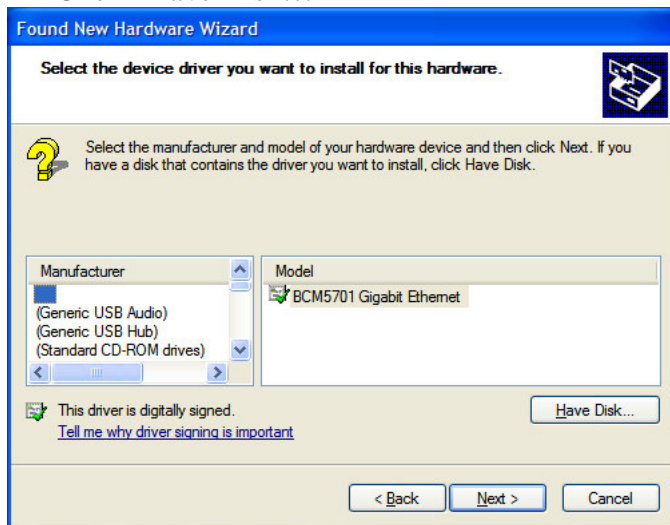
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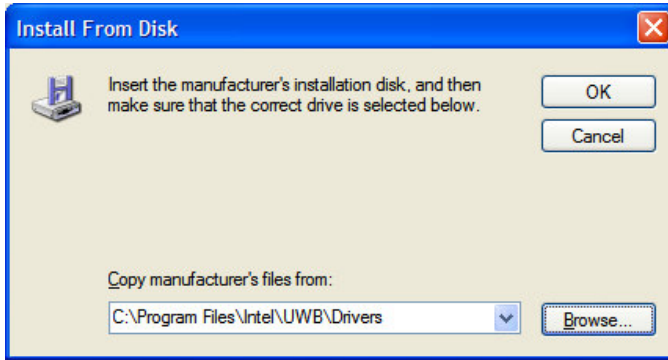
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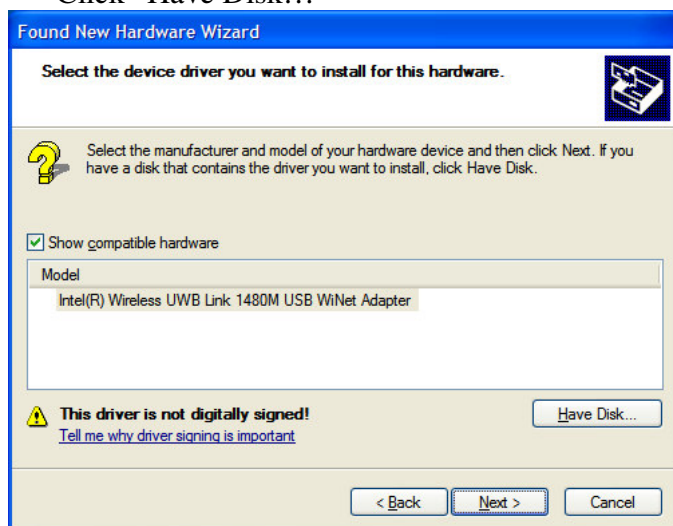
- Click "Have Disk..."



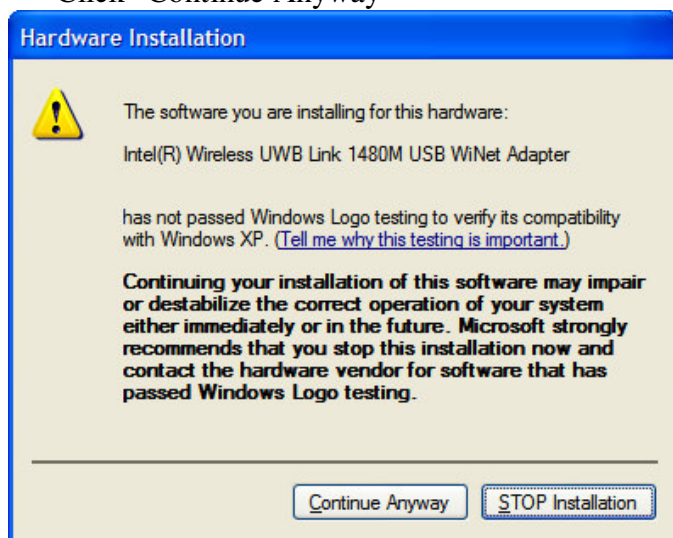
- Install the drivers from C:\Program Files\Intel\UWB\Drivers



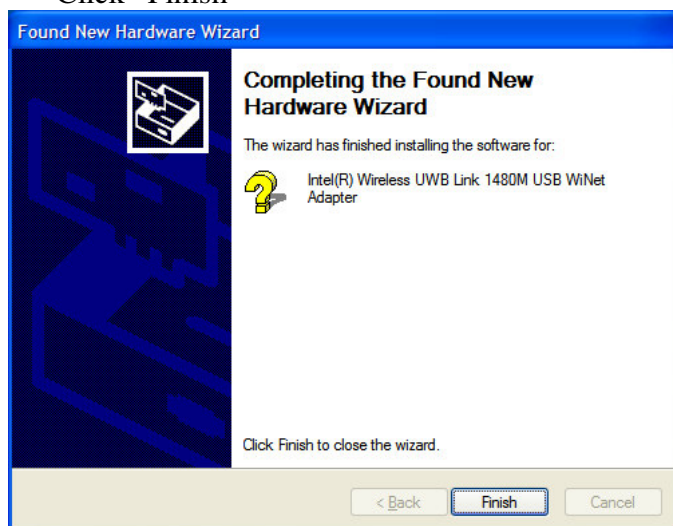
- Click “Have Disk...”



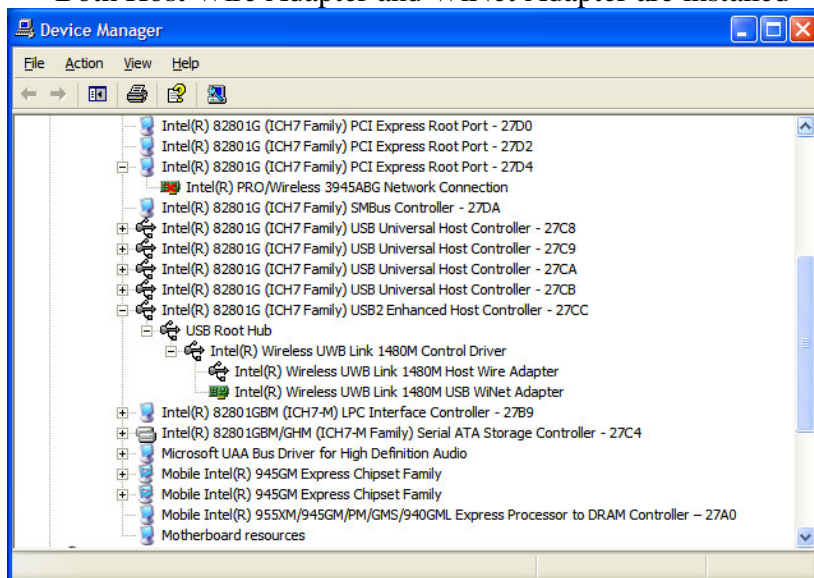
- Click “Continue Anyway”



- Click “Finish”

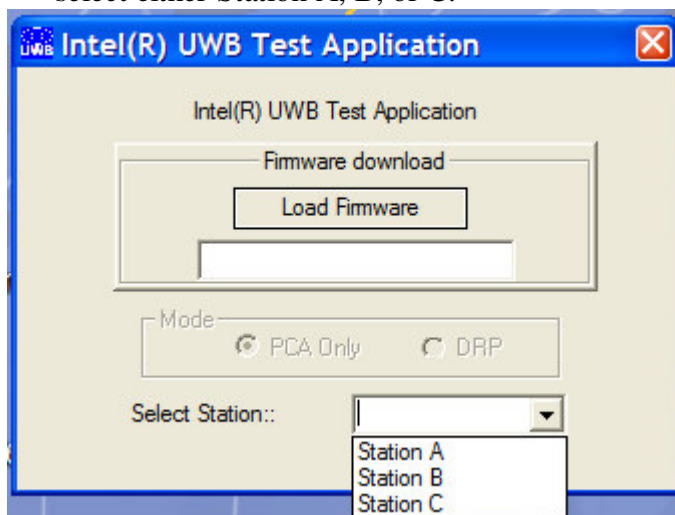


- Both Host Wire Adapter and WiNet Adapter are installed

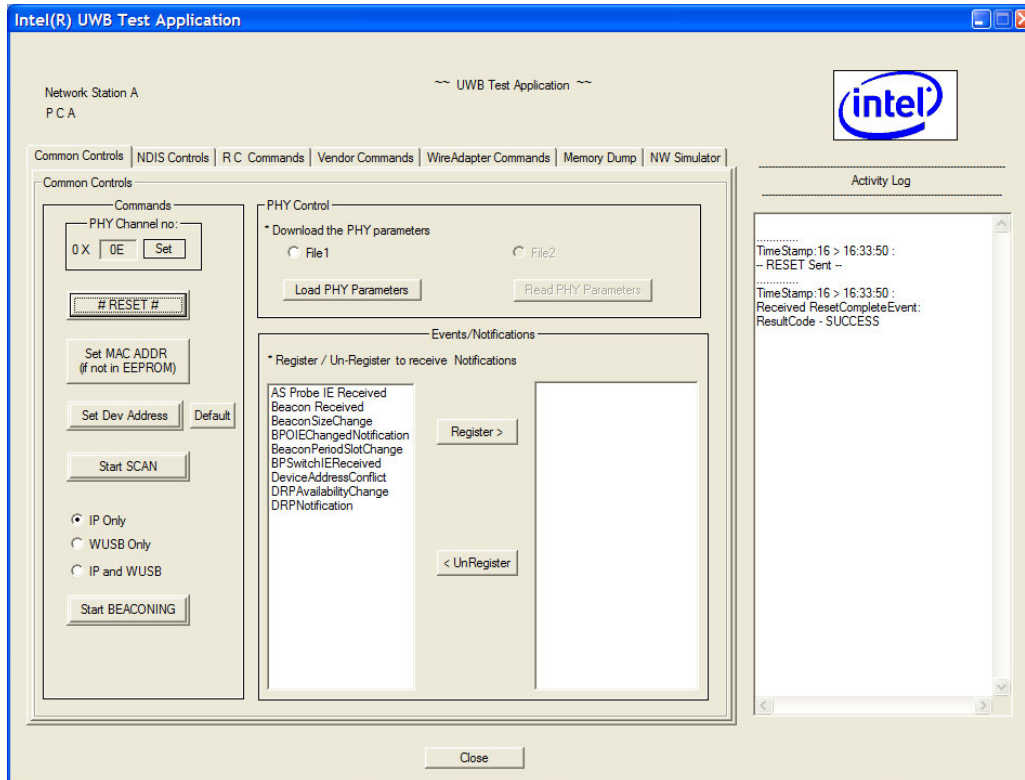


### 3.1.3 Application Operation

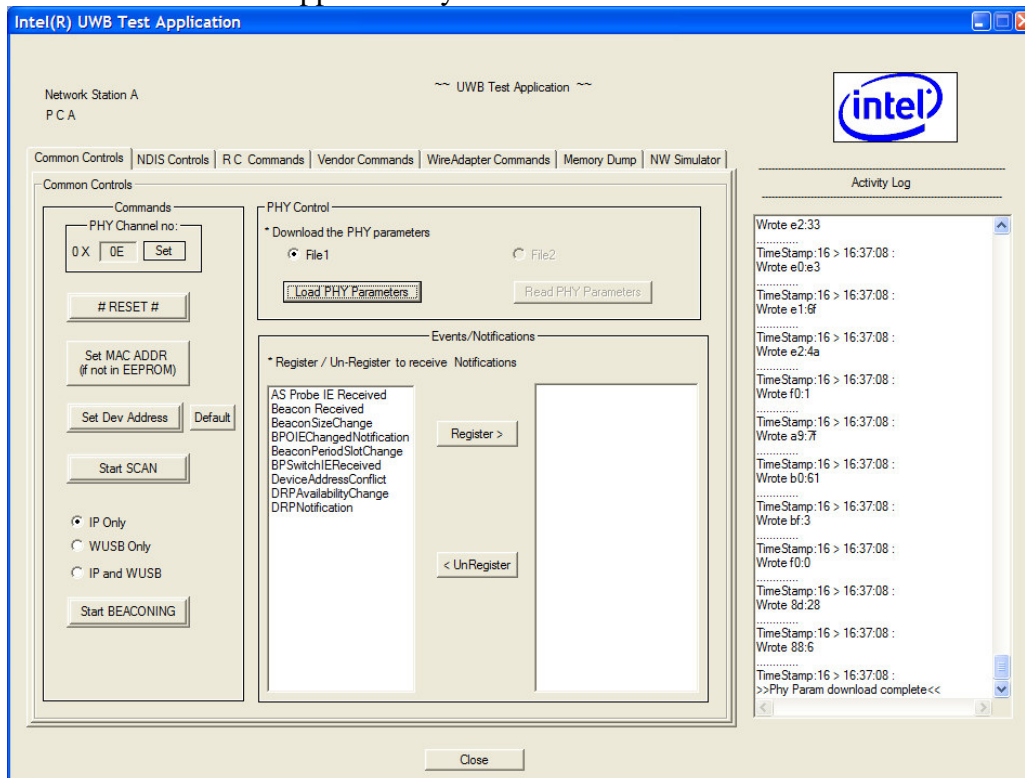
- Execute the C:\Program Files\Intel\UWB\App\UWB Test Application.exe, and select either Station A, B, or C.



- Press #RESET# button in the Commands block of the Common Controls tab

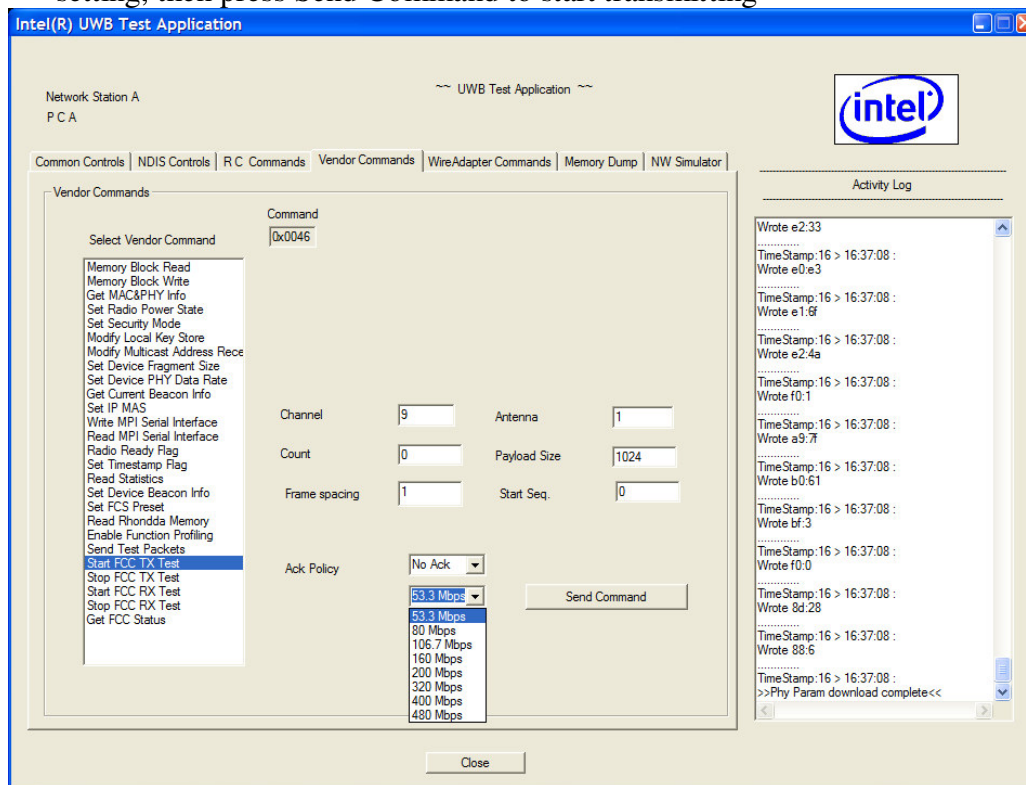


- Select File1 and press Load PHY Parameters in the PHY Control block to load the PHY parameter file, RTU7010-13RF1.TXT, from the C:\Program Files\Intel\UWB\App directory.





- Change to Vendor Command tab, select Start FCC TX Test, configure transmit setting, then press Send Command to start transmitting



- Channel: 7 channels can be tested. TFC-1~7. The mapping is in the table 1 below.
- Antenna: 1. Do not change to other values. Only antenna 1 is used.
- Count: Transmit packet count. Set to 0 to transmit continuously.
- Payload Size: 0~4095.
- Frame spacing: 1~255. Set to 1 for the minimum Tx frame spacing.
- Start Seq.: Don't care.
- Ack Policy: No Ack.
- Transmit packets data rates: 8 different data rates to test. 53.3Mbps, 80Mbps, 106.7Mbps, 160Mbps, 200Mbps, 320Mbps, 400Mbps, and 480Mbps.

**Table 1 Channel Table**

TFC	Channel Value
1	9
2	10
3	11
4	12
5	13
6	14
7	15

- Select Stop FCC TX Test and press Send Command to stop transmitting.
- To continue Tx tests with different Tx setting, just change the setting and press Send Command without leaving the Start FCC TX Test.
- Whenever there's Tx or Rx activities, one of the lights (LED's) should be blinking. If the light is not blinking, press the Sand Command again. If the light is still not blinking or in any other abnormal situations that the USB dongle is not working correctly, close the application, unplug the dongle, and re-plug the dongle, execute the application and do the test again.
- To enable receive function, just select Start FCC RX test, configure related setting, and press Send Command to start receiving.
- Activity Log window also shows commands result of the dongle being tested.

## 4 Hardware Interfaces

### 4.1 USB Interface

Table 2 shows the pinout of the USB interface.

**Table 2 USB Connector Pinout**

Pin#	Pin Name	Description
1	VBUS	USB BUS Power = 5V
2	Data-(D-, DM on the schematic)	Differential Data Pin -
3	Data+(D+, DP on the schematic)	Differential Data Pin +
4	GND	USB BUS Ground

## 5 Instruction to The User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- \* Reorient or relocate the receiving antenna.
- \* Increase the separation between the equipment and receiver.
- \* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

\* Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables

is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This equipment may only be operated indoors. Operation outdoors is in violation of 47 USC Section 301 and could subject the operator to serious legal penalties.

## 6 Document History

<b>Date</b>	<b>Revision</b>	<b>Description</b>	<b>Author</b>
02/14/07	A	Initial Release	Ted Lin