

USB-IF WHCI-based PDK

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Revision 1.1

About this Document

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Revision History

Revision 1.0	Release
Revision 1.1	Supported PDK HW (attenuator specification), Removed HW assembly, SW support, & generic Device Manager reference.

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1. Summary

This document illustrates USB-IF WHCI-based PDK technical installation and operation. The procedures should be performed by a qualified systems technician. Instructions included in this document:

- System Preparation
- PDK Assembly
- PDK Installation

2. Introduction

This document is provided as a resource from Intel Corporation for the installation of the USB-IF WHCI-based PDK and is recommended when installing the USB-IF WHCI-based PDK Host for the first time or as a training refresher.

3. Scope

Instructions will cover workstation setup, system hardware requirements, and software installation guidelines. All three are required to ensure the PDK product will function properly. The workstation setup environment, system hardware specifications, and software installation have been tested by qualified Intel hardware technicians. Any deviation may result in unpredictable behavior in the Wireless USB Host product (PDK).

4. Implementation

USB-IF WHCI-based PDK Hardware will provide a PC with a Wireless USB Host controller that will connect Wireless USB devices as defined by the Wireless USB specification. Following this documentation will provide a baseline system, providing a development test system for Wireless USB devices to connect that are in or near the final stages of development. Furthermore this document is not a substitution for any referenced documentation.

5. References

Wireless USB Specification Revision 1.0
<http://www.usb.org/developers/wusb/>

PDK System Overview
http://www.usb.org/developers/estoreinfo/PDK_Overview/PDK_Overview

Acronyms

EEPROM	Electrically Erasable Programmable Read-Only Memory
ESD	Electro Static Discharge
CCA	Clear Channel Assessment
DUT	Device Under Test
FW	Firmware
HW	Hardware
I/O	Input / Output
JMB2	Host Product Development FPGA Board from Intel Corporation
MAC	Media Access Controller
MB	Motherboard
MPI	MAC PHY Interface
NC	No Connection
OS	Operating System
PC	Personal Computer
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCLK	PHY Clock Signal
PDK	Product Development Kit
PHY	Physical Layer
RF	Radio Frequency
RXEN	Receive Enable Signal
SMA	Sub Miniature version A Coax Cable Connection
TXEN	Transmit Enable Signal
USB	Universal Serial Bus
USB-IF	Universal Serial Bus Implementers Forum
UWB	Ultra Wide Band
WHCI	Wireless Host Controller Interface
WUSB	Wireless Universal Serial Bus

6. Workstation Preparation

6.1. Equipment and Materials

1. Product Development Kit
 - a. USB-IF WHCI-based PDK PCI Card Assembly
 - b. 2 WATT, DC to 18 GHz SMA Attenuator Impedance: 50 OHMS (-30 dB or a value that emulates a 1 to 2 meter loss in over the air attenuation)
 - c. 3' RF Cable, DC to 24 GHz SMA Male to SMA Male
 - d. Approved Vendor PHY
 - e. Technical Documentation
 - f. Software and Drivers
2. Recommended Computer System

Current model Desktop PC with available PCI slots.
(See section 6.2)
3. 5/16" Torque Wrench Calibrated to 8 lb-in
4. Recommended: UWB/Wireless USB Protocol Analyzer
5. Optional: Spectrum Analyzer 30Hz -18GHz
6. Optional: Logic Analyzer

6.2. PDK System Requirements

Recommended system requirements: The following system requirements are tested and ensures the highest system stability for the PDK. Any modifications to this list of hardware may result in system related failures or system crashes.

- ATX or BTX Mid Tower Desktop System Case
- Intel Desktop Board (or equivalent) with 2 adjacent 5v PCI slots, for PDK card clearance
- Intel Pentium 4 processor 1.8GHz or Higher clock speed
- 512MB of RAM or higher
- 450V Power Supply or higher power rating with AC Power Switch
- DVD/CD-Rom Drive
- 40GB or Higher Hard Disk with 10GB of free space
- Monitor, Keyboard and Mouse
- Windows Operating System

6.3. Hardware Configuration

6.3.1. PDK Dimensions

1. 1.5" [38.1 mm] is recommended for the component side of the PDK for PHY clearance. The Outside dimensions of the PDK are:
 - Card Length from the PCI I/O bracket = 6.88" [174.6 mm]
 - Card Width from the PCB mounting surface = 1.0" [25.4 mm]
 - Card Height from the top of the PCI connector = 4.33" [111.1 mm]
2. Power is provided to the PDK through the PCI connection.
3. An RF SMA bulkhead connection is attached to a standard PCI I/O bracket to provided an external RF cable or antenna connection. One 3" RF interconnect cable is provided with the PDK, antennas are not included. All RF testing should be conducted only.
4. Note: PHY's may vary in dimension and MPI hardware. A good example of the MPI header is provided to clarify a proper MPI connection. Proper HW assembly of the MAC and PHY is illustrated in Figure 1.0

6.3.2. PHY Header Requirements

Power to the PHY is provided through the MPI. Power Pins are referenced on Table 1.0. For detailed electrical specifications refer to the MAC-PHY Interface Specification.

6.4. Software Configuration

Install the recommended Wireless USB files provided by approved software vendors before installing the PDK HW.

After the Microsoft Wireless USB Software installation is finished, shut down and disconnect power to the PC then install the PDK hardware as described in section 6.5.

The PDK software is proprietary software provided by the USB-IF or their representative. Find more information regarding proprietary software setup at the USB-IF website.

6.5. Hardware Installation

6.5.1. PDK Assembly

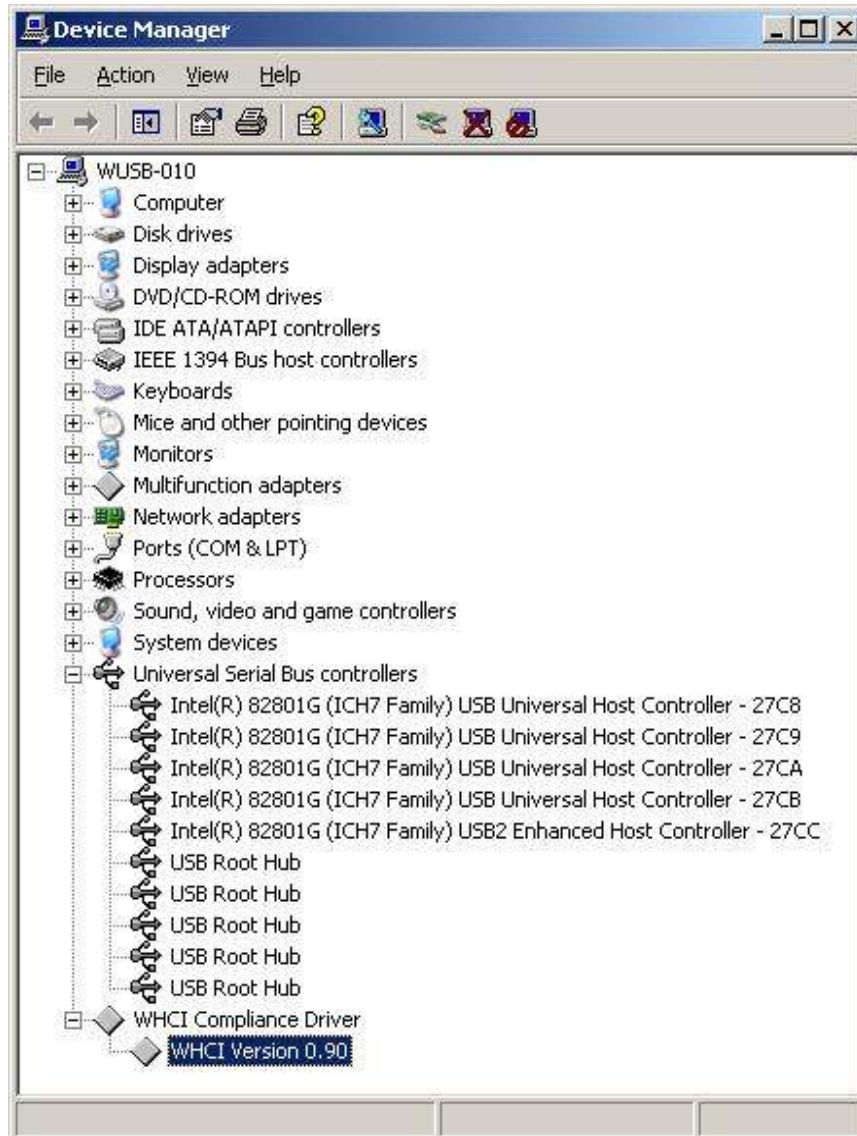
1. The PDK comes fully assembled and tested prior to shipment ready for installation. The Host PCI board and PHY are sold as the Wireless Host Controller Interface.
2. The PDK FW is PHY product specific. The only PHY supported by the PDK firmware comes installed prior to shipment.
3. Be certain the PHY is connected to the PDK board as illustrated in figure 1.0 Be certain the pin alignment is correct and all pins are connected to the PDK socket.
4. Removal of the product specific PHY and attaching a dissimilar PHY is not supported and will cause adverse behavior.

6.5.2. PDK System Installation

1. Installing the USB-IF WHCI-based PDK board.
 - a. Refer to section 6.4 above.
 - b. Shutdown the PC. Use *caution* anytime hardware is removed or inserted into a computer system
 - c. **Remove power to the PC system. If the PC does not provide a power switch unplug the power cord before attempting to remove or insert the PDK.** In this situation it's also recommended to use a properly grounded ESD strap if the AC plug is removed.
2. Power on the PC after the PDK is properly installed. When the OS loads Windows with the PDK for the first time the PC will find a new device connected to the PC. The New Hardware Wizard install will prompt the user to install a driver. It may be necessary to navigate (Browse) to the Program Files\USB-IF Test Suite\Wireless-USBCV\Driver\ folder during driver file installation if the installation wizard does not locate the drivers.

6.5.3. Device Manager Driver Reference

1. Once the driver installation is complete reboot the PC.
2. After the PC reboots, navigate to the Device Manager to confirm proper installation of the WHCI Compliance Driver.



7. Graphics and Tables

7.1. USB-IF WHCI-based PDK

Figure 1.0:



7.2. MPI Header Pins

Table 1.0: MPI

40 Pin MAC-PHY Connector Pin-Out			
Pin	Function	Pin	Function
1	Reset	2	Ground
3	Data 0	4	NC
5	Data 1	6	PWR
7	Data 2	8	PWR
9	Data 3	10	PWR
11	Data 4	12	PWR
13	Data 5	14	PWR
15	Data 6	16	PWR
17	Data 7	18	NC
19	Ground	20	Key
21	PCLK	22	Ground
23	TXEN	24	Ground
25	RXEN	26	Ground
27	PHY ACTIVE	28	NC
29	DATA ENABLE	30	Ground
31	CCA STATUS	32	Ground
33	SERIAL DATA	34	Ground
35	STOP CLOCK	36	Ground
37	Reserved 1	38	Ground
39	Reserved 2	40	Ground

8. PDK Programming Addendum

8.1. WHCI PDK Limitations

The PDK firmware is proprietary and may only be updated with firmware updater packages provided by the USB-IF or their representative.

The WHCI Compliance Driver is installed with WUSB-CV and is supported for use with MS XP. NOTE: The PDK drivers provided with WUSB-CV does not support HOST interoperation with Microsoft XP. HOST software and drivers for Microsoft XP is proprietary software. More information to acquire HOST software and driver packages are provided by the USB-IF or their representatives.

More information to acquire MS Vista HOST software and driver support are provided by the USB-IF or their representatives.

Disable the UAC (User Access Control) option when attempting to install WUSB-CV with MS Vista.

For more information, contact USB-IF @ www.usb.org

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