



**MICROCHIP**

---

**ZENA™ Wireless Adapter  
User's Guide**

---

**Note the following details of the code protection feature on Microchip devices:**

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

---

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

**Trademarks**

The Microchip name and logo, the Microchip logo, dsPIC, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC<sup>32</sup> logo, rPIC and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MXDEV, MXLAB, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Application Maestro, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniscient Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICkit, PICtail, REAL ICE, rfLAB, Select Mode, Total Endurance, TSHARC, UniWinDriver, WiperLock and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

All other trademarks mentioned herein are property of their respective companies.

© 2011-2012, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 978-1-61341-964-9

*Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC<sup>®</sup> MCUs and dsPIC<sup>®</sup> DSCs, KEELOQ<sup>®</sup> code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.*

---

**QUALITY MANAGEMENT SYSTEM**  
**CERTIFIED BY DNV**  
**== ISO/TS 16949:2009 ==**



# ZENA™ WIRELESS ADAPTER USER'S GUIDE

---

---

## Table of Contents

---

---

<b>Preface</b> .....	<b>5</b>
<b>Chapter 1. Overview</b>	
1.1 Introduction .....	11
1.2 ZENA Wireless Adapter Package Contents .....	11
1.3 ZENA Wireless Adapter Description .....	11
1.4 Regulatory Statements .....	12
<b>Chapter 2. Getting Started</b>	
2.1 Introduction .....	15
2.2 Installation .....	15
2.3 Using ZENA Wireless Adapter with the Wireless Development Studio .....	19
<b>Appendix A. ZENA™ Wireless Adapter Construction Details</b>	
A.1 Introduction .....	21
A.2 ZENA Wireless Adapter Schematic .....	21
A.3 ZENA Wireless Adapter PCB Layout .....	24
A.4 ZENA Wireless Adapter Bill of Materials .....	28
<b>Worldwide Sales and Service</b> .....	<b>30</b>

# ZENA™ Wireless Adapter User's Guide

---

---

NOTES:



# ZENA™ WIRELESS ADAPTER USER'S GUIDE

---

---

## Preface

---

---

### NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site ([www.microchip.com](http://www.microchip.com)) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXA”, where “XXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE on-line help. Select the Help menu, and then Topics to open a list of available on-line help files.

## INTRODUCTION

This chapter contains general information that will be useful to know before using the ZENA™ Wireless Adapter. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [Warranty Registration](#)
- [Recommended Reading](#)
- [The Microchip Web Site](#)
- [Development Systems Customer Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)

## DOCUMENT LAYOUT

This document describes how to use the ZENA Wireless Adapter. The manual layout is as follows:

- **Chapter 1. “Overview”** – This chapter provides a brief overview of the ZENA Wireless Adapter, including kit contents and features.
- **Chapter 2. “Getting Started”** – This chapter describes how to start using your ZENA Wireless Adapter.
- **Appendix A. “ZENA™ Wireless Adapter Construction Details”** – This appendix contains the schematics, PCB layout and Bill of Materials (BOM).

## CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

### DOCUMENTATION CONVENTIONS

Description	Represents	Examples
<b>Arial font:</b>		
Italic characters	Referenced books	<i>MPLAB® IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File&gt;Save</i></u>
Bold characters	A dialog button	Click <b>OK</b>
	A tab	Click the <b>Power</b> tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
<b>Courier New font:</b>		
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets [ ]	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: {   }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }

### WARRANTY REGISTRATION

Please complete the enclosed Warranty Registration Card and mail it promptly. Sending in the Warranty Registration Card entitles users to receive new product updates. Interim software releases are available at the Microchip web site.

### RECOMMENDED READING

This user's guide describes how to use the ZENA Wireless Adapter. The following Microchip documents are available from the Microchip web site ([www.microchip.com](http://www.microchip.com)), and are recommended as supplemental reference resources.

**MRF24J40MA 2.4 GHz IEEE Std. 802.15.4 RF Transceiver Module Data Sheet (DS70329)**

**MRF89XAM8A 868 MHz Ultra-Low Power Sub-GHz Transceiver Module Data Sheet (DS70651)**

**MRF89XAM9A 915 MHz Ultra-Low Power Sub-GHz Transceiver Module Data Sheet (DS75017)**

**PIC18F46J50 USB Microcontroller Data Sheet (DS39931)**

**MCP1700 Low Quiescent Current LDO Data Sheet (DS21826)**

**25LC256 256K SPI Bus Serial EEPROM Data Sheet (DS21822)**

**2K SPI Bus Serial EEPROM with EUI-48™ Node Identity Data Sheet (DS22123)**

### THE MICROCHIP WEB SITE

Microchip provides online support via our web site at [www.microchip.com](http://www.microchip.com). This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

## DEVELOPMENT SYSTEMS CUSTOMER CHANGE NOTIFICATION SERVICE

Microchip's customer notification service helps keep customers current on Microchip products. Subscribers will receive e-mail notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, access the Microchip web site at [www.microchip.com](http://www.microchip.com), click on Customer Change Notification and follow the registration instructions.

The Development Systems product group categories are:

- **Compilers** – The latest information on Microchip C compilers and other language tools. These include the MPLAB C18 and MPLAB C30 C compilers; MPASM™ and MPLAB ASM30 assemblers; MPLINK™ and MPLAB LINK30 object linkers; and MPLIB™ and MPLAB LIB30 object librarians.
- **Emulators** – The latest information on Microchip in-circuit emulators. This includes the MPLAB ICE 2000 and MPLAB ICE 4000.
- **In-Circuit Debuggers** – The latest information on the Microchip in-circuit debugger, MPLAB ICD 2.
- **MPLAB® IDE** – The latest information on Microchip MPLAB IDE, the Windows® Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB SIM simulator, MPLAB IDE Project Manager and general editing and debugging features.
- **Programmers** – The latest information on Microchip programmers. These include the MPLAB PM3 and PRO MATE® II device programmers and the PICSTART® Plus and PICKit™ 1 development programmers.

## CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at: <http://support.microchip.com>



## DOCUMENT REVISION HISTORY

### Revision A (June 2011)

- This is the initial released version of the document.

### Revision B (January 2012)

This revision incorporates the following updates:

- Preface:
  - Updated **“Recommended Reading”**
- Chapters:
  - Updated **Table 1-1** in **Chapter 1. “Overview”**
  - Updated the title for **Figure 1-1** in **Chapter 1. “Overview”**
  - Removed the note in **2.2.2 “Installing USB Drivers”**
  - Updated the first paragraph in **2.2.2.1 “Installing the USB Driver for Windows® 2000/XP/Vista/7 OSs”**
  - Updated step 3 and step 4 in **2.2.2.1 “Installing the USB Driver for Windows® 2000/XP/Vista/7 OSs”**
  - Replaced the figure in **Figure 2-5**
  - Replaced the figure in **Figure 2-6**
  - Updated the title for **Figure A-1** in **Appendix A. “ZENA™ Wireless Adapter Construction Details”**
  - Updated the title for **Figure A-2** in **Appendix A. “ZENA™ Wireless Adapter Construction Details”**
  - Added **Figure A-2** in **Appendix A. “ZENA™ Wireless Adapter Construction Details”**
- Minor updates related to formatting and text have been incorporated throughout the document

NOTES:

---

---

## Chapter 1. Overview

---

---

### 1.1 INTRODUCTION

The ZENA Wireless Adapter is a multi-function USB wireless adapter connecting USB-equipped desktop or notebook computers with Microchip wireless products for development or application uses. As a development tool, the ZENA Wireless Adapter can be used as a protocol analyzer or as a diagnostic tool. It can also be used to connect the computer as a wireless node to the network for application uses. The ZENA Wireless Adapter is capable of performing a variety of functions and each function can be programmed into the adapter using the built in USB boot loader.

Additional software and firmware updates can be downloaded from the Microchip web site: <http://www.microchip.com/zena>.

This chapter discusses:

- [ZENA Wireless Adapter Package Contents](#)
- [ZENA Wireless Adapter Description](#)
- [Regulatory Statements](#)

### 1.2 ZENA WIRELESS ADAPTER PACKAGE CONTENTS

Depending on the frequency and device type ZENA Wireless Adapter ordered, the package may contain one of the following listed in [Table 1-1](#).

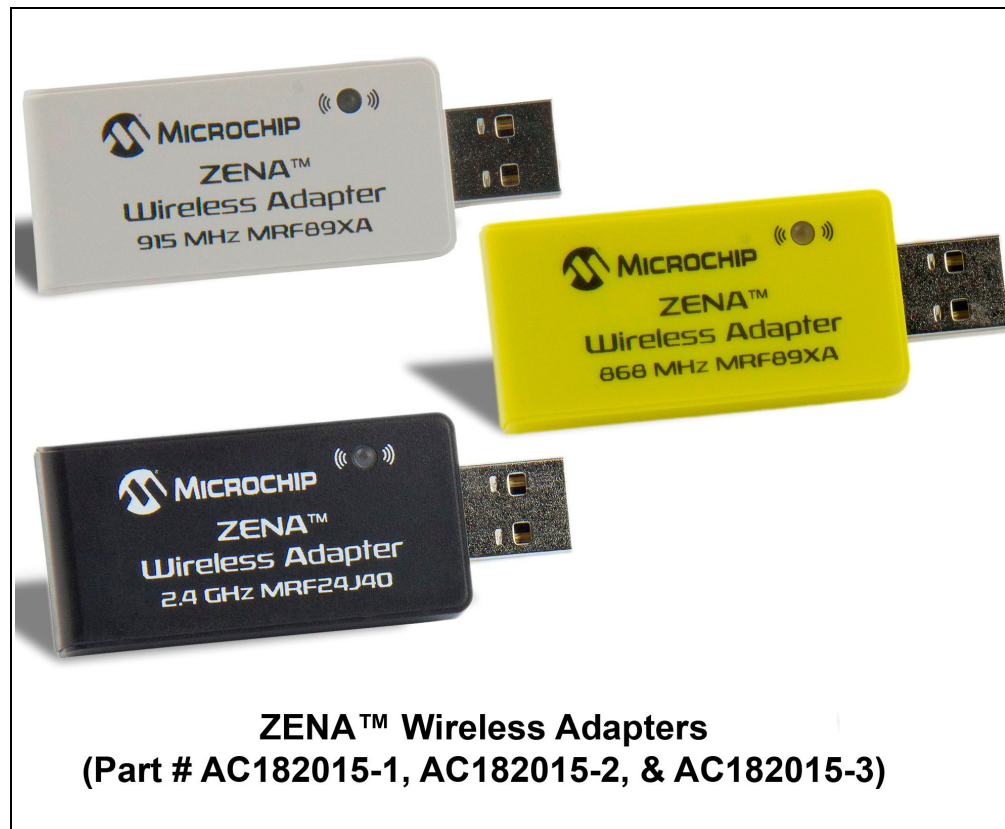
**TABLE 1-1: ZENA™ WIRELESS ADAPTER**

Description	Part Number
ZENA™ Wireless Adapter – 2.4 GHz MRF24J40	AC182015-1
ZENA Wireless Adapter – 868 MHz MRF89XA	AC182015-2
ZENA Wireless Adapter – 915 MHz MRF89XA	AC182015-3

### 1.3 ZENA WIRELESS ADAPTER DESCRIPTION

The ZENA Wireless Adapters are shown in [Figure 1-1](#).

FIGURE 1-1: ZENA™ WIRELESS ADAPTERS



The ZENA Wireless Adapter plugs into the computers USB slot either directly or using an extension cable. The LED indicates operation status.

## 1.4 REGULATORY STATEMENTS

### 1.4.1 United States

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 1.4.2 Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTES:

---

---

## Chapter 2. Getting Started

---

---

### 2.1 INTRODUCTION

The ZENA Wireless Adapter is a flexible, multipurpose device. Firmware applications can be updated from a computer application program such as the Wireless Development Studio.

The ZENA Wireless Adapter is pre-programmed with a MiWi™ Wireless Protocol Sniffer application. This allows the user to display MiWi Wireless Protocol packets in a graphical format in the Wireless Development Studio.

ZENA Wireless Adapter software and firmware updates can be downloaded from the Microchip web site <http://www.microchip.com/zena>.

### 2.2 INSTALLATION

#### 2.2.1 Installing the Wireless Development Studio

The Wireless Development Studio can be downloaded from the Microchip web site: <http://www.microchip.com/wds>. Install the program following the installation instructions that come with the package.

#### 2.2.2 Installing USB Drivers

The ZENA Wireless Adapter has been designed to communicate with the Microchip MPLABComm driver which is based on the libusb-win32 (for Windows) and libusb (for Mac and Linux operating systems) libraries. The USB Drivers come with the Wireless Development Studio. To install the USB drivers, follow the sections below for the operating system of choice.

## 2.2.2.1 INSTALLING THE USB DRIVER FOR WINDOWS® 2000/XP/VISTA/7 OSs

To Install the USB Driver for windows, perform the following tasks:

**Note:** In the following screenshots, we have used ZENA Wireless Adapter – 2.4 GHz MRF24J40. The same set of sequence is applicable for ZENA Wireless Adapter – 868 MHz MRF89XA and ZENA Wireless Adapter – 915 MHz MRF89XA.

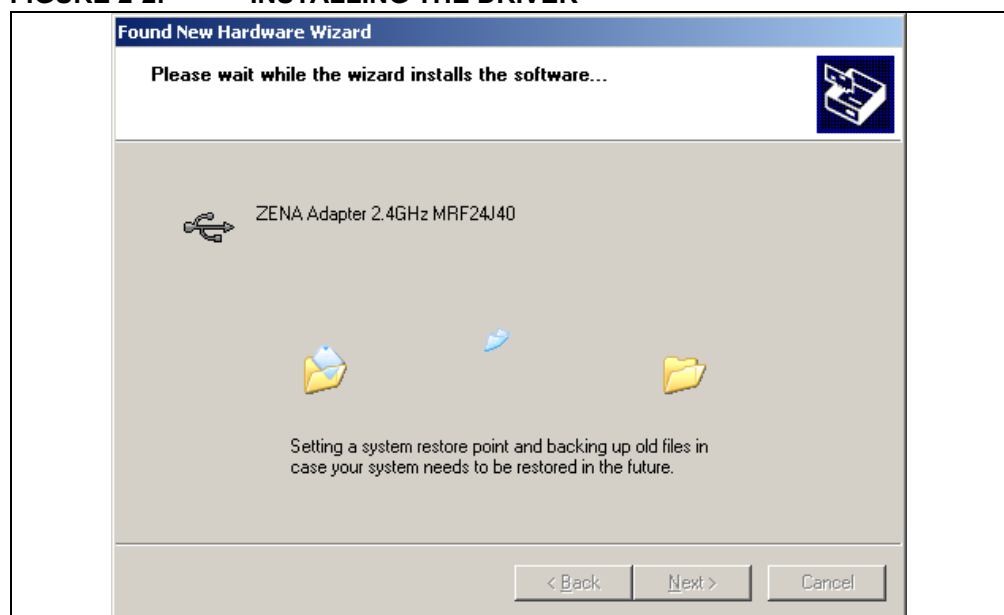
1. Plug in the ZENA Wireless Adapter into a USB port. Windows will prompt for a hardware installation as shown in [Figure 2-1](#).

**FIGURE 2-1: FOUND NEW HARDWARE WIZARD WINDOW**



2. Select *Install the software automatically (Recommended)* and then click *Next*. Windows will search and install the driver automatically as shown in [Figure 2-2](#).

**FIGURE 2-2: INSTALLING THE DRIVER**



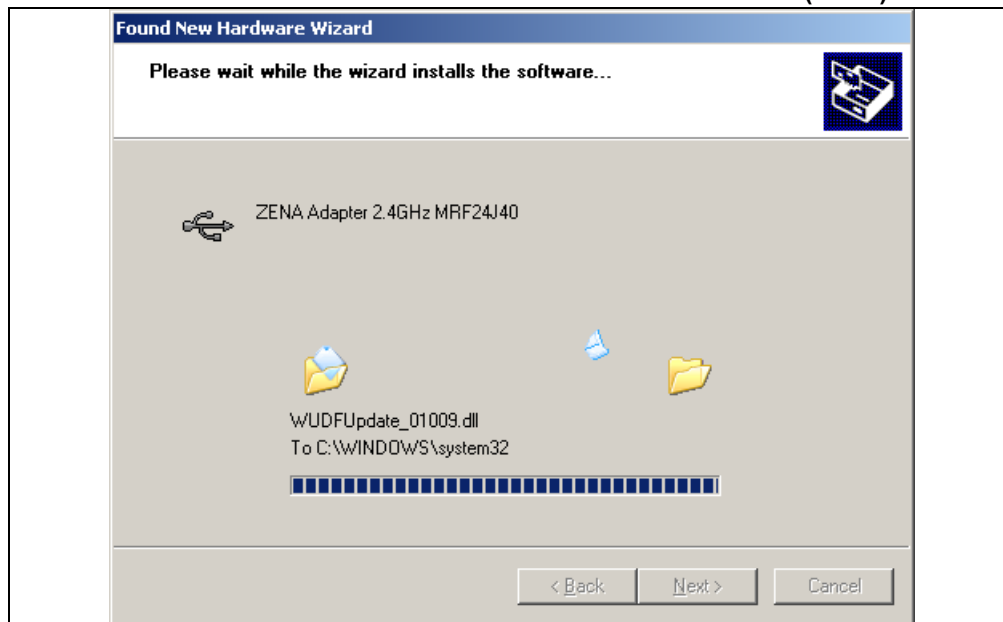


3. If Windows is unable to find the hardware for the device, then click *Back* and select *Install from a list or specific location (Advanced)*.
  - a) The driver for ZENA Wireless Adapter – 2.4 GHz MRF24J40 is located in the “Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 2.4 GHz MRF24J40\” folder.

**Note:** Default installation location for WDS on Windows is C:\Program Files\Microchip\

- b) The driver for ZENA Wireless Adapter – 868 MHz MRF89XA is located in the “Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 868 MHz MRF89XA\” folder.
  - c) The driver for ZENA Wireless Adapter – 915 MHz MRF89XA is located in the “Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 915 MHz MRF89XA\” folder.
4. After installing the driver, if Windows prompts the following Dynamic Linked Libraries (DLLs): WinUSBCoInstaller2.dll, WdfCoInstaller01009.dll and WUDFUpdate\_01009.dll as shown in [Figure 2-3](#):
  - a) If installing in a Windows 32-bit system, point the folder location to “Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 2.4 GHz MRF24J40\i386\”  
(or)  
“Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 868 MHz MRF89XA\i386\”  
(or)  
“Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 915 MHz MRF89XA\i386\”
  - b) If installing in a Windows 64-bit system, point the folder location to “Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 2.4 GHz MRF24J40\amd64\”  
(or)  
“Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 868 MHz MRF89XA\amd64\”  
(or)  
“Wireless Development Studio\Driver and Inf\ZENA Wireless Adapter 915 MHz MRF89XA\amd64\”

**FIGURE 2-3: INSTALLING DYNAMIC LINKED LIBRARIES (DLLs)**



5. After installing the driver and DLLs, the Completing the Found New Hardware Wizard appears on the screen as shown in Figure 2-4.
6. Click Finish to complete the installation.

**FIGURE 2-4: COMPLETING THE FOUND NEW HARDWARE WIZARD**



### 2.2.2.2 INSTALLING THE USB DRIVER FOR MAC OR LINUX OSs

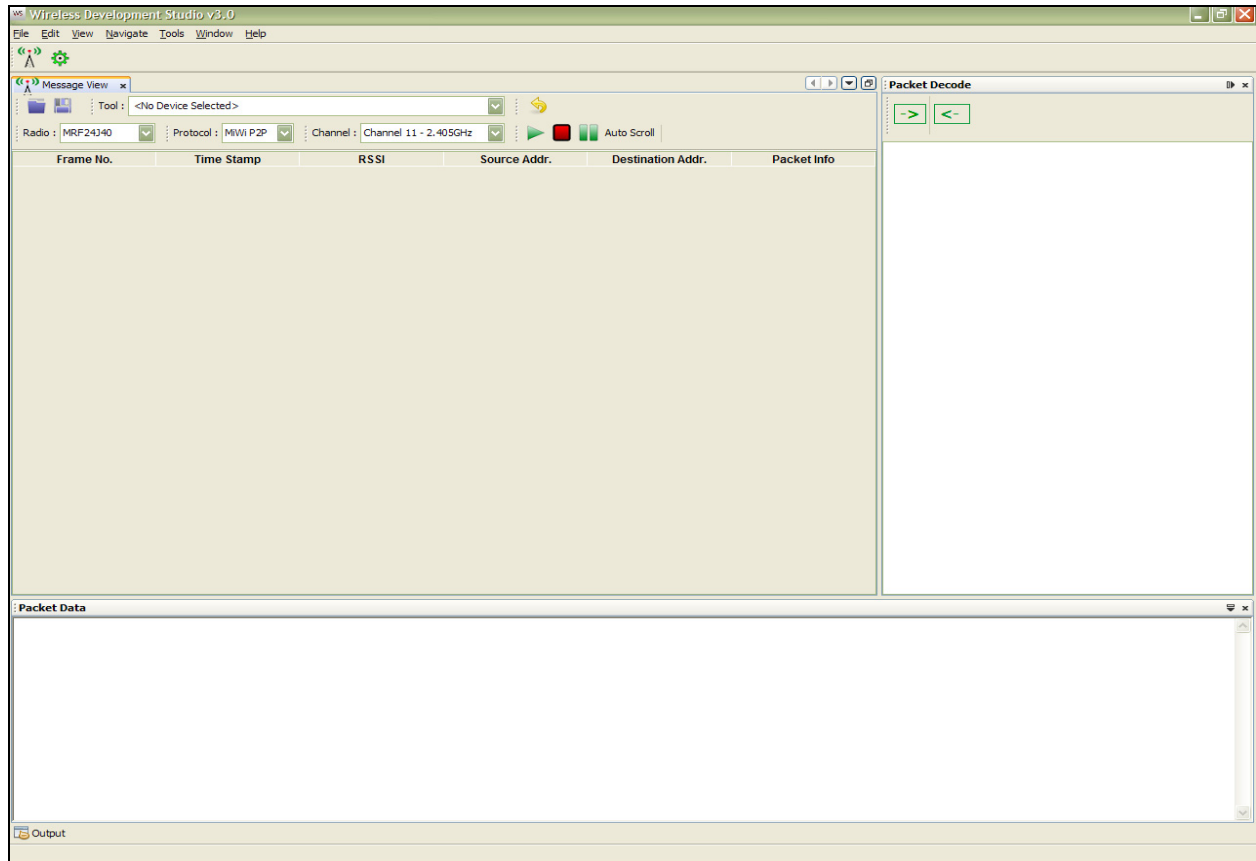
The ZENA Wireless Adapter uses the libUSB drivers. When installing the USB drivers on a Mac or Linux computer, the installer will place the USB drivers in the proper location.

## 2.3 USING ZENA WIRELESS ADAPTER WITH THE WIRELESS DEVELOPMENT STUDIO

To use the ZENA Wireless Adapter with the Wireless Development Studio, it must first be selected as the source device by performing the following tasks:

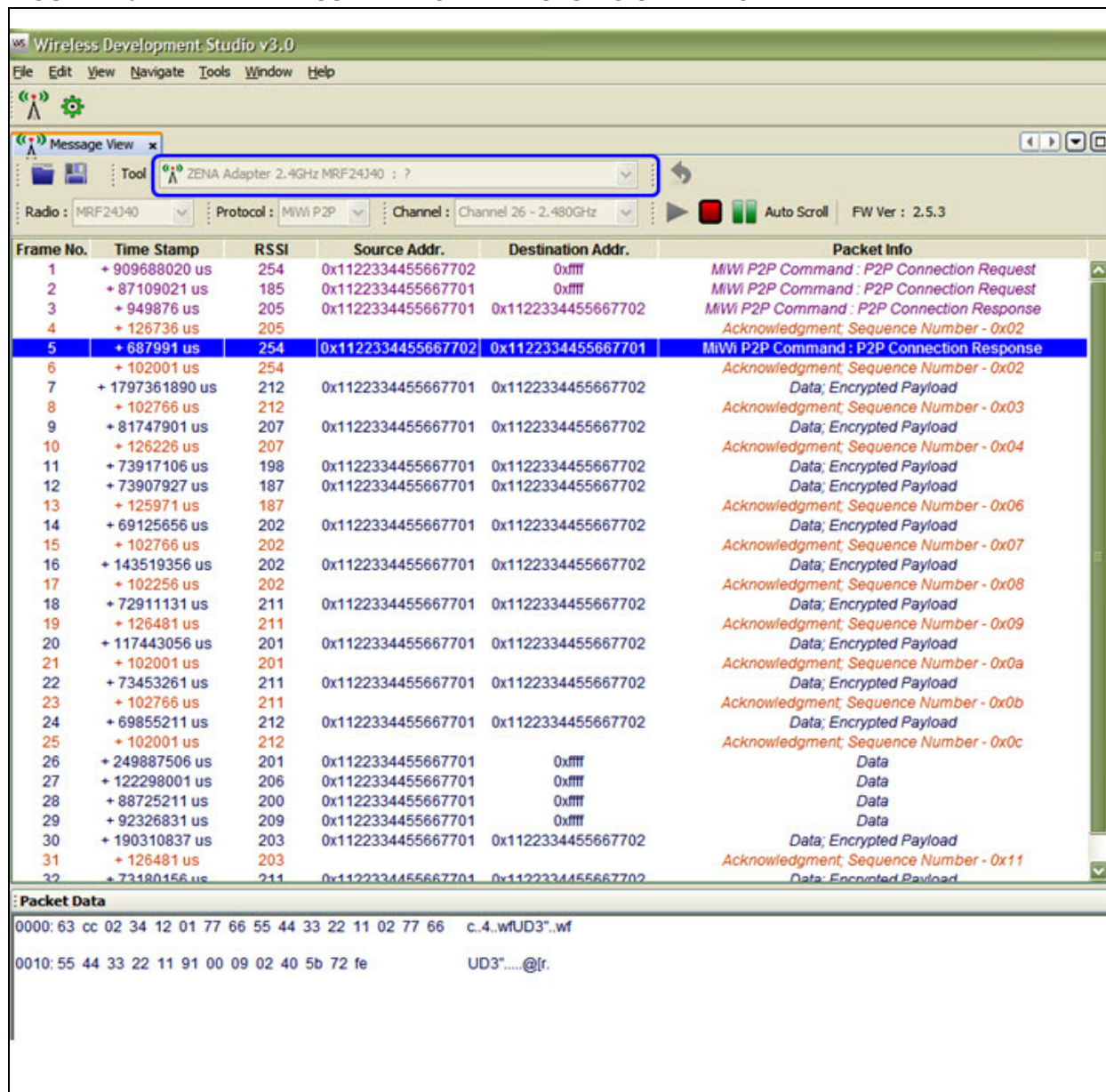
1. From the main window, select *Sniffer* as the active application, see [Figure 2-5](#). The Packet List window will appear.

**FIGURE 2-5: SNIFFER APPLICATION SELECTION**



- From the Packet List window, select ZENA Wireless Adapter from the Source drop-down box, see [Figure 2-6](#).

**FIGURE 2-6: WIRELESS DEVELOPMENT STUDIO SELECTION**



**Note:** If multiple ZENA Wireless Adapters are plugged in, they can be individually chosen by serial number.

For more information on running the Wireless Development Studio, see the Wireless Development Studio help.



# ZENA™ WIRELESS ADAPTER USER'S GUIDE

---

---

## Appendix A. ZENA™ Wireless Adapter Construction Details

---

---

### A.1 INTRODUCTION

This appendix provides the ZENA Wireless Adapter schematics, PCB layout and Bill of Materials (BOM).

### A.2 ZENA WIRELESS ADAPTER SCHEMATIC

[Figure A-1](#) and [Figure A-2](#) illustrate the ZENA Wireless Adapter schematics.

FIGURE A-1: ZENA™ WIRELESS ADAPTER – SCHEMATIC (SHEET 1 OF 2)

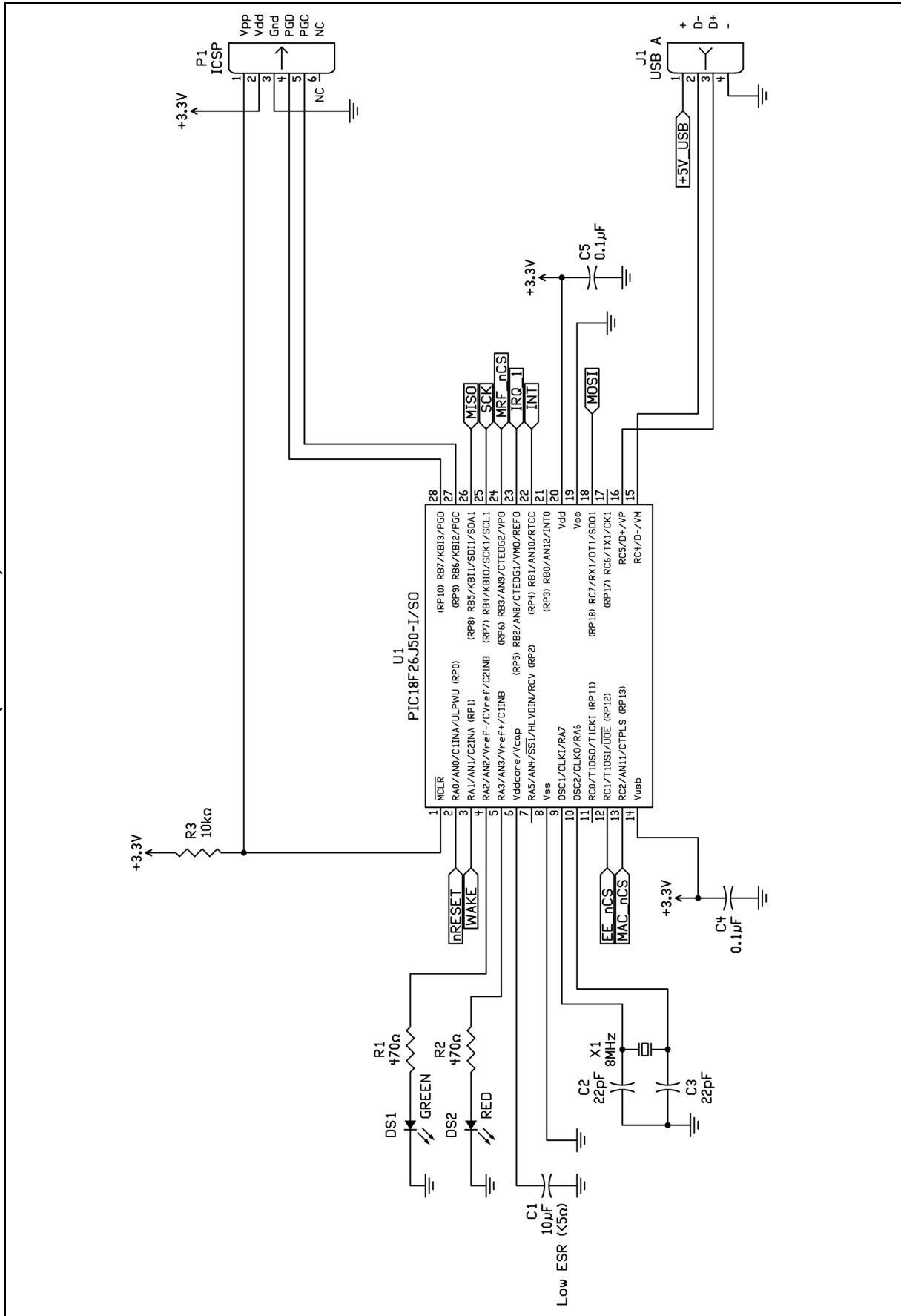
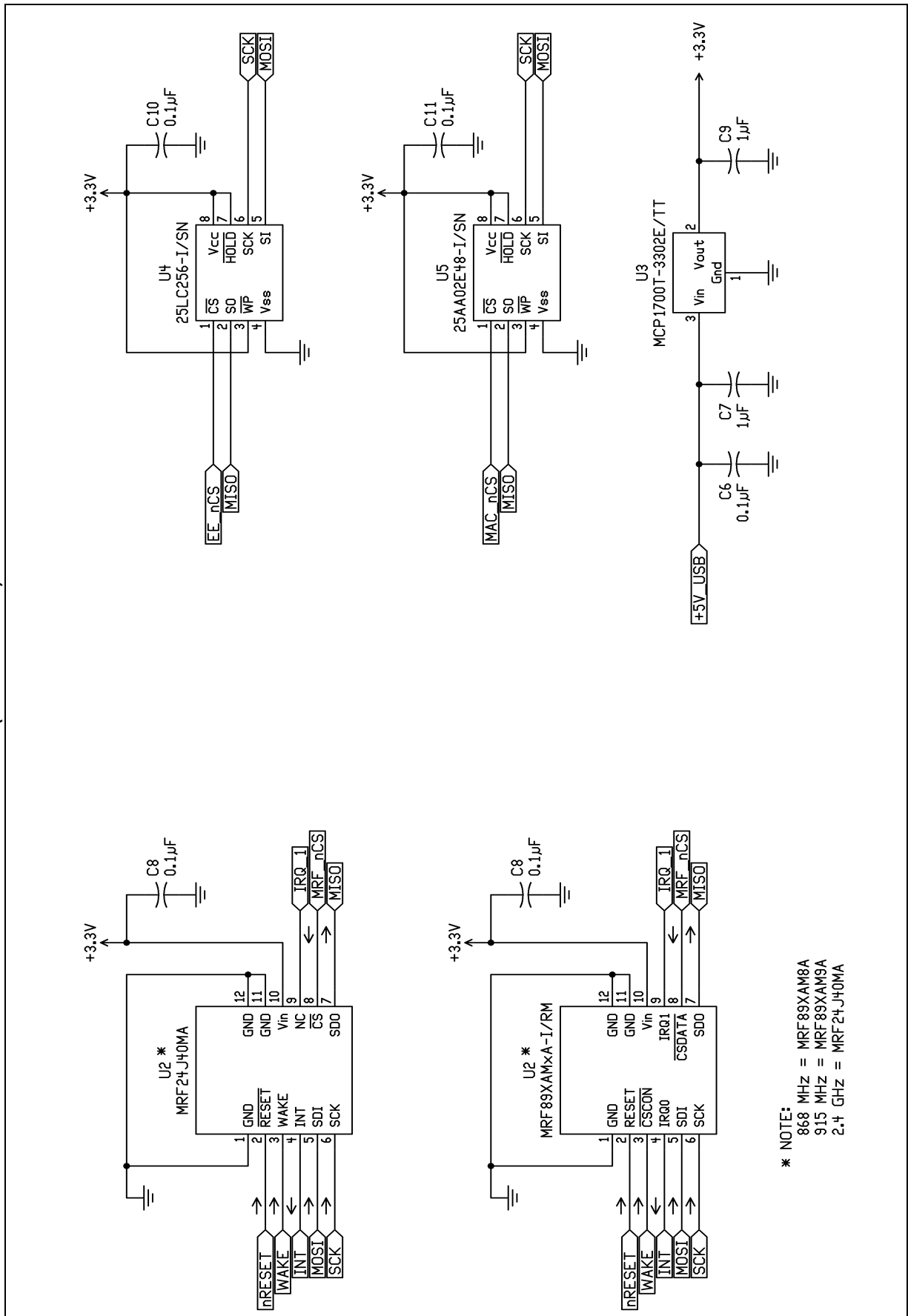


FIGURE A-2: ZENA™ WIRELESS ADAPTER SCHEMATIC (SHEET 2 OF 2)



\* NOTE:  
 868 MHz = MRF89XAM8A  
 915 MHz = MRF89XAM9A  
 2.4 GHz = MRF24J40MA

## A.3 ZENA WIRELESS ADAPTER PCB LAYOUT

The ZENA Wireless Adapter PCB is a 4-layer, high temperature FR4, 0.031 inch, plated through hole construction. [Figure A-3](#) through [Figure A-8](#) show the PCB layers. [Figure A-3](#) illustrates the ZENA Wireless Adapter top silk screen.

**FIGURE A-3: TOP SILK SCREEN**

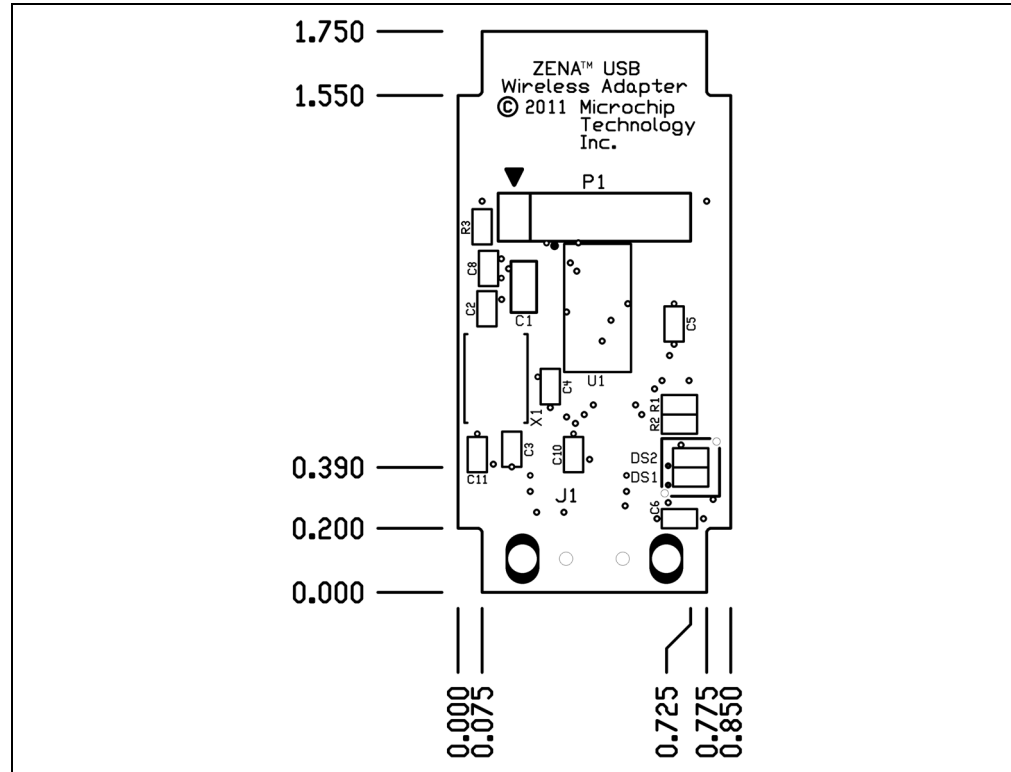




Figure A-4 illustrates the ZENA Wireless Adapter top copper.

**FIGURE A-4: LAYER1 — TOP COPPER**

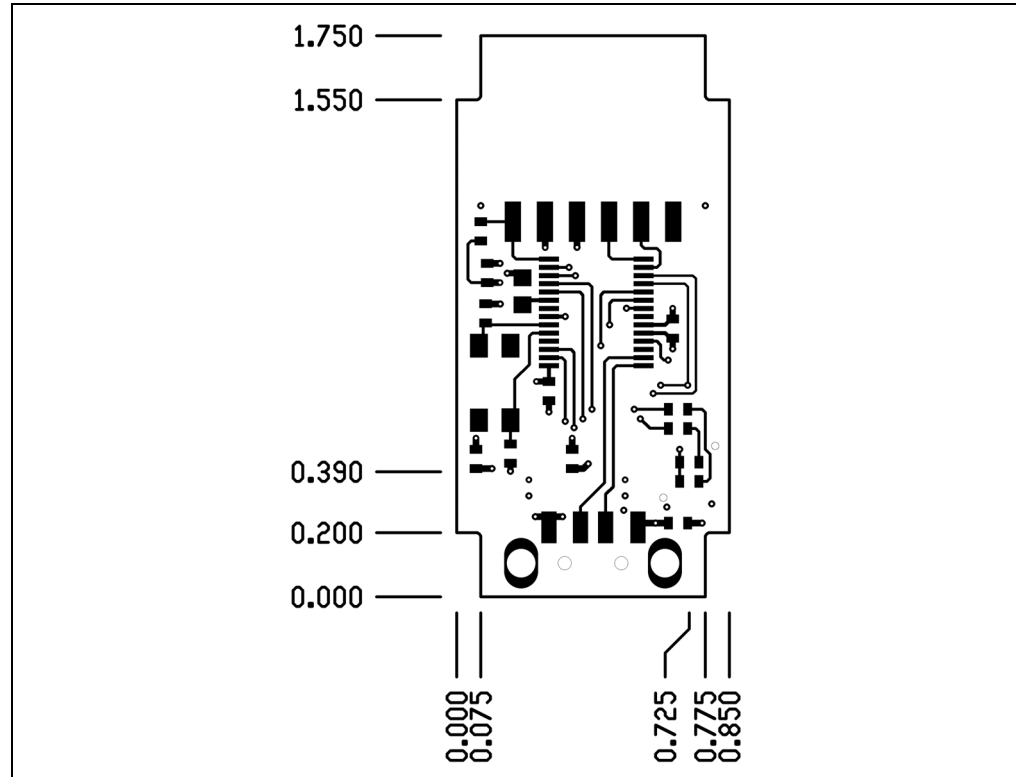


Figure A-5 illustrates the ZENA Wireless Adapter ground plane.

**FIGURE A-5: LAYER 2 — GROUND PLANE**

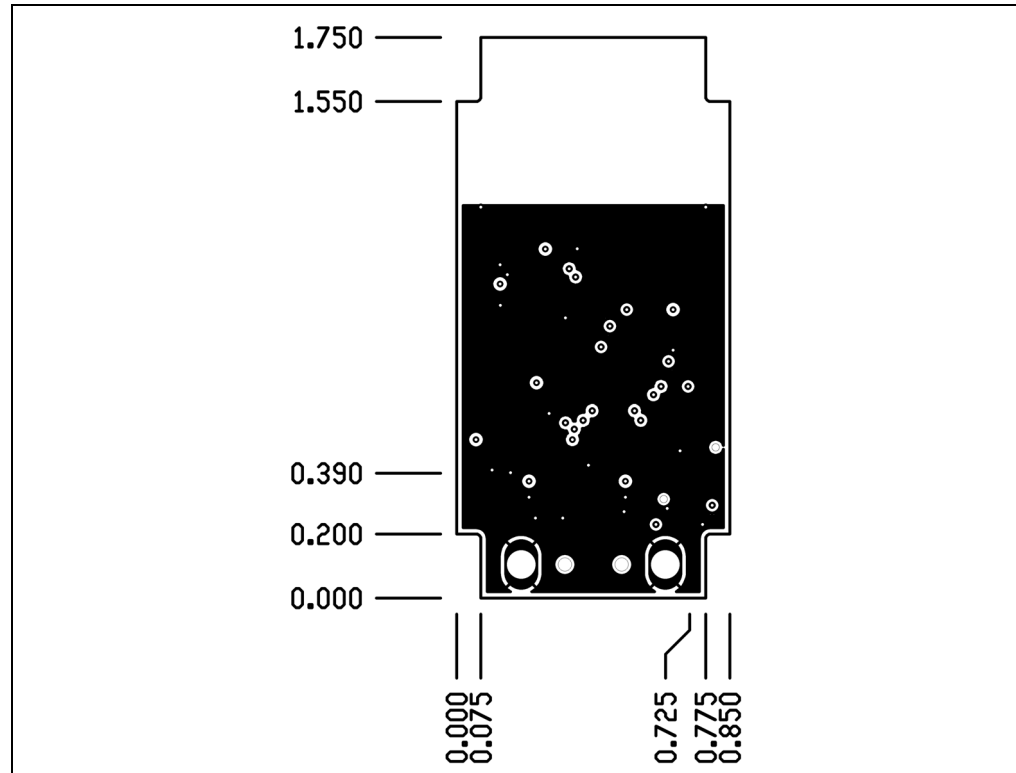


Figure A-6 illustrates the ZENA Wireless Adapter power plane.

**FIGURE A-6: LAYER 3 — POWER PLANE**

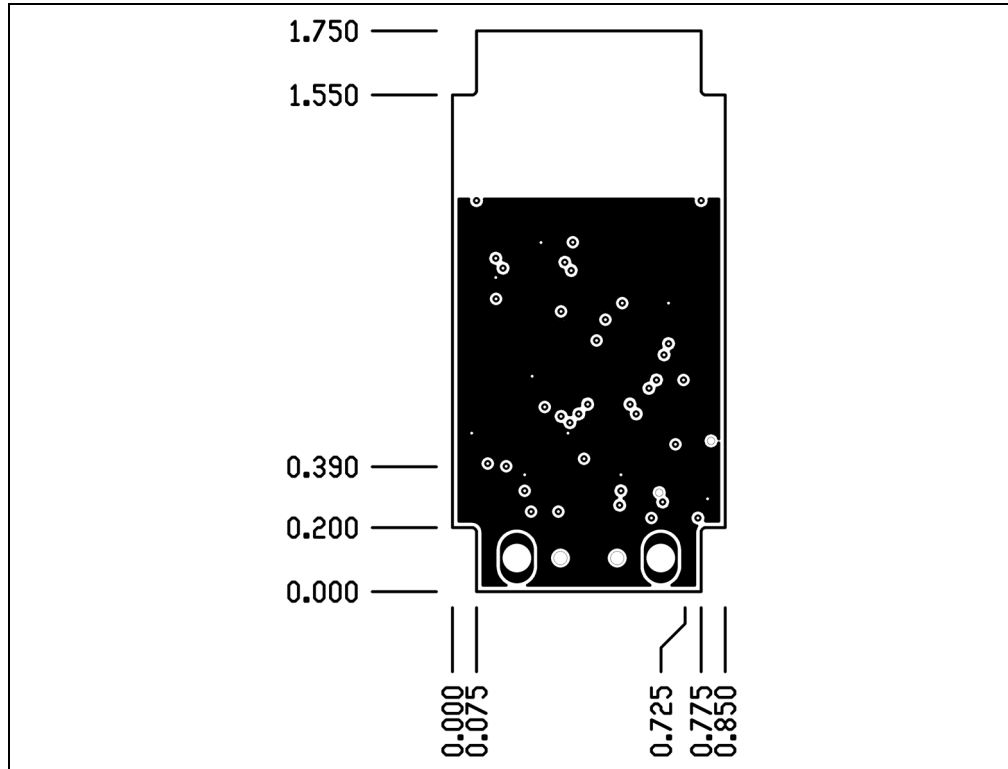
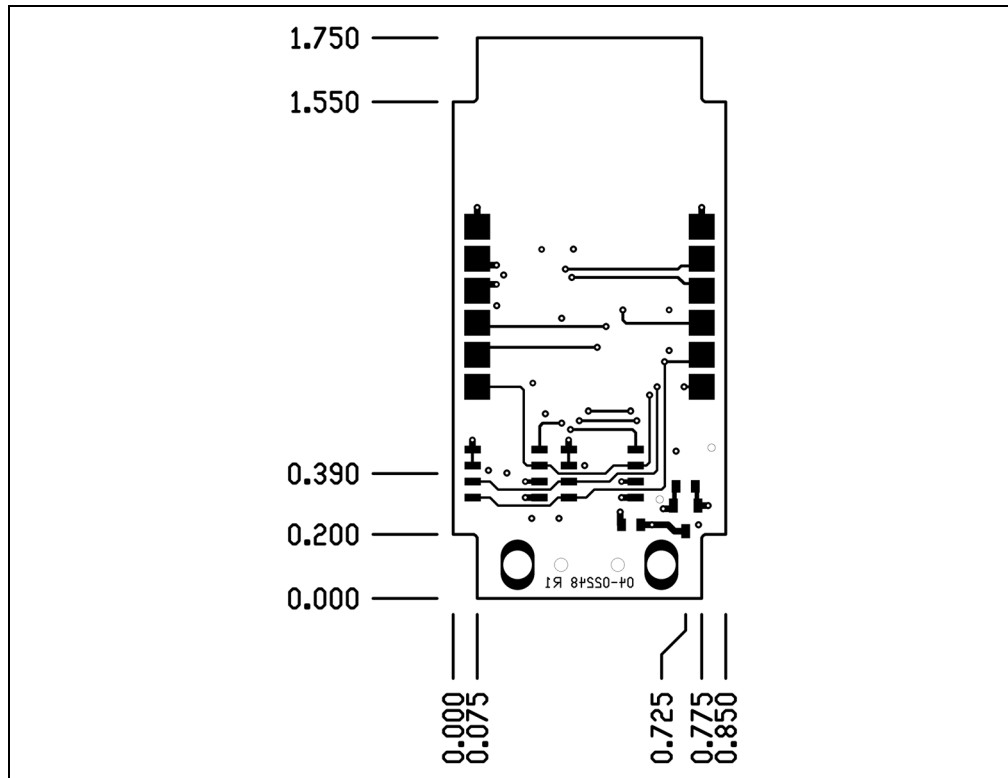


Figure A-7 illustrates the ZENA Wireless Adapter bottom copper.

**FIGURE A-7: LAYER 4 — BOTTOM COPPER**





# ZENA™ Wireless Adapter User's Guide

## A.4 ZENA WIRELESS ADAPTER BILL OF MATERIALS

Table A-1 provides a detailed description of the ZENA Wireless Adapter Bill of Materials (BOM).

**TABLE A-1: BILL OF MATERIALS**

Qty	Designator	Value	Description	Manufacturer	Manufacturer Part Number
2	C2, C3	22 pF	Capacitor, Ceramic, SMT 0603	Murata Electronics North America	GRM1885C1H220JA01D
6	C4, C5, C6, C8, C10, C11	0.1 µF	Capacitor, Ceramic, 16V, ±10%, X7R, SMT 0603	Murata Electronics North America	GRM188R71C104KA01D
2	C7, C9	1 µF	Capacitor, Ceramic, 6.3V, ±10%, X5R, SMT 0603	Murata Electronics North America	GRM188R60J105KA01D
1	C1	10 µF	Capacitor, Ceramic, 6.3V, ±20%, X5R, SMT 0805	Murata Electronics North America	GRM21BR60J106ME19L
1	DS1	Green	Diode, Light Emitting, Green	OSRAM	LG Q971-KN-1-0-20-R18
1	DS2	Red	Diode, Light Emitting, Red	OSRAM	LS Q976-NR-1-0-20-R18
1	J1	—	Connector, Plug USB 4Pos RT Ang SMD	Molex	480371000
2	R1, R2	470 ohms	Resistor, Thin Film File, SMT 0603	Stackpole Electronics	RMCF0603JT470R
1	R3	10K ohms	Resistor, Thin Film File, SMT 0603	Stackpole Electronics	RMCF0603JT10K0
1	U1	—	PIC18F26J50-I/SS	Microchip Technology	PIC18F26J50-I/SS
1	U2 alternates: MRF89XAM8A (868 MHz) and MRF89XAM9A (915 MHz)	—	MRF24J40MA (or) MRF89XAM8A (or) MRF89XAM9A	Microchip Technology	MRF24J40MA-I/RM (or) MRF89XAM8A-I/RM (or) MRF89XAM9A-I/RM
1	U3	—	MCP1700T-3302E	Microchip Technology	MCP1700T-3302E/TT
1	U4	—	25LC256-I/SN	Microchip Technology	25LC256-I/SN
1	U5	—	25AA02E48-I/SN	Microchip Technology	25AA02E48-I/SN
1	X1	8 MHz	Crystal, SMT, 8 MHz	Abracon	ABMM-8.000MHZ-B2-T
1	@DS1 and DS2	—	Light Pipe, Vertical, 0.300" round	Bivar Inc.	VLP-300-R
1	Enclosure	—	Enclosure, USB Device	New Age Enclosures	P-201005

---

---

**NOTES:**



# MICROCHIP

## Worldwide Sales and Service

### AMERICAS

**Corporate Office**  
2355 West Chandler Blvd.  
Chandler, AZ 85224-6199  
Tel: 480-792-7200  
Fax: 480-792-7277  
Technical Support:  
<http://www.microchip.com/support>  
Web Address:  
[www.microchip.com](http://www.microchip.com)

**Atlanta**  
Duluth, GA  
Tel: 678-957-9614  
Fax: 678-957-1455

**Boston**  
Westborough, MA  
Tel: 774-760-0087  
Fax: 774-760-0088

**Chicago**  
Itasca, IL  
Tel: 630-285-0071  
Fax: 630-285-0075

**Cleveland**  
Independence, OH  
Tel: 216-447-0464  
Fax: 216-447-0643

**Dallas**  
Addison, TX  
Tel: 972-818-7423  
Fax: 972-818-2924

**Detroit**  
Farmington Hills, MI  
Tel: 248-538-2250  
Fax: 248-538-2260

**Indianapolis**  
Noblesville, IN  
Tel: 317-773-8323  
Fax: 317-773-5453

**Los Angeles**  
Mission Viejo, CA  
Tel: 949-462-9523  
Fax: 949-462-9608

**Santa Clara**  
Santa Clara, CA  
Tel: 408-961-6444  
Fax: 408-961-6445

**Toronto**  
Mississauga, Ontario,  
Canada  
Tel: 905-673-0699  
Fax: 905-673-6509

### ASIA/PACIFIC

**Asia Pacific Office**  
Suites 3707-14, 37th Floor  
Tower 6, The Gateway  
Harbour City, Kowloon  
Hong Kong  
Tel: 852-2401-1200  
Fax: 852-2401-3431

**Australia - Sydney**  
Tel: 61-2-9868-6733  
Fax: 61-2-9868-6755

**China - Beijing**  
Tel: 86-10-8569-7000  
Fax: 86-10-8528-2104

**China - Chengdu**  
Tel: 86-28-8665-5511  
Fax: 86-28-8665-7889

**China - Chongqing**  
Tel: 86-23-8980-9588  
Fax: 86-23-8980-9500

**China - Hangzhou**  
Tel: 86-571-2819-3187  
Fax: 86-571-2819-3189

**China - Hong Kong SAR**  
Tel: 852-2401-1200  
Fax: 852-2401-3431

**China - Nanjing**  
Tel: 86-25-8473-2460  
Fax: 86-25-8473-2470

**China - Qingdao**  
Tel: 86-532-8502-7355  
Fax: 86-532-8502-7205

**China - Shanghai**  
Tel: 86-21-5407-5533  
Fax: 86-21-5407-5066

**China - Shenyang**  
Tel: 86-24-2334-2829  
Fax: 86-24-2334-2393

**China - Shenzhen**  
Tel: 86-755-8203-2660  
Fax: 86-755-8203-1760

**China - Wuhan**  
Tel: 86-27-5980-5300  
Fax: 86-27-5980-5118

**China - Xian**  
Tel: 86-29-8833-7252  
Fax: 86-29-8833-7256

**China - Xiamen**  
Tel: 86-592-2388138  
Fax: 86-592-2388130

**China - Zhuhai**  
Tel: 86-756-3210040  
Fax: 86-756-3210049

### ASIA/PACIFIC

**India - Bangalore**  
Tel: 91-80-3090-4444  
Fax: 91-80-3090-4123

**India - New Delhi**  
Tel: 91-11-4160-8631  
Fax: 91-11-4160-8632

**India - Pune**  
Tel: 91-20-2566-1512  
Fax: 91-20-2566-1513

**Japan - Osaka**  
Tel: 81-66-152-7160  
Fax: 81-66-152-9310

**Japan - Yokohama**  
Tel: 81-45-471-6166  
Fax: 81-45-471-6122

**Korea - Daegu**  
Tel: 82-53-744-4301  
Fax: 82-53-744-4302

**Korea - Seoul**  
Tel: 82-2-554-7200  
Fax: 82-2-558-5932 or  
82-2-558-5934

**Malaysia - Kuala Lumpur**  
Tel: 60-3-6201-9857  
Fax: 60-3-6201-9859

**Malaysia - Penang**  
Tel: 60-4-227-8870  
Fax: 60-4-227-4068

**Philippines - Manila**  
Tel: 63-2-634-9065  
Fax: 63-2-634-9069

**Singapore**  
Tel: 65-6334-8870  
Fax: 65-6334-8850

**Taiwan - Hsin Chu**  
Tel: 886-3-5778-366  
Fax: 886-3-5770-955

**Taiwan - Kaohsiung**  
Tel: 886-7-536-4818  
Fax: 886-7-330-9305

**Taiwan - Taipei**  
Tel: 886-2-2500-6610  
Fax: 886-2-2508-0102

**Thailand - Bangkok**  
Tel: 66-2-694-1351  
Fax: 66-2-694-1350

### EUROPE

**Austria - Wels**  
Tel: 43-7242-2244-39  
Fax: 43-7242-2244-393

**Denmark - Copenhagen**  
Tel: 45-4450-2828  
Fax: 45-4485-2829

**France - Paris**  
Tel: 33-1-69-53-63-20  
Fax: 33-1-69-30-90-79

**Germany - Munich**  
Tel: 49-89-627-144-0  
Fax: 49-89-627-144-44

**Italy - Milan**  
Tel: 39-0331-742611  
Fax: 39-0331-466781

**Netherlands - Drunen**  
Tel: 31-416-690399  
Fax: 31-416-690340

**Spain - Madrid**  
Tel: 34-91-708-08-90  
Fax: 34-91-708-08-91

**UK - Wokingham**  
Tel: 44-118-921-5869  
Fax: 44-118-921-5820

11/29/11