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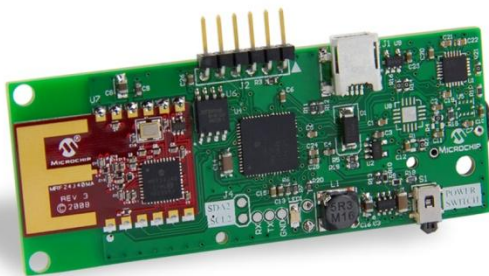
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Motion Sensor Demo Board Quick Start Guide



**Motion Sensor Demo Board
(Part # DM240316)**

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Introduction:

Thank you for purchasing the Motion Sensor Demo Board. Microchip's Motion Sensor Demo Board (DM240316) is powered by a PIC24F microcontroller with on-board USB functionality and includes an MRF24J40MA 2.4GHz wireless transceiver that sends data wirelessly to a ZENATM wireless adapter. The board integrates an MPU-6050 motion sensing chip from InvenSense. The MPU-6050 has a 3-axis gyroscope, 3-axis accelerometer and uses sensor fusion technology to create a 3-D reference frame.

Microchip's Motion Sensor Demo Board allows you to easily add this breakthrough technology to your next gaming accessory, tablet PC, digital camera, or other consumer application.

This quick start guide provides an overview of the hardware, features, installation and use of the Motion Sensor Demo Board

Where to find the supporting material for the demo:

- www.microchip.com/motion

The page will have the following items:

- Quick Start guide(This document)
- Motion Sensor Demo Board schematics and layout (Please install the Free Altium Designer Viewer)
- Bill of Material for the Motion Sensor Demo Board
- 'Spizzle' Installer
- 'Teapot Demo' Installer
- Demo Board software
 - Motion_wireless_gold.hex
 - Motion_hardwired_gold.hex
- PC source code
 - 'Spizzle' source code
 - 'Teapot Demo' source code
 - 'Zena' source code

Box Contents:

Open the box and verify the following contents:

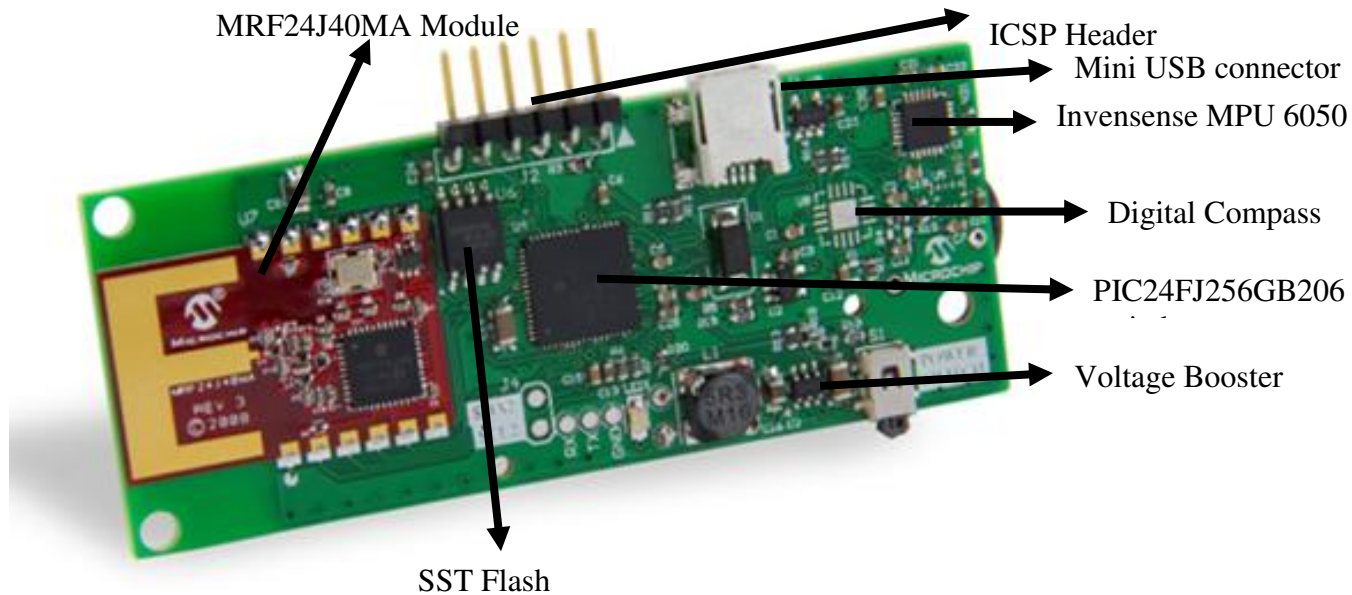
- Motion Sensor Demo Board
- ZENA Wireless USB Adapter
- Mini USB – cable
- An insert with the website link for the collateral

Getting Started:

The Motion Sensor Demo Board is preprogrammed with the complete firmware to demonstrate all the movements of the demo board. In order to explore this software and the interface between the controller and the target of the ZENA Wireless Adapter, you will need to install software and

pair the demo to the target. This section describes the basic features of the hardware included, and provides instructions for how to install and use the Motion Sensor Demo Board.

Hardware:



**ZENA™ Wireless Adapter – 2.4 GHz MRF24J40
(Part # AC182015-1)**

ZENA Wireless Adapter

Power sources:

The Motion Sensor Demo Board can be powered in one of two ways. Make sure only one power source is connected to the board at a time.

- 1) Mini USB cable (power supplied via USB bus).
- 2) 1 x AAA Battery : On battery holder on the back side of the board

To power with battery, insert battery into the battery holder.

Installation and use:

The Motion Sensor Demo Board has two operating modes, and these can be exercised by programming the device with one of our pre-assembled hex files. Programming is done through the 6-pin header (J2). For programming motion sensing devices, you will need the following hardware:

1. MPLAB® supported programmer: Current supported programmers are: ICD2, ICD3, REAL ICE, PICKIT3, MPLAB PM3
2. Programming adapter board (part # AC1164110), shown below:



3. The programming adapter (shown above) will plug into J2 to allow programming of the motion sensor demo board.
4. In MPLAB, select your programmer using the “*Programmer -> Select Programmer*” option.
5. In MPLAB, select the processor by using the “*Configure -> Select Device*” option, and choose 24FJ256GB206
6. Using MPLAB, use the “*File -> Import*” option to load the selected hex file into MPLAB.
7. Select the “Programmer/Program” option to re-program the motion sensor demo board.
8. Device may require power cycle to start running new program.

Available .hex files: Wireless and USB versions.

*Motion_wireless_gold.hex – programs the motion sensor board for wireless operation. Power can be supplied with a single AAA battery or via USB connection.

Motion_hardwired_gold.hex – programs the motion sensor board for hard-wired USB operation. Power is supplied via the USB cable.

*The motion sensor is programmed with this hex file by default.

Wireless Operation for the ‘Spizzle’ demo:

Note: The ‘Spizzle’ demo only works with Microsoft operating systems Vista and 7 (which support Microsoft Direct3D10).

1. Download the Motionsensor.zip folder from www.microchip.com/motion
2. Copy the “spizzleinstall.exe” application to a local drive on your PC and run the application.

3. Select the “accept agreement” for DirectX installation
4. After the installation is complete, plug Zena™ Wireless Adapter into USB port. System may prompt that it is installing device driver software
5. Insert 1 AAA battery into the battery holder on the back side of the Motion Sensor board
6. The LED on the motion sensor board should have two quick blinks followed by a delay. This is an indicator that the motion sensor board is powered up and operating normally.
7. The LED on the ZENA adapter should be blinking rapidly, indicating that wireless data is being received from the Motion Sensor Demo Board
8. Launch the Spizzle demo by double clicking the application “spizzle.exe” on your desktop. The window in figure 1 should appear.
9. Move the motion sensor board and try to align the holes in the sphere with the incoming pieces.

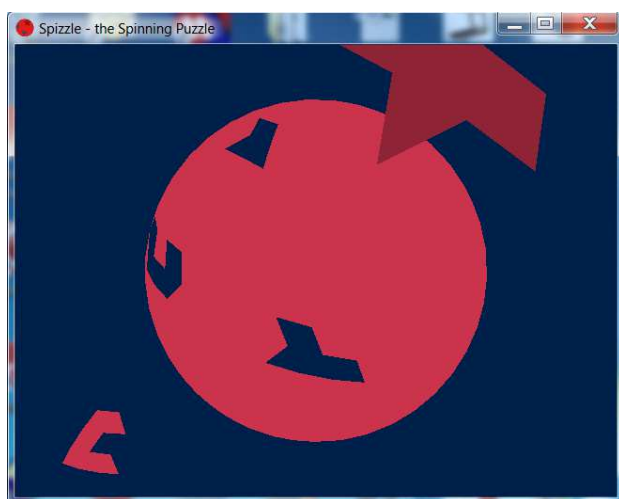


Figure 1: ‘Spizzle’ screen capture

Hard-wired USB Operation:

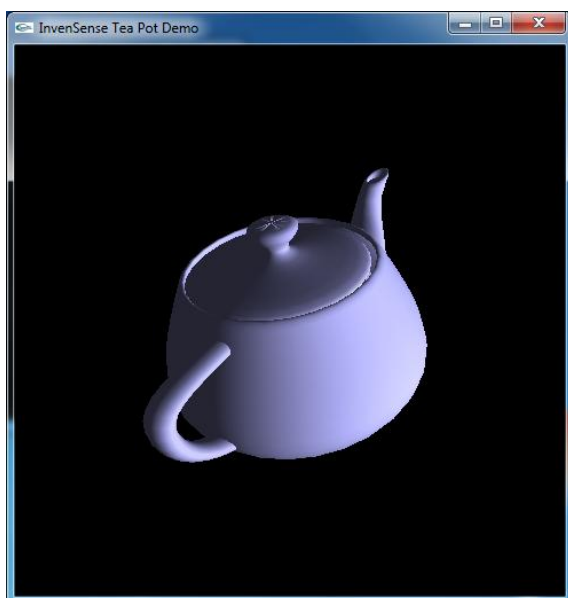
1. Download the Motionsensor.zip folder from www.microchip.com/motion
2. Copy the “spizzleinstall.exe” application to a local drive on your PC and run the application
3. Select the “accept agreement” for DirectX installation
4. Connect the motion sensor board to the PC through the USB cable provided in the box
5. To enable the hard-wired USB mode, program the Motion Sensor Demo Board with the ‘motionsense_hardwired_gold.hex’ file through the programming header. You will need a supported Microchip programmer to do this (ex: ICD3, Real ICE,)
6. The LED on the Motion Sensor board starts blinking slowly
7. Launch the Spizzle demo by double clicking the application “spizzle.exe” on your desktop. A GUI should open up.
8. Move the motion sensor board and try to align the holes in the sphere with the incoming pieces

9. To return to the wireless mode, program the Motion Sensor Demo Board with the 'motionsense_wireless_gold.hex' file

TeaPot Demo

The TeaPot Demo utilizes "OpenGL" for 3-D rendering, and will work with either wireless or hard-wired USB mode. To run the TeaPot Demo:

1. Download and install "TeaPotinstall.exe". Running this application will install USB drivers, and will install OpenGL files. USB drivers will be installed to the directory: c:/MCHPWinUSB . If you have problems with the install, you can manually install the USB driver with these files.
2. Run the "TeaPot.exe" file to start the demo.
3. The Tea Pot should appear in the window and reflect movements of the motion sensor demo board.



Recording and Playback (only works in hard-wired USB mode):

- Make sure the demo is operating in the Hard-wired USB mode
- Press the power switch to start the recording
- After the completion of recording, press the power switch a second time to playback

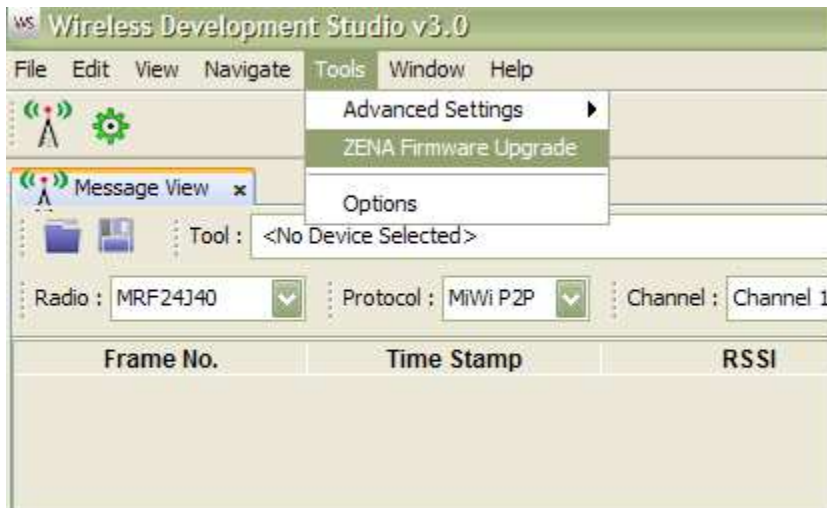
Note: The on-board Flash (SST25VF016B) can record approximately 20 minutes of activity.

Re-programming the ZENA wireless adapter

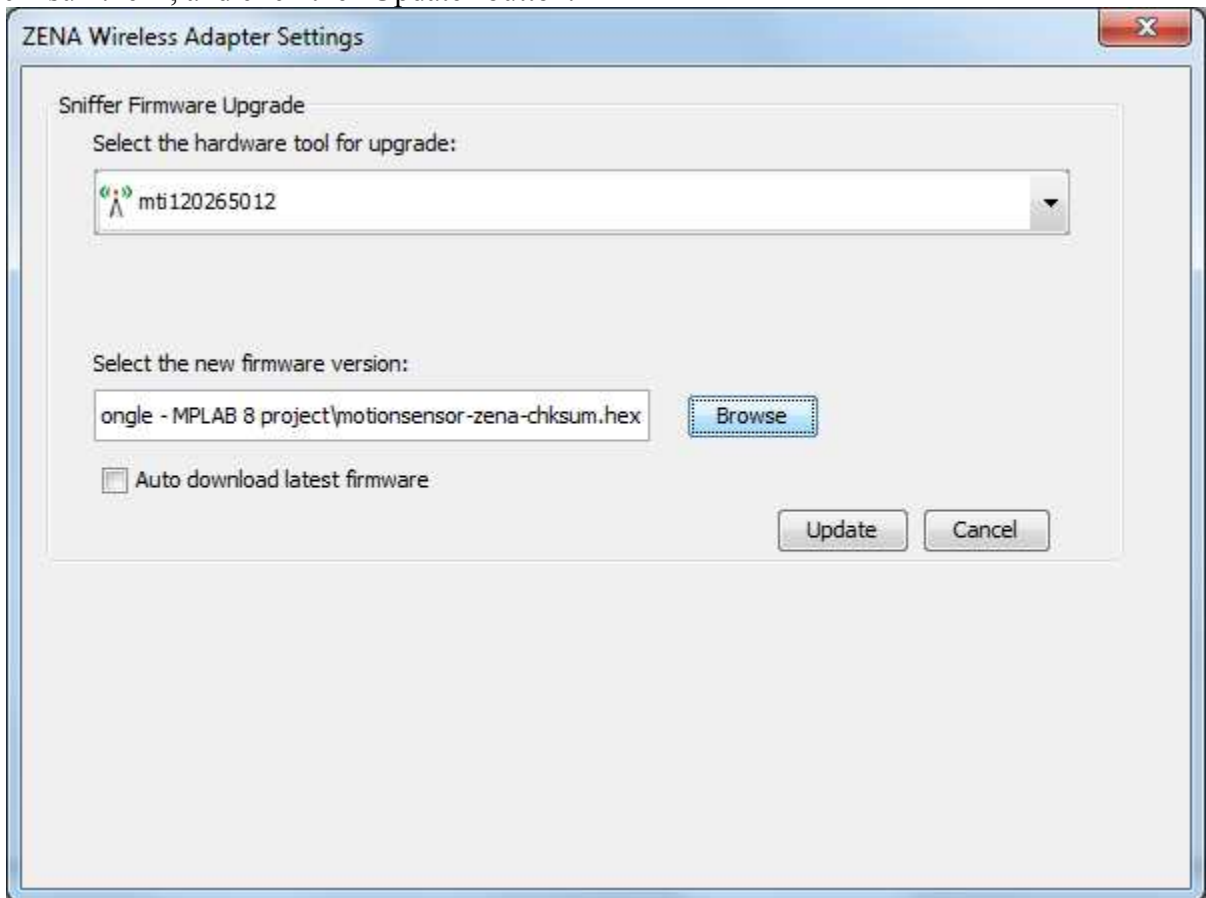
The ZENA wireless adapter has been pre-programmed to work with the motion sensor demo board. If desired, the ZENA adapter can be programmed as a wireless sniffer, and then re-programmed with the motion sensor demo code. In order to re-program the ZENA adapter:

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1. Open the WDS (Wireless Development Studio)
2. Select Tools -> ZENA Firmware Upgrade



3. Select the ZENA wireless adapter, select the firmware version “motionsensor-zena-chksum.hex”, and click the “Update” button.



Troubleshooting

- Light not blinking on ZENA adapter – wireless packets are not being received. Make sure that the motion sensor board is powered up and that the LED has two fast blinks followed by a delay.
- Light not blinking correctly on motion sensor board – two fast blinks indicate wireless mode. If you are not seeing this, then you are in another mode.
- What if the ZENA USB drivers have not installed properly?
Install Microchip WDS (Wireless Development Studio) to install ZENA USB drivers.
- How can I tell if my USB drivers for the ZENA have been installed properly?
The ZENA adapter should show up as indicated in the Device Manager (available through the Control Panel).