Texas Instruments

User's Guide

Z-Stack Sensor Monitor

SWRU157A
2008 Low-Power RF

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1. Introduction

Z-Stack Sensor Monitor (or ZSensorMonitor[1]) is a PC application that will be used to monitor the sensors in a ZigBee Network. ZSensorMonitor can be used together with either the CC2530ZDK or an eZ430-RF2480 kit.

The network is formed when setting up the basic out of the box demo included either of the kits. In the case of eZ430-RF2480 this includes the ZigBee Accelerator Sample Application.

This document will only describe the user interface of the ZSensorDemo PC application.

1.1. CC2530ZDK

Further details about the CC2530ZDK and the Sensor Demo sample application can be found on the CC2530ZDK website:

www.ti.com/cc2530zdk

1.2. eZ430-RF2480

Further details about the hardware platform and the ZigBee Accelerator Sample Application (ZASA) can be found on the eZ430-RF2480 Demo kit website at www.ti.com/eZ430-RF2480

[1] Formerly known as eZ430-RF2480 Sensor Monitor.

2. Installation

The installation of ZSensorMonitor is very straight forward. Download the zip file from internet and unzip the setup file. Double click on the setup file and follow the instructions.

3. eZ430-RF2480 Driver Installation

This section is only relevant if the eZ430-RF2480 kit platform is used.

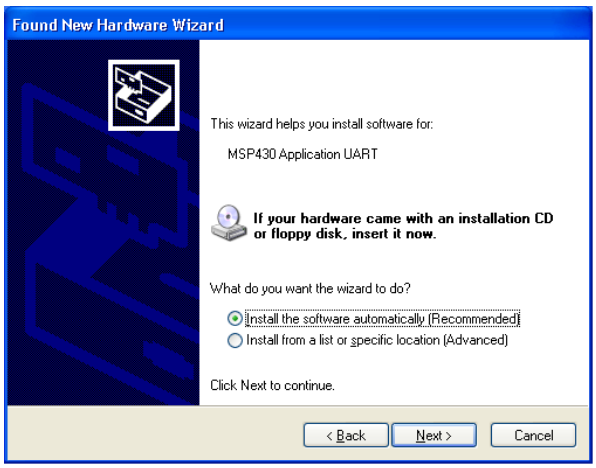
Note: When using eZ430-RF2480 the PC application should be installed before the eZ430-RF2480 dongle is connected to the PC. This is to be sure that the required files for the driver installation are available

The PC application will communicate with the eZ430-RF2480 dongle over a virtual COM port. The first time the dongle is connected to the PC, the new HW will be detected and the wizard will appear and ask to install the necessary software. The required “inf” file will be installed when installing the PC application. Please follow the guidelines in this section based on your PC’s operating system.

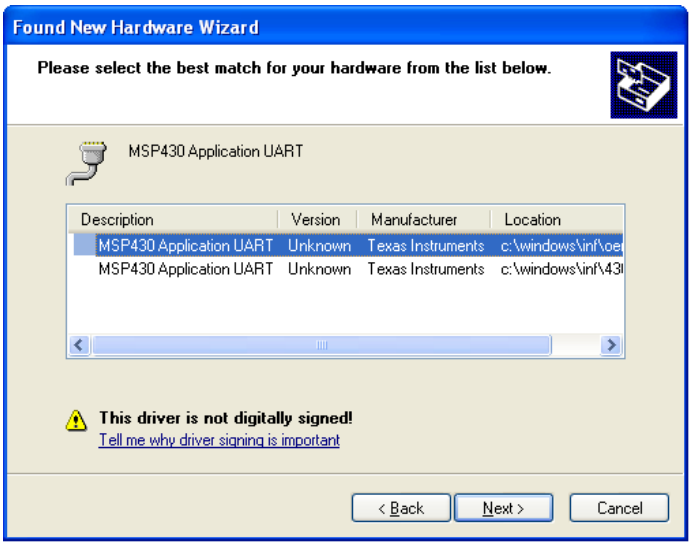
3.1. Windows XP

When the dialog box appears, select “No, not this time” and Click next.

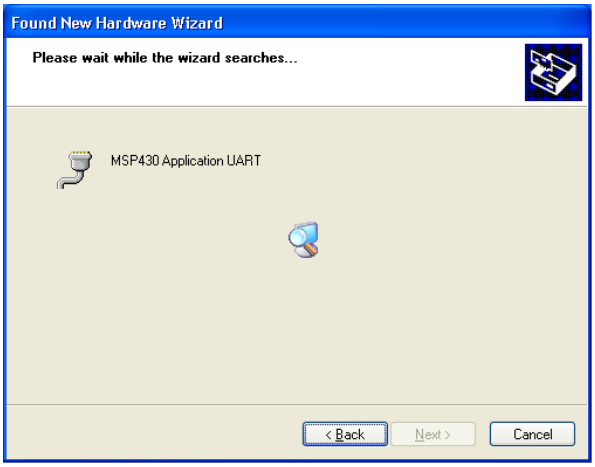
Select “Install the software automatically” and click next.



III

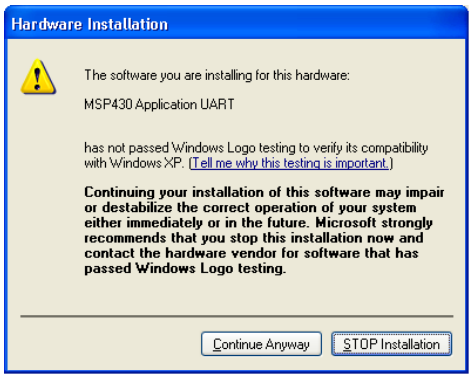


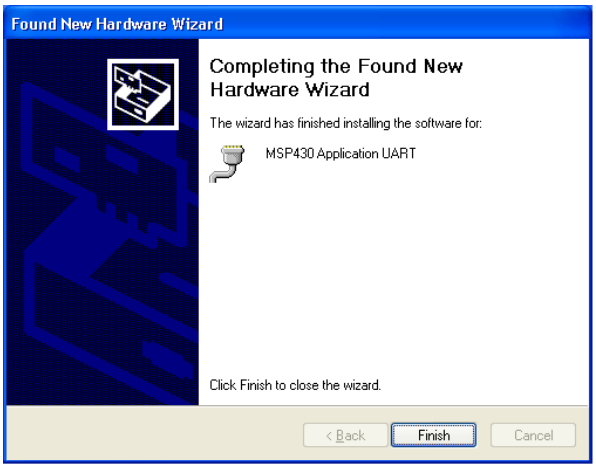
If the IAR kickstart for MSP430 has been installed before this application, it might be that this dialog will pop up and ask the user to select one of the two inf files. Both inf files are equal and it doesn't matter which one that is selected. Either should work fine.



The installation will start without any further selections.

If this warning appears, the option “Continue Anyway” must be selected in order to install the driver.

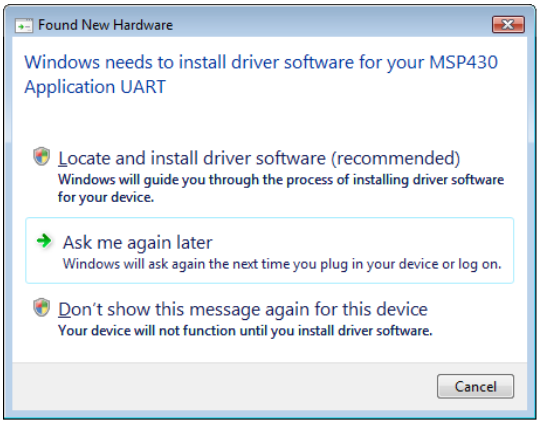




This dialog will be shown when everything has been successfully installed.

Click Finish to close the wizard.

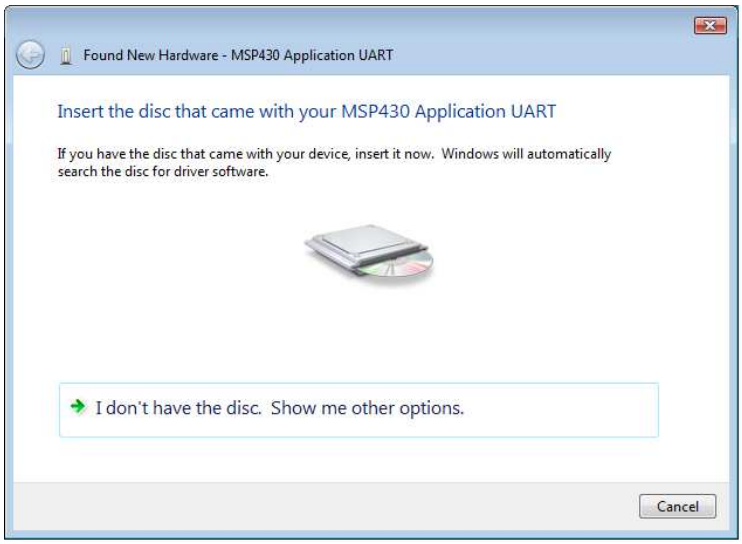
3.2. Windows Vista

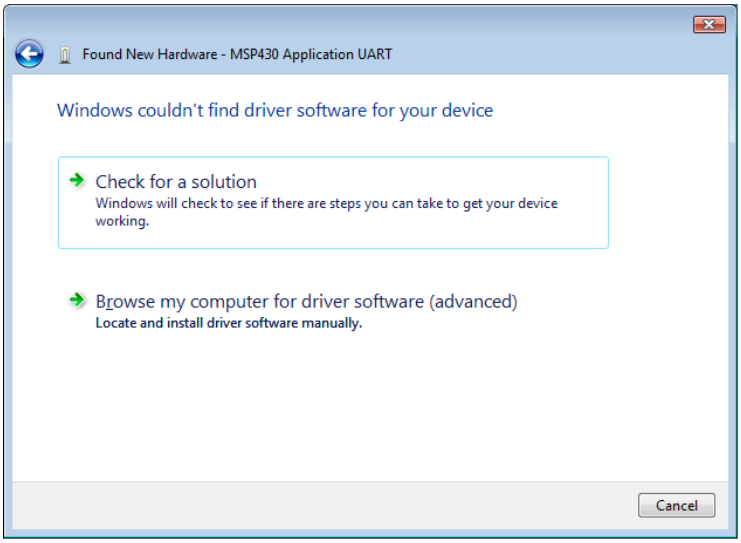


The first time the USB dongle (sink) is connected to the PC, the new HW is detected and the system will ask to install driver software.

Select “Locate and install driver software”.

Select “I don’t have the disc. Show me other options.”

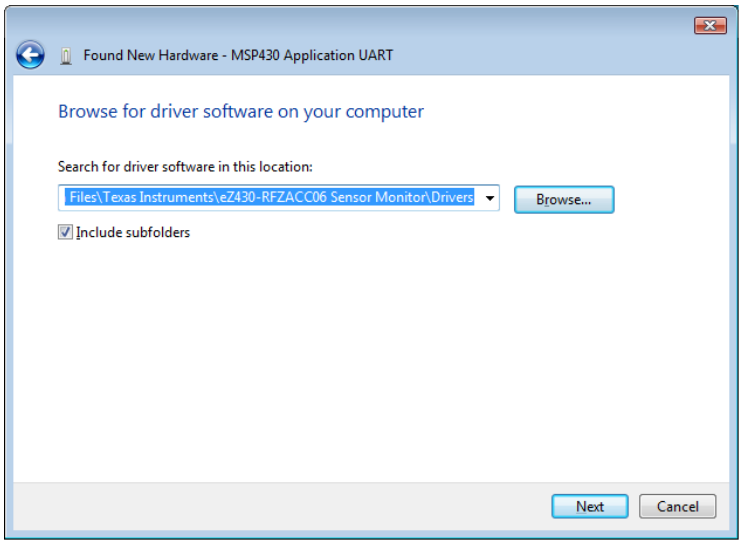


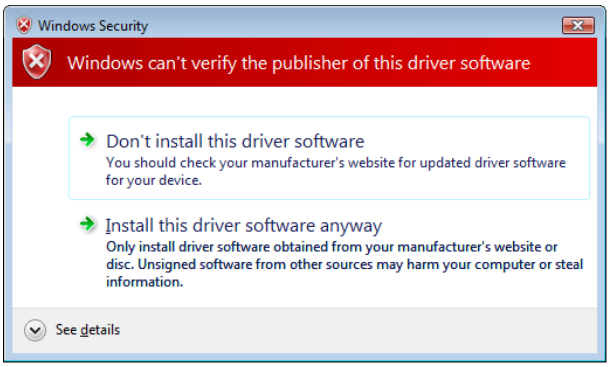


Select “Browse my computer for driver software.”

The required “inf” file will be installed together with the application. Browse to the directory of the application and select the sub directory “Drivers”.

Click Next to continue.

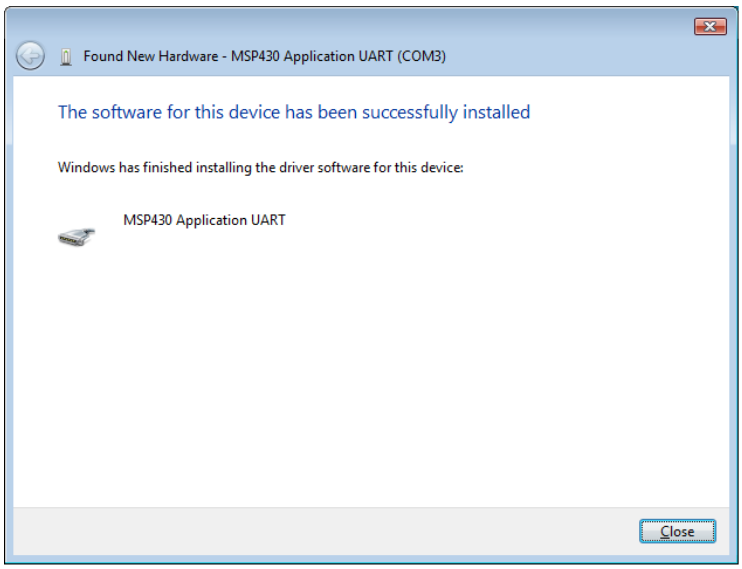




Select “Install this driver software anyway”

At the end the software should be successfully installed.

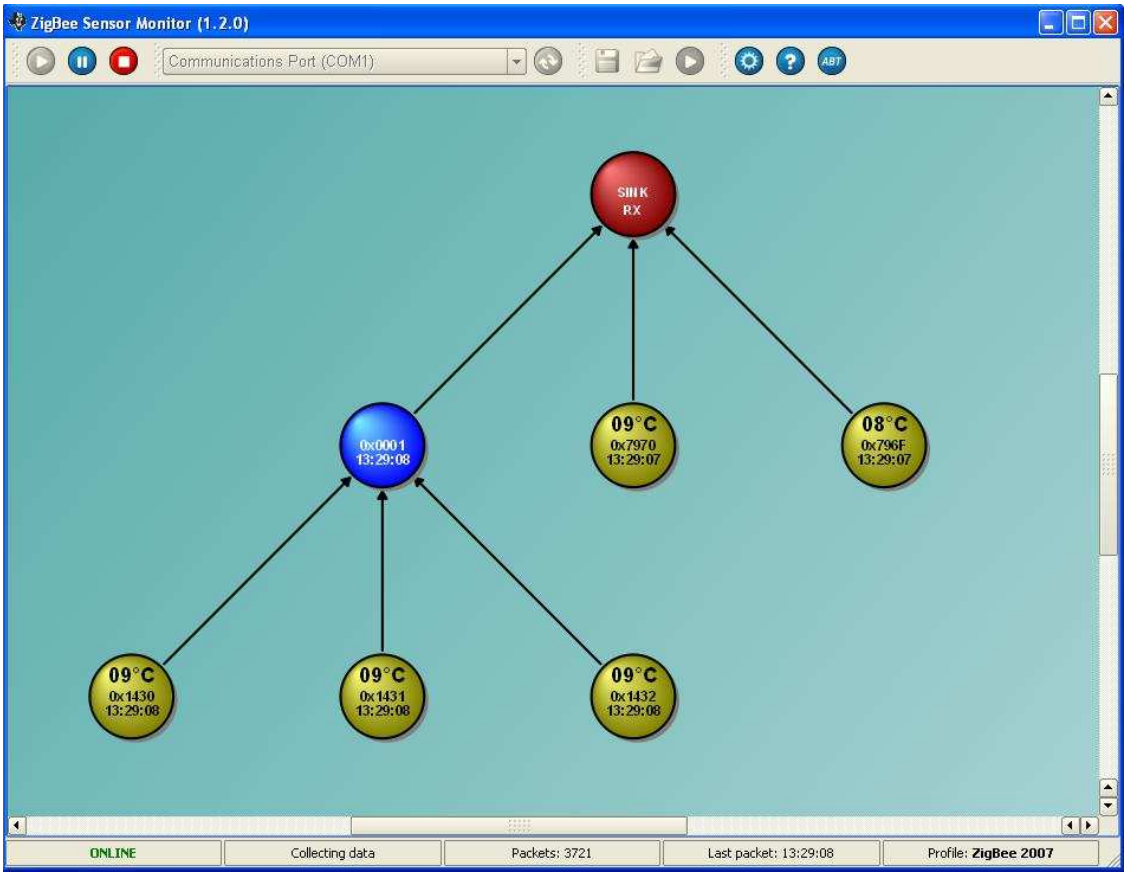
Click Close to end the installation.



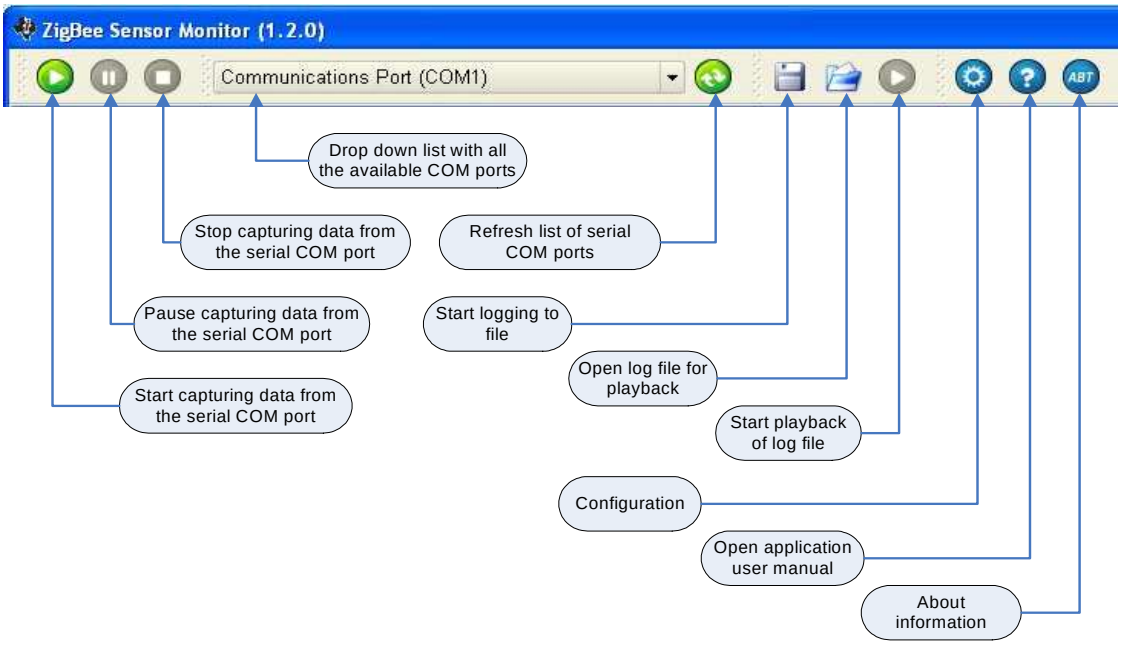
4. User Interface

The user interface is developed to be as simple as possible with only a few buttons and input fields. When the eZ430-RF2480 dongle is connected to the PC, the application will search for an applicable COM port and start reading if a connection is successfully established.

Below is a screenshot showing a ZigBee Coordinator, Routers and End Devices where the Coordinator is operating as a data Sink and all remaining devices are operating as data Sources.



4.1. Toolbar



The list of available COM ports will automatically be updated when the eZ430-RF2480 dongle is connected or disconnected. It is also possible to force refresh of the list by clicking on the green “refresh” button .

4.2. Data capture

If the applicable COM port can be found when “refresh” has been clicked, the application will automatically try to capture data from the COM port. If communication is successfully established, the “capture” button will be disabled and both the “Pause capture” button and the “Stop capture” button will be enabled. If more than one device with the applicable COM port is connected to the PC, it could be that wrong COM port gets selected. In this case the first port in the list will be selected. If this was not the intended device to connect to, the appropriate COM port must be selected manually.

Using the “Stop capture” button will cause the nodes on display to be removed from the screen once the “Start capture” button is clicked. This differs from the “Pause capture” button which will maintain the nodes on the screen when the “Start capture” button is clicked.

4.3. Data logging and playback

It is possible to capture the data traffic on the serial port to a log file for debugging and playback purposes. The log file is pure ASCII text which displays a time-stamp and the raw data in hexadecimal format.

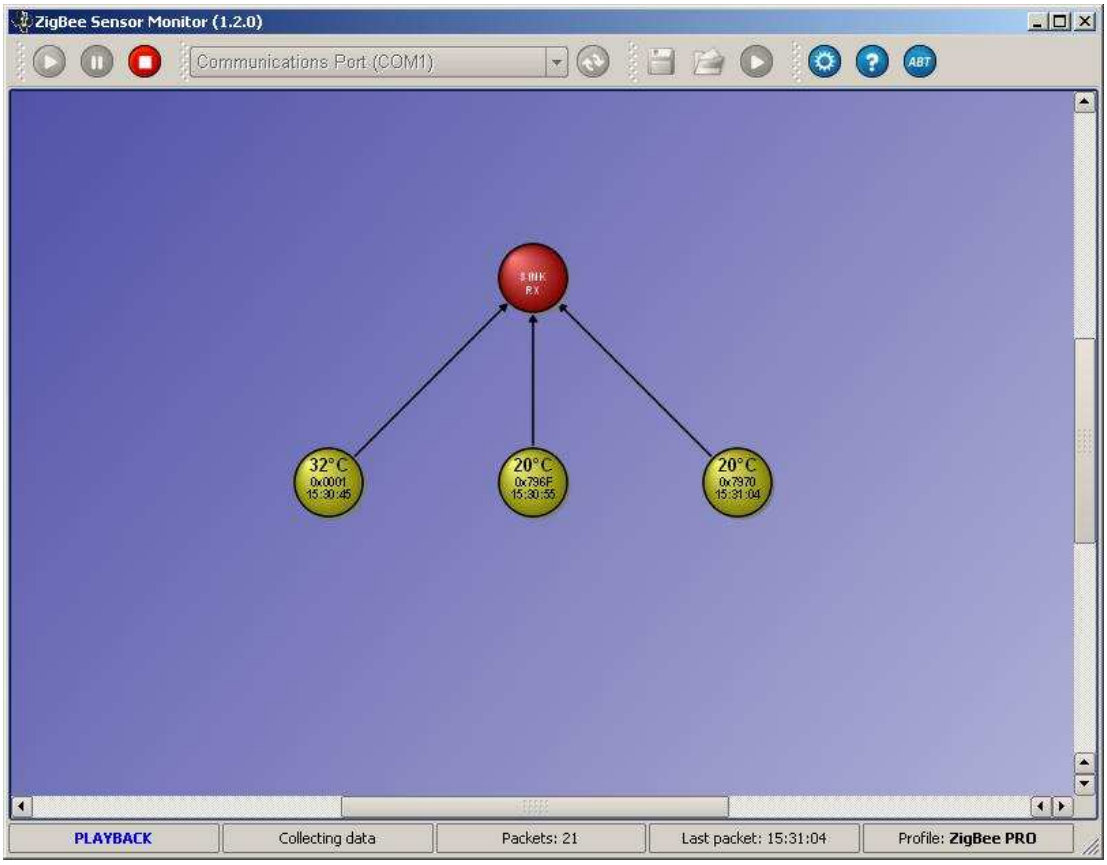
Data logging is started by clicking the button . The user will then be requested to provide a file using the standard “File Save” dialog. The log file shown below is a sample ZigBee PRO log file included in the distribution as “ZSensorMonitor_pro.log”.

```
15:30:27 02 61 01 41 00
15:30:45 03 46 82 01 00 58
15:30:45 0A 46 87 01 00 01 00 02 00 1e 1c 00 00
15:30:53 03 46 82 6f 79 19
15:30:55 0A 46 87 01 00 01 00 02 00 1f 1c 00 00
15:30:55 0A 46 87 6f 79 01 00 02 00 14 1e 00 00
15:31:03 03 46 82 70 79 19
15:31:04 0A 46 87 70 79 01 00 02 00 14 17 00 00
15:31:05 0A 46 87 01 00 01 00 02 00 20 1c 00 00
15:31:06 0A 46 87 70 79 01 00 02 00 14 17 00 00
15:31:12 03 46 82 71 79 58
15:31:12 0A 46 87 71 79 01 00 02 00 17 1d 00 00
15:31:15 0A 46 87 01 00 01 00 02 00 21 1c 00 00
15:31:16 0A 46 87 70 79 01 00 02 00 14 17 00 00
15:31:17 0A 46 87 6f 79 01 00 02 00 14 1e 00 00
```

Playback is done in two steps:

- Open a log file using the button. This will active the button.
- Click on the button to start the playback

During playback the network view background will differ from when capturing data online. The figure below is an example of playing back already recorded data.



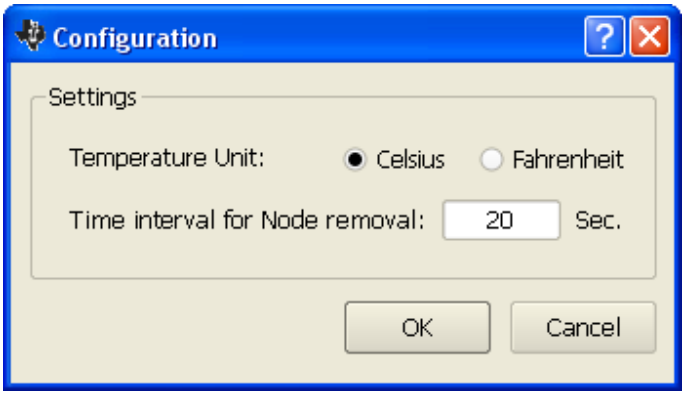
4.4. Help

The User's Manual is a file which opens when the "help" button is clicked.

The "About" button can be clicked to obtain information about the application.

4.5. Configuration

Click on the "Configuration" button and the settings dialog will appear.



Temperature unit

Celsius or Fahrenheit can be selected.

Time interval

The timestamp of each node will be checked regularly to see if any message has been received within the given time interval. If the elapsed time is longer than specified, the Node will be removed from the screen.

4.6. Network View

The PC demo will always display one node on the top of the screen, the Sink. Below the Sink the presence of additional network nodes will be displayed as they are detected. Be aware that nodes may place themselves on top of existing nodes when they first appear, but can easily be dragged away with the mouse.

The various states of the nodes are described below.

Sink node not connected to the PC.

An attempt to read from the COM port has been made, but no response received.

Sink node connected to the PC but reading from the COM port is not active.

Sink node connected to the PC and reading from the COM port. The difference with a Sink not connected to the PC can be seen from the black and white outline.

A combined router and source node in the network. The short address, temperature, voltage[2] and a timestamp is shown within the node. The timestamp is from the last message received from the node.

The node will blink each time a message is received by the connected Sink node.

A dummy router. If we don't receive any message from a router within the configured time interval, it can be assumed that the node is out of service. However, if the node has child nodes that are still alive, the node will not be removed, it will be changed to a "dummy router".

Source node with information about the short address, temperature,

[2] Only applicable for the eZ430-RF2480.

voltage and a timestamp from when the last message was received from this node.

The source node will blink each time a message is received by the connected Sink node.

The role of each node is also indicated if the mouse is held over the node for more than a second.

The nodes are connected with arrows to show the relationship between parent and child nodes based on the CSKIP[3] addressing scheme. This relationship is with respect to addressing, and does not necessarily reflect the path taken for routing messages between a source and the sink.

4.6.1. Zoom

The user can zoom in and out of the network view by using the wheel on the mouse or by clicking on the "+" or "-" buttons. The focus for zooming in and out will be based on the location of the mouse pointer.

4.6.2. Scroll bars

The Horizontal and Vertical scroll bars can be used to navigate the network. If the Network view is zoomed out far enough to make the outline of the rectangular background visible, the scroll bar will disappear.

4.6.3. Moving a Node

The nodes can be moved around with the mouse. To move a node, click and hold the left mouse button while pointing to the node. Hold the left mouse button and drag the node to the required position. Release the left mouse button when the node is in the desired position.

4.6.4. Removal of a Node

A node will be removed from the screen if no message has been received within the time interval given in the settings dialog.

4.7. Status bar

The status bar shows the status of the application; connection state, mode of operation, serial port traffic statistics and protocol information.

[3] Applies only to the ZigBee 2006 protocol used in eZ430-RF2480.

5. Troubleshooting

5.1. Incorrect temperature values

If the temperature is much different from the expected value, this is because the temperature sensor is not calibrated.

5.2. Status of the connected dongle

NB! This section only applies to the eZ430-RF2480.

It is possible for the status of the connected dongle to get out of synchronization if the dongle gets disconnected and connected rapidly without any delay in between. In this case the start/stop capturing data should be used manually to get the capture operational again.

5.3. More than one dongle connected to the PC

NB! This section only applies to the eZ430-RF2480.

If more than one dongle is connected to the PC, make sure that the correct dongle is selected in the list of COM ports.

5.4. Connect/Disconnect other USB device on same PC

NB! This section only applies to the eZ430-RF2480.

If any USB device is connected or disconnected while the eZ430-RF2480 dongle is connected and Capture data is active, the capture of data could get deactivated. In this case the Capture must be re-activated manually.

5.5. USB dongle not automatically detected when connected

NB! This section only applies to the eZ430-RF2480.

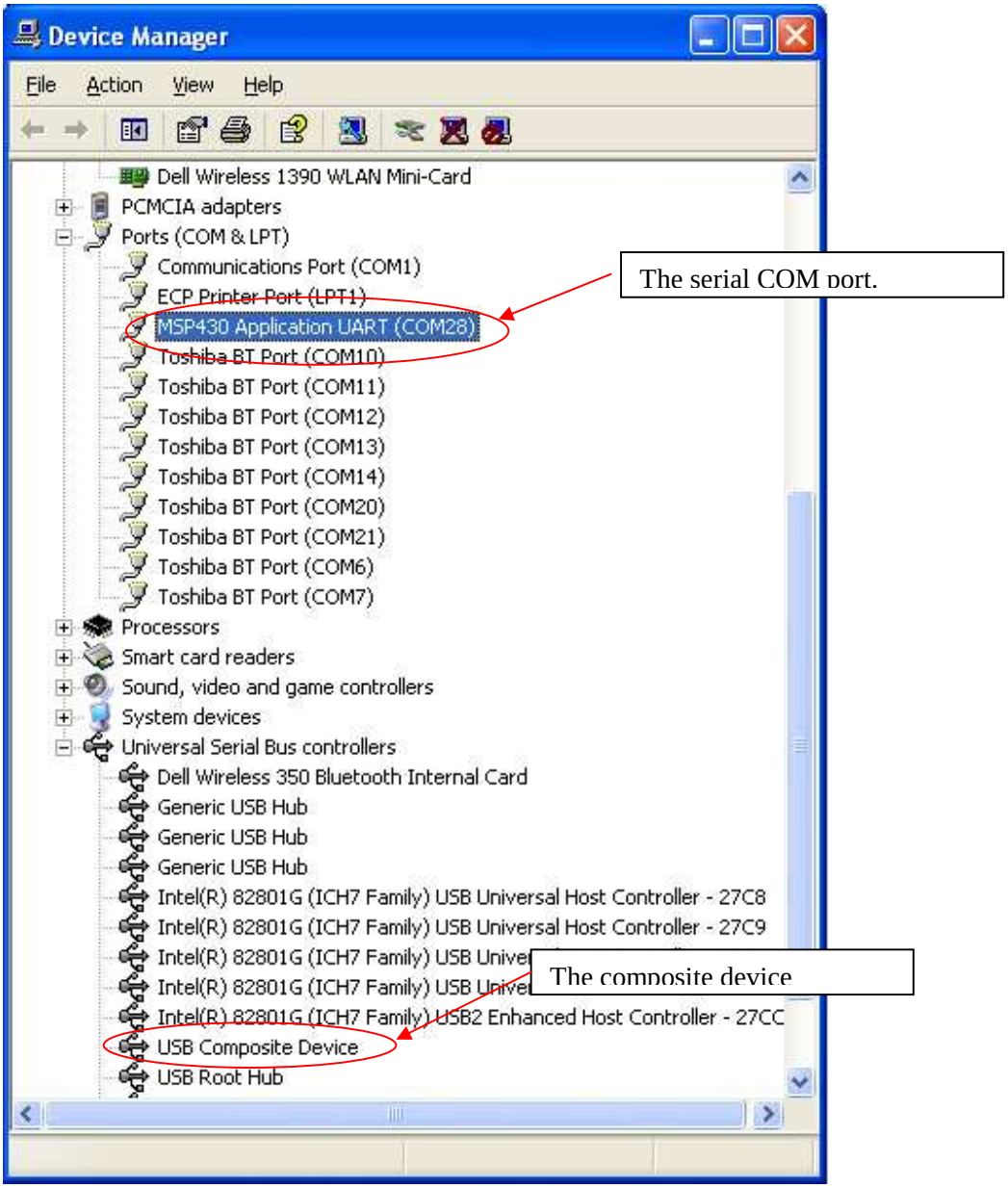
If the eZ430-RF2480 dongle is not automatically detected, try to remove the dongle and to connect it again. Windows is sometimes slow in detecting a new dongle so don't do this in quick succession..

It is also recommended to first start the PC application and then to plug-in the eZ430-RF2480 dongle.

It is also possible to manually select the COM port from the drop down list. Search for device starting with "MSP430…" and select this one. Then push the "capture" button to establish the communication.

If still no success, it is time to check the device in the device manager. If the device drivers have been successfully installed, there should be one Composite USB device and one serial COM port.

Correctly installed devices should look like the screen shot below.

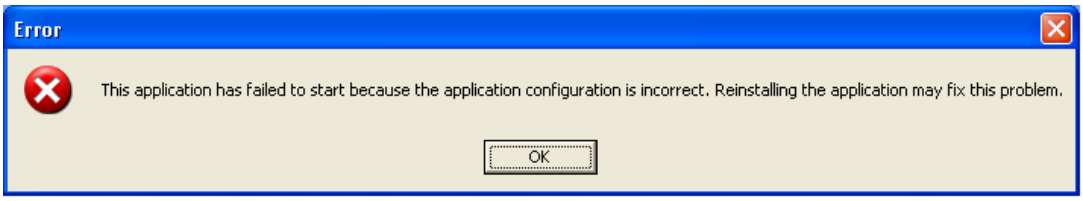


When the eZ430-RF2480 is removed, these device drivers should disappear from the view in the Device Manager. If they don't disappear, a restart of the PC will be necessary.

Check that the "MSP430" device is available in the drop down list of available COM ports.

5.6. Not able to start the application

If an error message about missing the **msvcp80.dll** is received, or the error message shown below appears when attempting to start the application, you may be required to install an additional package from Microsoft.



The package contains some additional runtime components needed by applications developed with Visual C++. To resolve this problem, install the package by running the file vcredist_x86.exe file found in the folder \vcredist of the ZSensorMonitor installation.

Alternatively the package can be downloaded from the web:

http://www.microsoft.com/downloads/details.aspx?familyid=9B2DA534-3E03-4391-8A4D-074B9F2BC1BF&displaylang=en

Document History

Revision	Date	Description/Changes
swru157	08/03/2008	Initial release.
swru157a	08/05/2009	• Added logging and playback • Changed document name • Added support for CC2530 Z-Stack Sensor Demo • Added status bar

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