

Using the TI CC2430/2431/2520 with the Daintree Networks Sensor Network Analyzer

Application Note AN010



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Sensor Network Analyzer Release 3.0 (2008-10-01)

About the Sensor Network Analyzer

The Daintree Networks Sensor Network Analyzer (SNA) combines a powerful protocol analyzer with network visualization, measurements and diagnostics for IEEE 802.15.4™ and ZigBee® applications. It provides automatic display of network formation, topology changes, and router and coordinator state changes allowing rapid detection of incorrect network behavior and identification of device or network failures.

The SNA works in conjunction with Daintree's 2400E Sensor Network Adapter to provide analysis for small and large networks. With multi-node capture, analysis of large networks across wide areas (such as multiple rooms within a facility) is possible.

The SNA application is compatible with boards from the TI/Chipcon CC2430ZDK or CC2431ZDK development kits. These kits ship with 2xSmartRF04EB boards each with a plug-on CC2430EM (or CC2431EM) module and 5xCC2430DB (or CC2431DB) Development Boards. The SNA is also compatible with the TI/Chipcon CC2520EM and SmartRF05EB board. Any of these boards can be used as a packet sniffing node. No additional hardware is required.

This application note describes how to use the SNA software with the CC2430/2431/2520 boards. You can find out more about the SNA software in general, refer to the following:

- **Quick Start Guide:** Included with the SNA application. From the SNA **Help** menu, select **Quick Start Guide**, or else from the Windows **Start** menu, select **Daintree Networks > Documentation > SNA Quick Start Guide**.
- **User Guide:** Included with the SNA application. From the SNA **Help** menu, select **User Guide**, or else from the Windows **Start** menu, select **Daintree Networks > Documentation > SNA User Guide**.
- **FAQs and other support resources:** These are available from the Daintree Networks web site at www.daintree.net/support

To find out more about the TI/Chipcon CC2430/2431/2520 boards and TI's ZigBee offerings in general, visit the Texas Instruments web site at www.ti.com/zigbee

Getting started

In summary, getting started involves the following steps, each of which is described in detail in the following sections:

1. Install the Sensor Network Analyzer software
2. Install the CC2430/2431/2520 software and connect the board to your PC via USB.
3. Start the SNA software, and then add the CC2430/2431/2520 board as a capture device.
4. Select the CC2430/2431/2520 as the current capture device.

Once connected and configured, you can use the CC2430/2431/2520 as a packet sniffer/capture node with the Sensor Network Analyzer.

1. Installing the SNA software

1. Go to www.daintree.net/register to register your software and download the latest release.
2. Enter your email address together with the 15-digit alpha-numeric registration code from the software CD case. After you click Next, an activation code will be emailed to the address you supply.
3. Follow the link provided to download the latest release of the SNA software, plus the *Sensor Network Analyzer Quick Start Guide*. Daintree **strongly** recommends that you download the latest version of the software to ensure you have the latest functionality and fixes.
4. Follow the instructions in the *Quick Start Guide* to install and activate the software.

2. Installing the CC2430/2431/2520 software and connecting the board to your PC via USB

1. Install the TI Packet Sniffer software, which is provided with the development kit and can also be downloaded from the TI website at <http://focus.ti.com/docs/toolsw/folders/print/cc2430zdk.html#supportsoftware>.
To install the software, unpack the zip file, and then run the setup file.
2. Use a USB cable to connect the USB port of the TI/Chipcon CC2430/2431/2520 board to the USB connector of your PC. Note that the packet sniffer software is not supported over the serial port.

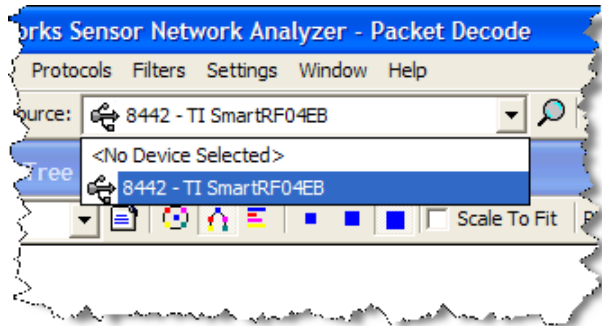



The first time you connect this board to your PC, a Found New Hardware wizard will open.


3. Select to **Install the software automatically**, and then click **Next**. The wizard will locate and install the required driver files.
4. When installation is complete, we recommend you use the TI Packet Sniffer software or SmartRF Studio software to verify that the CC2430/2431/2520 board is correctly connected and configured. See the TI/Chipcon User Manual for instructions.

3. Selecting the CC2430/2431/2520 board as the current capture device

1. In the SNA main window, select the CC2430/2431/2520 board from the **Source** list:
 - SmartRF04EB + CC2430EM boards will be shown as **TISmartRF04EB**
 - A CC2430DB board will be shown as **CC2430DB**
 - SmartRF04EB + CC2431EM boards will be shown as **TISmartRF04EB**
 - A CC2431DB board will be shown as **CC2431DB**
 - SmartRF05EB + CC2520EM boards will be shown as **TISmartRF05EB**




If the CC2430/2431/2520 is not available from the list, click  to get the SNA software to search/scan for capture devices and refresh the Source list.

2. Select the **Channel** on which you want to capture traffic.
Click  to start the capture.

Known limitations

If the CC2430/2431/2520 board is in use by the SNA application, it cannot be used concurrently by any other application. Similarly, if the board is in use by one of the TI applications, it cannot be used by the SNA.

If the CC2430/2431/2520 is not detected by the SNA application the first time it is connected to the PC via USB, try disconnecting and then reconnecting it. Then click  to refresh the list of available capture devices.

If multiple CC2430/2431 boards (CC2430/2431DB or SmartRF04EB+CC2430EM) are connected, it may be difficult to identify which board is which, and which is the required capture node. A trial and error approach is required. Note that this is not a problem with the SmartRF05EB+CC2520EM boards, which show the ID from the bottom of the board.

Where to next?

We recommend that you start exploring the SNA menus to get an understanding of the full capabilities of this product.

Detailed descriptions of all options are available in the *Sensor Network Analyzer User Guide*, which you can open from the SNA **Help** menu and the Windows **Start** menu. You can also find FAQs and other supporting information on the Daintree web site at www.daintree.net/support

The Daintree web site includes other useful information, such as

- www.daintree.net/solutions for product information including data sheets and an animated tour
- www.daintree.net/purchase to purchase Daintree products online
- www.daintree.net/contact to contact the Daintree sales or support teams