



Anaren Integrated Radio

## How to set up & use Anaren EZ4 target boards with Texas Instruments eZ430-RF2500 Development Kit

Texas Instruments low-cost, eZ430-RF2500 development kit enables you to create a two-node wireless network: The kit include a Remote Sensing Demo, a USB JTAG Probe, and a Battery Pack, and a Remote Sensor software demo based on TI's open-source wireless software stack, SimpliciTI. Now, because Anaren's AIR modules are based on TI's CC1101 and CC2500 low-power RF technology, Anaren offers FCC-certified Target Boards you can use with TI's eZ430-RF2500 kit and Sensor Demo. Even better, depending on which AIR-equipped Target Board set you use (433MHz, 868MHz, 915MHz, or 2.4GHz) — you can now use the eZ430 kit at any of the four ISM bands! Simply swap our AIR-equipped target boards with the standard boards provided with the kit — and (for only \$100! — you've got a completely FCC-certified, two-node wireless development environment based on the TI MSP-430 Microcontrollers and Anaren's TI-based AIR modules!

### Getting started

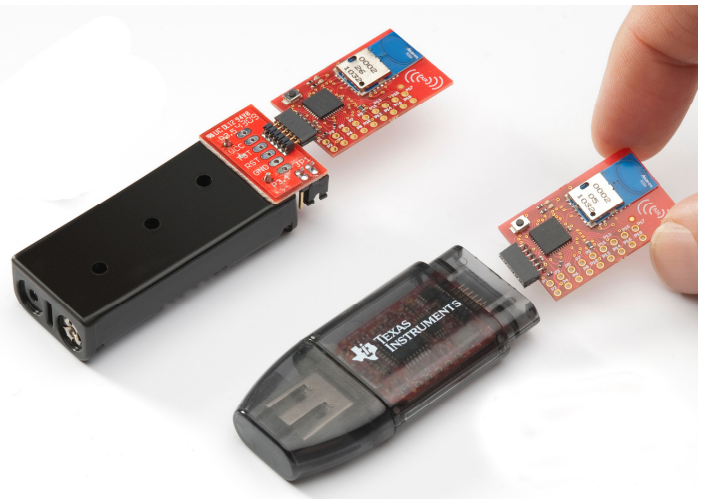
The first step is to assemble all the pieces, which can be obtained through TI's and Anaren's shared distributors: Arrow, Avnet, and Mouser. (Links to the applicable pages on our distributors' websites are below; or click the "AIR Support" icon at [www.anaren.com/AIR](http://www.anaren.com/AIR).)

When securing your supplies, remember that one EZ430-RF2500 kit will use two Anaren Target Boards. Also note that Anaren EZ target boards come with two part numbers. While they are identical in terms of hardware, we have pre-programmed them to work with TI's Sensor Demo: The "-EZ4A" board is pre-programmed as the *access point*, while the "-EZ4E" board arrives pre-programmed as an *end-point*. (If you wind up with two of the same boards, they are easily reprogrammed!)

- Applicable Arrow web pages:
  - TI's [EZ430-RF2500](#) kit
  - Anaren's EZ [Target Boards](#)
- Applicable Avnet pages:
  - TI's [EZ430-RF2500](#) kit
  - [Anaren page](#) on Avnet (AIR to be in stock mid-July 2011)
- Applicable Mouser pages:
  - TI's [EZ430-RF2500](#) kit
  - Anaren's EZ [Target Boards](#)
- Other useful links:
  - TI's web page for the [EZ430-RF2500](#)
  - TI's web page for the [Sensor Monitor Demo](#)
  - Schematics for Anaren's [EZ4x Target Board](#)
  - IAR's Embedded [Workbench Kickstart Version](#)
  - Code Composer Studio (CCStudio) [Integrated Development Environment \(IDE\) v4.x](#)
  - eZ430-RF2500 Development Tool [User's Guide](#)
  - Wireless Sensor Monitor Using the [eZ430-RF2500](#)
  - TI's SimpliciTI [Overview](#)

And, of course, there's much more at TI's website!

### More about Anaren EZ430 Target Boards

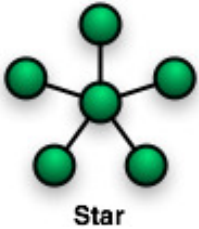


Each Anaren EZ430 Target Board includes a TI MSP430F2274 microcontroller, two LEDs, some I/O port headers, a push-button switch, and your AIR module of choice. (We offer 400MHz, 868MHz, 915MHz, or 2.4GHz models and, within those bands, also a choice of embedded PCB antenna or a U.FL connector for an external whip antenna.) The target boards arrive pre-loaded with TI's SimpliciTI-based Sensor Monitor Demo (one as an access point, the other as an end point). And because our EZ4x Target Boards are equipped with our AIR modules, they are FCC-certified. (Note: The boards may be reprogrammed at any time using the USB JTAG Probe that comes as part of the TI EZ430-RF2500 kit. Additional tooling will be required in order to do so; however, this tooling is available via the web and in many cases is available free of charge.)



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### The TI Sensor Monitor Demo Software



TI's Sensor Monitor Demo establishes a simple star-topology network (shown at left), based on TI's SimpliciTI software stack. This network consists of a single *access point* connected to one (or more) *end point* nodes. Each node (including the *access point*) measures its temperature (using the internal temp sensor in the on-board MSP430F2274)

and transmits that information to the *access point* at approximately a 1Hz rate. TI provides a simple Windows GUI that displays the network topology and all the temperatures. Placing one's thumb on the MSP430 will demonstrate the temp sensor. Remember that, in general, these temp sensors require calibration (not part of the demo); so, while you will see temperatures go up and down based on heating or cooling the MSP-430 — the temperatures are not calibrated for accuracy/precision.

The *access point* node is considered to be an "always-on" node -- ready to receive from the *end points*. The *end point* nodes are considered to be sleeping nodes; they "wake up" about once a second, read their temperature, transmit it to the *access point*, and then go back to sleep. As such, this demonstration also shows the low-power nature of the SimpliciTI-based RF networks (aka: sleeping nodes save energy).

The *access point* node is connected to a PC using the EZ430-RF2500's USB JTAG probe and transmits all this information back to the GUI using a USB Serial Port connection. The Windows-based GUI application that is supplied as part of the TI EZ430-RF2500 kit then displays all the information. You can find the GUI by clicking:

*Start / All Programs / Texas Instruments / eZ430-RF2500 Sensor Monitor Folder / eZ430-RF2500 Sensor Monitor*

In the PC Sensor Monitor Visualizer, the center node is the *access point* and the attached bubbles are the *end devices*. The PC application displays the temperature of both the *end devices* and the *access point*. Additionally, the PC application is capable of simulating distance from its *access point* when the *end devices* are moved. The number of *end devices* can also be expanded by adding more target boards in the star network, as seen in the figure shown at right.

### AIR Support



Anaren's applications engineers are ready to assist you should you have any trouble getting your EZ430-RF2500 equipped with AIR modules up and running. Simply email us at [AIR@anaren.com](mailto:AIR@anaren.com) for a quick and custom response.

Additionally, Anaren's AIR Support [webpage](#) offers a wide range of additional, helpful information — including Users Manuals for AIR modules, register (or "configuration") settings, instructional videos, and more.

### Other TI-focused development tools!



If you use a Texas Instruments "DK" development kit CC1101DK, CC2500DK, or CC8520DK — you might be interested in AIR-module equipped evaluation modules ("EM") you can easily use with your kit. Like our EZ target boards, these are also available through our/TI's distributors! (Also coming soon from Anaren: AIR-equipped LaunchPad tools!)

