



SILICON LABORATORIES

# 802.15.4-2.4-DK

## 2.4 GHz 802.15.4 DEVELOPMENT KIT USER'S GUIDE

### 1. Kit Contents

The 2.4 GHz 802.15.4 Development Kit contains the following items, shown in Figure 1.

- 2.4 GHz 802.15.4/ZigBee Target Boards (2)
- Antennas (2)
- 9 V batteries (2)
- 2.4 GHz 802.15.4 Development Kit User's Guide (this document)
- Silicon Laboratories Development Kit IDE and Product Information CD-ROM. CD content includes the following:
  - Silicon Laboratories Integrated Development Environment (IDE)
  - Keil Software 8051 Development Tools (evaluation assembler, linker and C compiler)
  - 802.15.4 Application Programming Interface (API) library
  - Source code examples and register definition files
  - 2.4 GHz 802.15.4 Demonstration Software
  - Documentation
- AC to DC power adapter
- USB debug adapter (USB to debug interface)
- USB cables (2)



Figure 1. Silicon Laboratories 2.4 GHz 802.15.4 Development Kit

## 2. Kit Overview

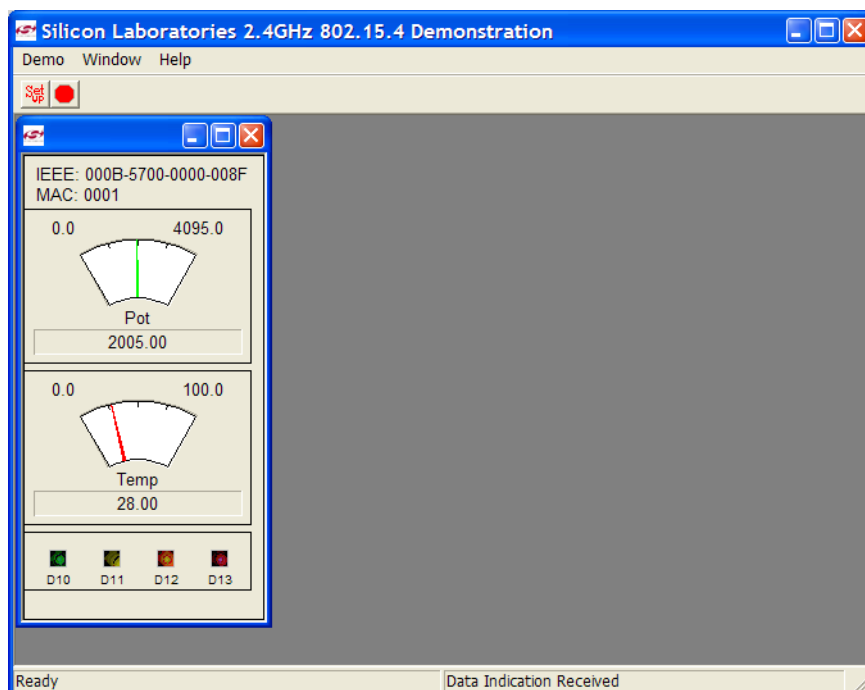
The 2.4 GHz 802.15.4 Development kit contains everything necessary to demonstrate and develop a two-node 802.15.4 network. The 802.15.4 Demonstration Software provides a quick and convenient graphical PC-based demonstration with no programming required. A complete development environment is provided in the kit for those wishing to develop a custom 802.15.4 application. The development environment includes an IDE, evaluation C compiler, software libraries, and a code example.

## 3. Demonstration Tools

The kit includes a demonstration to enable the user to quickly construct a 802.15.4 network, shown in Figure 2.

The demonstration has both software and firmware components. The 2.4 GHz 802.15.4 Demonstration Software is a graphical user interface that runs on the PC. The demonstration firmware is the 8051 code that runs on the development board. Development boards are shipped with the firmware preloaded. Software and firmware updates are available upon request through Silicon Laboratories' Applications group.

Detailed instructions are in document "AN267: 2.4 GHz 802.15.4 Demonstration Software User's Guide", included with this kit.



**Figure 2. Silicon Laboratories 2.4 GHz 802.15.4 Demonstration Software**

## 4. Development Tools

The 2.4 GHz 802.15.4 Development Kit includes everything necessary to write, compile, download, and debug a simple 802.15.4-based application.

The Silicon Laboratories Integrated Development Environment (IDE) serves as the primary programming and debugging tool. The IDE includes an evaluation versions of the Keil C compiler, assembler, and linker, limited to 4 kB of linked user code. The included 802.15.4 MAC library components do not count against this limit. The kit also includes an adapter for programming and debugging from the IDE environment as shown in Figure 3.

The software library includes the 802.15.4 MAC and PHY layers. A Network Application Programming Interface (API) contains all necessary network primitives to build a 802.15.4 network from a user-defined application. A software example illustrates the MAC API. This example builds an ad-hoc 802.15.4 network using the included MAC API software library.

Refer to "AN268: 802.15.4 MAC Application Programming Interface Layer Guide" for a complete description of the API commands and usage. This guide closely follows the format of the IEEE 802.15.4-2003 specification, which should also be reviewed before beginning development. "AN269: 2.4 GHz 802.15.4 MAC API Programming Example Guide" describes the Network API programming example, IDE setup and operation, and details of using the software library. Both documents are included in this kit.

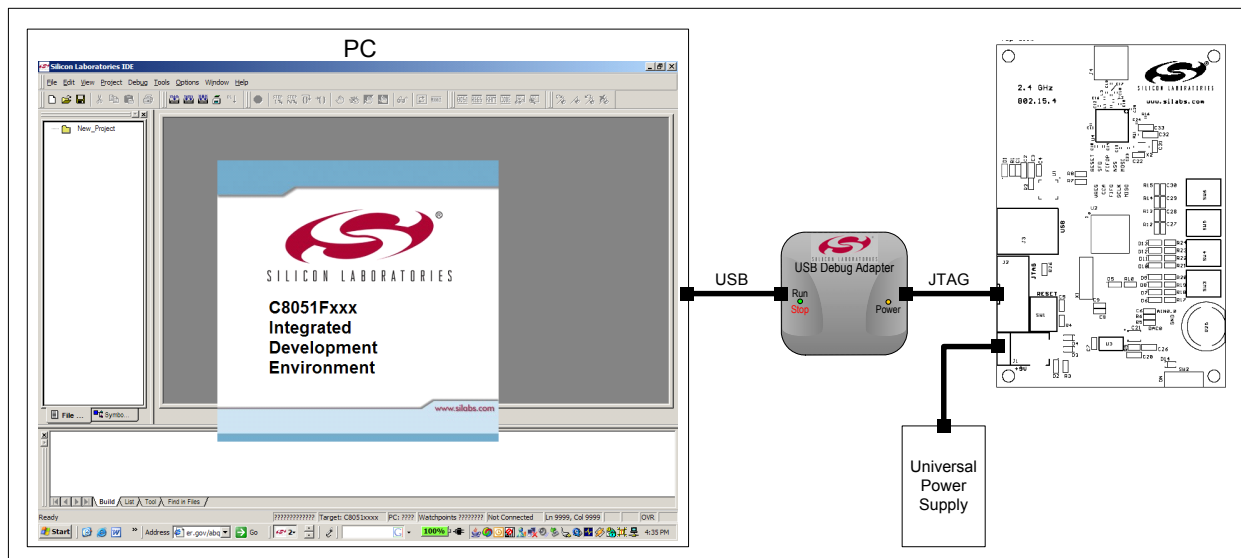


Figure 3. Development Environment Components

## 5. Hardware

The 2.4 GHz 802.15.4 Development Kit includes two target boards. These boards are all identical and may be used for demonstration or development.

Each board features a Silicon Laboratories C8051F121 microcontroller and a Chipcon CC2420 2.4 GHz 802.15.4 transceiver. Support components include a USB interface, JTAG programming interface, a variety of pushbuttons and LED's, and a voltage regulator.

Refer to "AN222: 2.4 GHz 802.15.4/ZigBee Development Board Hardware User's Guide" for schematics, PCB layout, and configuration instructions.

## CONTACT INFORMATION

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