



Getting Started with the CY4632 Reference Design Kit

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Introduction

Welcome to the CY4632 WirelessUSB LS Keyboard/Mouse/Bridge Reference Design Kit! This kit includes everything you will need to make a wireless keyboard and mouse. Cypress' new 2.4GHz WirelessUSB LS radio system on a chip products have many powerful features that allow creation of never before seen radio applications. Agilent's ADNS-2030 Low Power Optical Mouse Sensor is particularly optimized for wireless mouse applications.

This document is aimed at providing an overview of the kit and a roadmap to guide you to the pieces of information that will help you the most.

The CY4632 Reference Design Kit utilizes PSoC controllers for the RDK Keyboard (CY8C27643-24PVXI) and the RDK Mouse (CY8C27443-24PVXI). Please contact your local sales representative for more information on these PSoC controllers. For more information on Agilent's ADNS-2030 Low Power Optical Mouse Sensor, please contact your local Agilent sales representative.

Review of Kit Components

To make sure that you have everything you should, here is a list of the components that are physically included in the kit, along with a brief description:

- Documents
A few items are included in hardcopy for convenience. Descriptions of these documents (except the Welcome Letter) are covered in the Documentation Index section.
 - Welcome Letter
 - CY4632 Getting Started (this guide)
 - CY4632 SW License Agreement
 - CYWUSB6934 WirelessUSB LS Datasheet
 - CY7C63723 enCoRe Datasheet
 - CY8C27443/643 PSoC Datasheet
 - Agilent ADNS-2030 Low Power Optical Mouse Sensor Datasheet
 - CY4632 RDK Release Notes
 - CY4632 RDK Errata
 - CY4632 Keyboard FW User's Guide

- CY4632 Bridge FW User's Guide
 - CY4632 Mouse FW User's Guide
 - CY4632 WirelessUSB SW User's Guide
 - CY4632 Protocol Library
 - WirelessUSB LS Theory of Operation
 - WirelessUSB LS 1-Way HID Networks
 - Preliminary WirelessUSB LS 2-Way HID Systems
 - WirelessUSB Calculating Battery Life
 - WirelessUSB LS Interference Avoidance
 - WirelessUSB Managing Power
 - WirelessUSB Maximizing Range
 - WirelessUSB LS Radio Module FCC Testing
 - WirelessUSB LS Radio Module ETSI Testing
 - Preliminary WirelessUSB LS PCB Layout Guidelines
 - Preliminary WirelessUSB LS Micro Bridge PCB Layout Guidelines
 - WirelessUSB Tips and Tricks
- WirelessUSB LS RDK Keyboard
The RDK Keyboard is a 101-key keyboard with the addition of multimedia keys (Internet, mail, and etc.) and power keys.
 - WirelessUSB LS RDK Bridge
The RDK Bridge supports both the RDK Keyboard and RDK Mouse.
 - WirelessUSB LS RDK Microbridge
The RDK Microbridge supports both the RDK Keyboard and RDK Mouse with a smaller footprint.
 - WirelessUSB LS RDK Mouse
The RDK Mouse is a three button optical mouse with scroll wheel.
 - USB Standard A-Plug to Standard A-Receptacle Cable
A USB extension cable for use with the RDK Bridge.
 - Batteries
Five AA batteries are included in this Kit. Three batteries are for the RDK Keyboard and two batteries are for the RDK Mouse. The bridge is a USB bus-powered device and does not require batteries.
 - WirelessUSB LS Keyboard/Mouse RDK CD-ROM
The CD contains the documentation, example code and hardware design files – everything you should need to design your wireless keyboard and mouse.

Connecting the Bridge, Keyboard, and Mouse

Insert batteries into the internal keyboard battery compartment.

Next insert batteries into the mouse.

Next plug the USB extension cable into your PC and then plug the bridge into the extension cable. Your PC should automatically recognize the device and install drivers for USB HID devices (keyboard and mouse). The red LED on the bridge will blink slowly until a device is connected. The red LED will blink faster during the bind process. The green LED will turn on when data from the keyboard or mouse is received.

The keyboard and mouse may have already been “bound” together during manufacturing. If the devices are already “bound” skip the next two steps.

Press the bind button on the bridge and then the bind button on the keyboard. The keyboard bind button is located on the bottom of the keyboard under the right side foot. Please refer to the CY4632 Keyboard FW User's Guide for more details if you have trouble locating the button. This will bind the keyboard to the bridge. At this point, you should be able to type characters with your wireless keyboard.

Once again, press the bind button on the bridge and then the bind button on the mouse. The mouse bind button is located on the bottom of the mouse. Please refer to the CY4632 Mouse FW User's Guide for more details if you have trouble locating the button. This will bind the mouse to the bridge. Your mouse should be fully functional at this point.

WirelessUSB LS Keyboard/Mouse RDK CD-ROM

The CD-ROM contains electronic versions of the documents, the hardware design files for the PCBs (Gerbers, BOMs, schematics and Orcad files), battery level and signal strength application, and the source code and binary files for the bridge, keyboard and mouse.

Directory Structure

This list goes over the higher-level directory structures and does not completely explore the lower level directories or attempt to describe the location of every file.

-- Docs	"Docs" contains the kit documentation. All items are in Adobe Acrobat Portable Document Format (.pdf). If you need the free Acrobat Reader go to Adobe's website at www.adobe.com . Descriptions of these documents are contained in the Documentation Index immediately following this section.
-- Hardware	"Hardware" contains the design files used in development of the boards in the kit. There is a subdirectory for each board. Within those directories you will find .pdf schematics, Bill of Materials, Orcad source files, and Gerber databases. Designs utilizing the QFN radio package are recommended.
-- QFN Keyboard	
-- QFN Mouse	
-- QFN Microbridge	
-- SOIC Keyboard	
-- SOIC Mouse	
-- SOIC Bridge	
-- Firmware	"Firmware" contains the firmware related files.
-- Source Code	"Source Code" contains the source files for each of the RDK boards. The "RDK Keyboard" and "RDK Mouse" directories include the application source files and the necessary PSoC Designer directories/files. The "RDK Bridge" directory includes the enCoRe™ source files.
-- RDK Keyboard	
-- RDK Bridge	
-- RDK Mouse	
-- Binaries	"Binaries" contains a binary image of the firmware for each RDK board.
-- Software	"Software" contains the battery level and signal strength application files. A "readme.txt" file describes the steps to install/uninstall the application.
-- Source Code	"Source Code" will contain the battery level and signal strength application source files in the final kit release.
-- Binaries	"Binaries" contains the battery level and signal strength application executable(s).

Documentation Index

A brief description of the documents is given below:

Getting Started with the CY4632 Reference Design Kit

Location: Printed and in the top-level directory

File Name: CY4632 Getting Started.pdf

Description: Introduction to the development kit contents - this document.

Cypress Software License Agreement

Location: Printed and in Docs directory

File Name: CY4632 SW License Agreement.pdf

Description: This document provides the standard Cypress license for use of materials supplied in the development kit.

CYWUSB6934 WirelessUSB LS Datasheet

Location: Printed and in the Docs directory

File Name: CYWUSB6934 WirelessUSB LS Datasheet.pdf

Description: This is the document that describes the WirelessUSB LS Radio. The datasheet is focused primarily on the hardware aspects of the design, but do cover a general overview of the part. Cypress always maintains the latest documents on its website for download, so it's worth a periodic check during the design process to see if there are updated datasheets available. Go to www.cypress.com and look under "WirelessUSB".

CY7C63723 enCoRe Datasheet

Location: Docs directory

File Name: CY7C63723 enCoRe Datasheet.pdf

Description: This is the datasheet for the CY7C63722/23/43 *enCoRe™* USB Combination Low-Speed USB & PS/2 Peripheral Controller.

CY8C27443/643 PSoC Datasheet

Location: Docs directory

File Name: CY8C27443 PSoC Datasheet.pdf

Description: This is the datasheet for the CY8C27143/243/443/543/643 *PSoC™* Controller devices.

Agilent's ADNS-2030 Low Power Optical Mouse Sensor Datasheet

Location: Docs directory

File Name: ADNS-2030 Datasheet.pdf

Description: This is the datasheet for the Agilent ADNS-2030 Low Power Optical Mouse Sensor.

CY4632 Reference Design Kit Release Notes

Location: Printed and in the Docs directory

File Name: CY4632 RDK Release Notes.pdf

Description: This Release Notes document focuses explicitly on the development kit materials. It covers any last minute information that relates to deviations from functionality explained in the documentation.

CY4632 Reference Design Kit Errata

Location: Printed and in the Docs directory

File Name: CY4632 RDK Errata.pdf

Description: This document covers any known RDK errata.

CY4632 Keyboard Firmware User's Manual

Location: Docs directory

File Name: CY4632 Keyboard FW User's Guide.pdf

Description: This is a detailed reference that describes the RDK Keyboard firmware.

CY4632 Bridge Firmware User's Manual

Location: Docs directory

File Name: CY4632 Bridge FW User's Guide.pdf

Description: This is a detailed reference that describes the RDK Bridge firmware.

CY4632 Mouse Firmware User's Manual

Location: Docs directory

File Name: CY4632 Mouse FW User's Guide.pdf

Description: This is a detailed reference that describes the RDK Mouse firmware.

CY4632 WirelessUSB Software User's Manual

Location: Docs directory

File Name: CY4632 WirelessUSB SW User's Guide.pdf

Description: This document describes the software source code modules used to communicate with the WirelessUSB LS RDK Bridge to obtain current radio parameters and battery level information for the attached WirelessUSB devices (RDK Keyboard and RDK Mouse).

CY4632 Protocol Library

Location: Docs directory

File Name: CY4632 Protocol Library.pdf

Description: This is a detailed reference that describes the KBM RDK Protocol Library.

WirelessUSB LS Theory of Operation

Location: Docs directory

File Name: WirelessUSB Theory of Operation.pdf

Description: This document describes the theory of operation with the LS radio.

WirelessUSB LS 1-Way HID Networks

Location: Docs directory

File Name: WirelessUSB 1-Way HID Networks.pdf

Description: This document describes 1-Way HID Networks with the LS radio.

Preliminary WirelessUSB LS 2-Way HID Systems

Location: Docs directory

File Name: Preliminary WirelessUSB LS 2-Way HID Systems.pdf

Description: This document describes 2-Way HID Systems with the LS radio.

WirelessUSB Calculating Battery Life

Location: Docs directory

File Name: WirelessUSB Calculating Battery Life.pdf

Description: This document describes how to calculate projected battery life for LS HID designs.

WirelessUSB LS Interference Avoidance

Location: Docs directory

File Name: WirelessUSB LS Interference Avoidance.pdf

Description: This document describes how WirelessUSB LS technology avoids the interference caused by narrowband signals.

WirelessUSB Managing Power

Location: Docs directory

File Name: WirelessUSB Managing Power.pdf

Description: This document describes how WirelessUSB technology helps minimize power consumption and how system design considerations play a key role in maximizing battery life.

WirelessUSB Maximizing Range

Location: Docs directory

File Name: WirelessUSB Maximizing Range.pdf

Description: This document describes three main areas of focus for maximizing range in systems that utilize WirelessUSB LS technology.

WirelessUSB LS Radio Module FCC Testing and Verification

Location: Docs directory

File Name: WirelessUSB LS Radio Module FCC Testing.pdf

Description: This document gives a brief overview of the legal issues governing the manufacture and sale of wireless products intended for unlicensed operation in the United States and Canada.

WirelessUSB LS Radio Module ETSI Testing

Location: Docs directory

File Name: WirelessUSB LS Radio Module ETSI Testing.pdf

Description: This document gives a brief overview of the legal issues governing the manufacture and sale of wireless products intended for unlicensed operation in the European Union.

Preliminary WirelessUSB LS Printed Circuit Board Layout Guidelines

Location: Docs directory

File Name: Preliminary WirelessUSB LS PCB Layout Guidelines.pdf

Description: This document provides guidelines for printed circuit board design using the CYWUSB6932/34.

Preliminary WirelessUSB LS Micro Bridge Printed Circuit Board Layout Guidelines

Location: Docs directory

File Name: Preliminary WirelessUSB LS Micro Bridge PCB Layout Guidelines.pdf

Description: This document provides guidelines for a microbridge printed circuit board design.

WirelessUSB Firmware Tips and Tricks

Location: Docs directory

File Name: WirelessUSB Tips and Tricks.pdf

Description: This document provides tips and tricks for firmware when using the CYWUSB6932/34.

Development Tools

The PSoC and enCoRe™ development tools are not provided in this kit. Check the Cypress/Cypress Microsystems website www.cypress.com for availability.

Additionally, the WirelessUSB LS KBM RDK is compatible with the WirelessUSB Listener tool available with the CY3632 WirelessUSB Development Kit.

Compliance Testing

Although most developers are fairly comfortable with the challenges of the hardware and software design process, there is one aspect that is often neglected until late in the design process: compliance testing. These are the USB and emissions compliance tests for the bridge, keyboard and mouse.

First of all, start planning for it early on. For USB, there are compliance workshops (“PlugFests”) run by the USB Implementer’s Forum approximately once per quarter, but they can fill up quickly. Check the USB-IF website (www.usb.org) for the date of upcoming compliance workshops and reserve a spot early. Also, don’t forget that there is a checklist (available on the web) that must be filled out ahead of time and brought with you. This is also a common oversight. The alternative to PlugFest is to use an approved test house to obtain your certification, but there will of course be a cost for this.

It is important to understand the different types of USB compliance testing that exist, and how the design of an USB device is impacted. To make certain that you have the most up to date information it is highly recommended that you check the USB-IF website for current compliance policies.

Emission testing may also be performed by approved test house(s). Specific emission tests requirements depend on which countries the final product may be sold.

Support

Hopefully this document has been successful in giving you the guidance that you need to begin work on your design. The last thing to cover is how to get help when you need it. Almost everything that you need should be included in the materials in this kit. If you can’t find it, or if the information you are looking for just isn’t here, then it’s time to get help. There are a few places to go, depending on your preferences or the type of help that you need.

First of all, check the web for updates. We have a section for Development Kits that will probably contain general kit items, but there are also sections for Application Notes, Software Downloads, and other types of content. All of these types of content should be accessible by starting under the Product Family of WirelessUSB.

Next is the Cypress Knowledge Base. This is an on-line system that has a collection of frequently asked questions and answers. Look for it under www.cypress.com/support and search for your topic.

If you don’t find what you need in the Knowledge Base, then you can submit a question on-line through our Case Management System. You can also access this system from www.cypress.com/support. Enter your question and our Applications Engineering team will get back to you with a response. They usually follow up within 24 hours, although some cases may take longer depending upon the nature of the question.

In addition, it is possible to reach Applications Engineering by phone. Dial (800)-541-4736 or (408)-943-2600 and enter 8 for support.

Also please keep your Cypress Sales Representative and Field Applications Engineer informed. Your local FAE may be able to provide on-site assistance to help you resolve your problem. If nothing else, they can serve as liaison to the internal factory resources to manage requests for assistance.

For technical assistance with the Agilent ADNS-2030 sensor, visit www.agilent.com/semiconductors or call:

Americas/Canada: +1 (800) 235-0312 or (408) 654-8675

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Japan: (+81 3) 3335-8152

Taiwan: (+65) 6755 1843