CY4605/CY4606

EZ-USB® HX2LP™ Hi-Speed USB 2.0 Hub Reference Design Kit Guide

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Contents

1.   Introduction

Cypress's EZ-USB® HX2LP™ Reference Design Kit (RDK) board is a tool to demonstrate the features of EZ-USB HX2LP devices (CY7C65620/CY7C65630). Both CY7C65620 and CY7C65630 are identical in every aspect except for the number of ports they support. The term HX2LP refers to both the chipsets unless stated explicitly. The EZ-USB HX2LP implements a fixed-function hub functionality between one upstream USB port and two or four downstream ports. The HX2LP RDK is based on the 56-pin QFN for CY7C65620/CY7C65630. Both are single transaction translator (1TT) hubs. In the initial phase of the design, this board helps developers to understand the chip features and limitations before proceeding with a complete design. The RDK includes support documents related to board hardware, PC application software, and EEPROM configuration data (.iic) files.

The HX2LP adheres to the USB Hub class requests described in chapter 10 of the USB 2.0 specification.

The Getting Started chapter on page 7 describes the installation and configuration of the CY4605/CY4606 HX2LP RDK. The Configuration Utility chapter on page 11 describes the configuration utility. The HX2LP Manufacturing Software chapter on page 13 describes the manufacturing utility. The Resources chapter on page 15 describes the hardware, firmware, and documentation resources for this kit. The Appendix on page 17 provides the schematics, board layout, and bill of materials (BOM) for the kit.

1.1   Features

The features of the HX2LP RDK are:

■ Certified as USB 2.0 compliant
■ CY7C65620 supports two downstream ports and CY7C65630 supports up to four downstream ports
■ Supports bus-powered and self-powered modes
■ Single Transaction Translator (1TT)
■ Space saving 56-pin QFN
■ Internal regulator for reduced cost
■ Integrated pull-up/termination resistors for upstream ports
■ Integrated pull-down/termination resistors for downstream ports
■ Integrated port status control
■ 24-MHz external crystal
■ In-system EEPROM programming (ISP); supports 3-wire SPI interface to program external EEPROM

1.2   Additional Learning Resources

Visit http://www.cypress.com for additional learning resources in the form of datasheets, technical reference manual, and application notes.

1.3   Document History

Table 1-1. Revision History

Revision	PDF Creation Date	Origin of Change	Description of Change
**	09/23/2011	NMMA	Initial revision
*A	03/09/2012	ELIN	Added the Appendix section. Minor content updates throughout the document.

1.4   Documentation Conventions

Table 1-2. Document Conventions for Guides

Convention	Usage
Courier New	Displays file locations, user entered text, and source code: `C:\...cd\icc\`
Italics	Displays file names and reference documentation: Read about the *sourcefile.hex* file in the *PSoC Designer User Guide*.
[**Bracketed, Bold**]	Displays keyboard commands in procedures: [**Enter**] or [**Ctrl**] [**C**]
File >> Open	Represents menu paths: File >> Open >> New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the **File** icon and then click **Open**.
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes cautions or unique functionality of the product.

2. Getting Started

2.1 Installation

Follow these steps to set up your board for the first time:

1. Connect the 5-V supply provided with the kit to the board.
2. Make sure the SW1 switch points to the self-powered mode configuration.
3. Connect a USB A to B cable between the hub upstream port and one of the USB ports on a computer.
4. The hub enumerates as a 'Generic USB Hub' class device when connected to the computer.

   Right-click on **My Computer > Properties > Hardware Tab > Device Manager**. Under USB controllers, the HX2LP is listed as "Generic USB hub" with a VID/PID of 0x4B4/6560.
5. Use the SW1 switch on the board to configure either in bus-powered or self-powered mode; repeat steps 3 to 5.

Note The maximum current limit in bus-powered mode is 100 mA per port. Any device connected on a downstream port exceeding this power limit will not work.

2.2 Jumpers and Switches

The HX2LP RDK board contains a single switch (SW1) and two jumpers (J5 and J6). This makes it easy to configure the board in self-powered or bus-powered mode.

Jumper/Switch	Function
J5	In self-powered mode, this jumper is shorted to glow LED D1 to indicate that the 5-V power supply is connected to the board. This jumper acts as a status indicator for the power supply.
J6	Short the pins on the jumper to observe the green/amber LEDs turn on for the corresponding port. Green indicates port is active and amber indicates an exception condition.
SW1	Mechanical switch to configure the HX2LP chip in self-powered or bus-powered mode.

2.3   Recommended Settings

Jumper/ Switch	Name	Configuration-1	Configuration-2
SW1	Power mode switch	Slide it to the direction indicating SELF_PWR below the switch.	Slide it to the direction indicating BUS_PWR below the switch.
J5	External power supply status indicator	In SELF_PWR, short the jumper; LED D1 glows on the board indicating that a 5-V supply is connected to the board.	In BUS_PWR, the chip functionality has no use.
J6	Port status indicator	Short the jumper pins; connect the USB devices to downstream ports. The LEDs glow corresponding to a port, indicating the following status: Green: USB device connected to a downstream port (1-4) Amber: Error condition. See Table 2 in the Cypress HX2LP datasheet for more details	Port LEDs in BUS_PWR mode glow similar to when in SELF_POWER mode.

2.4   Installation of Cypress USB Driver for the Hub

The HX2LP hub when connected to a computer enumerates as a 'Generic USB hub' by default. It indicates that the Windows native hub driver (*usbhub.sys*) binds automatically to the Cypress hub. In some cases, the hub class request parameters (such as self-powered/bus-powered and port power configuration) may need to be modified to suit customer applications. At the product development stage, customers may want to modify these parameters several times before final release. To change the parameters, the external EEPROM connected to HX2LP should be programmed with the modified configuration files (.iic) using the Blaster tool software supplied in the kit. This software communicates to the Cypress hub using *cyusb.sys,* a generic driver provided by Cypress. The process to install the Cypress driver for the hub is described in the following sections.

2.4.1   Identify Cypress Hub Entry in Device Manager

1. Connect the USB A to B cable between the hub board and the computer.
2. Right-click on **My Computer > Properties > Hardware Tab > Device Manager**. This displays a new window. Expand the list of USB controllers in the device manager.
3. Locate the **Generic USB Hub** entry in the list and verify if this belongs to the Cypress hub VID/ PID-0x4B4/6560. To do this, right-click on the entry and select **Properties**; a new window is displayed. Click on the **Details** tab and select **Device Instance ID** in the drop-down menu. The window shows the VID/PID corresponding to the hub.

2.4.2   Installing Cypress Driver

Follow these steps to install the Cypress generic driver for the hub:

1. Right-click on the Cypress hub entry again and select **Update Driver**. The Hardware Update wizard window is displayed. Select the **Yes, this time only** option and click **Next**.
2. In the next window, select **Install from a list or specific location** and click **Next**.
3. Select **Dont search. I will choose driver to install** and click **Next**.
4. Click on the **Have Disk** button in the next window. A new window opens on top of the existing window.
5. Click **Browse** and point to the driver path for each OS and select the INF file. For example:

Windows 2003 Server/Windows XP 64-bit:

CY4605:`C:\Cypress\USB\CY4605-HX2LP\1.0\Software\Driver\wxp\x64`

CY4606:`C:\Cypress\USB\CY4606-HX2LP\1.0\Software\Driver\wxp\x64`

Windows XP/Windows 2003 32-bit:

CY4605:`C:\Cypress\USB\CY4605-HX2LP\1.0\Software\Driver\wxp\x86`

CY4606:`C:\Cypress\USB\CY4606-HX2LP\1.0\Software\Driver\wxp\x86`

Windows-Vista/ Win-7 32-bit:

CY4605:`C:\Cypress\USB\CY4605-HX2LP\1.0\Software\Driver\wlh\x86`

CY4606:`C:\Cypress\USB\CY4606-HX2LP\1.0\Software\Driver\wlh\x86`

Windows-Vista/ Win-7 64-bit:

CY4605:`C:\Cypress\USB\CY4605-HX2LP\1.0\Software\Driver\wlh\x64`

CY4606:`C:\Cypress\USB\CY4606-HX2LP\1.0\Software\Driver\wlh\x64`

6. For Windows XP 32-/64-bit, Vista, and Windows 7 in 32-bit configurations, it is not required for the drivers to be digitally signed. The *cyusb.sys* supplied with the kit is an unsigned driver and Windows may present a warning dialog. Choose **Continue** on the warning dialog. For more information on signing drivers, look for Windows Hardware Quality Labs (WHQL) on the Microsoft website or consult the Windows DDK documentation.

7. For Windows Vista and Windows 7 64-bit machines, turn off the Driver Signature Enforcement by rebooting the OS with **Advanced Boot Options** (accessed via F8 on boot up). Click on **Disable Driver Signature Enforcement**; repeat steps 2 and 3. The Cypress driver *cyusb.sys* is not digitally signed and can be properly installed only when the Driver Signature Enforcement is turned off. **Note** This setting is temporary and does not propagate to the next reboot automatically.

8. Because the drivers are not digitally signed, Windows cannot verify the publisher and throws a security warning. Choose **Install this driver software anyway** option to begin installation.

9. The hardware wizard now reports successful installation of the Cypress driver for the hub. Open the device manager and observe the updated hub name (as defined in the INF file) in the list of USB controllers.

Note After programming the required .iic file to EEPROM, close the Blaster tool and locate the hub entry following the process in 2.4.1 Identify Cypress Hub Entry in Device Manager. Right-click on the hub entry in the Device Manager and select **Update Driver**. The Windows Hardware Wizard is displayed. Select **Yes** and click **Next**. In the next screen, select **Install the Software Automatically** and click **Next**. After successful installation, the hub should be listed as a "Generic USB Hub".

3.   Configuration Utility

3.1   Blaster.Exe

The Cypress HX2LP configuration utility, Blaster.exe, is a PC application software provided with the CY4605/CY4606 HX2LP RDK. This utility is located in the Software folder, in the kit installation directory. The HX2LP board is a fixed-function device and initially requires EEPROM configuration (.iic) files with appropriate information. For details on different types of configuration data, refer to the Cypress HX2LP datasheet. Blaster.exe software performs the following major operations:

■   Reads the configuration files already pre-programmed on the on-board EEPROM

■   Writes the configuration files to the on-board EEPROM

The read configuration files can be modified based on certain hub class request parameters to suit the end-product.

3.1.1   Components

The software consists of the executable utility (Blaster.exe), primer utility (primer.exe), and configuration files (.iic) to program a three-wire SPI EEPROM connected to hub.

3.1.2   Supported Platforms

The HX2LP configuration utility has been tested on Windows XP, Windows Vista, and Windows 7 operating system (OS) platforms in both 32-bit and 64-bit configurations. This utility is not supported on Windows Millennium Edition, Windows 98, Windows 95, or any version of Windows NT.

3.1.3   Manufacturing Driver

The configuration utility requires a special device driver to upload and download data to HX2LP-based devices. The driver consists of two parts, the device driver (cyusb.sys) and the driver information file (cyusb.inf). Both files are located in the Drivers directory, in the same location as the Blaster.exe application file. The procedure to update a Windows PC with the Cypress driver and INF files is explained in Installation of Cypress USB Driver for the Hub on page 8. After installing the drivers, the HX2LP configuration utility can be used for communication.

3.1.4   Installation

The utility may be installed locally by copying the entire software directory to the desired location on the host computer. After it is copied, rename the directory.

3.2   Overview

The Cypress HX2LP Blaster tool programs different EEPROM configuration files with any of three different signatures—0xD0, 0xD2, and 0xD4. These signature values are the first byte in the EEPROM configuration files (.iic). During booting, the HX2LP ROM code checks the signature type

and decodes the subsequent data, which exists in a fixed format. For details on each signature and its content, see the "Configuration Options " section in the Cypress HX2LP datasheet.

The HX2LP contains default configuration settings, Cypress VID/PID(0x4B4/6560), and other USB descriptors in its internal fuse ROM. These settings are not suitable when using the hub for different purposes. In such an instance, test the hub under different configurations by changing the parameters in the IIC file. The modified IIC file is then programmed to EEPROM and the subsequent behavior of the hub is observed when integrated to an entire system. The HX2LP configuration utility provides the flexibility to change parameters in the IIC file.

3.3   User Interface

The Cypress HX2LP configuration utility user interface consists of a single window.

Figure 3-1. Configuration Utility
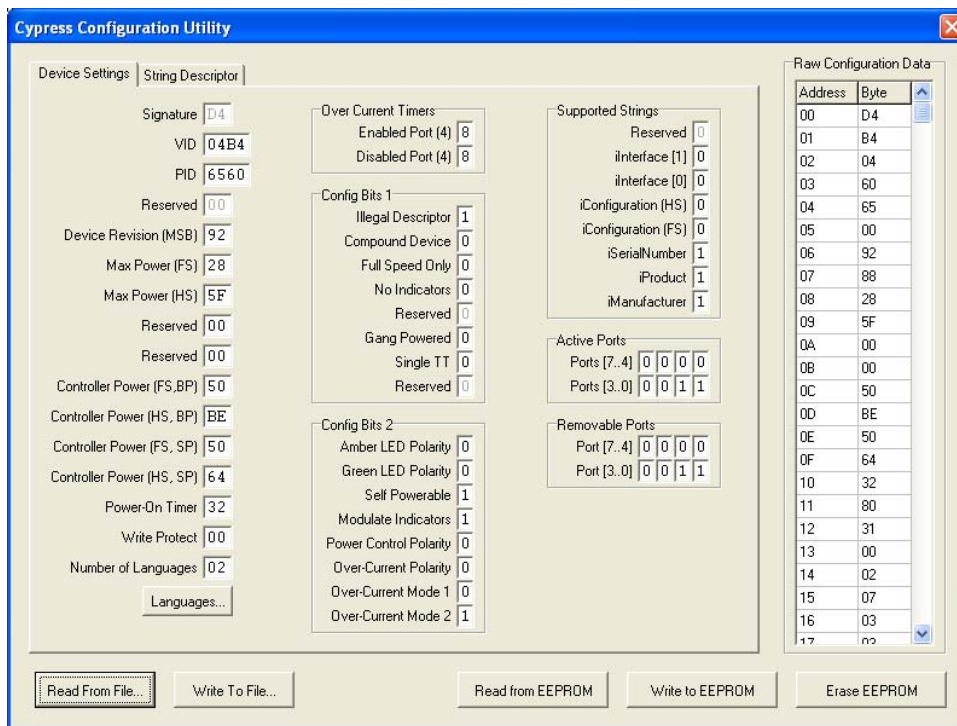
Configuration settings can be stored in a file on the PC. The **Read From File…** button opens a file browser and enables you to load a HX2LP config (.iic) file. The **Write To File…** button opens a file browser and allows to save the HX2LP config file.

Alternatively, the utility can work with configuration settings directly from a EEPROM attached to HX2LP. The **Read from Device** controls enable you to select a source to read and upload the configuration settings. The source of these settings are the serial EEPROM or the internal RAM. The configuration settings can also be downloaded directly to the USB attached HX2LP part. The **Write to Device** controls enable you to select the destination to write to and download the settings. The configuration settings can be written to the three-wire SPI EEPROM or the internal RAM. Note that the HX2LP's internal RAM only contains device configuration settings and not the USB descriptors.

The tabs on the top-left of the window provides a parsed display of the configuration settings and USB string descriptor. If a field cannot be edited, it is because it is a read-only, obsolete, or utility-managed value. The definitions of the configuration settings fields on the Device Settings tab is available in the Configuration Options section of the Cypress HX2LP datasheet.

4. HX2LP Manufacturing Software

4.1   Primer.exe

The Cypress HX2LP manufacturing software, Primer.exe, allows you to program the EEPROM configuration (.iic) files at the click of a button. The tool initially prompts you to plug in the HX2LP device; the EEPROM is then automatically programmed with the image specified as a configuration file. The status box of this software window turns yellow during programming, green if successful, or red if otherwise. This tool does not allow you to change any of the ATA/ATAPI parameters such as the Blaster tool. It is useful for mass programming of HX2LP boards.

4.1.1   Components

The software consists of the executable utility (Primer.exe), a configuration file (Primer.ini), manufacturing driver (cyusb.sys and cyusb.inf), and user guide (this file).

4.1.2   Supported Platforms

The Cypress HX2LP manufacturing utility has been tested on Windows XP, Windows Vista, and Windows 7 in both 32-bit and 64-bit configurations.

4.1.3   Driver

The Cypress HX2LP manufacturing utility requires a special device driver to download device firmware to the external EEPROM and test HX2LP-based devices. See Installation of Cypress USB Driver for the Hub on page 8 for details.

4.1.4   Installation

The utility may be installed locally by copying the entire software directory to the desired location on the host PC. After it is copied, rename the directory.

4.2   Overview

Circuit designs with Cypress HX2LP use a serial EEPROM to store the device firmware. For HX2LP-based designs, the EEPROM can be conveniently programmed via the USB interface using the Cypress HX2LP manufacturing utility. Double-click the **Primer.exe** icon to launch the manufacturing utility software. This utility has a simple user interface consisting of a single screen that guides you through the programming process. Manufacturing options for this utility can be adjusted using a configuration file (Primer.ini).

4.3   User Interface

Figure 4-1 shows the user interface for the Cypress HX2LP manufacturing utility. The name of the firmware image file used to program devices is shown in the box at the bottom-left of the window. The programming process can be abandoned at any point by closing the window, which will quit the application. The Instruction field displays instructions. The Status field indicates the programming process.

First, plug in the device to be programmed. Note that due to a limitation in Windows, if the device is already plugged in when the utility is started, the utility will not be able to detect it.

When the device is plugged in, the external EEPROM is programmed using the firmware image specified in the configuration file. During this step, the background of the Status field turns yellow, and the text indicates that the device is being programmed. If the device is successfully programmed, the Status field turns green and the status message "Programming Succeeded" is displayed. If the device cannot be programmed successfully, the Status field turns red and the status message "Programming Failed" is displayed. The user is prompted to disconnect the device and plug in the next device.

Figure 4-1. Manufacturing Utility
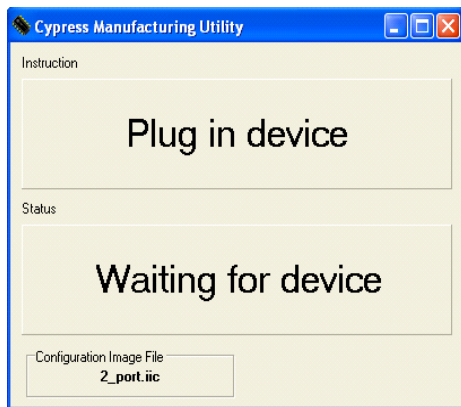
4.4   Configuration File

The Cypress HX2LP manufacturing utility uses a configuration file (Primer.ini) to configure its global settings. This file is located in the same directory as Primer.exe. The file can be edited in any plain text editor (such as Notepad) to change the global settings. When the file is opened, the following is displayed:

//

// Manufacturing SW Custom Settings

//

// Copyright (c) 2002 Cypress Semiconductor

//

[General]

[DefStartupOpts]

SerNumPrefix=0xDEF1 ;SN prefix value (0xDEF1 is default)

ConfigFile= Config_File\2_port.iic;The HX2LP config file to load at startup

The SerNumPrefix should contain the four-digit serial number prefix. The utility generates serial numbers based on the host computer's clock. To guarantee uniqueness, the serial number prefix should be different for each host computer being used to program devices. The ConfigFile setting tells the utility which firmware image file to download to devices. Note that the ConfigFile setting must contain the complete path to the firmware image file. If a relative path is used, it is considered to start from the directory where the utility resides. The "." (current directory) and ".." (parent directory) path designators do not work for the ConfigFile setting.

5.   Resources

5.1   Hardware Resources

The CY4605/CY4606 HX2LP RDK has several hardware resources that guide you in designing your own custom board. Some files in the hardware directory of the kit are:

- *hx2lp_3.ibs*: Contains the IBIS model of the HX2LP chips.
- *CY4605/CY4606_PCA_BOM.xls*: Contains bill of material (BOM) components, from several vendors, used to design the RDK board.
- *CY4605/CY4606_Schematic.DSN and CY4604/CY4606_Schematic.pdf*: Shows the editable and non-editable (pdf) versions of the RDK board schematic design.
- *CY4605/CY4606_Board_Layout.brd and CY4604/CY4606_Board_Layout.pdf*: Shows the editable and non-editable (pdf) versions of the board layout.
- *CY4605/CY4606_Gerber.rar*: Contains the gerber files of the HX2LP RDK boards, which can be used for reference during the custom PCB fabrication process.

5.2   Firmware Resources

The CY4605/CY4606 HX2LP RDK boards are designed based on CY7C65620/CY7C65630. These are fixed-function devices and require only EEPROM configuration files (.iic) in the range of 7 to 30 bytes to configure for different end-products.

5.3   Application Notes

For the HX2LP family of chipsets, the following documents are available on the Cypress website:

- Bus-Powered USB Hub Design Using EZ-USB HX2LP/HX2VL - AN15454

  HX2LP consumes less than two unit loads for the hub core, which leaves three unit loads for downstream ports. This means that the hub can be configured to have two or three downstream ports and supply 100 mA per port. HX2VL consumes less than one unit load for the hub core, which leaves four unit loads for downstream ports. This means that the hub can be configured to have two, three, or four downstream ports and supply 100 mA per port. This application note guides the designer in using this hub family to create a bus-powered hub.

- EZ-USB Hubs (CY7C656XX) PCB Design Recommendations - AN5044

  This application note presents recommendations for designing with the Cypress CY7C65630 and CY7C65620 components. High-speed design techniques must be applied to circuits using these components. Due to the packaging and high-performance characteristics of the hub chips, the PCB thermal design is recommended for applications.

- Single Versus Multiple Transaction Translator - AN1071

  High-speed USB 2.0 hubs have a component to provide communication to full-speed and low-speed devices when the hub operates at high-speed. This component is called a transaction translator (TT). The USB 2.0 specification allows two implementations: one TT for all downstream ports (TT/hub) or one TT for each downstream port (TT/port). The TetraHub™ (CY7C65640B),

which is a four-port high-speed hub, provides the option of using this part in a single TT (TT/Hub) or multiple TT (TT/Port) mode. This application note presents the advantages of using multiple TT high-speed hubs versus a single TT high-speed hub.

■ How HX2LP Addresses Byte and Word Addressable SPI EEPROMs - AN61904

The SPI EEPROMs connect to the HX2LP to store configuration settings. To read the configuration settings from the EEPROM, HX2LP first identifies whether the connected EEPROM is byte addressable or word addressable. This application note lists the sequence of operations that HX2LP executes to identify the type of EEPROM connected to it.

■ Schematic and Layout Review Checklist for HX2LP - AN49150

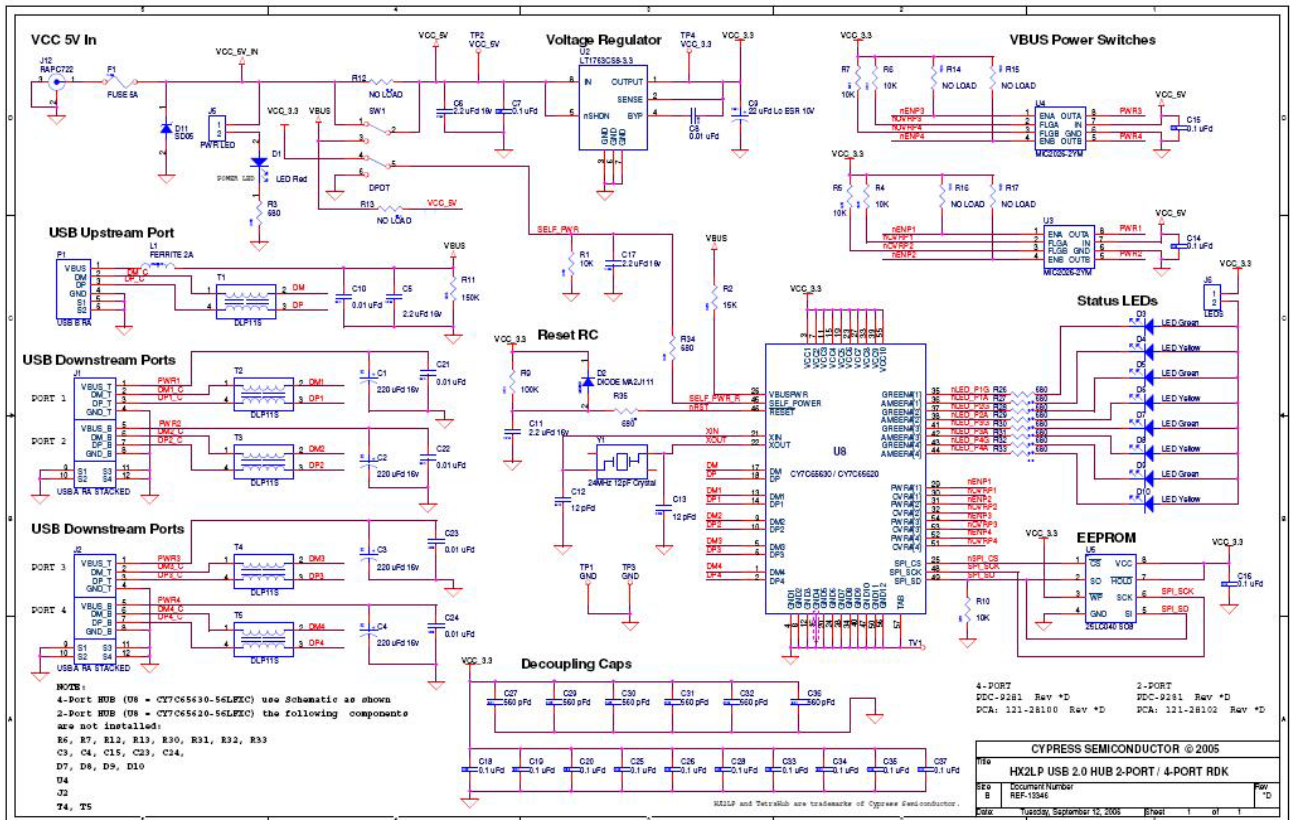This application note discusses the schematic and layout review checklist for the EZ-USB HX2LP family.

■ Migrating from EZ-USB HX2™ to EZ-USB HX2LP - AN5038

This application note expedites the developer's learning curve on migrating a CY7C65640A (EZ-USB HX2) design to use the CY7C65630 (HX2LP) hub chips.
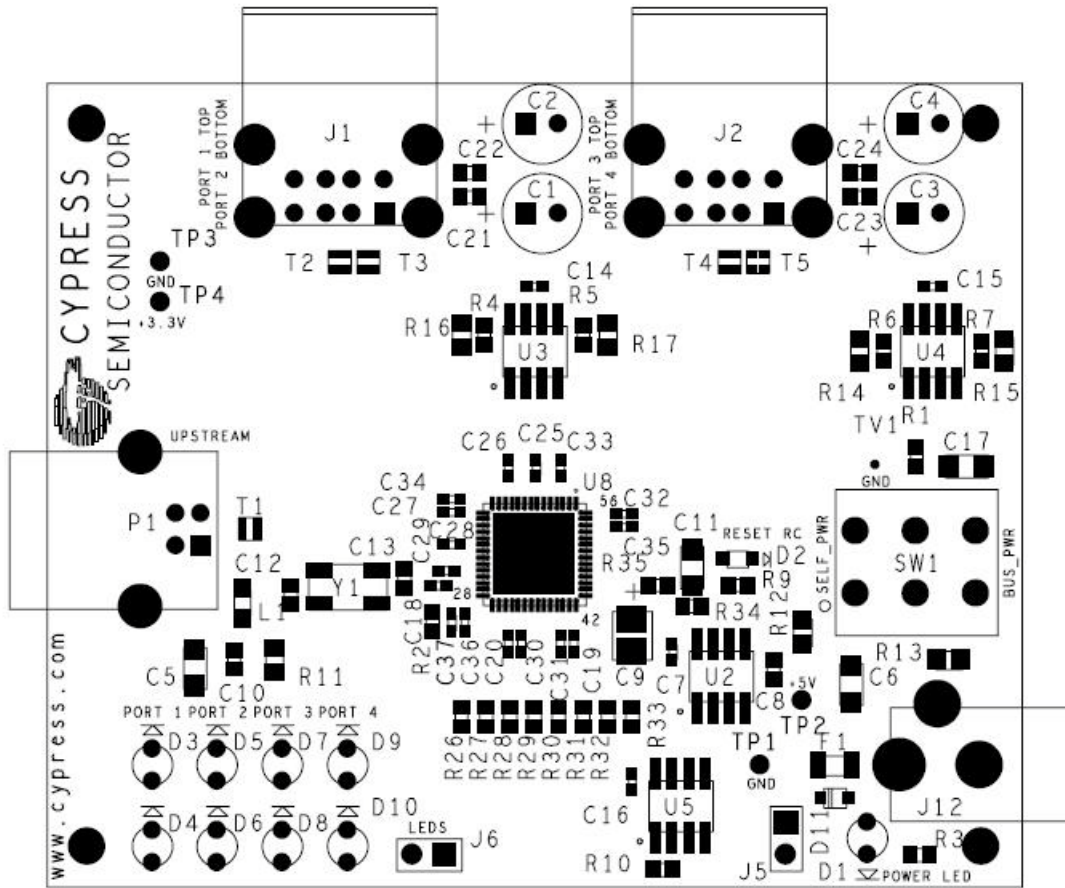
A. Appendix

A.1 Schematic

A.2   Board Layout

A.3 Bill of Materials

Item	Qty.	Reference	Description	Manufacturer	Mfr. Part Number
1	2	C1,C2	CAP 220UF 16V ELECT VZ RADIAL	Nichicon	UVZ1C221MED
2	4	C5,C6, C11, C17	CAP 2.2UF 16V CERAMIC Y5V 1206	Panasonic - ECG	ECJ-3VF1C225Z
3	13	C7,C14,C16,C18,C19, C20,C25,C26,C28,C33 ,C34,C35,C37	CAP 0.1 uF 50V CERAMIC X5R 0402	Kamet	C0402C104K8PACTU
4	4	C8,C10, C21,C22	CAP 0.01UF 50V CERAMIC X7R 0603	Panasonic - ECG	ECU-V1H103KBV
5	1	C9	CAP 22UF 10V TANT Lo ESR 10% 3528	AVX	TPSB226K010R0400
6	2	C12,C13	CAP CERAMIC 12PF 50V 0603 SMD	Panasonic - ECG	ECJ-1VC1H120J
7	6	C27,C29,C30,C31,C32 ,C36	CAP 560PF 50V CERAMIC X7R 0402	Murata Electronics	GRM155R71H561KA0 1D
8	1	D1	LED 3MM RED DIFFUSED TH	Lite-On	LTL-4261N
9	1	D2	DIODE SWITCH 80V 100MA SMINI 2P	Panasonic - SSG	MA2J11100L (MA111-TX)
10	2	D3,D5	LED 3MM SHORT LENS GREEN DIFF	Lumex Opto/Compo-nents Inc.	SSL-LX3044LGD
11	2	D4,D6	LED 3MM YELLOW DIFFUSED TH	Lite-On	LTL-4251N
12	1	D11	Single Line TVS Diode for ESD Protec-tion	SEMTECH	SD05.TCT
13	1	F1	FUSE 5.0A 24V FAST 1206 SMD	Littelfuse Inc.	429005WRM
14	1	J1	CONN RECEPT STACKED USB A RT ANG	EDAC Inc.	690-008-621-013
15	2	J5,J6	CONN HDR BRKWAY 2POS STR AU PCB	AMP Division of TYCO	103185-2
16	1	J12	CONN 2.1MM PWRJACK RT ANGLE PCB	Switchcraft Inc.	RAPC722
17	1	L1	FERRITE CHIP 220 OHM 2000MA 0805 SMD	Murata	BLM21PG221SN1D
18	1	P1	CONN USB RECEPT TYPE B PCB	AMP/TYCO	787780-1
19	3	T1-T3	FILTER COMMON MODE CHOKE 90ohm SMD0504	Murata	DLP11SN900SL2
20	4	R1,R4,R5,R10	RES 10K OHM 1/16W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ103V
21	1	R2	RES 15K OHM 1/16W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ153V
22	7	R3,R26,R27,R28,R29, R34,R35	RES 680 OHM 1/10W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ681V
23	1	R9	RES 100K OHM 1/16W 5% 0603 SMD	Panasonic - ECG	ERJ-3GEYJ104V
24	1	R11	RES 150K OHM 1/8W 5% 0805 SMD	Panasonic - ECG	ERJ-6GEYJ154V
25	1	SW1	SWITCH SLIDE MINI DPDT PCMNT SLV DUAL	ITT Industries, C&K Div	1201M2S3CQE2
26	1	U2	IC REGULATOR LDO 3.3V 500MA SO8	Linear Technology	LT1763CS8-3.3
27	1	U3	+3V to 5.5V USB POWER CONTROL SWITCH	Micrel, Inc.	MIC2026-2YM
28	1	U5	EEPROM CMOS SPI 512X8 SO-8	Microchip Technology	25LC040/SN
29	1	CY7C65620-56LFXC/ CY7C65630-56LFXC	USB 2.0 2/4-Port HUB CONTROLLER	Cypress Semiconductor	CY7C65620-56LFXC/ CY7C65630-56LFXC
30	1	Y1	Crystal 24 Mhz SMT 12pF 50ppm	eCERA	FX2400026

Item	Qty.	Reference	Description	Manufacturer	Mfr. Part Number
31	1	PCB	PRINTED CIRCUIT BOARD	Cypress Semiconductor	PDC-9281
32	1	LABEL	SERIAL NUMBER		XXXXXX
33	1	LABEL	ASSEMBLY NUMBER		#REF!
34	8	TP1,TP2, TP3,TP4	TEST POINT 43 HOLE 65 PLATED	NONE	
35	2	R6, R7	RES NO LOAD 0603 SMD	NA	NA
36	4	R14, R15, R16, R17	RES NO LOAD 0805 SMD	NA	NA
37	4	R30, R31,R32,R33	RES NO LOAD 0603 SMD	NA	NA
38	2	D7,D9	LED NO LOAD GREEN	NA	NA
39	2	D8,D10	LED NO LOADYELLOW	NA	NA
40	1	U4	IC NO LOAD SOIC-8	NA	NA
41	1	J2	CONN NO LOAD RECEPT USB A RT ANG	NA	NA
42	2	T4,T5	FILTER NO LOAD COMMON MODE CHOKE	NA	NA
43	2	C3,C4	CAP NO LOAD ELECT VZ RADIAL	NA	NA
44	2	C23, C24	CAP NO LOAD 0603 SMD	NA	NA
45	1	C15	CAP NO LOAD 0402 SMD	NA	NA
46	2	R12,R13	RES NO LOAD 0805 SMD	NA	NA