



CY3685 EZ-USB NX2LP™

Development Kit

User's Guide

Rev 1.2



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User's Guide, Version 1.2.

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Table of Contents

NX2LP Development Kit Overview	1
Introduction	1
Development Kit Contents	2
Development Kit Requirements	2
Hardware Features	3
Development Board Features	3
Development Board Layout	3
Hardware Configuration	6
Technical Support	9



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1.0 NX2LP Development Kit Overview

1.1 Introduction

The CY3685 EZ-USB NX2LP™ Development Kit is a complete design environment for use in NAND flash-based systems. The combination of hardware and programming utility software provide the designer with complete development and manufacturing support.

This development kit is designed to allow scalable testing and evaluation of the Cypress EZ-USB NX2LP NAND Flash Controller device (CY7C68023 and CY7C68024) with different NAND flash devices. The hardware platform is designed to support between 1-8 single-device NAND flash chips, or 1-4 dual-device NAND flash chips for scalable density testing.

Additionally, Cypress has created a device Programming Utility to assist in the manufacturing environment. This programming utility allows easy NAND flash configuration during the design and manufacturing process.

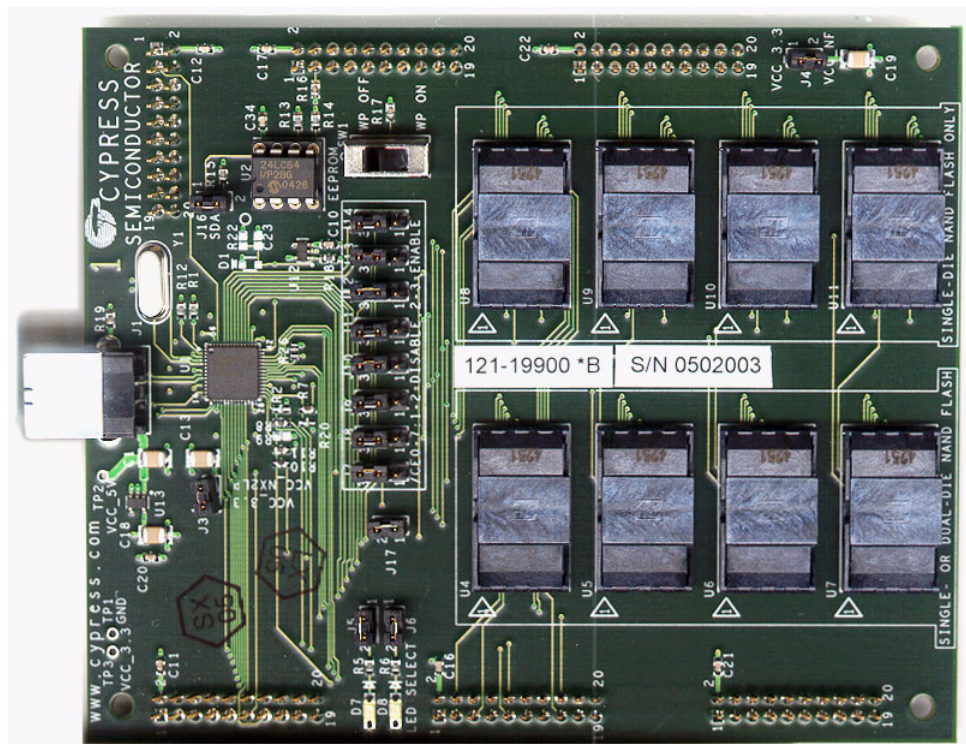


Figure 1-1. (CY7C68023 and CY7C68024) NAND Flash Controller Development Platform

1.2 Development Kit Contents

The CY3685 Development Kit should contain the following items:

Hardware:

- Hardware Development Platform (with no sockets populated with NAND flash devices)
- USB Cable
- CD-ROM

Paper copies of the following documents:

- Cover Letter
- CY3685 EZ-USB NX2LP Development Kit User's Guide (this manual)
- EZ-USB NX2LP Programming Utility Installation Guide

CD-ROM with complete contents of all design materials including:

- PDFs of all documents above
- CY7C68023/CY7C68024 Datasheet
- Hardware files – Schematics, Bill of Materials, OrCAD files
- Installation files for the EZ-USB NX2LP Programming Utility

1.3 Development Kit Requirements

The Development Kit supports Windows 98SE, Windows ME, Windows 2000 and Windows XP. The recommended environment is:

- Windows XP
- USB 2.0 Host Controller

For Windows 98SE and Windows ME support, please follow installation instructions in the enclosed EZ-USB NX2LP NAND Programming Utility Installation Instructions.

The Cypress EZ-USB NX2LP Programming Utility software is designed to run on the Windows operating system. It will not run on Mac OS. The Cypress EZ-USB NX2LP development board and the EZ-USB NX2LP NAND Flash Controller, however, will operate in a Mac environment if the NAND flash is pre-configured and the Mac OS supports USB mass storage devices.

2.0 *Hardware Features*

2.1 *Development Board Features*

The EZ-USB NX2LP Development kit hardware supports the following NAND flash features:

- 1-8 single-device or 1-4 dual-device NAND flash chips with X8 organization
- 512-byte per page (BPP) or 2,048 (2K) BPP NAND flash devices
 - 512 BPP supports 512Mbit to 1Gbit NAND flash devices
 - 2K BPP supports 1Gbit to 8 Gbit NAND flash devices
- Jumper options for flexible testing and configuration
- Pin headers for easy debug and signal analysis
- 48-pin TSOP NAND flash package support
- Write-protect switch
- Dual-LED operation and power control feature
- Download-over-USB for device programming

2.2 *Development Board Layout*

The CY3685 EZ-USB NX2LP Development kit comes with all the hardware design files necessary to fully evaluate and customize the Cypress development board for your design; these files are available on the CD-ROM contained in this kit. Please refer to the development board schematics.

Jumper and Switch Configurations

Jumper/Switch Location	Jumper/Switch Descriptions	Default Jumper Install	Connection
J3	Power on/off to EZ-USB NX2LP	On	1-2
J4	Power on/off for all NAND flash devices	On	1-2
J5	LED D7 enable/disable NAND flash activity indicator	On	1-2
J6	LED D8 enable/disable (Spare)	On	1-2
J7	U4 enable/disable control	On	2-3
J8	U8 enable/disable control	On	2-3
J9	U5 enable/disable control	On	2-3
J10	U9 enable/disable control	On	2-3
J11	U6 enable/disable control	On	2-3
J12	U10 enable/disable control	On	2-3
J13	U7 enable/disable control	On	2-3
J14	U11 enable/disable control	On	2-3
J16	I2C enable/disable control. Note: For the next revision of the NX2LP chips, jumper J16 and IC U2 should be disabled (removed).	On	1-2
SW1	Write-protect Switch ON Write-protect Switch OFF	See label on Board	

Jumper default configuration and functionality is discussed below in the *Hardware Configuration* section.

Header Configurations

This design contains six logic analyzer headers. The functionality of these headers is described below. Please refer to the EZ-USB NX2LP Datasheet for more specific chip pin descriptions and functionality.

Header Label	Header Pin	Pin Name	EZ-USB NX2LP Signal
P1	1	NC	No connect
	2	VCC_3.3	3.3V Power
	3	NC	No connect
	4	nXCE7	Chip enable #7
	5	nXCE6	Chip enable #6
	6	nXCE5	Chip enable #5
	7	nXCE4	Chip enable #4
	8	nXCE3	Chip enable #3
	9	nXCE2	Chip enable #2
	10	nXCE1	Chip enable #1

	11	nXCE0	Chip enable #0
	12	D7	Data 7
	13	D6	Data 6
	14	D5	Data 5
	15	D4	Data 4
	16	D3	Data 3
	17	D2	Data 2
	18	D1	Data 1
	19	D0	Data 0
	20	GND	Ground
P2	1	NC	No connect
	2	VCC_3.3	3.3V Power
	3	NC	No connect
	4	R_nB2	Ready/Busy 2
	5	R_nB1	Ready/Busy 1
	6	NC	No connect
	7	NC	No connect
	8	NC	No connect
	9	nXRE1	Read enable 1
	10	nXRE0	Read enable 0
	11	nXWE	Write enable
	12	NC3	No connect
	13	NC2	No connect
	14	nWP_SW	Write-protect switch input
	15	nWP_NF	Write-protect NAND flash
	16	nLED2	Chip active LED sink
	17	nLED1	Data activity LED sink
	18	ALE	Address latch enable
	19	CLE	Command latch enable
	20	GND	Ground
P3			Unused header
P4			Unused header
P5			Unused header
P6			Unused header

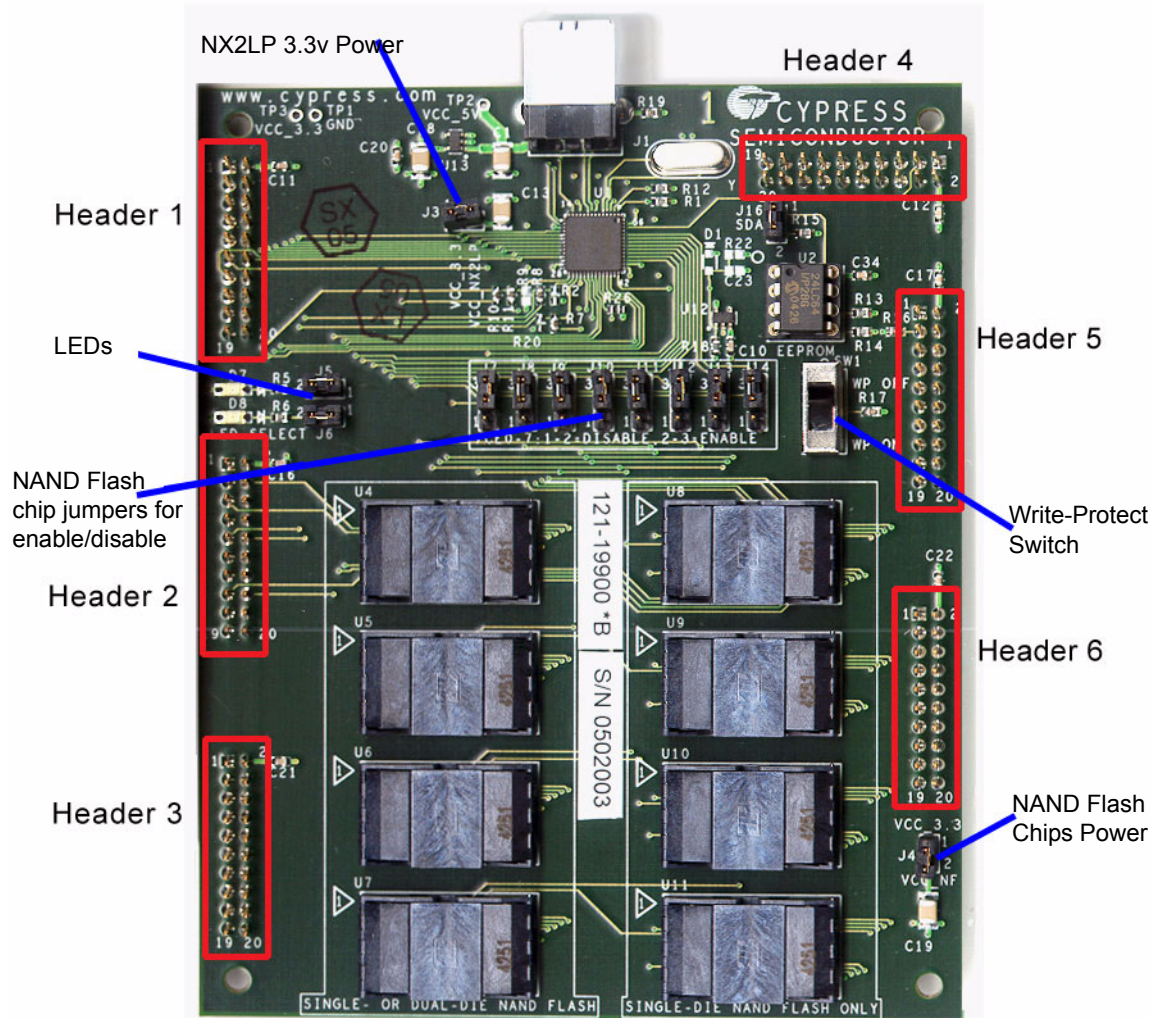


Figure 1-2. Key Component Locations

2.3 Hardware Configuration

This section describes how to properly configure the EZ-USB NX2LP Development board. Sockets are provided on the NX2LP Development Board for development convenience in testing a variety of NAND flash parts.

Because of the many different NAND types available on the market, it is important to configure the EZ-USB NX2LP Development Board properly to ensure correct operation. The following table provides four simple questions that will assist in understanding how to configure your board:



Note: All NAND configuration changes should be performed while *DISCONNECTED* from the USB bus.

Table 1. NAND Flash Parameters

Question	Response
Q1: NAND flash vendor?	
Q2: NAND flash part number?	
Q3: Single- or dual-device part? (Note: Single-device parts have one $\overline{\text{CE}}$ pin, dual-device parts have two $\overline{\text{CE}}$ pins.)	
Q4: Total NAND flash devices (1-8 for single-device or 1-4 for dual-device)?	

Step 1: Inserting NAND Devices into Sockets (U4-U11)

The NX2LP DVK supports up to 8 single-device or 4 dual-device NAND flash chips. The same part type (vendor, part number) must be loaded in the NX2LP DVK board for it to function correctly. *Do not mismatch NAND flash devices as it could lead to data corruption.*



Warning: The NAND flash sockets are rated by their manufacturer for 50 insertions and can be damaged by careless handling. However, with care, more insertions are possible. Please use caution when inserting or removing NAND flash devices from the sockets. Be certain to install the parts so pin 1 is in the upper left corner. Pin 1 is clearly marked on the EZ-USB NX2LP DVK Board with a triangle at each socket.

Depending on the response to Question #3 above, follow the directions below:

Single-Device Parts - one $\overline{\text{CE}}$ pin

Install the NAND flash devices in the following order until you reach the total listed in response to Q4:

U4, U8, U5, U9, U6, U10, U7, U11

Dual-Device Parts - two $\overline{\text{CE}}$ pins

Install the NAND flash devices in the following order until you reach the total listed in response to Q4:

U4, U5, U6, U7

Step 2: Configure NAND Flash Jumpers J7-J14

It is possible to enable or disable individual NAND flash chips using jumpers J7-J14. The EZ-USB NX2LP device detects NAND flash in the following order:

For single-device parts: U4, U8, U5, U9, U6, U10, U7, U11
For dual-device parts: U4, U5, U6, U7

For example, for single-device parts, if U5 is disabled by shunting pins 1-2 of jumper J9 (see Table 2 below) then U5 and the parts after it (U9, U6, U10, U7, and U11) will not be detected by the NX2LP at power-on.

By default J7-J14 should be shunted across pins 2-3. The following tables show how to enable or disable NAND flash devices by configuring J7-J14. This is preferable to removing NAND flash devices and extends socket life.

Single-Device Parts

Individual NAND flash devices can be enabled and disabled as shown below:

Table 2. Single-Device Parts Configuration of J7-J14

	Jumper Settings	
	Shunt 1-2	Shunt 2-3
J7	Disable U4	Enable U4
J8	Disable U8	Enable U8
J9	Disable U5	Enable U5
J10	Disable U9	Enable U9
J11	Disable U6	Enable U6
J12	Disable U10	Enable U10
J13	Disable U7	Enable U7
J14	Disable U11	Enable U11

Dual-Device Parts

For dual-die NAND flash devices the jumpers must be enabled or disabled in pairs as shown below:

Table 3. Dual-Device Parts Configuration of J7-J14

	Jumper Settings	
	Shunt 1-2	Shunt 2-3
J7 and J8	Disable U4	Enable U4
J9 and J10	Disable U5	Enable U5
J11 and J12	Disable U6	Enable U6
J13 and J14	Disable U7	Enable U7

Step 3: Device Programming and Configuration

Provided the guidelines above have been followed, your EZ-USB NX2LP development kit should now be properly configured. The next step is to plug the DVK into the USB port on your target PC and to write the configuration data with the EZ-USB NX2LP Programmer Utility. Please follow the installation guidelines provided in the enclosed *EZ-USB NX2LP Programming Utility Installation* instructions.

2.4 Technical Support

For feedback or technical support regarding Cypress EZ-USB NX2LP products, please contact Cypress at www.cypress.com >Technical Support >Create a Case.

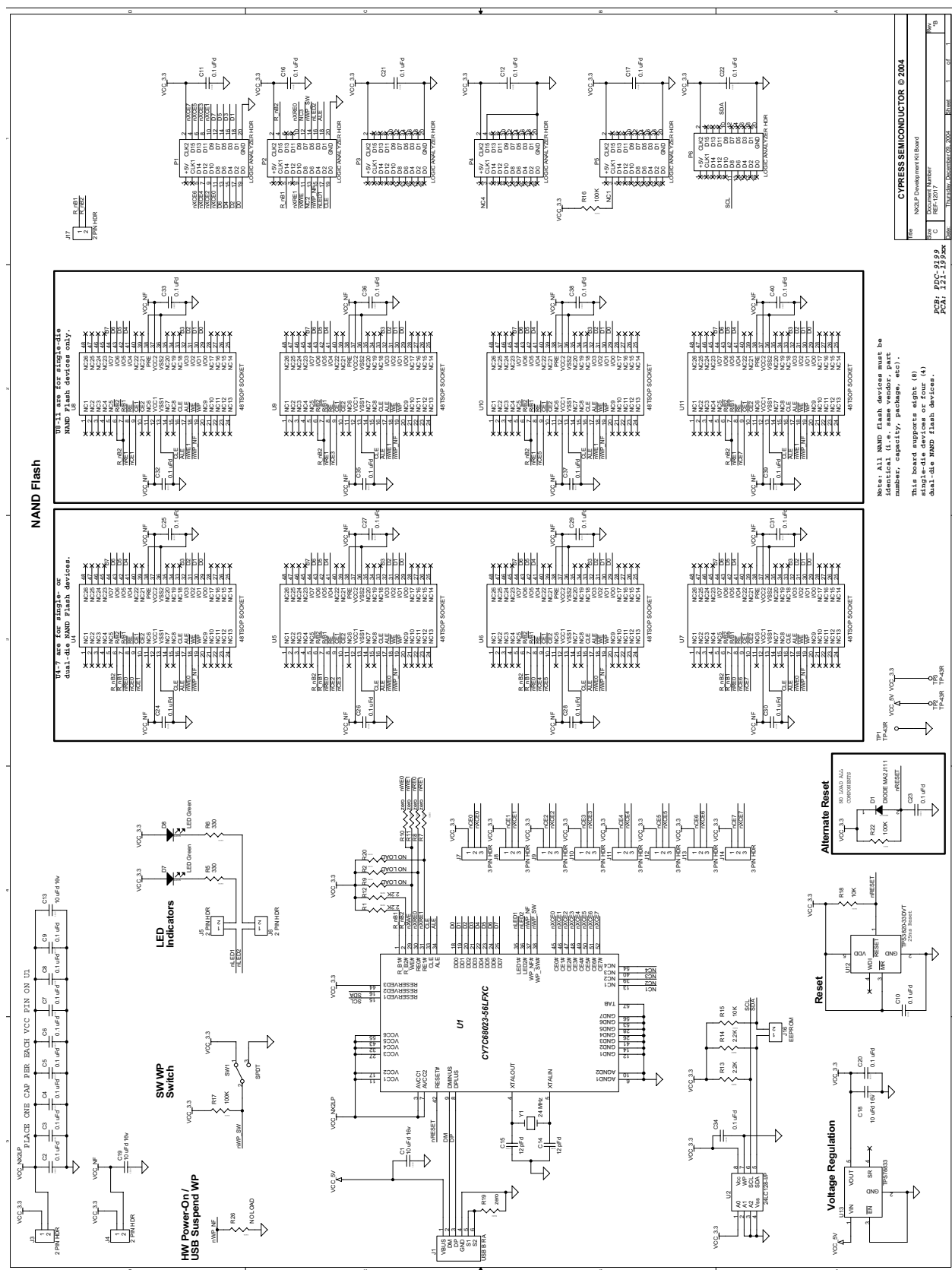


Figure 1-3. NX2LP 56 DVK Schematic