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Spec No: 001-41299

Spec Title: AN41299 - INTERFACING CYPRESS CY3686 DVK TO NAND FLASH MEMORY WITH FOUR CHIP SELECTS

Sunset Owner: Karnik Shah (SHAH)

Replaced By: 001-89951

Interfacing Cypress CY3686 DVK to NAND Flash Memory with Four Chip Selects

AN41299

Author: David Amaranto
Associated Project: No
Associated Part Family: CY7C68023/33
Software Version: NandMFg.exe (2.2010.38.1)
Associated Application Notes: AN61347

OBSOLETE

Application Note Abstract

The Samsung K9NCG08U5M (64 Gbit) and K9WBG08U5M (32 Gbit) are NAND flash memory devices in a 48-pin TSOP stacked package. This application note considers these chips as examples to understand the interface between the CY3686 development kit (DVK) and NAND flash devices with four chip select requirement. K9NCG08U5M and K9WBG08U5M consist of four separate memory dies of 16 Gb and 8 Gb, respectively. Each of these devices requires an individual Chip Enable (CE) input and an individual Ready or Busy (R/B) output. The Cypress CY3686 DVK board contains eight separate 48-pin TSOP sockets. These sockets, however, only accept single package chips and have the connections for only two CE inputs and two R/B outputs.

Introduction

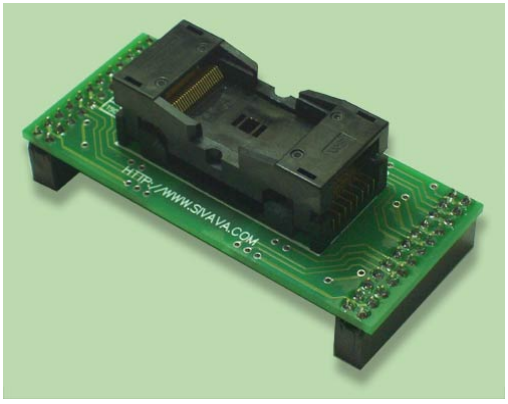
The CY3686 DVK requires an adapter board to support the extra mechanical and electrical requirements of NAND flash devices with a higher number (4 or 8) of chip enables.

Adapter Board

Following are the details of an adapter board with a socket that accepts stacked packages and provides access to all 48 pins:

Website	http://www.sivava.com
Product Code	[TO1]
Product Name	Head SOP32, 40, 48LD Socket(A)
Image	See Figure 1

Figure 1. 48-Pin TSOP Adapter Board



Wiring Connections

Table 1 lists the required signal connections between Samsung NAND devices and Cypress CY3686 DVK.

Table 1. NAND Flash and CY3686 Signal Connections

NAND Flash		CY3686	
Name	**Pin**	**Name**	**Port: Pin**
$\overline{R/B4}$	4	R_nB2	P2: 4
$\overline{R/B3}$	5	R_nB2	P2: 4
$\overline{R/B2}$	6	R_nB1	P2: 5
$\overline{R/B1}$	7	R_nB1	P2: 5
$\overline{RE}$	8	nXRE0	P2: 10
$\overline{CE1}$	9	nXCE0	P1: 11
$\overline{CE2}$	10	nXCE1	P1: 10
Vcc	12	VCC_3.3	P2: 2
Vss	13	GND	P2: 20
$\overline{CE3}$	14	nXCE2	P1: 9
$\overline{CE4}$	15	nXCE3	P1: 8
CLE	16	CLE	P2: 19
ALE	17	ALE	P2: 18
$\overline{WE}$	18	nXWE	P2: 11
$\overline{WP}$	19	nWP_NF	P2: 15

NAND Flash		CY3686	
Name	**Pin**	**Name**	**Port: Pin**
I/O0	29	D0	P1: 19
I/O1	30	D1	P1: 18
I/O2	31	D2	P1: 17
I/O3	32	D3	P1: 16
Vss	36	GND	P1: 20
Vcc	37	VCC_3.3	P1: 2
I/O4	41	D4	P1: 15
I/O5	42	D5	P1: 14
I/O6	43	D6	P1:13
I/O7	44	D7	P1:12

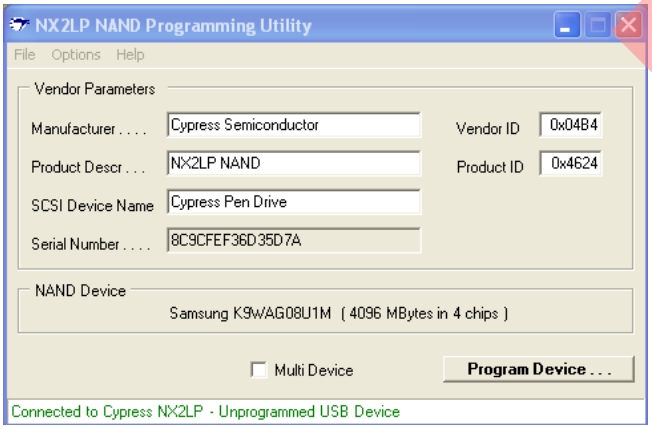
The CY3686 provides only two R/B lines, each with a 2.2-kΩ pull-up resistor, which must be shared by the four R/B open-drain outputs.

$R/\overline{B4}$ and $R/\overline{B3}$ share R_nB2, and $R/\overline{B2}$ and $R/\overline{B1}$ share R_nB1.

Programming

Connect the adapter board as described in Table 1. Then, insert a working NAND flash device into the socket on the adapter board. Install the latest version of the NX2LP NAND Programming Utility (*NandMfg.exe*) on your computer, and run the utility. The latest software tools are available at CY3686 EZ-USB NX2LP-Flex™ USB 2.0 Development Kit. Connect the CY3686 to your computer using a standard USB cable.

Figure 2. Connected and Unprogrammed Device

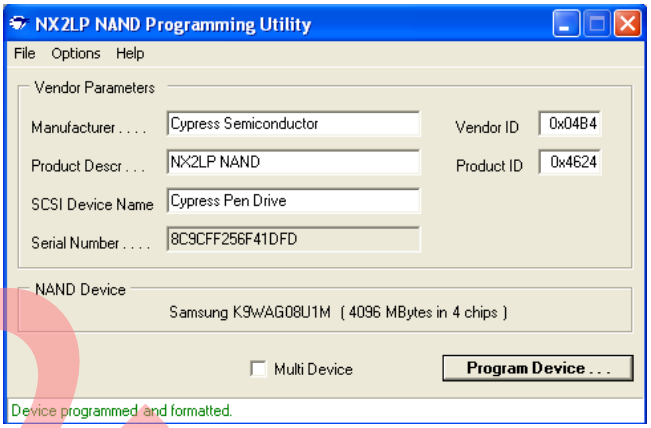


The NX2LP NAND Programming Utility dialog box (Figure 2) appears. The CY3686 user's guide is installed with the software tools. Refer to the user's guide for details on how the programming utility formats the NAND device. When the NAND device is set up and connected, it is listed as Samsung <chip number> (<chip size> Mbytes in four chips). This is because the device is actually four smaller devices physically stacked on top of each other. Information on how the firmware handles four chip selects and R/B lines are available in the application note AN61347. This document is also provided with the software.

To program the part with firmware:

1. In the **File** menu, click the **Select Configuration** option.
2. Load the appropriate **.nx2** file.
3. Click the **Program Device** button.

Figure 3. Programmed and Formatted Device



The NX2LP NAND Programming Utility dialog box (Figure 3) appears after the device is programmed and formatted. The part is now ready for use.

Additional Resources

- EZ-USB NX2LP-Flex USB 2.0 Development Kit
- NX2LP Compatibility List
- EZ-USB FX2LP Development Kit
- USB 2.0 USB to ATA Reference Design
- Mass Storage Plus Keyboard Using NX2LP-Flex
- NX2LP-Flex™ USB to NAND Flash Firmware Design Notes

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Document History

Document Title: AN41299 - Interfacing Cypress CY3686 DVK to NAND Flash Memory with Four Chip Selects

Document Number: 001-41299

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	1555266	DVJA	10/05/2007	New application note.
*A	3020451	SHAH	09/01/2010	Updated information on non-Cypress part numbers. Provided links to software and application note.
*B	3172716	SHAH	02/15/2011	Added Additional Resources section.
*C	4189917	RSKV	11/12/2013	Obsolete document.

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