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Spec No: 001-15286

Spec Title: AN5070 - MIGRATING FROM ISD-300LP(TM) TO CY7C68300C

Sunset Owner: Prajith Cheerakkoda (PRJI)

Replaced By: NONE

Migrating from ISD-300LP™ to CY7C68300C

AN5070

Author: Narayana Murthy M
Associated Project: No
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CY7C68320C/CY7C68321C
Associated Application Notes: None

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Abstract

AN5070 is intended to help expedite the process of migrating existing designs that use the ISD-300LP™ (300LP) to the CY7C68300C (EZ-USB AT2LP™). Designers already familiar with the 300LP will quickly recognize that the AT2LP is similar to the 300LP in many ways. Most of the features and tools were derived from 300LP applications. These similarities make it easy for most designs to be converted from using the 300LP to the AT2LP™ without losing any features or performance. In fact, many designs will benefit from the increased performance and expanded feature set that the AT2LP provides.

Introduction

The AT2LP is Cypress's next-generation high-speed USB-to-ATA/ATAPI bridge. The AT2LP supports many features available in the 300LP, while providing increased functionality, drive compatibility, and performance.

Since the AT2LP is not a drop-in replacement for the 300LP, design changes needs to be made when migrating from the 300LP to the AT2LP. This application note is not intended to be a comprehensive design guide. Instead, it is intended to list the major similarities and differences between the two chips to help designers familiarize themselves with the features available in the AT2LP family.

Major items discussed in this application note include:

- AT2LP/300LP Feature Comparison
- GPIO Pins
- EEPROM Configuration Bits
- Forcing AT2LP Into Manufacturing Mode
- ATACB Support
- USB Certification

The features listed in this document do not reflect all of the features that the AT2LP provides. This document is only intended for comparison of the 300LP and AT2LP, so many new features and performance benefits listed in other AT2LP documents are not noted here. Refer to the AT2LP datasheet for a comprehensive listing of AT2LP features and benefits.

Details

AT2LP/300LP Feature Comparison

The AT2LP is a fixed-function USB-to-ATA/ATAPI bridge, similar in operation to the 300LP. With the AT2LP, Cypress has taken the best features from the 300LP and AT2 families and combined them with improved performance to satisfy design needs that were previously met by several different chips.

Table 1 lists the major features of the 300LP and shows which AT2LP packages also support those features:

Table 1. Feature Comparison Chart for ISD-300LP™ and EZ-USB AT2LP™

	ISD-300LP	CY7C68320C-56	CY7C68320C-100	CY7C68300C-56
Bus-powered compliant	✓	✓	✓	✓
GPIO Pins	✓	✓	✓	
Drive power control pins	✓		✓	✓
SYSIRQ Pin (GPIO Interrupt)	✓		✓	
ATA Enable (Tri-State ATA Bus)	✓	✓	✓	✓
USB Hi-Speed Indicator	✓	✓	✓	
Chip Sleep (Low-power) Indicator	✓		✓	
ATACB Support	✓	✓	✓	✓

GPIO Pins

The AT2LP provides the same GPIO functionality as the 300LP, and support for the AT2LP's GPIO pins is added to Cypress's mass storage class drivers. The CY7C68320C 56-pin package provides two GPIO pins, while the 100-pin package provides six GPIO pins. The 100-pin AT2LP also has a SYSIRQ pin for externally triggering a GPIO interrupt.

The AT2LP GPIO pins can be used in either "300LP Mode" or in "HID Mode". The 300LP Mode offers the same behavior as is found in the 300LP and functions in conjunction with Cypress's mass storage drivers. The HID Mode is an input-only mode that works in conjunction with native HID drivers. Refer to the AT2LP documentation for more details on HID mode operation.

EEPROM Configuration Bits

Just like the 300LP, the AT2LP uses configuration data stored in an external EEPROM. The format of the AT2LP EEPROM bits are similar to those used for the 300LP. Cypress provides a software tool, the AT2LP Blaster, for creating, editing, and programming EEPROM files in a development environment. The AT2LP Blaster software can be found in the CY4615B reference design files, which are on the kit CD and Cypress's website.

See the AT2LP datasheet for a complete description of the EEPROM contents and an example of typical configuration values. A default EEPROM image is also supplied in the AT2LP reference design kit files.

Forcing AT2LP Into Manufacturing Mode

The AT2LP has a manufacturing mode similar to the 300LP. This mode is used in conjunction with the manufacturing software to access the EEPROM and run system-level tests. A simple way to force the chip into manufacturing mode is added to the AT2LP to help speed up the development and testing process. Simply setting ARESET# to LOW at power-up will cause the AT2LP to start up in manufacturing mode. The easiest way to accomplish this using the AT2LP development board from Cypress is to remove any drives that are connected to the AT2LP and short pins 1 and 3 on the 40-pin ATA connector.

The previous method for putting the 300LP into manufacturing mode was to disable the EEPROM at start-up, causing the chip to use the default descriptors contained in ROM space. The AT2LP supports the option of fusing some configuration data during factory manufacturing, so it will read the fuse area of memory if no EEPROM is detected at start-up. The fuse area contains all zeros when the fuse option is not utilized, which will result in the AT2LP returning invalid configuration data when no EEPROM is present. Because of this, disabling the EEPROM on an AT2LP to force manufacturing mode is not recommended. However, using a blank or corrupted EEPROM will result in proper manufacturing mode operation.

ATACB Support

Like the 300LP, the AT2LP can support any ATA command through the use of the ATACB feature.

Also, to support 48-bit addressing, as outlined in the ATA-6 specification, the AT2LP has added the ATACB2 feature. This works the same as the previous ATACB, but incorporates a different addressing scheme. Please refer to the AT2LP datasheet for more details.

USB Certification

When changing the USB controller silicon in a certified design, the USB-IF will almost certainly require the certification tests to be rerun. Any design which migrates from the 300LP to the AT2LP should be submitted for USB certification to ensure compliance with the USB-IF requirements. Questions about USB certification can be directed to the USB-IF (http://www.usb.org).

Summary

Migrating from the 300LP to the AT2LP is simple and straightforward. Design changes are minimal, while the new features available in the AT2LP can greatly enhance existing designs.

As with Cypress's 300LP, the AT2LP is made available with world-class development tools and software support. Visit Cypress website for more information.

Additional References

- CY4615B AT2LP Reference Design Kit
- AT2LP Datasheet
- ATA/ATAPI-6 specification -T13/1410D Rev 3B
- USB Mass Storage Bulk Only Transport (BOT) Specification
- USB Specification Version 2.0

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Document History Page

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	1776985	NMMA	08/19/2008	Old App Note Conversion Project – Applied new template with new copyright info, format style, new doc number, and added info into properties of file for Google search engine.
*A	3125634	NMMA	01/03/2011	Added Additional References section.
*B	3354409	NMMA	08/25/2011	Removed obsolete hyperlinks to AT2LP datasheet.Updated Additional References Section.
*C	4184423	RSKV	11/06/2013	Obsolete document.

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