

捷多邦,专业PCB打样工厂,24小时加急出货

Http://www.alcormicro.com/

Data Book

AU9386 USB Flash Disk Controller

Technical Reference Manual

Product Specification

Official Release

Revision 1.01W

Public



Apr 2005



Data sheet status

Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.

Revision History

Date	Revision	Description
Apr 2005 1.01W/A21		Removed the schematics. Please contact our sales if you need it.





Copyright Notice

Copyright 1997 - 2005 Alcor Micro Corp. All Rights Reserved.

Trademark Acknowledgements

The company and product names mentioned in this document may be the trademarks or registered trademarks of their manufacturers.

Disclaimer

Alcor Micro Corp. reserves the right to change this product without prior notice. Alcor Micro Corp. makes no warranty for the use of its products and bears no responsibility for any error that appear in this document. Specifications are subject to change without prior notice

Contact Information:

Web site : http://www.alcormicro.com/

Taiwan

Alcor Micro Corp. 4F, No 200 Kang Chien Rd., Nei Hu, Taipei, Taiwan, R.O.C. Phone: 886-2-8751-1984 Fax: 886-2-2659-7723

Santa Clara Office

2901 Tasman Drive, Suite 206 Santa Clara, CA 95054 USA Phone: (408) 845-9300 Fax: (408) 845-9086

Los Angeles Office

9070 Rancho Park Court Rancho Cucamonga, CA.91730 USA Phone: (909) 483-9900 Fax: (909) 944-0464



Table of Contents

1	Introduction	6
	1.1 Description	6
	1.2 Features	6
2	Application Block Diagram	8
3	Pin Assignment	9
4	System Architecture and Reference Design	10
	4.1 AU9386 Block Diagram	10
5	Electrical Characteristics	11
	5.1 Recommended Operating Conditions	11
	5.2 General DC Characteristics	11
	5.3 DC Electrical Characteristics for 3.3 volts operation	11
	5.4 Crystal Oscillator Circuit Setup for Characterization	12
	5.5 ESD Test Results	12
	5.6 Latch-Up Test Results	13
6	Mechanical Information	15



List of Figures

2.1	Block Diagram	8
3.1	Pin Assignment Diagram	9
4.1	AU9351 Block Diagram	10
5.1	Crystal Oscillator Circuit Setup for Characterization	12
5.2	Latch-Up Test Results	13
6.1	Mechanical Information Diagram	15

List of Tables

3.1	Pin Descriptions	9
5.1	Recommended Operating Conditions	11
5.2	General DC Characteristics	11
5.3	DC Electrical Characteristics for 3.3 volts operation	11
5.4	ESD Data	12
5.5	Latch-Up Test Results	14





1.0 Introduction

1.1 Description

The AU9386 is a highly integrated single chip USB flash disk controller. It provides the most cost effective bridge between USB enabled PC and NAND type flash memory. AU9386 can be used as a removable storage disk in enormous data exchange applications between PC, Macintosh, laptop and workstation. It can also be configured as a bootable disk for system repairing.

AU9386 gives USB storage device a new life. It will automatically execute your program & play content including Video MPEG, Audio MP3, Advertisements and Applications. AU9386 is an outstanding USB storage device controller; it enables auto run features in Windows 98, XP, 2000 and ME. These unique features give hardware device maker and software vendor tremendous opportunity to develop user-friendly appliance and application.

AU9386 works with NAND type flash memory chip with the combination of popular flash memory types such as 8M, 16M, 32M, 64M, 128M and 256M. Additional features include write protection switch, activity LED and password-protected security.

1.2 Features

- Support with USB v1.1 specification and USB Device Class Definition for Mass Storage, Bulk-Transport v1.0
- Work with default driver from Windows ME, Windows 2000, Windows XP, Mac OS 9.1, and Mac OS X. Windows 98se is supported by vendor driver from Alcor.
- Multiple FIFO implementation for concurrent bus operation
- Can be configured as "removable" or "HDD" type disk by utility software as customers' requirement.
- LED for bus activity monitoring
- Runs at 12MHz, built-in 48 MHz PLL
- Built-in 3.3V regulator
- Built-in power on reset circuit
- Packed in 28-pin SSOP form
- Supports 2 pieces NAND type Flash memory chips.
- Support AutoRun feature in removable type disk.
 - AutoRun feature can be supported on Windows ME, Windows 2000, Windows XP and Windows 98.



2.0 Application Block Diagram

Following is the application diagram of a typical flash disk product with AU9386. By connecting the flash disk to a desktop or notebook PC through USB bus, AU9386 is implemented as a bus-powered, full speed USB disk, which can be used as a bridge for data transfer between Desktop PC and Notebook PC.



Figure 2.1 AU9386 Application Block Diagram



3.0 Pin Assignment

The AU9386 is packed in 28-pin SSOP form factor. The figure on the following page shows the signal names for each of the pins on the chip. Accompanying the figure is the table that describes each of the pin signals



Figure 3.1 Pin Assignment Diagram



Pin No.	Pin Name	Pin Type	Description	
1	GPON7	0	General Purpose Out, used as activity LED	
2	FMWPN	I	Connect to Flash Memory Write Protect	
3	VCC2CARD	0	Connect to Flash Memory Vcc	
4	VCC5V	PWR	5V power supply	
5	VCCIO	PWR	Regular 3.3V output/ IO 3.3V input	
6	USB_DM	1/0	USB D-	
7	USB_DP	1/0	USB D+	
8	GNDIO	PWR	Ground	
9	FMWRN	0	Connect to Flash Memory Write Enable	
10	FMALE	0	Connect to Flash Memory Address Latch Enable	
11	XTAL1	I	Crystal Oscillator Input (12MHz)	
12	XTAL2	0	Crystal Oscillator Output (12MHz)	
13	VCCA	PWR	Analog 3.3V input	
14	GNDA	PWR	Ground	
15	VCCK	PWR	Core 3.3V Input	
16	FMCLE	0	Connect to Flash Memory Command Latch Enable	
17	FMCE1N	0	Connect to Flash Memory Chip1 Enable	
18	FMCE2N	0	Connect to Flash Memory Chip2 Enable	
19	FMRDN	0	Connect to Flash Memory Read Enable	
20	FMRBN	I	Connect to Flash Memory Ready/Busy	
21	FMDATA4	1/0	Connect to Flash Memory Data4	
22	FMDATA5	1/0	Connect to Flash Memory Data5	
23	FMDATA6	1/0	Connect to Flash Memory Data6	
24	FMDATA7	1/0	Connect to Flash Memory Data7	
25	FMDATAO	1/0	Connect to Flash Memory Data0	
26	FMDATA1	1/0	Connect to Flash Memory Data1	
27	FMDATA2	1/0	Connect to Flash Memory Data2	
28	FMDATA3	1/0	Connect to Flash Memory Data3	

Table 3.1 Pin Descriptions



4.0 System Architecture and Reference Design

4.1 AU9386 Block Diagram



Figure 4.1 AU9386 Block Diagram





5.0 Electrical Characteristics

5.1 Recommended Operating Conditions

SYMBOL	PARAMETER	MIN	ТҮР	МАХ	UNITS		
V _{CC}	Power Supply	4.75	5	5.25	V		
V _{IN}	Input Voltage	0		V _{cc}	V		
T _{OPR}	Operating Temperature	0		85	°C		
T _{STG}	Storage Temperature	-40		125	°C		

Table 5.1 Recommended Operating Conditions

5.2 General DC Characteristics

SYMBOL	PARAMETER	CONDITIONS	ΜΙΝ	ТҮР	МАХ	UNITS		
I_{1L}	Input low current	no pull-up or pull-down	-1		1	μA		
I _{IH}	Input high current	no pull-up or pull-down	-1		1	μA		
l _{oz}	Tri-state leakage current		-10		10	μΑ		
CIN	Input capacitance			5		ρF		
C _{OUT}	Output capacitance			5		ρF		
C _{BID}	Bi-directional buffer capacitance			5		ρF		

Table 5.2 General DC Characteristics

5.3 DC Electrical Characteristics for 3.3 volts operation

SYMBOL	PARAMETER	CONDITIONS	MIN	ТҮР	МАХ	UNITS	
VIL	Input Low Voltage	CMOS			0.9	V	
V _{IH}	Input Hight Voltage	CMOS	2.3			V	
V _{OL}	Output low voltage	I _{OL} =4mA, 16mA			0.4	V	
V _{OH}	Output high voltage	I _{OH} =4mA,16mA	2.4			V	
R	Input Pull-up/down resistance	$Vil=0_V$ or $Vih=V_{CC}$		10k/200k		KΩ	

Table 5.3 DC Electrical Characteristics for 3.3 volts operation



5.4 Crystal Oscillator Circuit Setup for Characterization

The following setup was used to measure the open loop voltage gain for crystal oscillator circuits. The feedback resistor serves to bias the circuit at its quiescent operating point and the AC coupling capacitor, Cs, is much larger than C1 and C2.



Figure 5.1 Crystal Oscillator Circuit Setup for Characterization

5.5 ESD Test Results

Test Description : ESD Testing was performed on a Zapmaster system using the Human-Body –Model (HBM) and Machine-Model (MM), according to MIL_STD 883 and EIAJ IC_121 respectively.

- Human-Body-Model stress devices by sudden application of a high voltage supplied by a 100 PF capacitor through 1.5 Kohm resistance.
- Machine-Model stresses devices by sudden application of a high voltage supplied by a 200 PF capacitor through very low (0 ohm) resistance

Test circuit & condition

- Zap Interval : 1 second
- Number of Zaps : 3 positive and 3 negative at room temperature
- Critera : I-V Curve Tracing

Model	Model Model S/S		TARGET	Results			
HBM	Vdd, Vss, I/C	15	4000V	Pass			
MM	Vdd, Vss, I/C	15	200V	Pass			

Table 5.4 ESD Data



5.6 Latch-Up Test Results

Test Description: Latch-Up testing was performed at room ambient using an IMCS-4600 system which applies a stepped voltage to one pin per device with all other pins open except Vdd and Vss which were biased to 5 Volts and ground respectively.

Testing was started at 5.0 V (Positive) or 0 V(Negative), and the DUT was biased for 0.5 seconds.

If neither the PUT current supply nor the device current supply reached the predefined limit (DUT=0 mA , Icc=100 mA), then the voltage was increased by 0.1 Volts and the pin was tested again.

This procedure was recommended by the JEDEC JC-40.2 CMOS Logic standardization committee.

Notes:

- 1. DUT: Device Under Test.
- 2. PUT: Pin Under Test.

Figure 5.2 Latch-Up Test Results





Test Circuit : Positive Input/ output Overvoltage /Overcurrent





Test Circuit: Negative Input/Output Overvoltage/Overcurrent



Supply voltage Test

Model	Model	Voltage (v) / Current (mA)	S/S	Results	
Voltage	+	11.0		Dece	
	-	11.0	Э	Pass	
Current	+	200	F		
	-	200	Э		
V	dd-Vxx	9.0	5	Pass	

Table 5.5 Latch–Up Data



6.0 Mechanical Information

Following diagram shows the dimensions of the AU9386 28-pin SSOP.



Figure 6.1 Mechanical Information Diagram

Http://www.alcormicro.com/



[MEMO]

About Alcor Micro, Corp

Alcor Micro, Corp. designs, develops and markets highly integrated and advanced peripheral semiconductor, and software driver solutions for the personal computer and consumer electronics markets worldwide. We specialize in USB solutions and focus on emerging technology such as USB and IEEE 1394. The company offers a range of semiconductors including controllers for USB hub, integrated keyboard/USB hub and USB Flash memory card reader...etc. Alcor Micro, Corp. is based in Taipei, Taiwan, with sales offices in Taipei, Japan, Korea and California.

Alcor Micro is distinguished by its ability to provide innovative solutions for spec-driven products. Innovations like single chip solutions for traditional multiple chip products and on-board voltage regulators enable the company to provide cost-efficiency solutions for the computer peripheral device OEM customers worldwide.

