ADATA Technology Corp.

USB Flash Module

IUM01-XXXX FVS

IUM01-XXXX FHS

IUM01-XXXX FHL

512MB、1GB、2GB、4GB

Version 1

Document Number: R21-0214

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2F, No. 258, Lian Cheng Rd., Chung Ho Dist., New Taipei City 235, Taiwan (R.O.C.)

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1.0 Revision History

Revision No.	History	Draft Date	Remark	Editor
1.0		Mar. 14, 2011		Eugene Liao
0	Add 512MB 8GB EOL	Dec. 06, 2011		Ken Yang
1	Modify S/N Coding rule	Dec. 04, 2013		Andy Lin

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2.0 Product Description

The USB DOM solution is the best choice on wide-ranged mobile computing devices and consumer electronic products, which employing static wear-leveling technology to maximize device mean time between failures (MTBF). As standard USB DOM form factor or customized module of factor, ADATA USB DOM provides the capacities from 512MB to 4GB which using SLC NAND type flash memories.

The USB DOM of ADATA Technology fully consists of semiconductor devices using SLC NAND flash memory which provide high reliability and high performance for a storage media. The USB DOM doesn't have any moving parts such as platter (disk) and head media, which provides a better solution in a embedded notebook PC and Tablet PC for a storage device providing higher performance, reduced latencies, and a low power consumption in a small form factor. The USB DOM could also provide rugged features in industrial PC with an extreme environment with a high MTBF.

3.0 Features

- Completes USB specification ver.2.0 compatibility
- Complies with USB Mass Storage Class specification ver.1.0
- Complies with USB power specification for bus-powered devices
- Operating system supported: Windows Vista / XP / 2000 / ME / 98SE / 98, Mac OS 9.x and above, Linux Kernel 2.4 and above.
- Supports Flash Memory with 8 and 15 bits per 528byte BCH ECC hardware engine.
- Supports suspend and wake-up resume
- Supports “Write Protect” security function to protect data in UFD

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4.0 Mechanical Specification

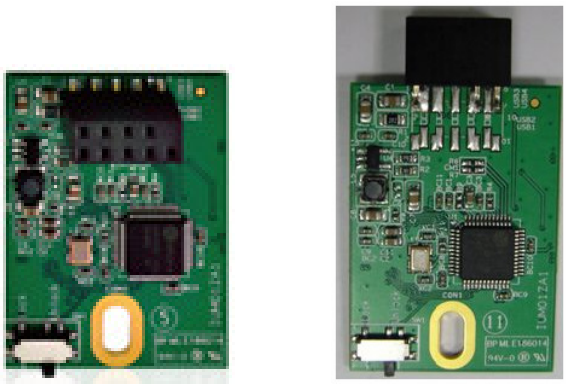
4.1 Physical dimensions and Weight

Horizontal

Model	Height(mm) 2.0/2.54mm Pitch	Width(mm) 2.0/2.54mm Pitch	Length(mm) 2.0/2.54mm Pitch	Weight(gram) 2.0/2.54mm Pitch
512MB	5.75 / 8.7	26.6	36.9	5 / 5 g
1GB	5.75 / 8.7	26.6	36.9	5 / 5 g
2GB	5.75 / 8.7	26.6	36.9	5 / 5 g
4GB	5.75 / 8.7	26.6	36.9	5 / 5 g

Vertical

Model	Height(mm) 2.54mm Pitch	Width(mm) 2.54mm Pitch	Length(mm) 2.54mm Pitch	Weight(gram) 2.54mm Pitch
512MB	5.3	26.6	45.4	5g
1GB	5.3	26.6	45.4	5 g
2GB	5.3	26.6	45.4	5 g
4GB	5.3	26.6	45.4	5 g



[Figure 3-1] Physical dimension

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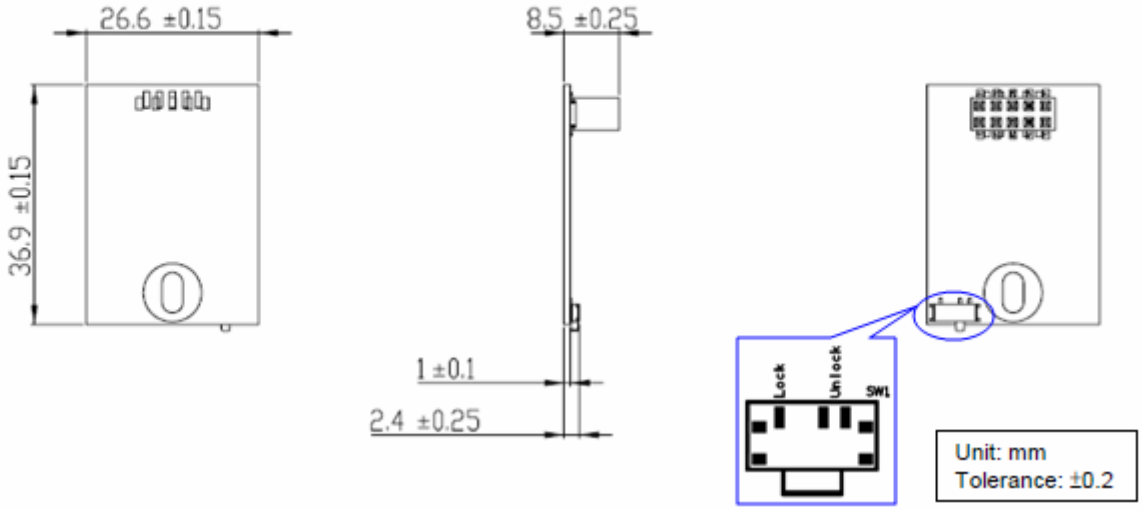
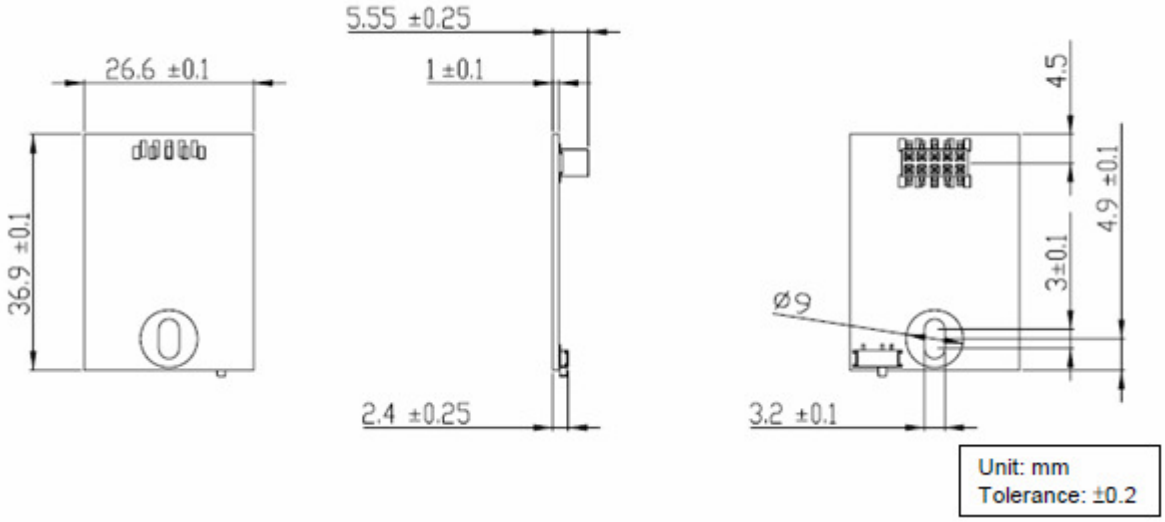
4.2 PCBA Dimensions

a. Horizontal Pitch: 2.54mm



b. Horizontal Pitch: 2.0mm



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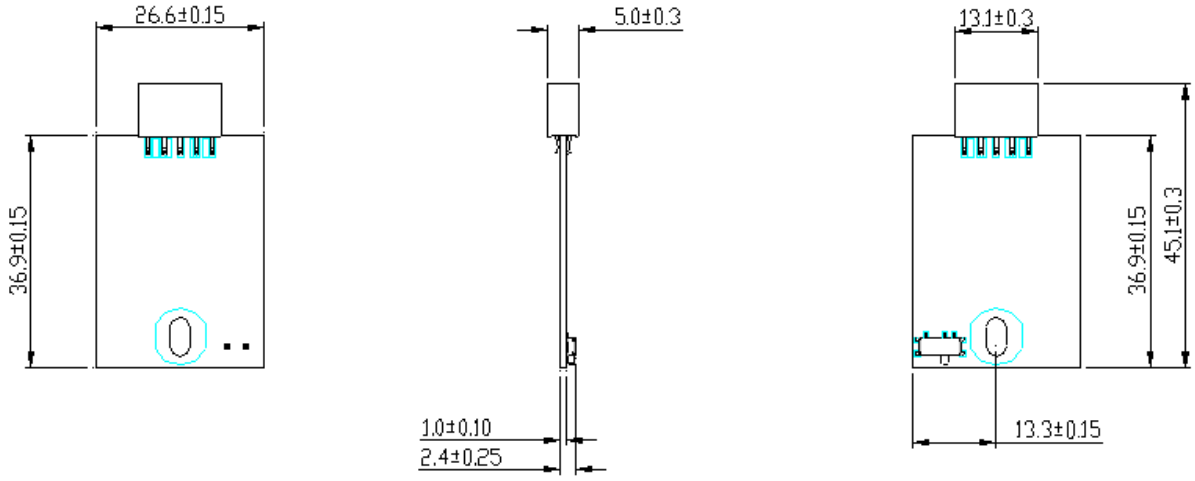
c. Vertical Pitch: 2.54mm



[Figure 3-2] PCB Dimensions

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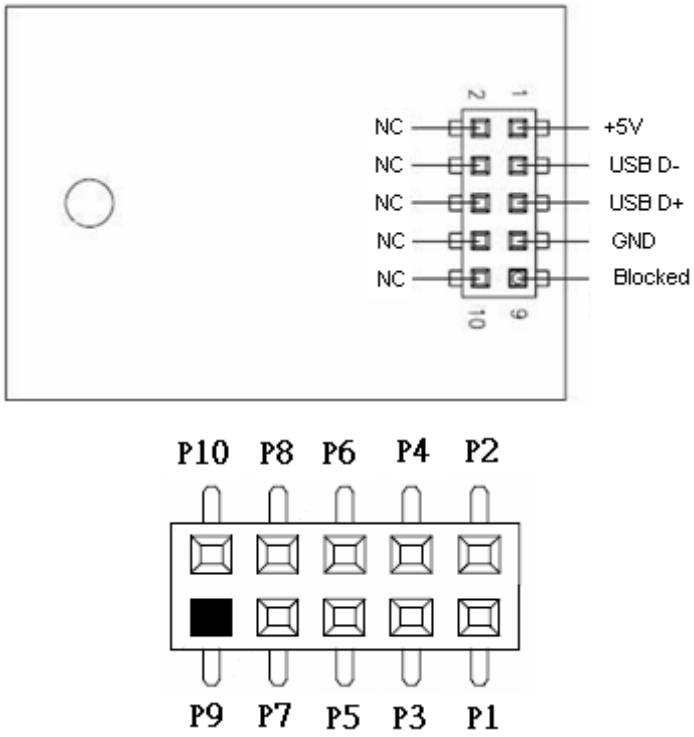
5.0 Electronic Specification

5.1 USB Interface Connector

Drive Connector：USB Type 4 pin

Pin # are marked as P1 ~ P10 in the below dimension, please refer to pin assignments.



[Figure 5-1] USB Interface Connector

5.2 Pin Assignments

Pin	Assignment	Description	Pin	Assignment	Description
1	VBUS	Power	2	N.C	N.C
3	D-	Signal	4	N.C	N.C
5	D+	Signal	6	N.C	N.C
7	GND	GND	8	N.C	N.C
9	Blocked	N.C	10	N.C	N.C

[Table 5-1] Pin Assignments

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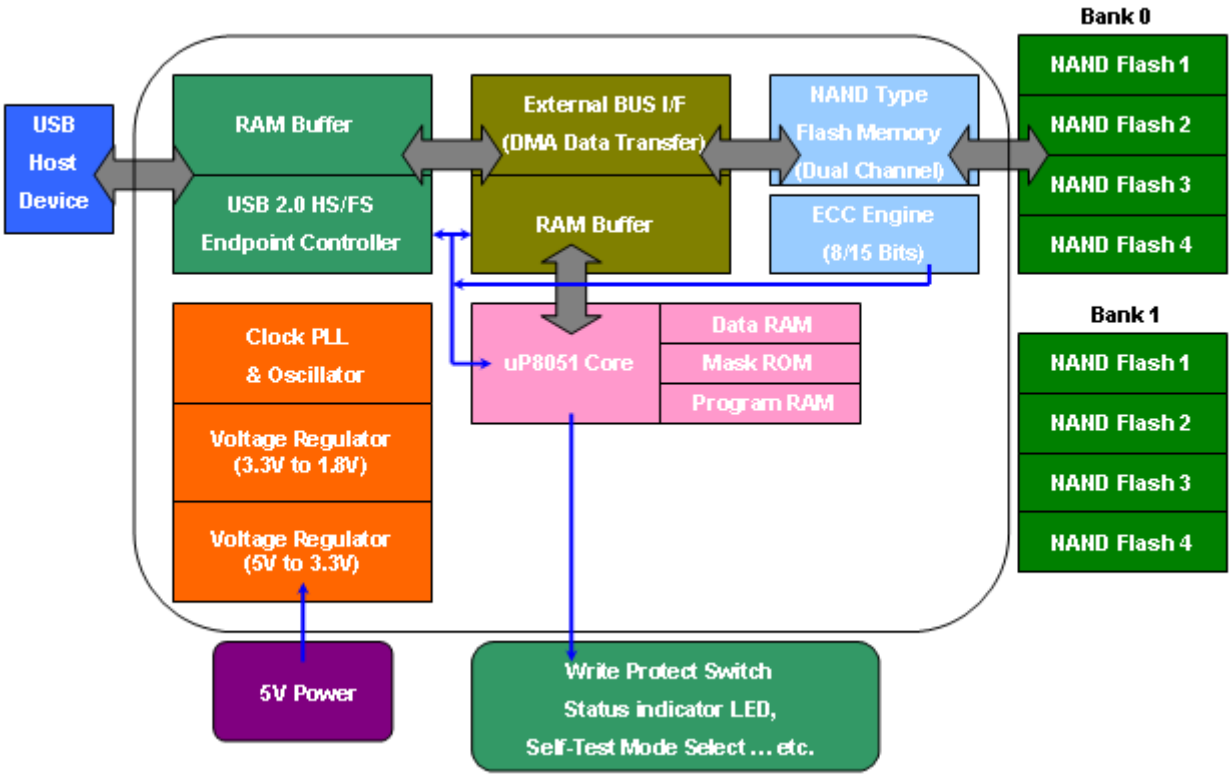
5.3 Function Block Diagram



[Figure 5-2] Function Diagram

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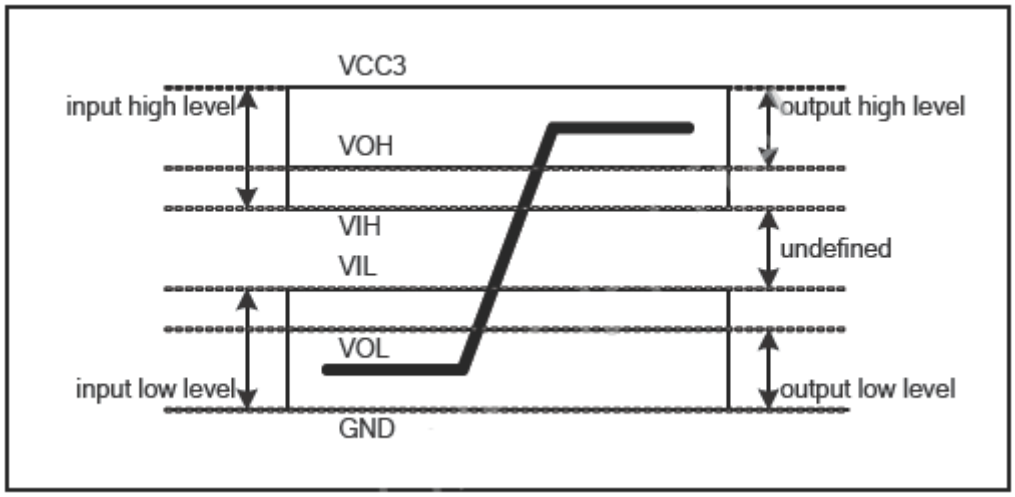
5.4 AC/DC Characteristics

Parameter	Symbol	Min.	Max.	Unit	Remark
Peak voltage on all lines		-0.5	3.6	V	Except VCC5V input
All input leakage current		-10	10	uA	
All output leakage current		10	10	uA	
Supply voltage	VCC3	2.7	3.6	V	
Pull up resistance	R_{PU}	52.7	141	K Ohm	
Pull down resistance	R_{PD}	47.5	172	K Ohm	

Bus Signal Level



Parameter	Symbol	Min.	Max.	Unit	Remark
Output High voltage	V_{OH}	2.4		V	
Output Low voltage	V_{OL}		0.4	V	
Input High voltage	V_{IH}	2.0		V	
Input Low voltage	V_{IL}		0.8	V	

Bus Signal Line Loading

Parameter	Symbol	Min.	Max.	Unit	Remark
Bus Line capacitance	C_L		20	pF	

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5.5 Internal Regulator (5.0V to 3.3V)

Electrical characteristics：

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
VDD5I	Analog supply voltage		4.2	5.0	5.5	V
VDD33O	Regulated output voltage	VBUS=5.0V	3.0	3.3	3.6	V
I_{STB}	Stand-by current	N0 Load		50	70	uA
I_{output}	Output driving current			300	350	mA

5.6 Internal Regulator (3.3V to 1.8V)：

Electrical characteristics：

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
VDD33I	Analog supply voltage		3.0	3.3	3.6	V
VDD18O	Regulated output voltage	V33=3.3V Cload=4.7uF	1.71	1.8	1.85	V
I_{STB}	Stand-by current	N0 Load		40	50	uA
I_{output}	Output driving current			50	70	mA

5.7 Voltage Detector (2.7V)：

Electrical characteristics：

Symbol	Parameter	Min.	Typ.	Max.	Unit
VDD33I	Power Supply Voltage	3	3.3	3.6	V
P_POR_RR	Reference High Voltage	2.6	2.8	3.0	V
P_POR_FR	Reference Low Voltage	2.4	2.6	2.8	V
VHYS	Hysteresis Width	0.1	0.2	0.3	V

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5.8 NAND Flash AC Characteristics：

Parameter	Symbol	Min	Max	Unit
Data Transfer from Cell to Register	tR	-	25	us
ALE to RE Delay	tAR	10	-	ns
CLE to RE Delay	tCLR	10	-	ns
Ready to RE Low	tRR	20	-	ns
RE Pulse Width	tRP	12	-	ns
WE High to Busy	tWB	-	100	ns
Read Cycle Time	tRC	25	-	ns
RE Access Time	tREA	-	20	ns
CE Access Time	tCEA	-	25	ns
RE High to Output Hi-Z	tRHZ	-	100	ns
CE High to Output Hi-Z	tCHZ	-	30	ns
RE High to Output Hold	tRHOH	15	-	ns
RE Low to Output Hold	tRLOH	5	-	ns
RE Low to	tCOH	15	-	ns
CE High to Output Hold	tREH	10	-	ns
RE High Hold Time	tIR	0	-	ns
Output Hi-Z to RE Low	tRHW	100	-	ns
WE High to RE Low	tWHR	60	-	ns
Device Resetting Time(Read/Program/Erase)	tRST	-	5/10/500	us

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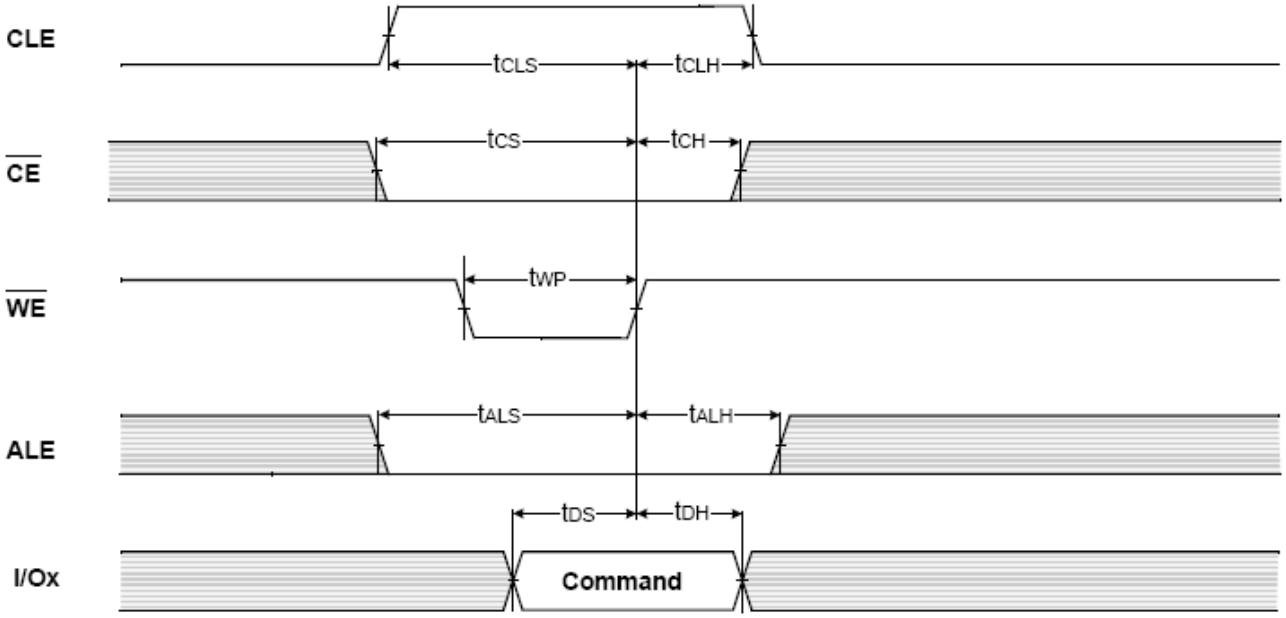
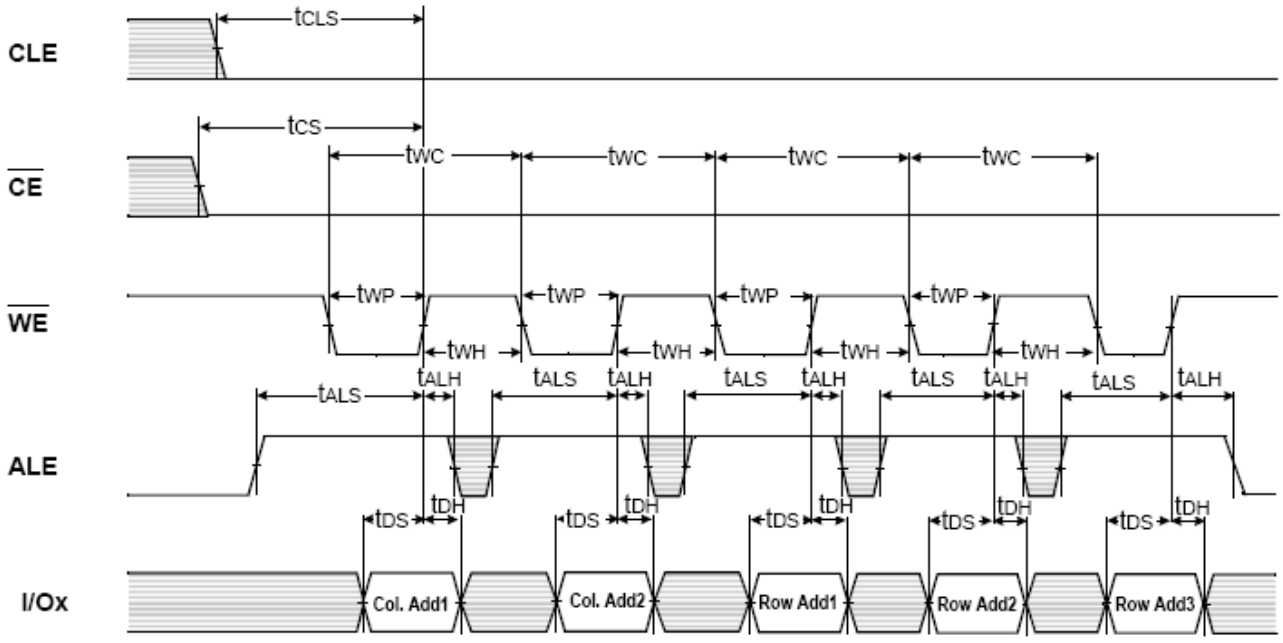
5.8.1 Command Latch Cycle



5.8.2 Address Latch Cycle



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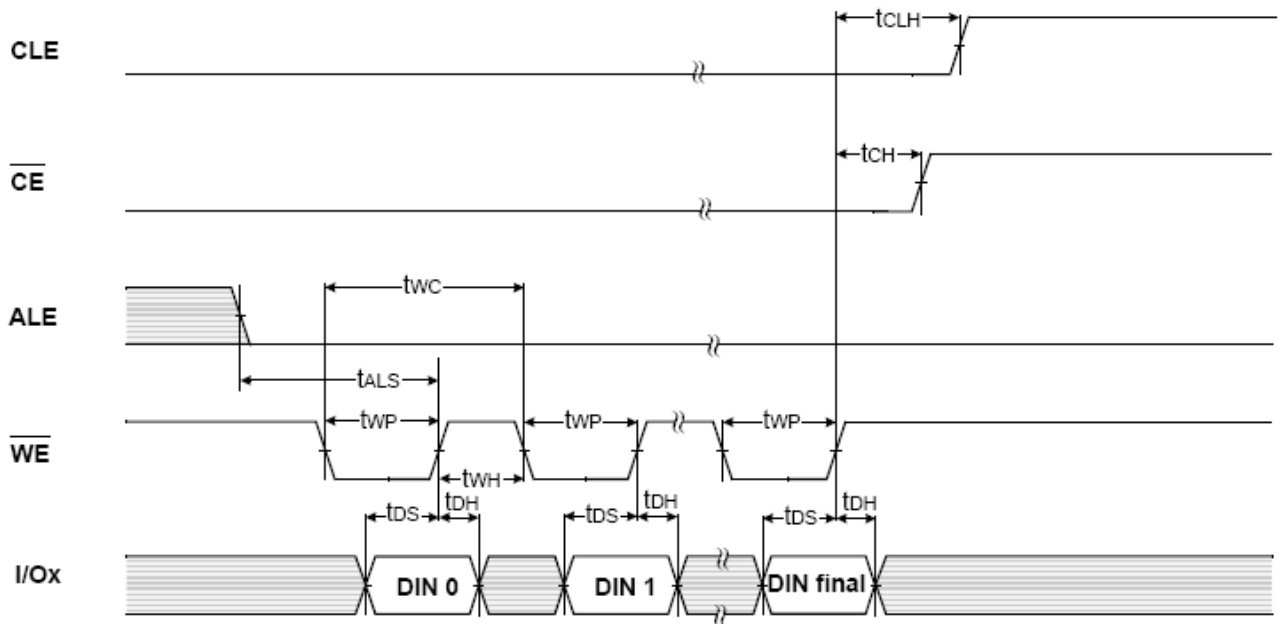
5.8.3 Input Data Latch Cycle



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6.0 Product Specifications

6.1 System Interface and Configuration

- The USB interface is compliant with the USB2.0 specification.
- The USB interface runs at a maximum speed of 480 Mb/sec.
- If the host computer is unable to negotiate a high-speed, the USB interface automatically renegotiates to full-speed or low-speed signaling mode.

6.2 System Performance

The performance was measured on a computer system with following setup:

- Platform: ASUA P5K3 Deluxe (Intel P35 + ICH9)
- Operation Systems: Windows XP SP3
- Testing Utility: CrystalDiskMark v3.0

IUM01	Windows OS	
	Read (Maximum)	Write (Maximum)
512MB	14 MB/s	8 MB/s
1GB	14 MB/s	8 MB/s
2GB	14 MB/s	13 MB/s
4GB	26 MB/s	18 MB/s

Actual performance may vary depending on use conditions and environment

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6.3 Drive Capacity

Windows XP	Capacity	Total bytes	Percentage	Windows 7	Capacity	Total bytes	Percentage
512MB	487MB	511,696,896	95.11%	512MB	487MB	511,696,896	95.11%
1GB	954MB	1,000,460,288	93.17%	1GB	951MB	998,240,256	92.96%
2GB	1.86GB	2,000,945,152	93.17%	2GB	1.86GB	2,000,678,912	93.16%
4GB	3.72GB	4,001,914,880	93.17%	4GB	3.72GB	4,001,351,920	93.16%

6.4 Supply Voltage

Item	Requirements
Allowable voltage	5V ± 5%
Allowable noise/ripple	100mV p-p or less

6.5 System Power Consumption

Power	Typical
Active	< 1.0W
Idle/Standby/Sleep	< 0.5W

6.6 System Reliability

MTBF	2,000,000 Hours

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6.7 Environmental Specifications

Feature	Operation	Non-Operation
Temperature	0℃ to 70℃	-40℃ to 85℃
Humidity	0℃ to 55℃ / 5%~95% RH, non-condensing	
Vibration	TBD	
Shock	TBD	

*Note: Depends on Flash memory specifications.

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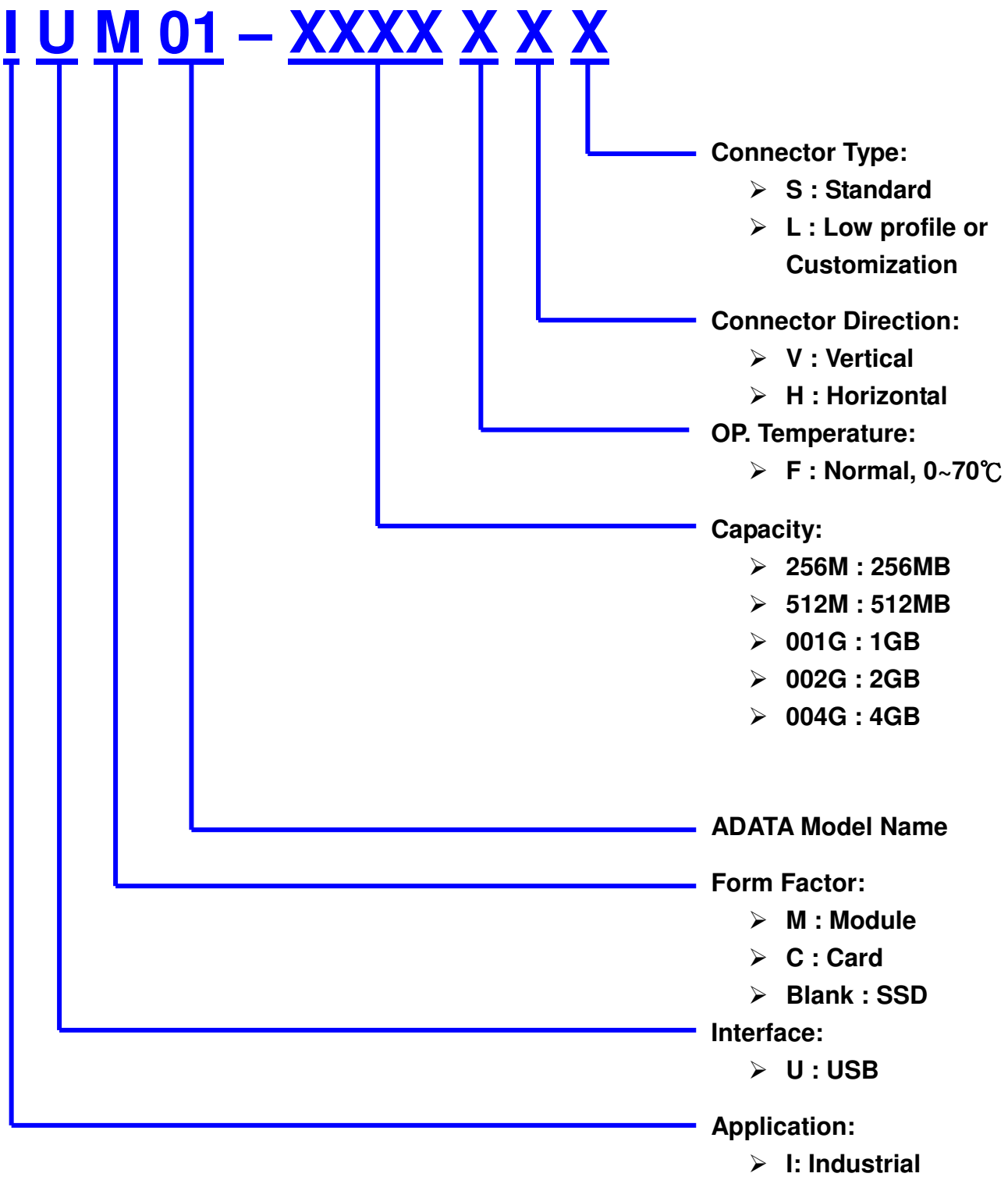
7.0 Part Number Decoder



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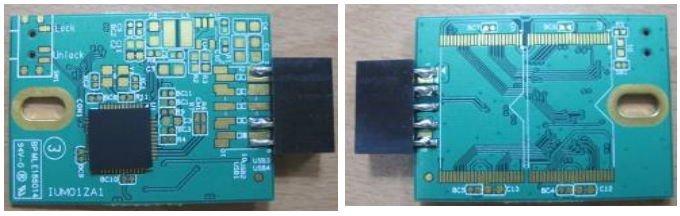
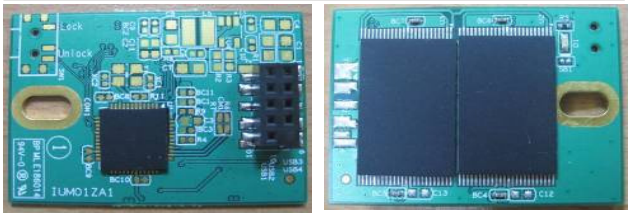
7.1 Packing

Product Type: 1.) IUM01-FV 2.) IUM01-FH 3.) IUM01-HL

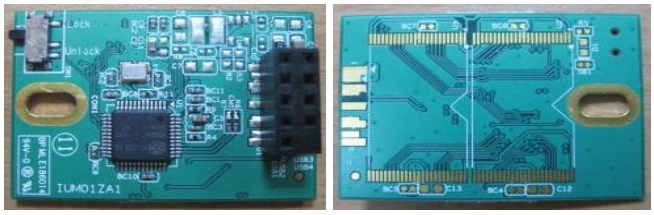
IUM01-FV



IUM01-HL



IUM01-FH



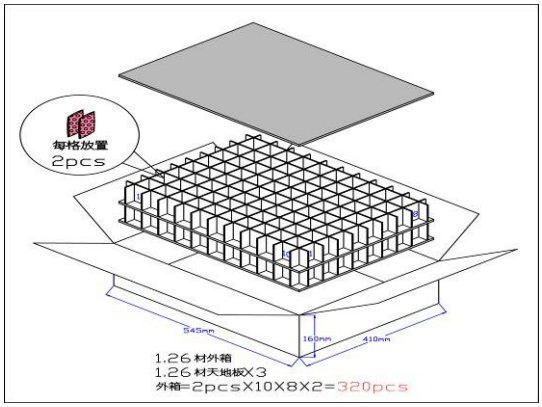
※Label (22*13mm) location as below:

Packing Way:

Total 160pcs for 1 tray; 320pcs per one carton.

Put into bubble bag

Tape it



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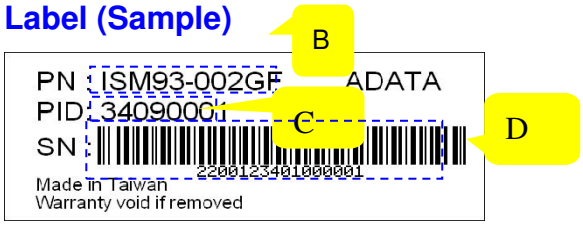
Attachment

Printing Coding Rule

A.(Model/Capacity)	B.(PN)	C.(PID)	D.(SN)
IUM01-512MB	IUM01-512MFVS	As SA	As below
IUM01-1GB	IUM01-001GFVS		
IUM01-2GB	IUM01-002GFVS		
IUM01-4GB	IUM01-004GFVS		
IUM01-512MB	IUM01-512MFHS	As SA	As below
IUM01-1GB	IUM01-001GFHS		
IUM01-2GB	IUM01-002GFHS		
IUM01-4GB	IUM01-004GFHS		
IUM01-512MB	IUM01-512MFHL	As SA	As below
IUM01-1GB	IUM01-001GFHL		
IUM01-2GB	IUM01-002GFHL		
IUM01-4GB	IUM01-004GFHL		

Label (Sample)



Definition for internal and external S/N

EX: 120529641318000001 (Total 18 codes)

Code	1-8	9-10	11-12	13	14-18
Definition	WIP No.	Year	Week	Product Condition	Counting No.
Example	12052964	13	18	0	00001

Explanation:

1.) Code 1-8: ADATA internal WIP No., total 8 numbers.

2.) Code 9-10: Produced year, 2013=13, 2014=14……

3.) Code 11-12: Produced week

4.) Code 13: Product condition and for RMA used. New finished goods: 0, first time of RMA: 1; Second time of RMA: 2, and such like……

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Code 14-18: Serial No. by decimal counting method. Total 5 numbers. And, it will begin from 00001 per each new WIP.

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