44Pin Flash Disk Module Min.16MB~Max.512MB, True IDE Interface Mode, 3.3V/5.0V Operating Part No. HFDOM44P-xxxSx

1. PRODUCT OVERVIEW

GENERAL DESCRIPTION

The HFDOM44P-xxxSx series 44Pin Flash Disk Module is a flash technology based with True IDE interface flash memory card. It is constructed with flash disk controller chip and NAND-type (Samsung) flash memory device. The HFDOM44P-xxxSx series operates in both 3.3-Volt and 5.0-Volt power supplies. It comes in capacity of 16, 32, 64, 128, 192, 256, 384 MB and up to 512 MB formatted 44Pin type .

By optimizing flash memory management, the life of this HFDOM44P-xxxSx series can be extended to its maximum level. Because the ECC function is included, the correctness of data transfer between the HFDOM44P-xxxSx series and a True IDE compatible interface device can be guaranteed.

The HFDOM44P-xxxSx series is fully compatible with applications such as CPU card / board, set top box, industry / military PC / Notebook, security equipment, measuring instrument and embedded systems.

FEATURES

- True IDE compatible host interface
- Direct plug in for 2.5″ IDE Connectors
- 44 pin 2.0mm IDE Connector
- Very high performance, very low power consumption
- Automatic error correction
- Support 3 power save mode : stop/idle/active
- Support for CIS implemented with 256 bytes of attribute memory
- 3.3V/5.0V operation voltage
- Host data transfer rate : 20MB/s
- Flash data transfer rate : 10MB/s
- Host Interface bus width : 8/16 bit Access
- Flash Interface bus width : 8 bit Access
- Capacity : Min. 16MB ~ Max. 512MB
- MTBF : 1,000,000 hours, minimum 30,000 insertions
- Operating vibration : 15G peak to peak maximum
- Operating shock : 1,000G maximum

PRODUCT SPECIFICATIONS

Capacities :

16, 32, 64, 128, 192, 256, 384 and up to 512 MB (formatted)

Power consumptions :

Read mode	30 mA (typ), 40 Ma (Max)
Write mode	30 mA (typ), 40 Ma (Max)
Stop mode	30 uA (typ)

Environment conditions :

Operating temperature	0°C to + 60°C
Storage temperature	- 25°C to + 85°C
Relative humidity	95%(Max)

Mechanical conditions :

Weight : Maximum 12.0g

Operating Voltage : 3.3V / 5.0V ±10%

ELECTRICAL SPECIFICATIONS

Table 1.1 Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V_{DD}	Supply voltage	- 0.3 to + 7.0	V
V_{IN}	Input voltage	- 0.3 to + 7.0	V
I_{IN}	DC input current	- 10	mA
T_{STG}	Storage temperature	- 20 to + 85	°C

Table 1.2 Recommended Operating Conditions

Symbol	Parameter		Ratings	Unit
V_{DD}	DC Supply voltage	5V	4.75 to 5.25	V
		3.3V	3.0 to 3.6	V
T_a	Storage temperature		- 20 to +70	°C

Table 1.3 DC Characteristics (Ta=0°C to 70°C, V_{DD}=3.0 to 5.3V)

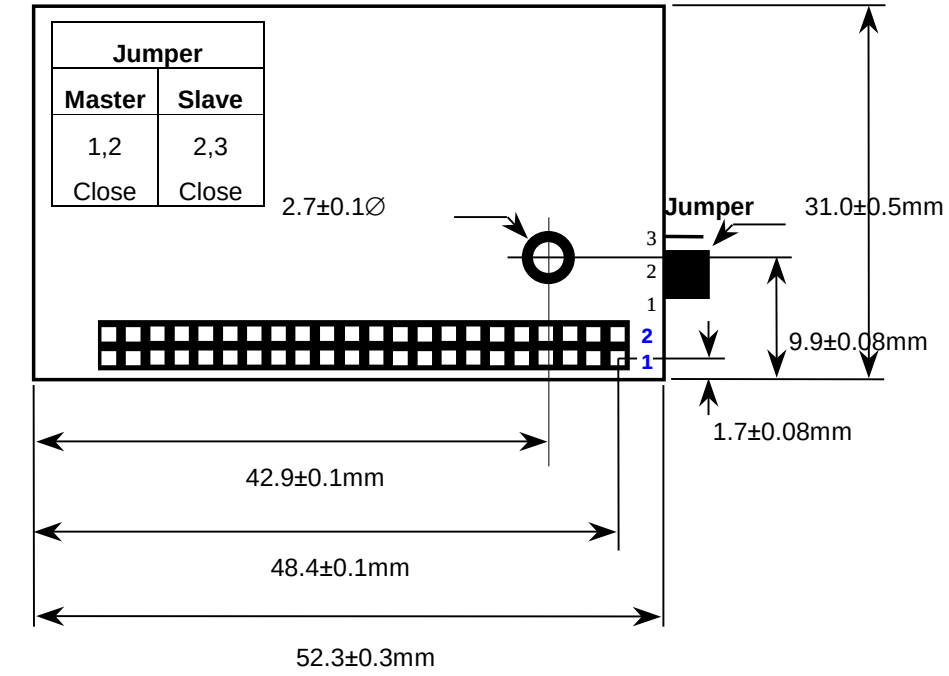
Symbol	Parameter	Min.	Typ.	Max.	Unit
I_{DD}	Operating Current		30	70	mA
I_{ds}	Stop Current		50	150	μA
V_{DD}	High Level Output Voltage	2.4			V
V_{DD}	Low Level Output Voltage			0.4	V

CAPACITY SPECIFICATIONS

Table 1.4 Capacity Specifications

Part Number	Capacity (*Unformatted*)	Total Sector	Cylinders	Heads	Sectors
HFDOM44P-016Sx	*15,990,784* ***bytes***	31,232	61	16	32
HFDOM44P-032Sx	*32,243,712* ***bytes***	62,976	123	16	32
HFDOM44P-064Sx	*65,536,000* ***bytes***	128,000	250	16	32
HFDOM44P-128Sx	*131,858,432* ***bytes***	257,536	503	16	32
HFDOM44P-192Sx	*196,608,000* ***bytes***	384,000	750	16	32
HFDOM44P-256Sx	*265,027,584* ***bytes***	517,632	1011	16	32
HFDOM44P-384Sx	*395,837,440* ***bytes***	773,120	1510	16	32
HFDOM44P-512Sx	*531,890,176* ***bytes***	1,038,848	2029	16	32

PHYSYCAL SPECIFICATIONS



< View from connector side >



< View from Right side >

Figure 1.1 44 pin Type Flash Disk Module Dimensions

INSTALLTION GUIDE

1) Setting Method

① Make sure your computer is turned off before you open the case.

② Plug the Flash Disk Module carefully into the 44pin IDE slot on your computer.
Caution: Make sure to align pin1 on host adapter interface connector with pin 1 on your Flash Disk Module. Pin 1 is indicated by printed on the Flash Disk Module PCB.

③ The Flash Disk Module is not use power connector cable of the computer.
Caution: If you need to remove your Flash Disk Module, use both hands to pull it out carefully.

④ Check all cable connections and then replace your computer cover.

2) BIOS setting Method

Before you format or partition your new drive, you must configure your computer's BIOS so that the computer can recognize your new drive.

① Turn your computer on. As your computer start up, watch the screen for a message describing how to run the system setup program on the screen (sometimes called BIOS or CMOS setup). This is usually done by pressing a special key, such as **Delete**, **Esc** or **F1** during startup. See your computer manual for details. Press the appropriate key to run the system setup program.

② ***If your BIOS provides automatic drive detection (an "AUTO" drive type), select this option.*** (**We recommend to use Normal / CHS mode to partition your Flash Disk Module to get the maximum formatted capacity.**)
This allows your computer to configure itself automatically for your new drive.
If your BIOS dose not provide "AUTO" drive detection, select "User-defined" drive setting and enter the CHS values from the table. BIOS Settings (see specification) Capacity Cylinders Heads Sectors(unformatted)

③ Save the settings and exit the System Setup program. (your computer will automatically reboot) After you configure your computer, you can use the standard DOS commands to partition and format your Flash Disk Module, as described below.

3) Formatting Method

To partition your new Flash Disk Module with Microsoft DOS program :

① Insert a bootable DOS diskette into your diskette drive and restart your computer.

② Insert a DOS program diskette that contains the **FDISK.EXE** and **FORMAT.COM** programs into your diskette drive. Use the same DOS version that is on your bootable diskette. At the **A:\ >** prompt, type **"FDISK"** and press **Enter**.

③ Select **"Create DOS partition or logical DOS drive"** by pressing **1**. Then press **Enter**.

④ Select **"Create primary DOS partition"** by pressing **1** again. Then press **Enter**.
Create your first drive partition. If you are creating a partition that will be used to boot your computer (drive C), make sure that the partition is marked active.

⑤ Create an extended partition and additional logical drives as necessary, until all the space on your new hard drive has been partitioned.

⑥ When the partitioning is complete, **FDISK** reboots your computer.
Caution: Make sure to use the correct drive letters so that you do not format a drive that already contains data.

⑦ At the **A:\ >** prompt, type **"format c:/s"**, where **c** is the letter of your first new partition, Repeat the format process for all the new partitions you have created.

⑧ After you format your drive, it is ready to use.

2. PIN INFORMATION

PIN ASSIGNMENTS AND PIN TYPE

Table 2.1 Pin Assignment and Pin type

Pin	Signal	Pin Type	Pin	Signal	Pin Type
1	/RESET	I	**2**	GND	Ground
3	D07	I/O	**4**	D08	I/O
5	D06	I/O	**6**	D09	I/O
7	D05	I/O	**8**	D10	I/O
9	D04	I/O	**10**	D11	I/O
11	D03	I/O	**12**	D12	I/O
13	D02	I/O	**14**	D13	I/O
15	D01	I/O	**16**	D14	I/O
17	D00	I/O	**18**	D15	I/O
19	GND	DC	**20**	Key Pin	--
21	Reserved	--	**22**	GND	Ground
23	/IOW	I	**24**	GND	Ground
25	/IOR	I	**26**	GND	Ground
27	IORDY	O	**28**	Reserved	--
29	Reserved	--	**30**	GND	Ground
31	IRQ	O	**32**	/IOIS16	O
33	A01	I	**34**	/PDIAG	I/O
35	A00	I	**36**	A02	I
37	/CS0	I	**38**	/CS1	I
39	/DASP(**LED)**	I/O	**40**	GND	Ground
41	VCC	Power	**42**	VCC	Power
43	GND	Ground	**44**	Reserved	--

Signal Descriptions

Table 2.2 Signal Descriptions

Signal Name	Dir.	Pin	Description
A[2:0]	I	33,35,36	In True IDE Mode only A[2:0] are used to select the one of eight registers in the Task File, the remaining address lines should be grounded by the host.
-PDIAG	I/O	34	This input / output is the Pass Diagnostic signal in the Master / Slave handshake protocol.
-DASP(**LED**)	I/O	39	This signal used either to drive an **LED** whenever the Disk Module is being accessed or as indication of a second drive present. This signal is active low when the Disk Module is busy.
-CS0, -CS1	I	37,38	CS0 is the chip select for the task file registers while CS2 is used to select the Alternate Status Register and the Device Control Register.
D[15:00]	I/O	3,4,5,6, 7,8,9,10, 11,12,13, 14,15,16, 17,18	All Task File operations occur in byte mode on the low order bus D00-D07 while all data transfers are 16 bit using D00-D15.
GND	--	2,19,22, 24,26, 30,40, 43	Ground.
-IOR	I	25	This is an I/O Read strobe generated by the host.
-IOW	I	23	The I/O Write strobe pulse is used to clock I/O data on the Card Data bus into the Storage Card controller registers when the Storage Card is configured to use the I/O interface. The clocking will occur on the negative to positive edge of the signal (trailing edge).
IRQ	O	31	In True IDE Mode signal is the active high Interrupt Request to the host.
-RESET	I	1	This input pin is the active low hardware reset from the host.
VCC	--	41,42	+5 V, +3.3 V power.
IORDY	O	27	This output signal may be used as IORDY.
-IOIS16	O	32	This output signal is asserted low when this device is expecting a word data transfer cycle.

BLOCK DIAGRAM

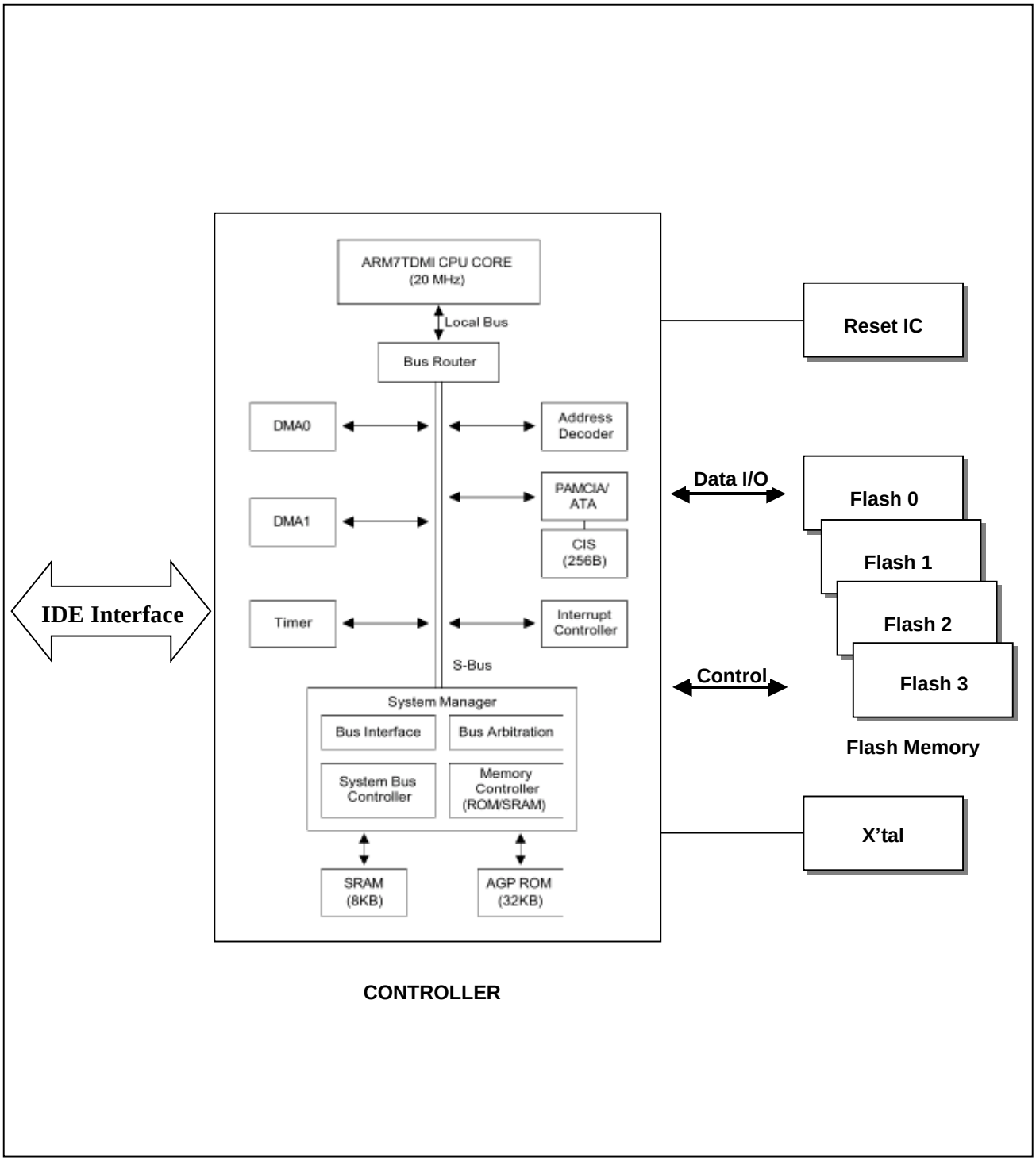


Figure 2.1 Flash Disk Module Block Diagram

3. INTERFACE BUS TIMING

ACCESS SPCIFICATIONS

1) IDE MODE I/O ACCESS SPECIFICATIONS

In this True IDE Mode the Flash Disk Module protocol and configuration are disabled and only I/O operations to the Task File and Data Register are allowed. In this mode no Memory or Attribute Registers are accessible to the host.

Table 3.1 IDE Mode I/O Access Mode

Mode	-CE2	-CE1	A2-A0	-IORD	-IOWR	D15 - D8	D7 – D0
Invalid Mode	L	L	x	x	x	High Z	High Z
Standby Mode	H	H	x	x	x	High Z	High Z
Task File Write	H	L	1-7h	H	L	Don't Care	Data In
Task File Read	H	L	1-7h	L	H	High Z	Data Out
Data Register Write	H	L	0	H	L	Odd Byte in	Even Byte in
Data Register Read	H	L	0	L	H	Odd Byte out	Even Byte out
Control Register Write	L	H	6h	H	L	Don't Care	Control In
All Status Read	L	H	6h	L	H	High Z	Status Out

Table 3.2 IDE Mode I/O Read Timing

Parameter	Symbol	IEEE Symbol	Min. ns	Max. ns
Data Delay after IORD	td (IORD)	tlGLQV		100
Data Hold following IORD	th (IORD)	tlGHQX	0	
IORD Width Time	tw (IORD)	tlGLIGH	165	
Address Setup before IORD	tsuA (IORD)	tAVIGL	70	
Address Hold following IORD	thA (IORD)	tlGHAX	20	
CE Setup before IORD	tsuCE (IORD)	tELIGL	5	
CE Hold following IORD	thCE (IORD)	tlGHEH	20	
IOIS16 Delay Falling from Address	tdfIOIS16 (ADR)	tAVISL		35
IOIS16 Delay Rising from Address	tdrIOIS16 (ADR)	tAVISH		35

NOTE: The maximum load on -IOIS16 is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from –WAIT high to -IORD high is 0nsec, but minimum -IORD width must still be met.

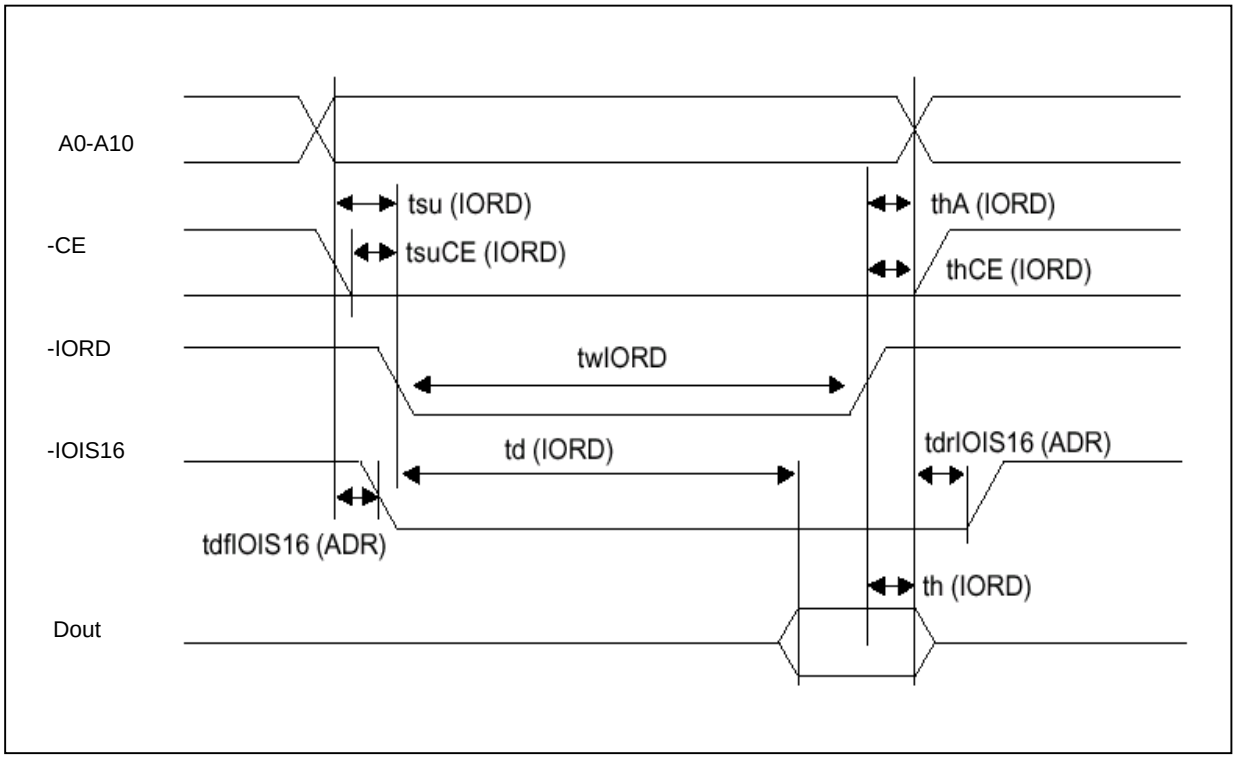


Figure 3.1 IDE Mode I/O Read Timing Example

Table 3.3 IDE Mode I/O Write Timing

Parameter	Symbol	IEEE Symbol	Min. ns	Max. ns
Data Setup before IOWR	tsu(IOWR)	tDVIWH	60	
Data Hold following IOWR	th(IOWR)	tlWHDX	30	
IOWR Width Time	twl(OWR)	tlWLIWH	165	
Address Setup before IOWR	tsuA(IOWR)	tAVIWL	70	
Address Hold following IOWR	thA(IOWR)	tlWHAX	20	
CE Setup before IOWR	tsuCE(IOWR)	tELIWL	5	
CE Hold following IOWR	thCE(IOWR)	tlWHEH	20	
IOIS16 Delay Falling from Address	tdfIOIS16(ADR)	tAVISL		35
IOIS16 Delay Rising from Address	tdrIOIS16(ADR)	tAVISH		35

NOTE: The maximum load on -IOIS16 is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from -WAIT high to -IOWR high is 0nsec, but minimum -IOWR width must still be met.

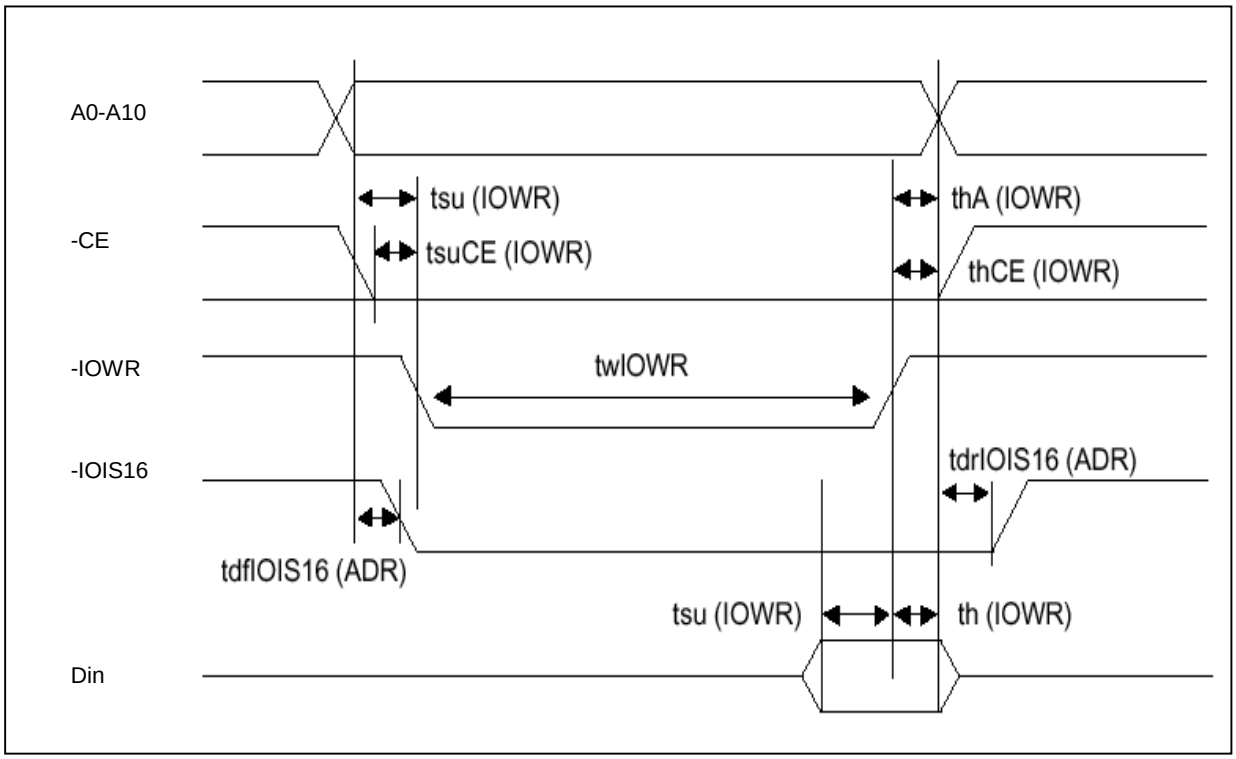


Figure 3.2 IDE Mode I/O Write Timing Example

Ordering Infomation

NO	Parts	Size	Capacity	Media transfer mode	Chip Number	Operation Mode
1	**HFDOM44P-016S1**	52.3x31.0x2.0mm	16Mbyte	BYTE	1	True IDE
2	**HFDOM44P-032S1**	52.3x31.0x2.0mm	32Mbyte	BYTE	1	True IDE
3	**HFDOM44P-032S2**	52.3x31.0x2.0mm		BYTE	2	True IDE
4	**HFDOM44P-064S1**	52.3x31.0x2.0mm	64Mbyte	BYTE	1	True IDE
5	**HFDOM44P-064S2**	52.3x31.0x2.0mm		BYTE	2	True IDE
6	**HFDOM44P-064S4**	52.3x31.0x2.0mm		BYTE	4	True IDE
7	**HFDOM44P-128S1**	52.3x31.0x2.0mm	128Mbyte	BYTE	1	True IDE
8	**HFDOM44P-128S2**	52.3x31.0x2.0mm		BYTE	2	True IDE
9	**HFDOM44P-128S4**	52.3x31.0x2.0mm		BYTE	4	True IDE
10	**HFDOM44P-192S3**	52.3x31.0x2.0mm	192Mbyte	BYTE	3	True IDE
11	**HFDOM44P-256S2**	52.3x31.0x2.0mm	256Mbyte	BYTE	2	True IDE
12	**HFDOM44P-256S4**	52.3x31.0x2.0mm		BYTE	4	True IDE
13	**HFDOM44P-384S3**	52.3x31.0x2.0mm	384Mbyte	BYTE	3	True IDE
14	**HFDOM44P-512S4**	52.3x31.0x2.0mm	512Mbyte	BYTE	4	True IDE

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