



**40Pin Flash Disk Module Min.8MB ~ Max.512MB, True IDE Interface  
Mode, 3.3V / 5.0V Operating** Part No. HFDOM40C-xxxSx

## 1. PRODUCT OVERVIEW

### GENERAL DESCRIPTION

The HFDOM40C-xxxSx series 40Pin 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 HFDOM40C-xxxSx series operates in both 3.3-Volt and 5.0-Volt power supplies. It comes in capacity of 8, 16, 32, 64, 128, 192, 256 MB and up to 512 MB formatted 40Pin type .

By optimizing flash memory management, the life of this HFDOM40C-xxxSx series can be extended to its maximum level. Because the ECC function is included, the correctness of data transfer between the HFDOM40C-xxxSx series and a True IDE compatible interface device can be guaranteed.

The HFDOM40C-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 3.5" IDE Connectors
- 40 pin 2.54mm 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. 8MB ~ 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 :

8, 16, 32, 64, 128, 192, 256, 384 and up to 512 MB (formatted)

**Operating Voltage :** 3.3V / 5.0V ±10%

#### Power consumptions :

Operating mode 40 mA (typ), 70 mA (Max)

Stop mode 30 uA (Max)

#### Environment conditions :

Operating temperature 0°C to + 70°C

Storage temperature - 10°C to + 85°C

Relative humidity 95%(Max)

#### Mechanical conditions :

Weight : Maximum 9.0g

## ELECTRICAL SPECIFICATIONS

Table 1.1 Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V <sub>DD</sub>	Supply voltage	- 0.3 to + 7.0	V
V <sub>IN</sub>	Input voltage	- 0.3 to + 7.0	V
I <sub>IN</sub>	DC input current	- 10	mA
T <sub>STG</sub>	Storage temperature	- 10 to + 85	°C

Table 1.2 Recommended Operating Conditions

Symbol	Parameter	Ratings	Unit	
V <sub>DD</sub>	DC Supply voltage	5V	4.75 to 5.25	V
		3.3V	3.0 to 3.6	V
T <sub>a</sub>	Storage temperature	- 0 to +70	°C	

Table 1.3 DC Characteristics

(T<sub>a</sub>=0°C to 70°C, V<sub>DD</sub>=3.0 to 5.0V)

Symbol	Parameter	Min.	Typ.	Max.	Unit
I <sub>DD</sub>	Operating Current		30	70	mA
I <sub>ds</sub>	Stop Current			100	μA
V <sub>DD</sub>	High Level Output Voltage	2.4			V
V <sub>DD</sub>	Low Level Output Voltage			0.4	V

## CAPACITY SPECIFICATIONS

Table 1.4 Capacity Specifications

Part Number	Capacity ( <i>Unformatted</i> )	Total Sector	Cylinders	Heads	Sectors
HFDOM40C-008Sx	7,864,320 <i>bytes</i>	15,360	30	16	32
HFDOM40C-016Sx	15,990,784 <i>bytes</i>	31,232	61	16	32
HFDOM40C-032Sx	32,243,712 <i>bytes</i>	62,976	123	16	32
HFDOM40C-064Sx	65,536,000 <i>bytes</i>	128,000	250	16	32
HFDOM40C-128Sx	131,858,432 <i>bytes</i>	257,536	503	16	32
HFDOM40C-192Sx	196,608,000 <i>bytes</i>	384,000	750	16	32
HFDOM40C-256Sx	265,027,584 <i>bytes</i>	517,632	1011	16	32
HFDOM40C-384Sx	395,837,440 <i>bytes</i>	773,120	1510	16	32
HFDOM40C-512Sx	531,890,176 <i>bytes</i>	1,038,848	2029	16	32

PHYSICAL SPECIFICATIONS

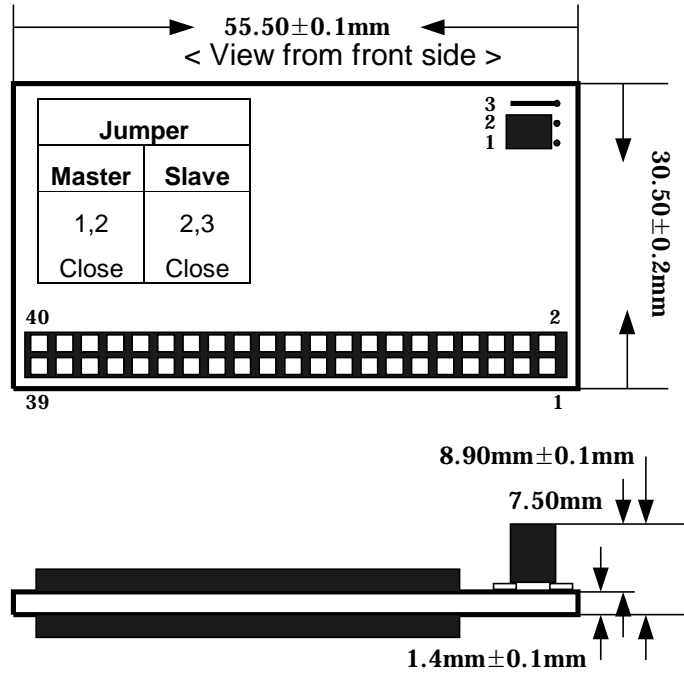
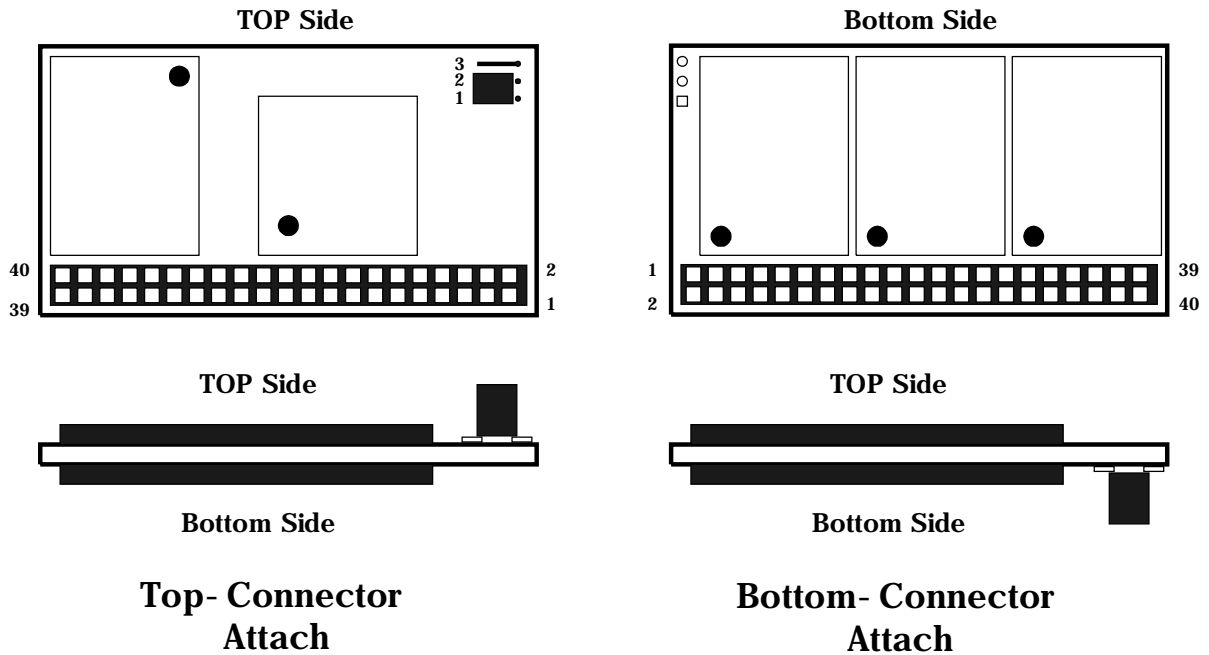


Figure 1.1 40 pin Type Flash Disk Module Dimensions



## INSTALLTION GUIDE

### 1) Setting Method

- ① Make sure your computer is turned off before you open the case.
- ② Plug the carefully into the 40pin 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 a triangle on the Flash Disk Module connector.
- ③ The Flash Disk Module is used 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 automatica lly 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

## 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 <b>LED</b> 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,	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.
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

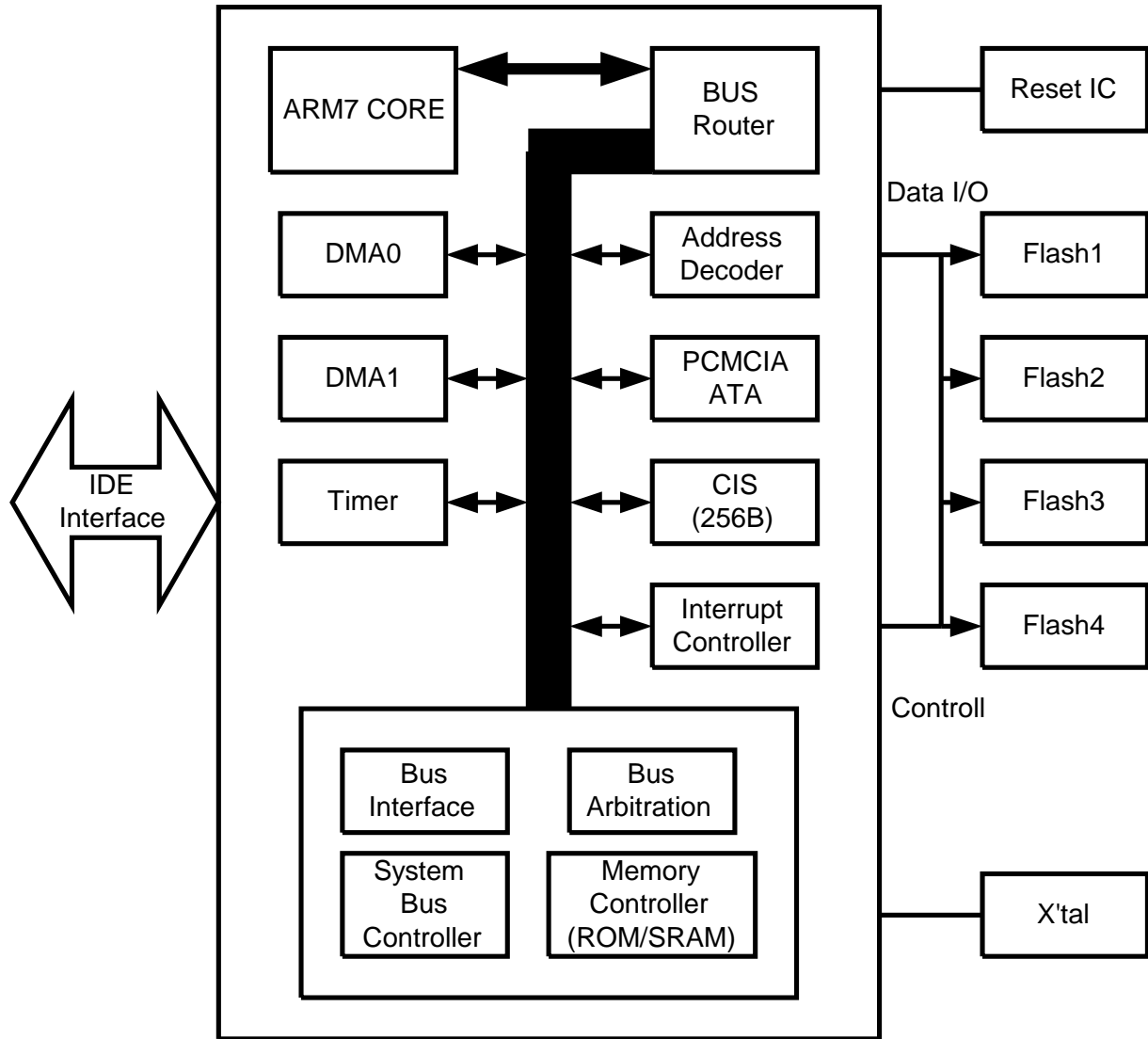


Figure 2.1 Flash Disk Module Block Diagram

### 3. INTERFACE BUS TIMING

#### ACCESS SPECIFICATIONS

##### 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	-IOR	-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)	tIGLQV		100
Data Hold following IORD	th (IORD)	tIGHQX	0	
IORD Width Time	tw (IORD)	tIGLIGH	165	
Address Setup before IORD	tsuA (IORD)	tAVIGL	70	
Address Hold following IORD	thA (IORD)	tIGHAX	20	
CE Setup before IORD	tsuCE (IORD)	tELIGL	5	
CE Hold following IORD	thCE (IORD)	tIGHEH	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.



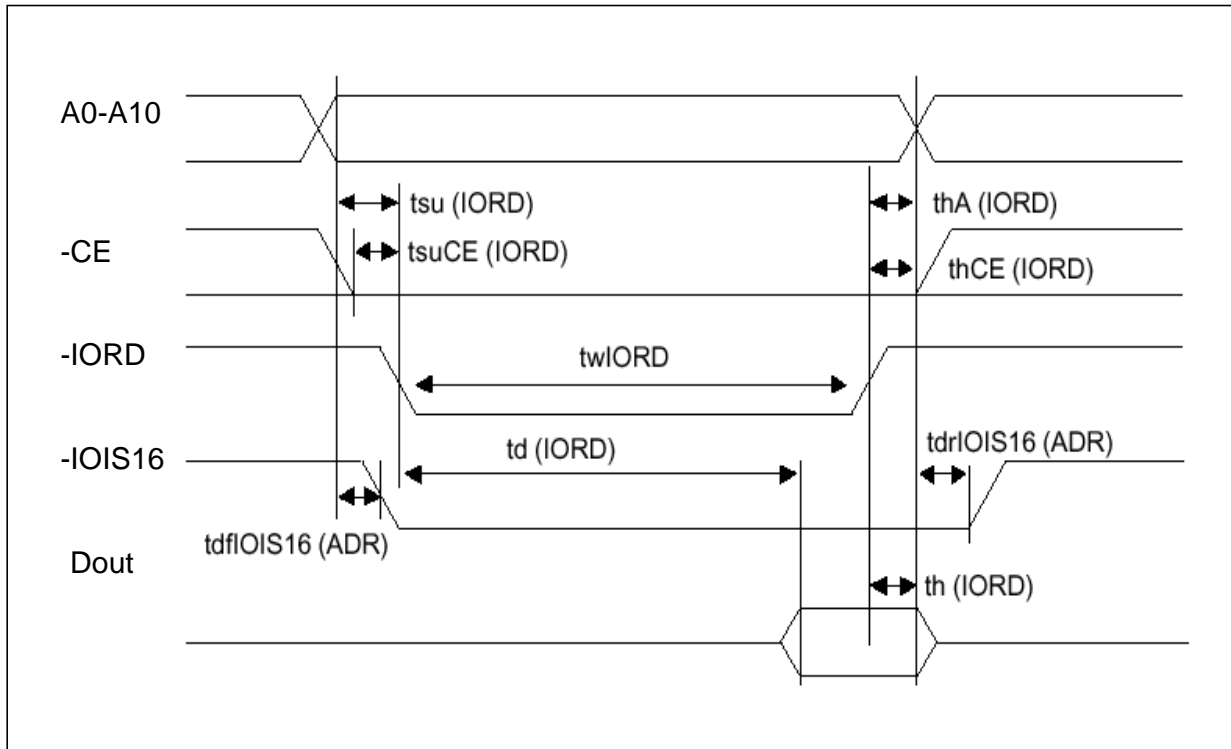


Figure 3.1 IDE Mode I/O Read Timing Example

Table 3.3 IDE Mode I/O Write Timing

Parameter	Symbol	IEEE Symbol	Min. ns	Max. ns
Data Setup before IOWR	$t_{su}(IOWR)$	tDVIWH	60	
Data Hold following IOWR	$t_h(IOWR)$	tIWHDX	30	
IOWR Width Time	$t_{wl}(IOWR)$	tIWLWH	165	
Address Setup before IOWR	$t_{suA}(IOWR)$	tAVIWL	70	
Address Hold following IOWR	$t_{hA}(IOWR)$	tIWHAX	20	
CE Setup before IOWR	$t_{suCE}(IOWR)$	tELIWL	5	
CE Hold following IOWR	$t_{hCE}(IOWR)$	tIWHHEH	20	
IOIS16 Delay Falling from Address	$t_{dfIOIS16}(ADR)$	tAVISL		35
IOIS16 Delay Rising from Address	$t_{drIOIS16}(ADR)$	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.

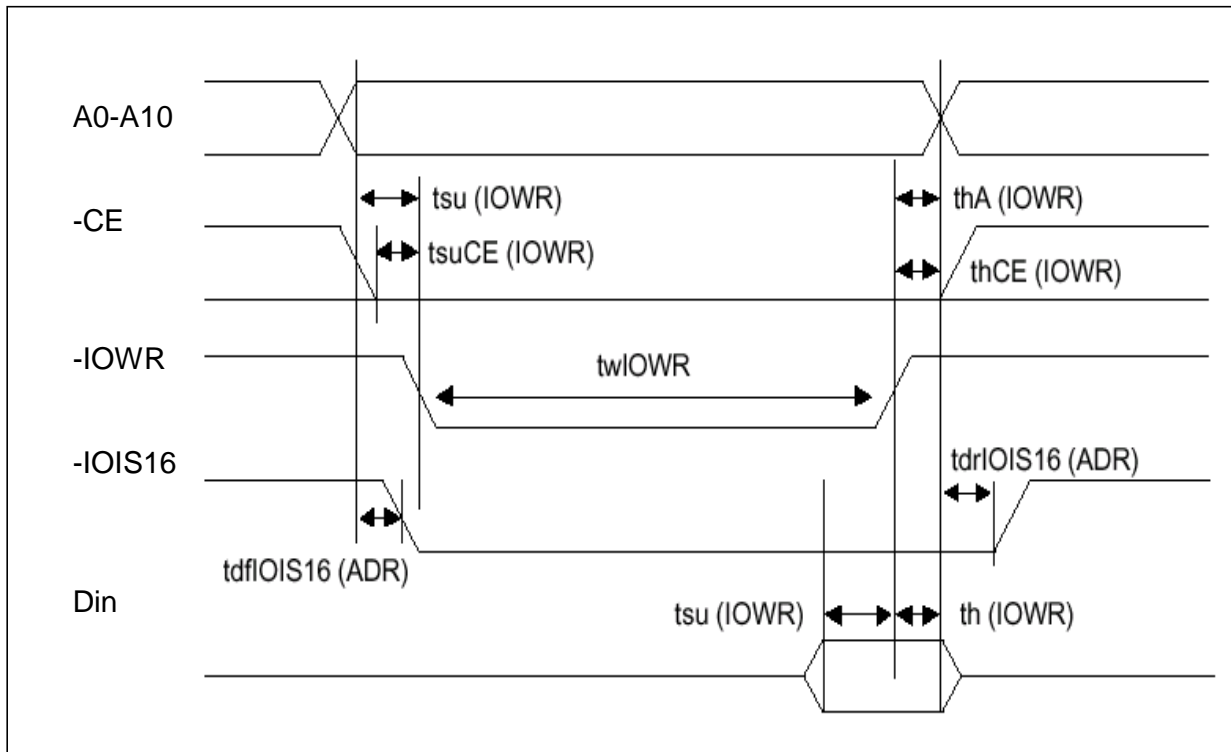


Figure 3.2 IDE Mode I/O Write Timing Example

### Ordering Infomation

NO	Parts	Size	Capacity	Media transfer mode	Chip Number	Operation Mode
1	HFDOM40C-016S1	55.5x30.5x1.4mm	16Mbyte	BYTE	1	True IDE
2	HFDOM40C-032S1	55.5x30.5x1.4mm	32Mbyte	BYTE	1	True IDE
3	HFDOM40C-032S2	55.5x30.5x1.4mm		BYTE	2	True IDE
4	HFDOM40C-064S1	55.5x30.5x1.4mm	64Mbyte	BYTE	1	True IDE
5	HFDOM40C-064S2	55.5x30.5x1.4mm		BYTE	2	True IDE
6	HFDOM40C-128S1	55.5x30.5x1.4mm	128Mbyte	BYTE	1	True IDE
7	HFDOM40C-128S2	55.5x30.5x1.4mm		BYTE	2	True IDE
8	HFDOM40C-192S3	55.5x30.5x1.4mm	192Mbyte	BYTE	3	True IDE
9	HFDOM40C-256S2	55.5x30.5x1.4mm	256Mbyte	BYTE	2	True IDE
10	HFDOM40C-384S3	55.5x30.5x1.4mm	384Mbyte	BYTE	3	True IDE
11	HFDOM40C-512S4	55.5x30.5x1.4mm	512Mbyte	BYTE	4	True IDE