



C-ONE TECHNOLOGY Corp.

Tiger ATA Card

Preliminary

Tiger ATA Industrial Application

Product Specification

December 2008

Document History

Version	Description	Date	Editor	Approved by
1.0	New issue	December 2008	Amos Chung	Matika

This document provides information regarding to C-ONE's ATA Flash card product specification and is subject to change without any prior notice. No part in this report shall be distributed, reproduced, or disclosed in whole or in part without prior written permission of C-ONE.

All rights reserved.
C-ONE Technology Corp. Ltd.

Contents

INDUSTRIAL APPLICATION.....	1
1. INTRODUCTION.....	4
1.1 GENERAL DESCRIPTION	4
1.2 FEATURES	5
2. PRODUCT SPECIFICATION.....	6
2.1 OPERATION AND ENVIRONMENT DESCRIPTION	6
2.2 PHYSICAL DESCRIPTION	7
3. PRODUCT MODEL	8
3.1 PART NUMBER DEFINITION	8
4. SUPPORT FLASH MEDIA.....	9
4.1 SUPPORTED NAND FLASH TYPE	9
4.2 LOGICAL FORMAT PARAMETERS (CHS)	錯誤! 尚未定義書籤。
5. BLOCK DIAGRAM.....	10
5.1 CONTROLLER ARCHIVE.....	10
5.2 FLASH CARD ARCHIVE.....	10
6. PHYSICAL SPECIFICATION.....	11
6.1 PCMCIA ATA (TYPE II).....	11
7. PIN ASSIGNMENT.....	12
7.1 PCMCIAATA	12
7.2 SIGNAL DESCRIPTION	14

1. Introduction

1.1 General Description

C-ONE's Tiger PCMCIA ATA Flash Card uses NAND-Type flash memory devices, which leads to its remarkable high performance and comes with capacities from 128 MB to 64GB unformatted.

Compliant with ISA (Industrial Standard Architecture) bus interface standard, the PCMCIA ATA Flash Card performs sequential read/write for each sector (512 bytes) count. It also conforms to PCMCIA Specification and is designed with precision mechanics to enable host devices to read/write from the PCMCIA interface into Flash Media. It can operate with a 3.3V or 5V single power from the host side.

The card provides extraordinary memory medium for PC or any other electric equipment and digital still camera, and, in particular, C-ONE's PCMCIA ATA Flash Card has been approved through various compatibility tests to be used in numerous portable desktop, notebook computers and Handheld PCs and Auto PCs under industrial environment.

1.2 Features

- ✧ PC Card compliant
 - Conforms to CompactFlash standard
 - Compatible with PCMCIA ATA specification
 - Support CIS implemented with attribute memory
 - Compatible with all PC Card Services and Socket Services
- ✧ PCMCIA ATA / IDE interface
 - ATA command set compatible
 - Support for 8-bit or 16-bit host data transfer
 - Program and auto-wait-state initiation for compatibility with any IORDY supporting host
 - Compatibility with host ATA disk I/O BIOS, DOS/Windows file system, utilities, and application software
- ✧ Extremely rugged and reliable
 - Advanced defect block management
 - Support background erased operation
- ✧ 3.3/5 Volt power supply, very low power consumption
 - Zero-power data retention, no batteries required
 - Internal self-diagnostic program operates at V_{CC} power on
 - Auto sleep mode
- ✧ High reliability based on internal ECC (Error Correcting Code) function
- ✧ Zero-power data retention, no batteries required
- ✧ 3 variations of mode access
 - Memory card mode
 - I/O card mode
 - True IDE mode
 - PIO Mode 4
 - UDMA mode 4

2. Product Specification

2.1 Operation and environment description

Operating Voltage	DC Input Power	5V ± 10%	
		3.3V ± 5%	
Typical Power Consumptions:	5V	Read Mode: 40mA (Max)	
		Write Mode: 60mA (Max)	
		Standby Mode: 6.5mA (Approach values)	
		Read/ Write Peak: 100mA	
	3.3V	Read Mode: 20mA (Max)	
		Write Mode: 35 mA (Max)	
		Standby Mode: 1mA (Approach values)	
		Read/ Write Peak: 100mA	
Environment conditions	Operating Temperature	Extended Temp.	-20°C to +85°C
		Industrial Temp.	-40°C to +85°C
	Storage Temperature	Extended Temp.	-40°C to +90°C
		Industrial Temp.	-50°C to +90°C
	Humidity Operation	5% to 95% (Non-condensing)	
	Humidity Non-operation	5% to 95% (Non-condensing)	
	Shock Operation	50-G (Max.)	
	Shock Non-operation	50-G (Max.)	
	Vibration Operation	20-G (Peak to peak to maximum)	
	Vibration Non-operation	20-G (Peak to peak to maximum)	
Operation System supported	DOS		
Compatibility (Microsoft Product)	Windows 98		Windows ME
	Windows NT	Windows 2000	Windows XP

2.2 Physical description

1. Weight and Measures (unit: m)	Type II	L x W x H 85.6 x 54 x 5.0 (mm)
2. Storage Capacities	Capacity	128MB – 6GB
3. Performance	Data Transfer Rates	To/from Flash memory (burst mode): up to 20 Mbytes/sec
		To/from host (burst mode): up to 8 Mbytes/sec
	Data Access Time	1.2 ms
4. Reliability	MTBF	3,000,000 hours
	Error Correction	More than 3 bit error correction per second read
	ECC	High reliability based on internal ECC function
	R/W Test	Testdisk: 3,000,000 Read/Write cycles

3. Product Model

3.1 Part Number Definition

X₁X₂X₃X₄X₅X₆X₇X₈

Code	Definition	symbol	Description
X ₁ X ₂	Card Type	PA	PCMCIA Type II
X ₃	Solution	M	Tiger Series
X ₄ X ₅ X ₆	Capacity	128	128MB
		256	256MB
		512	512MB
		01G	1GB
		02G	2GB
		04G	4GB
		06G	6GB
		08G	8GB
		16G	16GB
		32G	32GB
64G	64GB		
X ₇	Temperature Range	C	Commercial Grade 0 ~ 70C
		L	Light Grade -20~+85C
		H	Heavy Grade -40 ~ +85C
X ₈	Housing	P	Plastic housing
		R	Metal housing

4. Support Flash Media

4.1 Supported NAND Flash Type

4-1-1. Small block size of 16KB

Unit: bits

Flash Capacity	128 Mega	256 Mega	512 Mega
Operation Voltage	2.7V to 3.6V		

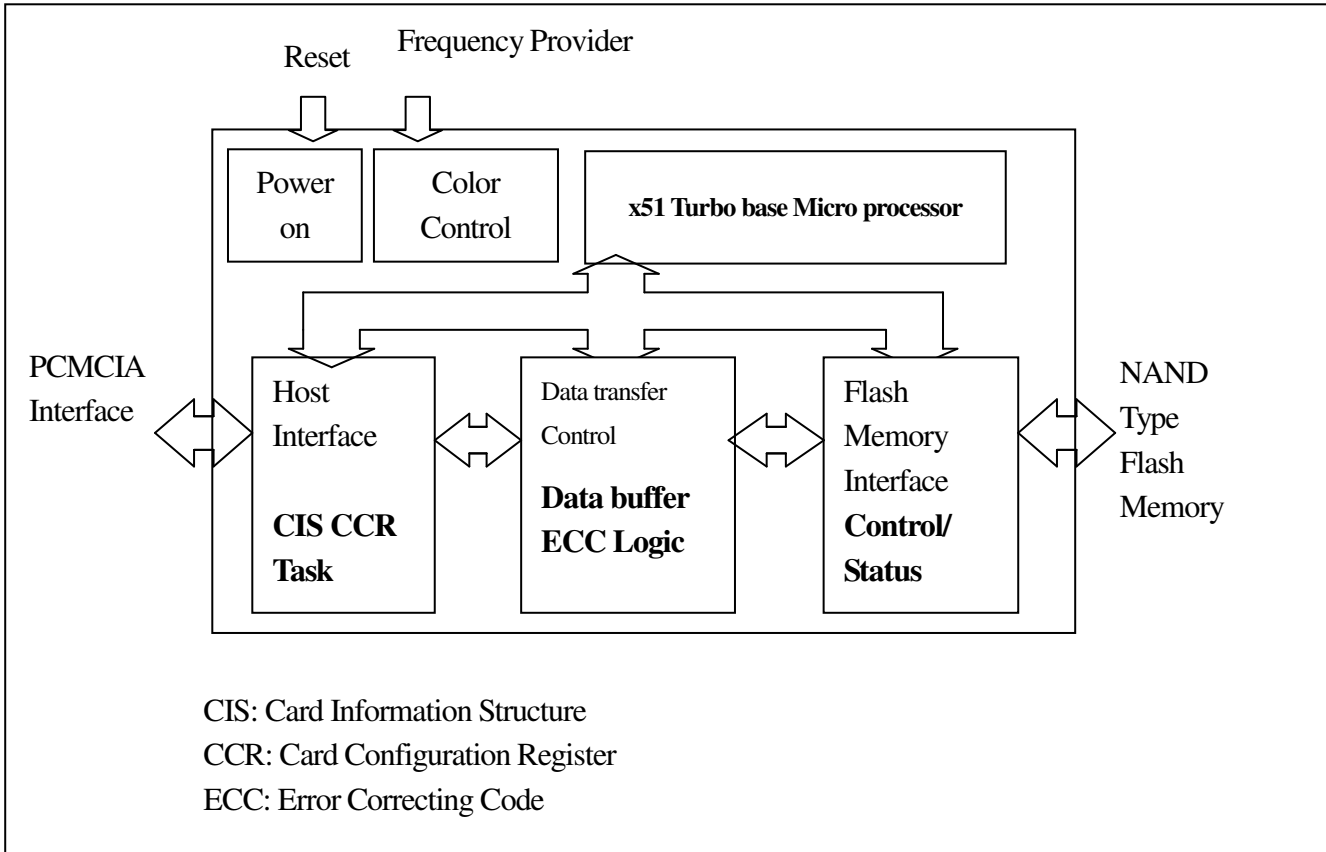
4-1-2. Large block size of 128KB

Unit: bits

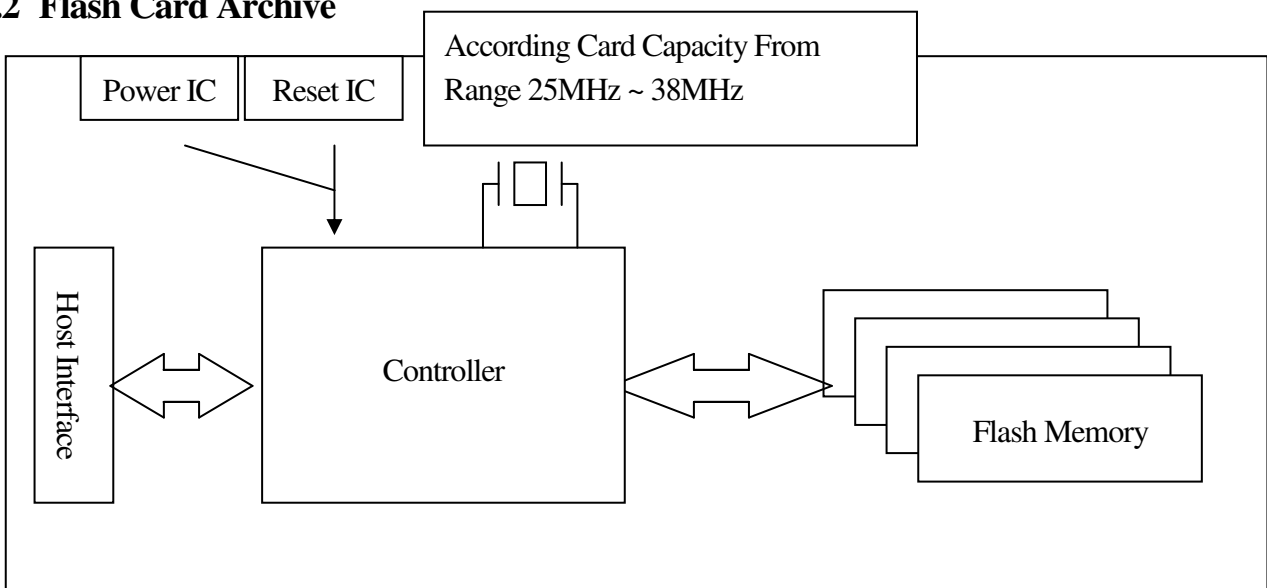
Flash Capacity	1 Giga	2 Giga	4 Giga	8 Giga
Operation Voltage	2.7V to 3.6V			

5. Block Diagram

5.1 Controller Archive

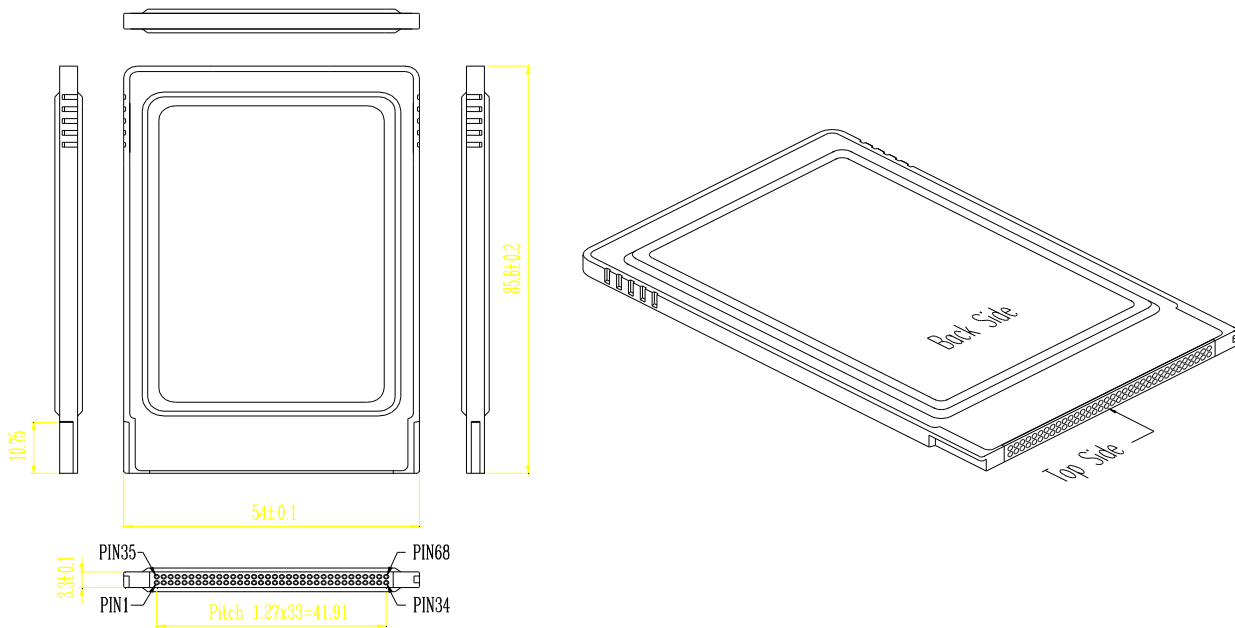


5.2 Flash Card Archive



6. Physical Specification

6.1 PCMCIA ATA (Type II)



7. Pin Assignment

7.1 PCMCIA ATA

PC Card Memory Mode			PC Card I/O Mode			True IDE Mode		
No.	Pin Name	I/O	No.	Pin Name	I/O	No.	Pin Name	I/O
1	GND		1	GND		1	GND	
2	D03	I/O	2	D03	I/O	2	D03	I/O
3	D04	I/O	3	D04	I/O	3	D04	I/O
4	D05	I/O	4	D05	I/O	4	D05	I/O
5	D06	I/O	5	D06	I/O	5	D06	I/O
6	D07	I/O	6	D07	I/O	6	D07	I/O
7	#CE1	I	7	#CE1	I	7	#CS1	I
8	A10	I	8	A10	I	8	A10	I
9	#OE	I	9	#OE	I	9	#ATASEL	I
10	----		10	----		10	----	
11	A09	I	11	A09	I	11	A09	I
12	A08	I	12	A08	I	12	A08	I
13	----		13	----		13	----	
14	----		14	----		14	----	
15	#WE	I	15	#WE	I	15	#WE	I
16	RDY/#BSY	O	16	#IREQ	O	16	INTRQ	O
17	VCC		17	VCC		17	VCC	
18	----		18	----		18	----	
19	----		19	----		19	----	
20	----		20	----		20	----	
21	----		21	----		21	----	
22	A07	I	22	A07	I	22	A07	I
23	A06	I	23	A06	I	23	A06	I
24	A05	I	24	A05	I	24	A05	I
25	A04	I	25	A04	I	25	A04	I
26	A03	I	26	A03	I	26	A03	I
27	A02	I	27	A02	I	27	A02	I
28	A01	I	28	A01	I	28	A01	I
29	A00	I	29	A00	I	29	A00	I
30	D00	I/O	30	D00	I/O	30	D00	I/O
31	D01	I/O	31	D01	I/O	31	D01	I/O
32	D02	I/O	32	D02	I/O	32	D02	I/O
33	WP	O	33	#IOIS16	O	33	#IOIS16	O

PC Card Memory Mode			PC Card I/O Mode			True IDE Mode		
34	GND		34	GND		34	GND	
35	GND		35	GND		35	GND	
36	#CD1	O	36	#CD1	O	36	#CD1	O
37	D11	I/O	37	D11	I/O	37	D11	I/O
38	D12	I/O	38	D12	I/O	38	D12	I/O
39	D13	I/O	39	D13	I/O	39	D13	I/O
40	D14	I/O	40	D14	I/O	40	D14	I/O
41	D15	I/O	41	D15	I/O	41	D15	I/O
42	#CE2	I	42	#CE2	I	42	#CS2	I
43	#VS1	O	43	#VS1	O	43	#VS1	O
44	RESERVED		44	#IORD	I	44	#IORD	I
45	RESERVED		45	#IOWR	I	45	#IOWR	I
46	----		46	----		46	----	
47	----		47	----		47	----	
48	----		48	----		48	----	
49	----		49	----		49	----	
50	----		50	----		50	----	
51	VCC		51	VCC		51	VCC	
52	----		52	----		52	----	
53	----		53	----		53	----	
54	----		54	----		54	----	
55	----		55	----		55	----	
56	#CSEL	I	56	#CSEL	I	56	#CSEL	I
57	#VS2	O	57	#VS2	O	57	#VS2	O
58	RESET	I	58	RESET	I	58	#RESET	I
59	#WAIT	O	59	#WAIT	O	59	IORDY	O
60	RESERVED		60	#INPACK	O	60	#INPACK	O
61	#REG	I	61	#REG	I	61	#REG	I
62	BVD2	I/O	62	#SPKR	I/O	62	#DASP	I/O
63	BVD1	I/O	63	#STSCHG	I/O	63	#PDIAG	I/O
64	D08	I/O	64	D08	I/O	64	D08	I/O
65	D09	I/O	65	D09	I/O	65	D09	I/O
66	D10	I/O	66	D10	I/O	66	D10	I/O
67	#CD2	O	67	#CD2	O	67	#CD2	O
68	GND		68	GND		68	GND	

7.2 Signal Description

Signal Name	Description	I/O	Pin
A0-A10 (PC Card Memory Mode)	These address lines along with the #REG signal are used to select the following: The I/O port address registers within the adapter.	I	8,11,12, 22,23,24, 25,26,27, 28,29
A0-A10 (PC Card I/O Mode)	This signal is the same as the PC Card Memory Mode signal.		
A0-A2 (True IDE Mode)	In True IDE Mode only A0-A2 are used to select the one of eight registers in the ATA Task File, the other address lines should be grounded.		
BVD1 (PC Card Memory Mode)	This signal is asserted high as the BVD1 signal since a battery is not used with this adapter.	I/O	63
#STSCHG (PC Card I/O Mode)	This signal is asserted low to alert the host to changes in the RDY/#BSY and Write Protect states, while the I/O interface is configured. It is controlled by the Card Configure and Status Register.		
#PDIAG (True IDE Mode)	In the True IDE Mode, this I/O is the Pass Diagnostic signal in the Master/Slave handshake protocol.		
BVD2 (PC Card Memory Mode)	This signal is always driven to a high state in Memory Mode since a battery is not required for this adapter.	I/O	62
#SPKR (PC Card I/O Mode)	This signal is always driven to a high state in I/O Mode since this adapter does not support the audio function.		
#DASP (True IDE Mode)	In the True IDE Mode, this I/O is the Disk Active/Slave Present signal in the Master/Slave handshake protocol.		
#CD1, #CD2 (PC Card Memory Mode)	These Card Detect pins are connected to ground on this adapter.	O	36,67
#CD1, #CD2 (PC Card I/O Mode)	They are used to determine if the adapter is fully inserted into the socket.		
#CD1, #CD2 (True IDE Mode)			

Signal Name	Description	I/O	Pin
#CE1,#CE2 (PC Card Memory Mode)	These signals are used both to select the adapter and to indicate to the adapter whether a byte or a word operation is being performed. #CE2 always accesses the odd byte of the word. #CE1 accesses the even byte or the odd byte of the word depending on A0 and #CE2.	I	7,42
#CE1,#CE2 (PC Card I/O Mode)			
#CS1,#CS2 (True IDE Mode)			
#CSEL (PC Card Memory Mode)	This signal is not used for this mode.	I	56
#CSEL (PC Card I/O Mode)	This signal is not used of this mode.		
#CSEL (True IDE Mode)	This internally pulled up signal is used to configure this adapter as a Master or a Slave. When this pin is grounded, this adapter is Master. When this pin is open, this adapter is Slave.		
D0-D15 (PC Card Memory Mode)	These lines carry the Data, Commands and Status between the host and controller. D00 is the LSB of the even byte of the word. D08 is the LSB of the odd byte of the word.	I/O	41,40,39, 38,37,66, 65,64,6,5, 4,3,2,32, 31,30
D0-D15 (PC Card I/O Mode)			
D0-D15 (True IDE Mode)			
GND (PC Card Memory Mode)	Ground.		1,34,35,68
GND (PC Card I/O Mode)			
GND (True IDE Mode)			
RESERVED (PC Card Memory Mode)	This signal is not used in this mode.	O	60

Signal Name	Description	I/O	Pin
#INPACK (PC Card I/O Mode)	The Input Acknowledge signal is asserted by the adapter when the adapter is selected and responding to an I/O read cycle at the address that is on the address bus.		
#INPACK (True IDE Mode)	In the True IDE mode, this signal is not used.		
RESERVED (PC Card Memory Mode)	This signal is not used in this mode.	I	44
#IORD (PC Card I/O Mode)	This is an I/O Read strobe generated by the host. This signal gates I/O data onto the bus from the adapter when the adapter is configured to use the I/O interface.		
#IORD (True IDE Mode)	In the True IDE mode, the signal is the same as the I/O Mode.		
RESERVED (PC Card Memory Mode)	This signal is not used in this mode.	I	45
#IOWR (PC Card I/O Mode)	The I/O Write strobe is used to clock I/O data on the Data bus into the adapter controller registers when the adapter is configured to use the I/O interface.		
#IOWR (True IDE Mode)	In the True IDE Mode, this signal is the same as the I/O mode.		
#OE (PC Card Memory Mode)	This is an Output Enable Strobe generated by the host interface. It is used to read data from the adapter in Memory Mode and to read CIS and configuration registers.	I	9
#OE (PC Card I/O Mode)	In I/O Mode, this signal is used to read the CIS and configuration registers.		
#ATASEL (True IDE Mode)	To enable True IDE Mode, this signal should be grounded by the host.		
RDY/#BSY (PC Card Memory Mode)	In the Memory Mode, this signal is set high when adapter is ready to accept a new data transfer operation and held low when the card is busy.	O	16

Signal Name	Description	I/O	Pin
#IREQ (PC Card I/O Mode)	I/O Operation. After the adapter has been configured for I/O Mode, this signal is used as Interrupt Request.		
INTRQ (True IDE Mode)	In the True IDE Mode, this signal is the active high Interrupt Request to the host.		
#REG (PC Card Memory Mode)	This signal is used during Memory Cycle to distinguish between Common Memory and Attribute Memory accesses. High for Common	I	61
#REG (PC Card I/O Mode)	Memory and Low for Attribute Memory. This signal must be low during I/O Cycles when the I/O address is on the Bus.		
#REG (True IDE Mode)	In the True IDE Mode, this signal is not used and should be connected to VCC by the host.		
RESET (PC Card Memory Mode)	When the signal is high, the signal Resets the adapter.	I	58
RESET (PC Card I/O Mode)			
#RESET (True IDE Mode)	In the True IDE Mode, the signal is the active low hardware reset from the host.		
VCC (PC Card Memory Mode)	5V , 3.3V		17,51
VCC (PC Card I/O Mode)			
VCC (True IDE Mode)			
#VS1,#VS2 (PC Card Memory Mode)	Voltage Sense Signals.	O	43,57
#VS1,#VS2 (PC Card I/O Mode)			
#VS1,#VS2 (True IDE Mode)			
#WAIT (PC Card Memory Mode)	This signal is driven low by the adapter to notice the host to delay completion of the a memory of I/O cycle that is in progress.	O	59
#WAIT (PC Card I/O Mode)			

Signal Name	Description	I/O	Pin
IORDY (True IDE Mode)	In the True IDE Mode, this signal may be used as IORDY.		
#WE (PC Card Memory Mode)	This signal is driven by the host and used for generating memory write cycle to the registers of the adapter when the adapter is configured in the Memory mode.	I	15
#WE (PC Card I/O Mode)	In I/O mode, this signal is used for writing the configuration registers.		
#WE (True IDE Mode)	In the True IDE Mode, this signal is not used and should be connected to VCC by the host.		
WP (PC Card Memory Mode)	Memory Mode, the adapter doesn't have a write protect switch. This signal is held low.	O	33
#IOIS16 (PC Card I/O Mode)	I/O Mode, A low signal indicates that a 16 bits or odd byte only operation can be performed by the addressed port.		
#IOIS16 (True IDE Mode)	In the True IDE Mode, this signal is asserted low when this device is expecting a word data transfer cycle.		