



General Description

Unity Digital's flash storage products adhere to the latest industry compliance and regulatory standards including UL, FCC, and RoHS. Each device incorporates a state-of-the-art flash memory controller that provides the greatest flexibility to customer applications while supporting key flash management features that provides reliable, long-term solutions for embedded storage applications.

Key Features:

- Fully compliant to CompactFlash™ 3.0 and 4.1 specifications
- Supports IDE PIO modes 0-6 and UDMA modes 0-6
- Sustained Read up to 45MB/s and Sustained Write up to 35 MB/s
- Two Direct Flash Access (DFA) channels with 8 chip-enabled pins per channel
- Supports two plane interleaving to maximize performance
- 13/24b 1KB BCH Error Correcting Code (ECC)
- Supports high performance, industrial grade Single Level Cell (SLC) Technologies
- In-System Programming (ISP) provides flexibility for new flash and device compatibility support.
- Global Wear Leveling
- Automatic power-down during wait periods, power saving including automatic wake-up and sleep mode
- Sophisticated block management and wear leveling algorithms dramatically enhance flash memory endurance
- Lifecycle management feature allows users to monitor the device's block management

Unity Digital's Bronze-2 CF products are for applications requiring solid performance and reliability in embedded applications. The rugged industrial design combined with temperature testing and adherence to rigid JEDEC JESD22 standards ensures flawless execution in typical industrial environments. In addition to custom hardware and firmware designs, Unity Digital also offers value-added services:

- Custom labeling and packaging
- Custom software imaging and ID strings
- Full BOM control and product change notification

Storage Capacities: 256MB, 512MB, 1GB, 2GB, 4GB, 8GB, 16GB, 32GB



Environmental Conditions:

- Operating temperature:
 - Commercial: 0°C to 70°C
 - Industrial Temp: -40°C to 85°C
- Storage temperature: -55°C to 125°C

CF Compatibility:

- CFA standard 4.1 compliant
- 3.3V or 5.0V single power supply
- 50 pin connector with Type-I form factor
- 256 Bytes of attribute memory

Power consumption:

- 5V operation
 - Active mode:
 - Write operation: 28 mA (Typ.), 30 mA (Max.)
 - Read operation: 23 mA (Typ.), 30 mA (Max.)
 - Sleep mode: 2.0mA (max.)
- 3.3V operation
 - Active mode:
 - Write operation: 28 mA (Typ.), 30 mA (Max.)
 - Read operation: 23 mA (Typ.), 30 mA (Max.)
 - Sleep mode: 2.0mA (max.)

Interface modes

- PC card memory mode
- PC card I/O mode
- True IDE mode

Dimensions: Type I form factor: 36.4mm(L) x 42.8mm(W) x 3.3mm(H)

MTBF > 5,000,000 hours

High shock & vibration tolerance

Less than 1 Error in 10E+14 bits read

W/E Endurance: 4,000,000 write/erase cycles

Resistant to data corruption due to power loss

RoHS compliant



Part Numbering Information:

| Unity Digital Part Number | Physical Capacity |
|---------------------------|-------------------|
| UC256MB2xxxxxx | 256MB |
| UC512MB2xxxxxx | 512MB |
| UC1GB2xxxxxx | 1GB |
| UC2GB2xxxxxx | 2GB |
| UC4GB2xxxxxx | 4GB |
| UC8GB2xxxxxx | 8GB |
| UC16GB2xxxxxx | 16GB |

| <u>UD</u> | <u>Form Factor</u> | <u>Capacity</u> | <u>Product Family</u> | <u>NAND Type</u> | <u>Chip Density</u> | <u>#Channel/Speed</u> |
|------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------|
| U: Unity Digital | C: CF | 256M: 256MByte 512M: 512MByte 1G: 1GByte 2G: 2GByte 4G: 4GByte 8G: 8GByte 16G: 16GByte 32G: 32GByte | B2: Bronze S: Silver G: Gold | 1: MLC 2: SLC | 3: 1Gb 4: 2Gb 5: 4Gb 6: 8Gb 7: 16Gb 8: 32Gb 9: 64Gb | S1: Single (1)-Std. Speed D1: Dual (2)-High Speed D2: Dual (4)-High Speed |

NAND Manufacturer

M: Micron
S: Samsung
T: Toshiba
I: Intel
H: Hynix
Z: Spansion

Programming Mode

M: PC Card Memory, I Temp (-40C ~ +85C)
N: PC Card Memory, C Temp (0C ~ +70C)


Environmental Characterization

| Item | Performance |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Cycle | JEDEC - JESD STD A104 Temp condition N (-40°C to 85 °C) and soak mode 3; 200 cycles |
| Humidity | MIL-STD 810F, Method 507.4, Paragraph 4.5.2 - 10 day test per figure 507.4-1, 10 day test |
| Vibration | MIL-STD 810F, Method 514.5, procedure 1, category 24, 1 hour per axis |
| Shock | MIL-STD 810F, Method 516.5, procedure 1, non-operational, 40g, SRS functional shock for ground equipment, three (3) shock per axis (positive or negative) JEDEC- JESD22-B, 104A, test condition B, 1500g pulse, 0.5 msec |
| Altitude | MIL-STD 810F, Method 500.4, procedure II, modified to 80,000 ft and non-operation 1 hr test duration at altitude. |

Product Reliability

| Item | Value |
|-------------------------|-----------------------------------------------|
| MTBF(@25°C) | > 4,000,000 Hours |
| Data Reliability | < 1 Non-Recoverable Error in 10E+14 Bits Read |
| Endurance | > 4,000,000 write/erase cycles |

Product Performance*

| Item | Performance (PIO mode 6) |
|------------------------------------------------|--------------------------|
| Read Transfer Rate | (Typical) 40MB/s |
| Write Transfer Rate | (Typical) 35MB/s |
| Burst Transfer Rate | Up to 40MB/s |
| Controller Overhead (Command to DRQ) | 1ms typical, 5ms (max) |

***Performance will vary depending on application**



DC Electrical Characteristics

| Symbol | Parameter | Min | Max | Units | Notes |
|-----------------|-------------------------------|-------|---------|-------|--------|
| V _{IL} | LOW Voltage | -0.30 | 0.80 | V | |
| V _{IH} | Input HIGH Voltage | 2.00 | VCC+0.3 | V | |
| V _{OL} | Output LOW Voltage | | 0.45 | V | at 4mA |
| V _{OH} | Output HIGH Voltage | 2.40 | | V | at 4mA |
| I _{CC} | Operating Current, VCC_R=5.0V | | | | |
| | Sleep Mode | | 0.20 | mA | |
| | Operating, 20 MHz | | 30.00 | mA | |
| I _{CC} | Operating Current, VCC_R=3.3V | | | | |
| | Sleep Mode | | 0.20 | mA | |
| | Operating, 20 MHz | | 30.00 | mA | |
| I _{LI} | Input Leakage Current | | ±10 | µA | |
| I _{LO} | Output Leakage Current | | ±10 | µA | |

**Attribute Memory Read and Write AC Characteristics**

VCC = 5V ± 0.5V, 3.3 V ± 0.3V

| Symbol | Parameter | Min | Max | Units | Notes |
|------------------|-------------------------------------|-----|-----|-------|-------|
| t_{cR} | Read Cycle Time | 250 | | ns | |
| $t_{a(A)}$ | Address Access Time | | 250 | ns | |
| $t_{a(CE)}$ | Card Enable Access Time | | 250 | ns | |
| $t_{a(OE)}$ | Output Enable Access Time | | 125 | ns | |
| $t_{dis(CE)}$ | Output Disable time from CE | | 100 | ns | |
| $t_{dis(OE)}$ | Output Disable time from OE | | 100 | ns | |
| $t_{en(CE)}$ | Output Enable time from CE | 5 | | ns | |
| $t_{en(OE)}$ | Output Enable time from OE | 5 | | ns | |
| $t_{V(A)}$ | Data valid time from address change | 0 | | ns | |
| $t_{su(A)}$ | Address Setup Time | 30 | | ns | |
| $t_{h(A)}$ | Address Hold Time | 20 | | ns | |
| $t_{su(CE)}$ | Card Enable Setup Time | 2 | | ns | |
| $t_{h(CE)}$ | Card Enable Hold Time | 20 | | ns | |
| t_{cW} | Write Cycle Time | 250 | | ns | |
| $t_{W(WE)}$ | Write Pulse Time | 150 | | ns | |
| $t_{su(A-WEH)}$ | Address setup time for WE | 180 | | ns | |
| $t_{su(CE-WEH)}$ | Card Enable setup time for WE | 180 | | ns | |
| $t_{su(D-WEH)}$ | Data setup time for WE | 80 | | ns | |
| $t_{h(D)}$ | Data hold time | 30 | | ns | |
| $t_{dis(WE)}$ | Output disable time from WE | | 100 | ns | |
| $t_{en(WE)}$ | Output enable time from WE | 5 | | ns | |
| $t_{su(OE-WE)}$ | Output Enable setup time for WE | 10 | | ns | |
| $t_{h(OE-WE)}$ | Output Enable hold time from WE | 10 | | ns | |



Common Memory Read and Write AC Characteristics

| Symbol | Parameter | Min | Max | Units |
|------------------|-------------------------------------|-----|-----|-------|
| t_{cR} | Read Cycle Time | 150 | | ns |
| $t_{a(A)}$ | Address Access Time | | 150 | ns |
| $t_{a(CE)}$ | Card Enable Access Time | | 150 | ns |
| $t_{a(OE)}$ | Output Enable Access Time | | 75 | ns |
| $t_{dis(CE)}$ | Output Disable time from CE | | 75 | ns |
| $t_{dis(OE)}$ | Output Disable time from OE | | 75 | ns |
| $t_{en(CE)}$ | Output Enable time from CE | 5 | | ns |
| $t_{en(OE)}$ | Output Enable time from OE | 5 | | ns |
| $t_{V(A)}$ | Data valid time from address change | 0 | | ns |
| $t_{su(A)}$ | Address Setup Time | 20 | | ns |
| $t_{h(A)}$ | Address Hold Time | 20 | | ns |
| $t_{su(CE)}$ | Card Enable Setup Time | 0 | | ns |
| $t_{h(CE)}$ | Card Enable Hold Time | 20 | | ns |
| t_{cW} | Write Cycle Time | 150 | | ns |
| $t_{w(WE)}$ | Write Pulse Time | 80 | | ns |
| $t_{su(A-WEH)}$ | Address setup time for WE | 100 | | ns |
| $t_{su(CE-WEH)}$ | Card Enable setup time for WE | 100 | | ns |
| $t_{su(D-WEH)}$ | Data setup time for WE | 50 | | ns |
| $t_{h(D)}$ | Data hold time | 20 | | ns |
| $t_{rec(WE)}$ | Write recovery time | 20 | | ns |
| $t_{dis(WE)}$ | Output disable time from WE | | 75 | ns |
| $t_{en(WE)}$ | Output enable time from WE | 5 | | ns |
| $t_{su(OE-WE)}$ | Output Enable setup time for WE | 10 | | ns |
| $t_{h(OE-WE)}$ | Output Enable hold time from WE | 10 | | ns |

**I/O Access Read and Write AC Characteristic**

| Symbol | Parameter | Min | Max | Units |
|---------------------|-----------------------------------|-----|-----|-------|
| $t_{d(IORD)}$ | Data Delay after IORD | | 100 | ns |
| $t_{h(IORD)}$ | Data Hold following IORD | 0 | | ns |
| $t_{w(IORD)}$ | IORD pulse width | 165 | | ns |
| $t_{suA(IORD)}$ | Address setup time for IORD | 70 | | ns |
| $t_{hA(IORD)}$ | Address hold time for IORD | 20 | | ns |
| $t_{suCE(IORD)}$ | Card Enable setup time for IORD | 5 | | ns |
| $t_{hCE(IORD)}$ | Card Enable hold time from IORD | 20 | | ns |
| $t_{suREG(IORD)}$ | REG setup time for IORD | 5 | | ns |
| $t_{hREG(IORD)}$ | REG Hold time from IORD | 0 | | ns |
| $t_{dfI NP(IORD)}$ | INPACK delay falling from IORD | 0 | 45 | ns |
| $t_{drINP(IORD)}$ | INPACK delay rising from IORD | | 45 | ns |
| $t_{dfI O16(IORD)}$ | IOIS16 delay falling from address | | 35 | ns |
| $t_{drIO16(IORD)}$ | IOIS16 delay rising from address | | 35 | ns |
| $t_{su(IOWR)}$ | Data setup time for IOWR | 60 | | ns |
| $t_{h(IOWR)}$ | Data hold time from IOWR | 30 | | ns |
| $t_{w(IOWR)}$ | IOWR pulse width | 165 | | ns |
| $t_{suA(IOWR)}$ | Address setup time for IOWR | 70 | | ns |
| $t_{hA(IOWR)}$ | Address hold time from IOWR | 20 | | ns |
| $t_{suCE(IOWR)}$ | Card Enable setup time for IOWR | 5 | | ns |
| $t_{hCE(IOWR)}$ | Card Enable hold time from IOWR | 20 | | ns |
| $t_{suREG(IOWR)}$ | REG setup time for IOWR | 5 | | ns |
| $t_{hREG(IOWR)}$ | REG hold time from IOWR | 0 | | ns |



True-IDE Mode I/O Access Read and Write AC Characteristics

| Symbol | Parameter | Min | Max | Units |
|-----------------|----------------------------------|-----|-----|-------|
| t_{cR} | Cycle time | 120 | | ns |
| t_{suA} | Address setup time for IORD/IOWR | 25 | | ns |
| t_{hA} | Address hold time from IORD/IOWR | 10 | | ns |
| t_w | IORD/IOWR recovery time | 70 | | ns |
| t_{rec} | IORD/IOWR recovery time | 25 | | ns |
| $t_{suD(IORD)}$ | Data setup time for IORD | 20 | | ns |
| $t_{hD(IORD)}$ | Data hold time for IORD | 5 | | ns |
| $t_{dis(IORD)}$ | Output disable time from IORD | | 30 | ns |
| $t_{suD(IOWR)}$ | Data setup time for IOWR | 20 | | ns |
| $t_{hD(IOWR)}$ | Data hold following IOWR | 10 | | ns |
| | | | | |


Pin Assignments & Pin Type

| Pin No. | PC Card Memory Mode | | | PC Card I/O Mode | | | True IDE Mode | | |
|---------|---------------------|----------|----------|--------------------|----------|----------|---------------------|----------|----------|
| | Signal Name | Pin Type | I/OType | Signal Name | Pin Type | I/OType | Signal Name | Pin Type | I/OType |
| 1 | GND | | Ground | GND | | Ground | GND | | Ground |
| 2 | D03 | I/O | I1Z, OZ3 | D03 | I/O | I1Z, OZ3 | D03 | I/O | I1Z, OZ3 |
| 3 | D04 | I/O | I1Z, OZ3 | D04 | I/O | I1Z, OZ3 | D04 | I/O | I1Z, OZ3 |
| 4 | D05 | I/O | I1Z, OZ3 | D05 | I/O | I1Z, OZ3 | D05 | I/O | I1Z, OZ3 |
| 5 | D06 | I/O | I1Z, OZ3 | D06 | I/O | I1Z, OZ3 | D06 | I/O | I1Z, OZ3 |
| 6 | D07 | I/O | I1Z, OZ3 | D07 | I/O | I1Z, OZ3 | D07 | I/O | I1Z, OZ3 |
| 7 | -CE1 | I | I3U | -CE1 | I | I3U | -CS0 | I | I3U |
| 8 | A10 | I | I2I | A10 | I | I2I | A10 ² | I | I2I |
| 9 | -OE | I | IU3 | -OE | I | IU3 | -ATA SEL | I | IU3 |
| 10 | A09 | I | I1Z | A09 | I | I1Z | A09 ² | I | I1Z |
| 11 | A08 | I | I1Z | A08 | I | I1Z | A08 ² | I | I1Z |
| 12 | A07 | I | I1Z | A07 | I | I1Z | A07 ² | I | I1Z |
| 13 | V _{CC} | | Power | V _{CC} | | Power | V _{CC} | | Power |
| 14 | A06 | I | I1Z | A06 | I | I1Z | A06 ² | I | I1Z |
| 15 | A05 | I | I1Z | A05 | I | I1Z | A05 ² | I | I1Z |
| 16 | A04 | I | I1Z | A04 | I | I1Z | A04 ² | I | I1Z |
| 17 | A03 | I | I1Z | A03 | I | I1Z | A03 ² | I | I1Z |
| 18 | A02 | I | I1Z | A02 | I | I1Z | A02 | I | I1Z |
| 19 | A01 | I | I1Z | A01 | I | I1Z | A01 | I | I1Z |
| 20 | A00 | I | I1Z | A00 | I | I1Z | A00 | I | I1Z |
| 21 | D00 | I | I1Z, OZ3 | D00 | I | I1Z, OZ3 | D00 | I | I1Z, OZ3 |
| 22 | D01 | I | I1Z, OZ3 | D01 | I | I1Z, OZ3 | D01 | I | I1Z, OZ3 |
| 23 | D02 | I | I1Z, OZ3 | D02 | I | I1Z, OZ3 | D02 | I | I1Z, OZ3 |
| 24 | WP | O | OT3 | -IOIS16 | O | OT3 | -IOIS16 | O | ON3 |
| 25 | -CD2 | O | Ground | -CD2 | O | Ground | -CD2 | O | Ground |
| 26 | -CD1 | O | Ground | -CD1 | O | Ground | -CD1 | O | Ground |
| 27 | D11 ¹ | I/O | I1Z, OZ3 | D11 ¹ | I/O | I1Z, OZ3 | D11 ¹ | I/O | I1Z, OZ3 |
| 28 | D12 ¹ | I/O | I1Z, OZ3 | D12 ¹ | I/O | I1Z, OZ3 | D12 ¹ | I/O | I1Z, OZ3 |
| 29 | D13 ¹ | I/O | I1Z, OZ3 | D13 ¹ | I/O | I1Z, OZ3 | D13 ¹ | I/O | I1Z, OZ3 |
| 30 | D14 ¹ | I/O | I1Z, OZ3 | D14 ¹ | I/O | I1Z, OZ3 | D14 ¹ | I/O | I1Z, OZ3 |
| 31 | D15 ¹ | I/O | I1Z, OZ3 | D15 ¹ | I/O | I1Z, OZ3 | D15 ¹ | I/O | I1Z, OZ3 |
| 32 | -CE2 ¹ | I | I3U | -CE2 ¹ | I | I3U | -CS1 ¹ | I | I3Z |
| 33 | -VS1 | O | Ground | -VS1 | O | Ground | -VS1 | O | Ground |
| 34 | -IORD | I | I3U | -IORD | I | I3U | -IORD | I | I3Z |
| 35 | -IOWR | I | I3U | -IOWR | I | I3U | -IOWR | I | I3Z |
| 36 | -WE | I | I3U | -WE | I | I3U | -WE ³ | I | I3U |
| 37 | RDY | O | OT1 | IREQ | O | OT1 | IREQ | O | OZ1 |
| 38 | V _{CC} | | Power | V _{CC} | | Power | V _{CC} | | Power |
| 39 | -CSEL ⁴ | I | I2Z | -CSEL ⁴ | I | I2Z | -CSEL | I | I2U |
| 40 | -VS2 | O | OPEN | -VS2 | O | OPEN | -VS2 | O | OPEN |
| 41 | RESET | I | I2Z | RESET | I | I2Z | RESET | I | I2Z |
| 42 | -WAIT | O | OT1 | -WAIT | O | OT1 | -IORDY | O | ON1 |
| 43 | -INPACK | O | OT1 | -INPACK | O | OT1 | DMARQ | O | OZ1 |
| 44 | -REG | I | I3U | -REG | I | I3U | -DMACK ⁵ | I | I3U |
| 45 | BVD ² | O | OT1 | -SPKR | I/O | OT1 | -DASP | I/O | I1U,ON1 |
| 46 | BVD ¹ | O | OT1 | -STSCHG | I/O | OT1 | PDIAG | I/O | I1U,ON1 |
| 47 | DO8 ¹ | I/O | I1Z, OZ3 | DO8 ¹ | I/O | I1Z, OZ3 | DO8 ¹ | I/O | I1Z, OZ3 |
| 48 | DO9 ¹ | I/O | I1Z, OZ3 | DO9 ¹ | I/O | I1Z, OZ3 | DO9 ¹ | I/O | I1Z, OZ3 |
| 49 | D10 ¹ | I/O | I1Z, OZ3 | D10 ¹ | I/O | I1Z, OZ3 | D10 ¹ | I/O | I1Z, OZ3 |
| 50 | GND | | Ground | GND | | Ground | GND | | Ground |

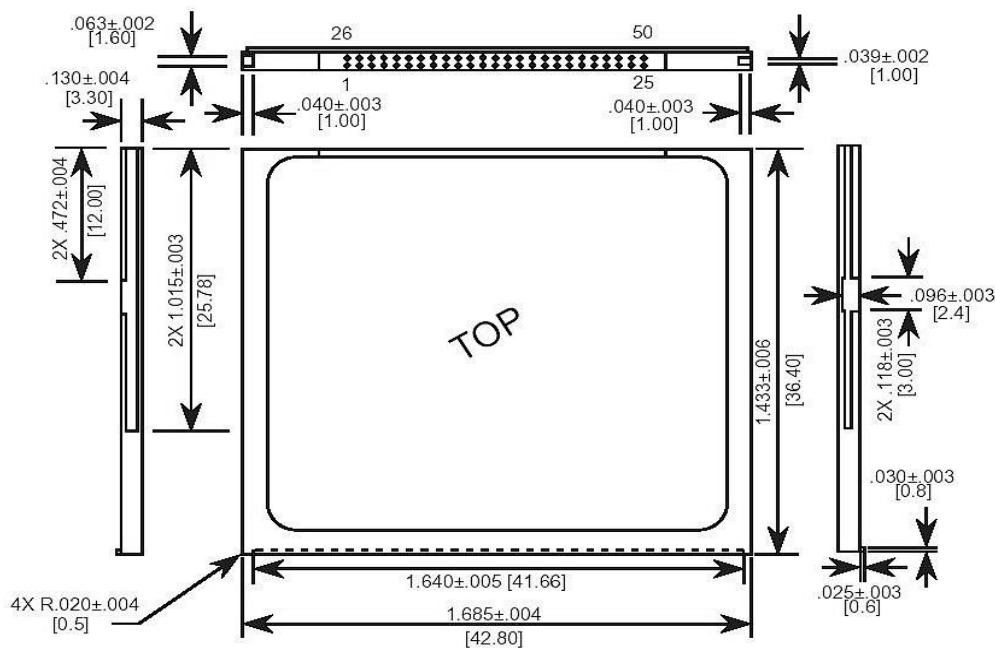


- Note:
1. These signals are required only for 16-bit access and are not required when installed in 8-bit systems. Devices should allow for 3-state signals not to consume current.
 2. Should be grounded by the host system.
 3. Should be tied to VCC by the host system.
 4. The -CSEL signal is ignored by the drive in PC Card modes. However, because it is not pulled up on the drive in these modes, it should not be left floating by the host in PC Card modes; the pin should be connected by the host to PC Card A25 or grounded by the host.
 5. If DMA operations are not used, the signal should be held high or tied to VCC by the host. For proper operation in older hosts, while DMA operations are not active, the drive shall ignore the signal, including a floating condition.

Physical Specifications

Table : Physical Specifications

| | |
|-------------------|----------------------------------------------------------|
| Weight: | 11.4 g (0.40 oz) typical, 14.2 g (0.50 oz) maximum |
| Length: | 36.40 ± 0.15 mm (1.433 ± 0.006 in) |
| Width: | 42.80 ± 0.10 mm (1.685 ± 0.004 in) |
| Thickness: | 3.3 ± 0.10 mm (0.13 ± 0.004 in) – Excluding Lip |





| Signal Name | Dir. | Pin | Description |
|----------------------------------------------|------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A10-A0 (PC Card Memory Mode) | I | 8, 10, 11, 12, 14,15,16,17,18,19,20 | These address lines along with the -REG signal are used to select the following: The I/O port address registers within the storage card or CF Drive, the memory mapped port address registers within the storage card or CF Drive. A byte in the drive's information structure and its configuration control and status registers. |
| A10-A0 (PC Card I/O Mode) | | | This signal is the same as the PC Card Memory Mode signal. |
| A2 - A0 (True IDE Mode) | | | 18, 19, 20 |
| BVD1 (PC Card Memory Mode) | I/O | 46 | This signal is asserted high, as BVD1 is not supported. |
| -STSCHG (PC Card I/O Mode) Status Changed | | | This signal is asserted low to alert the host to changes in the READY and Write Protect states, while the I/O interface is configured. Its use is controlled by the Card Config and Status Register. |
| -PDIAG (True IDE Mode) | | | In the True IDE Mode, this input / output is the Pass Diagnostic signal in the Master / Slave handshake protocol. |
| BVD2 (PC Card Memory Mode) | I/O | 45 | This signal is asserted high, as BVD2 is not supported. |
| -SPKR (PC Card I/O Mode) | | | This line is the Binary Audio out put from the drive. If the drive does not support the Binary Audio function, this line should be held negated. |
| -DASP (True IDE Mode) | | | In the True IDE Mode, this input/output is the Disk Active/Slave Present signal in the Master/Slave handshake protocol. |
| -CD1, -CD2 (PC Card Memory Mode) | O | 26,25 | These Card Detect pins are connected to ground on the storage card or CF Card. They are used by the host to determine that the storage card or CF Drive is fully inserted into its socket. |
| -CD1, -CD2 (PC Card I/O Mode) | | | This signal is the same for all modes. |
| -CD1, -CD2 (True IDE Mode) | | | This signal is the same for all modes. |
| -CE1, -CE2 (PC Card Memory Mode) Card Enable | I | 7,32 | These input signals are used both to select the drive and to indicate to the drive 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. A multiplexing scheme based on A0, -CE1, -CE2 allows 8-bit hosts to access all data on D0-D7. |
| -CE1, -CE2 (PC Card I/O Mode) Card Enable | | | This signal is the same as the PC Card Memory Mode signal. |
| -CS0, CS1 (True IDE Mode) | | | In the True IDE Mode, -CS0 is the chip select for the task file registers while -CS1 is used to select the Alternative Status Register and the Device Control Register. While -DMACK is asserted, -CS0 and -CS1 shall be held negated and the width of the transfers shall be 16 bits. |
| -CSEL (PC Card Memory Mode) | I | 39 | This signal is not used for this mode, but should be connected by the host to PC Card A25 or grounded by the host. |
| -CSEL (PC Card I/O Mode) | | | This signal is not used for this mode, but should be connected by the host to PC Card A25 or grounded by the host. |
| -CSEL (True IDE Mode) | | | This internally pulled up signal is used to configure this device as a Master or a Slave when configured in the True IDE Mode. When this pin is grounded, this device is configured as a Master. When the pin is open, this device is configured as a Slave. |



| Signal Name | Dir. | Pin | Description |
|----------------------------------------------|------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D15 - D00 (PC Card Memory Mode) | I/O | 31, 30, 29, 28, 27, 49, 48, 47, 6, 5, 4, 3, 2, 23, 22, 21 | These lines carry the Data, Commands and Status information between the host and the controller . D00 is the LSB of the Even Byte of the Word. D08 is the LSB of the Odd Byte of the Word. |
| D15 - D00 (PC Card I/O Mode) | | | This signal is the same as the PC Card Memory Mode signal. |
| D15 - D00 (True IDE Mode) | | | In True IDE Mode, all Task File operations occur in byte mode on the low order bus D[7:0] while all data transfers are 16 bit using D[15:0]. |
| GND (PC Card Memory Mode) | - | 1, 50 | Ground |
| GND (PC Card I/O Mode) | | | The signal is the same for all modes |
| GND (True IDE Mode) | | | The signal is the same for all modes |
| -INPACK (PC Card Memory Mode) | O | 43 | This signal is the same for all modes |
| -INPACK (PC Card I/O Mode) Input Acknowledge | | | The input Acknowledge signal is asserted by the storage drive or CF drive when the drive is selected and responding to an I/O read cycle at the address that is on the address bus. This signal is used by the host to control the enable of any input data buffers between the storage drive or CF drive and the CPU. |
| DMARQ (True IDE Mode) | | | This signal is a DMA Request that is used for DMA data transfers between host and device. It shall be asserted by the device when it is ready to transfer data to or from the host. For Multiword DMA transfers, the direction of data transfer is controlled by -DIOR and -DIOW. This signal is used in a handshake manner with -DMACK, i.e., the device shall wait until the host asserts -DMACK before negating DMARQ, and re asserting DMARQ if there is more data to transfer. While a DMA operation is in progress, -CS0 and -CS1 shall be held negated and the width of the transfers shall be 16 bits. If there is no hardware support for DMA mode in the host, this output signal is not used and should not be connected at the host. In this case, the BIOS must report that DMA mode is not supported by the host so that device drivers will not attempt DMA mode. A host that does not support DMA mode and implements both PCMCIA and True IDE modes of operation need not alter the PCMCIA mode connections while in True IDE mode as long as this does not prevent proper operation in any mode. |
| -IORD (PC Card Memory Mode) | I | 34 | This signal is not used in this mode |
| -IORD (PC Card I/O Mode) | | | This is an I/O strobe generated by the host. This signal gates I/O data onto the bus from the storage drive or CF drive when the drive is configured to use the I/O interface |
| -IORD (True IDE Mode) | | | In True IDE Mode, this signal has the same function as in PC Card I/O Mode. |



| Signal Name | Dir. | Pin | Description |
|-----------------------------|------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -IOWR (PC Card Memory Mode) | I | 35 | This signal is not used in this mode |
| -IOWR (PC Card I/O Mode) | | | The I/O Write strobe pulse is used to clock I/O data on the Card Data bus into the storage card or CF Drive controller registers when the storage drive or CF drive is configured to use the I/O interface. The clocking shall occur on the negative to positive edge of the signal (trailing edge). |
| -IOWR (True IDE Mode) | | | In True IDE Mode, this signal has the same function as in PC Card I/O Mode. |
| -OE (PC Card Memory Mode) | I | 9 | This is an Output Enable strobe generated by the host interface. It is used to read data from the storage card or CF drive in Memory Mode and to read the CIS and configuration registers. |
| -OE (PC Card I/O Mode) | | | In PC Card I/O Mode, this signal is used to read the CIS and configuration registers. |
| -ATA SEL (True IDE Mode) | | | To enable True IDE Mode this input should be grounded by the host. |
| Ready (PC Card Memory Mode) | O | 37 | In Memory Mode, this signal is set high when the storage card or CF drive is ready to accept a new data transfer operation and is held low when the drive is busy. At power up and at Reset, the READY signal is held low (busy) until the storage card or CF drive has completed its power up or reset function. No access of any type should be made to the storage card or CF drive during this time. Note, however, that when a drive is powered up and used with RESET continuously disconnected or asserted, the Reset function of the RESET pin is disabled. Consequently, the continuous assertion of RESET from the application of power shall not cause the READY signal to remain continuously in the busy state. |
| -IREQ (PC Card I/O Mode) | | | I/O Operation – After the storage drive or CF drive has been configured for I/O operation, this signal is used as -Interrupt Request. This line is strobed low to generate a pulse mode interrupt or held low for a level mode interrupt. |
| INTRQ | | | In True IDE Mode signal is the active high Interrupt Request to the host. |
| -REG (PC Card Memory Mode) | I | 44 | This signal is used during Memory Cycles to distinguish between Common Memory and Register (Attribute) Memory accesses. High for Common Memory, Low for Attribute Memory. |
| -REG (PC Card I/O Mode) | | | The signal shall also be active (low) during I/O Cycles when the I/O address is on the Bus. |
| -DMACK (True IDE Mode) | | | This is a DMA Acknowledge signal that is asserted by the host in response to DMARQ to initiate DMA transfers. While DMA operations are not active, the drive shall ignore the -DMACK signal, including a floating condition. If DMA operation is not supported by a True IDE Mode only host, this signal should be driven high or connected to VCC by the host. A host that does not support DMA mode and implements both PCMCIA and True IDE modes of operation need not alter the PCMCIA mode connections while in True IDE mode as long as this does not prevent proper operation all modes. |



| Signal Name | Dir. | Pin | Description |
|------------------------------------|------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RESET (PC Card Memory Mode) | I | 41 | The storage card or CF Card is Reset when the RESET pin is high with the following important exception: The host may leave the RESET pin open or keep it continually high from the application of power without causing a continuous Reset of the card. Under either of these conditions, the card shall emerge from power-up having completed an initial Reset. The storage card or CF Card is also Reset when the Soft Reset bit in the Card Configuration Option Register is set. |
| RESET (PC Card I/O Mode) | | | This signal is the same as the PC Card Memory Mode signal. |
| RESET (True IDE Mode) | | | In the True IDE Mode, this input pin is the active low hardware reset from the host. |
| VCC (PC Card Memory Mode) | | | +5 V, +3.3 V power. |
| VCC (PC Card I/O Mode) | - | 13, 38 | This signal is the same for all modes. |
| VCC (True IDE Mode) | | | This signal is the same for all modes. |
| -VS1 -VS2 (PC Card Memory Mode) | O | 33, 40 | Voltage Sense Signals. -VS1 is grounded on the Card and sensed by the Host so that the storage card or CF Card CIS can be read at 3.3 volts and -VS2 is reserved by PCMCIA for a secondary voltage and is not connected on the Card. |
| -VS1 -VS2 (PC Card I/O Mode) | | | This signal is the same for all modes. |
| -VS1 -VS2 (True IDE Mode) | | | This signal is the same for all modes. |
| -WAIT (PC Card Memory Mode) | O | 42 | The -WAIT signal is driven low by the storage card or CF Card to signal the host to delay completion of a memory or I/O cycle that is in progress. |
| -WAIT (PC Card I/O Mode) | | | This signal is the same as the PC Card Memory Mode signal. |
| IORDY (True IDE Mode) | | | In True IDE Mode, this output signal may be used as IORDY. |
| -WE (PC Card Memory Mode) | I | 36 | This is a signal driven by the host and used for strobing memory write data to the registers of the storage card or CF Card when the card is configured in the memory interface mode. It is also used for writing the configuration registers. |
| -WE (PC Card I/O Mode) | | | In PC Card I/O Mode, this signal is used for writing the configuration registers. |
| -WE (True IDE Mode) | | | In True IDE Mode, this input signal is not used and should be connected to VCC by the host. |
| WP (PC Card Memory Mode) | O | 24 | Memory Mode – storage card or CF Card does not have a write protect switch. This signal is held low after the completion of the reset initialization sequence. |
| -IOIS16 (PC Card I/O Mode) | | | I/O Operation – When the storage card or CF Card is configured for I/O Operation Pin 24 is used for the -I/O Selected is 16 Bit Port (-IOIS16) function. A Low signal indicates that a 16 bit or odd byte only operation can be performed at the addressed port. |



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